



2024-2025 SCHOOL OF GRADUATE STUDIES CATALOG





Table of Contents

Mission and Vision Statements, Accreditation, State Authorization, and Disclaimers	5
General Information.....	6
Admissions	7
Registration, Enrollment, and Grades	14
Academic Standards, Policies, and Degree Requirements.....	19
Financial Information	28
Graduate School Programs	31
Aging and Applied Thanatology	31
Biomedical Sciences-Dental School.....	32
Clinical Aspects of Hospice and Palliative Care	34
Clinical Informatics	35
Diversity Equity and Inclusion Leadership - MS	38
Forensic Medicine	39
Global Health	40
Global Health Monitoring and Evaluation	43
Global Health Systems	44
Graduate Program in Life Sciences	45
Biochemistry And Molecular Biology	45
Cellular and Molecular Biomedical Science	47
Epidemiology and Clinical Research	48
Epidemiology and Human Genetics	49
Gerontology - PhD	53
Gerontology - MS.....	54
Human Genetics and Genomic Medicine.....	56
Molecular Medicine	57
Molecular Microbiology and Immunology	60
Neuroscience	61
Physical Rehabilitation Science	62
Health Science.....	63
Health Professions Education - MS.....	66
Health Professions Education - PhD	67
Implementation and Dissemination Science.....	68
Integrative Health and Wellness.....	69
Intercultural Leadership	71
Leadership and Administration in Hospice and Palliative Care	72
Marine Estuarine Environmental Sciences.....	73
Medical and Research Technology	73
Medical Cannabis Science and Therapeutics	75
Medical Physics.....	76
Medical Science - DMSc.....	77
Nursing.....	79
Oral and Experimental Pathology	80
Palliative Care	82

Pathologists' Assistant Program.....	85
Pharmaceutical Health Services Research.....	87
Pharmaceutical Sciences	90
Pharmacometrics	91
Physician Assistant.....	92
Principles and Practice of Hospice and Palliative Care.....	94
Psychosocial/Spiritual Aspects of Hospice and Palliative Care	95
Regulatory Science.....	95
Research Administration	96
Global Research Ethics	97
Science Communication.....	98
Social Entrepreneurship	99
Social Work.....	100
Course Descriptions.....	102
AGNG.....	102
CIPP	102
DBMS	104
DEIL	107
DMSC	107
DPAT	108
ETHC.....	110
FMED	111
GERO.....	112
GLBH.....	114
GPLS.....	115
HGEN	124
HPE.....	126
INCL -	128
INFO	129
INNO -	130
MANA	134
MCST -	134
MEDT	136
MEES.....	138
MHS.....	138
MLL -	143
MP.....	143
MSPA.....	144
NURS -	144
PALC	148
PATH.....	152
PHAR.....	153
PHMX.....	157
PHSR	158
PREV	160
PTRS.....	167
REGS	169

SOWK -	169
THAN	179
TOXI.....	179
Administration	181
Faculty	182
Policies.....	183
Download and Print Catalog.....	191
Site Map.....	192
Index	194

Mission and Vision Statements, Accreditation, State Authorization, and Disclaimers

Mission

The mission of the Graduate School is to empower scholars, practitioners, and researchers to become agents of innovation and leaders of change through distinctive, relevant, and rigorous education.

Vision

The Graduate School aspires to be the global leader in health and biomedical graduate education and research by cultivating students who solve critical world problems.

Accreditation

The University of Maryland, Baltimore is accredited by the Middle States Commission on Higher Education. The Middle States Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

Middle States Commission on Higher Education
3624 Market St
Philadelphia, PA 19104
267-284-5000
www.msche.org

State Authorization

The Graduate School at the University of Maryland, Baltimore is authorized by the Maryland Higher Education Commission (MHEC), the State Licensing Authority, to confer degrees.

Maryland Higher Education Commission
6 North Liberty St., 10th Floor Baltimore, MD 21201
410-767-3300; 410-332-0270 (fax)
www.mhec.state.md.us

Disclaimer: Every effort is made to ensure that the information in this publication is accurate; however, information including phone numbers, web addresses, policies, and fees is subject to change subsequent to publishing. If you need this publication in an alternative form, please contact the Graduate School.

See UMB's *Notice of Nondiscrimination* in the [Policies](#) section of this catalog.

Special Note regarding delivery of instruction: In light of to the COVID 19 pandemic, UMB expects to return to some classroom and on-campus didactic instruction, consistent with safety standards, local and regional health conditions, and guidance of public authorities, in the academic year 2021-2022. UMB may supplement on-campus instruction with online and virtual learning opportunities as needed. Select labs, research assignments, experiential learning activities, clinical rotations and Performance Based Assessments (PBAs) will see a measured return to in-person, on-site practices as permitted by circumstances and UMB policies, and only after appropriate safety precautions are identified and implemented. For on-line learning, UMB will reformat the curriculum materials and teaching techniques as necessary to assure that coursework continues to meet the high standards set by UMB and to assure that all learning outcomes are achieved in accordance with accreditation standards and expectations.

General Information

Degrees Offered

PhD, MS, Postbaccalaureate Certificates

Location and Contact Information

Graduate School
University of Maryland, Baltimore
620 W. Lexington St.
Baltimore, MD 21201
410-706-7131; 410-706-3473 (fax)
gradinfo@umaryland.edu

The Graduate School

Graduate studies began at the Baltimore campus of the University of Maryland in 1918. Today, the Graduate School offers more than 50 degree programs in biomedical, health, human service, and life sciences at the postbaccalaureate certificate (PBC), Master of Science (MS) and Doctor of Philosophy (PhD) levels. Approximately half of these are self-supporting programs (the ‘Contemporary’ programs), exclusively delivered by Graduate School faculty, while others are affiliated with the University of Maryland schools of dentistry, medicine, nursing, pharmacy, and social work. The Graduate School also offers formal dual-degree programs with the University’s professional schools and facilitates interinstitutional studies and cooperative degree programs in several fields with other University System of Maryland (USM) campuses and graduate programs.

Our website, www.graduate.umaryland.edu, includes the *Graduate School Catalog*, program information, links to program and school web pages and email addresses, the online application for admission, and forms and policies for current graduate students.

University of Maryland, Baltimore

Opened in 1807, the University of Maryland, Baltimore (UMB) is Maryland’s public health, law, and human services university, dedicated to excellence in education, research, clinical care, and public service. UMB enrolls over 7,100 students in six nationally ranked professional schools — dentistry, law, medicine, nursing, pharmacy, and social work — and an interdisciplinary Graduate School. The University offers 80 doctoral, master’s, baccalaureate, and certificate programs and confers most of the professional practice doctoral degrees awarded in Maryland.

UMB is a thriving academic health center combining cutting-edge biomedical research and exceptional patient care. UMB’s extramural funding totaled \$688 million in Fiscal Year 2020, and each tenured/tenure-track faculty member brings \$1.5 million in research grants, on average, into UMB every year. Located in Baltimore, the campus consists of 71 acres with 6.5 million gross square feet of space in 62 buildings.

The University of Maryland Graduate School, Baltimore (UMGSB)

Created in 1985, UMGSB represents the combined graduate and research programs at the University of Maryland, Baltimore County (UMBC) and UMB — the University System of Maryland (USM) doctoral research campuses in the Baltimore area. Several joint programs with UMBC permit UMB graduate students to take advantage of the association of faculty and the wide variety of courses offered at UMBC. All UMB and UMBC graduate programs are reviewed by a joint Graduate Council of the UMGSB.

MPower

MPower is a strategic partnership between the University of Maryland, Baltimore (UMB) and the University of Maryland, College Park (UMCP) — to strengthen and serve the state of Maryland and its citizens. Since its creation in 2012, MPower has fostered hundreds of collaborations from across both institutions that are growing Maryland’s innovation economy, advancing interdisciplinary research, increasing educational benefits, and addressing the state’s most critical issues. The partnership is delivering on a vision of collaboration, innovation, and transformative impact across Maryland. The University of Maryland Strategic Partnership Act of 2016 strengthened and formalized the structured relationship between UMB and UMCP, and the law deepens the alliance and energizes UMB and UMCP to pursue even greater transformative change and impact.

Admissions

Integrity and Ethics Statement

The Graduate School at the University of Maryland, Baltimore, is committed to operating an admissions process with integrity that is also efficient, holistic, and fair. Graduate School application criteria, evaluation, and decisions are guided by appropriate and robust policies and practices in accordance with the principles and guidelines set forth by the Council of Graduate Schools (CGS) and the National Association of Graduate Admissions Professionals (NAGAP). The various admissions committees of the Graduate School conduct program-appropriate application reviews on the basis of multiple qualitative and quantitative factors. The various admissions committees seek to admit highly-qualified applicants who can contribute to the mission of UMB and of the Graduate School, as well as to the diversity of the student body. Application reviews are managed with honesty and integrity, free of bias and unlawful discrimination, by faculty with advanced degrees in the respective fields and by trained staff with current admissions knowledge and expertise.

Determination of Admissibility

Responsibility for admission to graduate study at the University of Maryland, Baltimore resides with the Office of the Dean, Graduate School. The Graduate School relies on recommendations from the degree-granting programs to determine the admissibility of applicants. The University of Maryland, Baltimore does not discriminate in its admissions, educational services, or supporting services because of race, religion, age, national origin, sex, sexual orientation, or disability.

Minimum Standards and Requirements

The minimum academic standard for full admission to the Graduate School is a B average, or 3.0 on a 4.0 scale, in a program resulting in the award of a bachelor's degree from a regionally accredited college or university, or an equivalent degree and standing from a comparable foreign institution. Standards for admission to a PhD program are generally higher than those for admission to a certificate or an MS program. Applicants also must document successful completion of undergraduate prerequisites for graduate study in the chosen field. Applicants must meet the minimum requirements set by the Graduate School and must meet departmental and/or program-specific requirements that may exceed the minimum.

Application Procedures and Required Items

The Graduate School requires a completed application for admission and transcripts of all prior undergraduate and graduate study. Additional, supplemental items are also required depending upon the degree level and the degree program:

In addition to the application for admission and transcripts, applicants to post-baccalaureate certificate programs must provide an essay/statement of goals, and curriculum vitae (CV) or resume. International applicants must provide acceptable results of the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exam.

In addition to the application for admission and transcripts, applicants to Master of Science degree programs must provide an essay/statement of goals, a curriculum vitae (CV) or resume, and three recommendations. Some MS programs also require results of the Graduate Record Examination (GRE) general aptitude test. International applicants must provide acceptable results of the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exam.

In addition to the application for admission and transcripts, applicants to doctoral research/PhD degree programs must provide an essay/statement of goals, a curriculum vitae (CV) or resume, and three recommendations. Some PhD programs also require results of the Graduate Record Examination (GRE) general aptitude test, and an interview. International applicants must provide acceptable results of the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exam.

Some programs require additional evidence of ability to succeed before granting admission. Such evidence may include an interview, an additional writing sample, or a GRE subject test, for example. Applicants should contact the office of the program to which they are applying about additional admission requirements.

The completed application form must be signed (hand signature or electronic certification) by the candidate for admission to receive consideration. A completed application file includes the application for admission and all accompanying documents/supplemental items required for the given degree program or status. It is the applicant's

responsibility to ensure that the Graduate School receives all required application materials. An incomplete application file, or applications for which there is no decision rendered following the start of application term, will be inactivated for the desired entry term. Failure to comply with all Graduate School and departmental or program requirements for admission, or failure to provide a completed application file by the published application deadline date, may result in the application being denied admission or not being considered.

Application Deadline Dates

Each graduate program has its own deadline date for submission of the completed application and accompanying documents. These dates are posted on the Graduate School website and are regularly published by the graduate programs. Students applying to programs that do not publish program-specific deadlines must adhere to the Graduate School's deadline dates. The Graduate School deadlines for the receipt of all application materials are to be followed:

- U.S. citizens and U.S.-educated permanent residents: July 1 for Fall semester and December 1 for Spring semester.
- International students: January 15 for Fall semester and May 1 of the prior year for Spring semester.
- Non-degree applicants: No later than two weeks before the start of the respective semester.

Admission to our graduate programs is highly competitive. For best consideration, applicants should submit accurate and complete credentials by the specified deadline. Applicants are encouraged to begin preparing their application files (collecting recommendations, obtaining transcripts, and taking standardized tests) well in advance of the published deadline dates.

Transcripts

Applicants must submit transcripts from each college/university attended, including coursework in progress at time of application. Unofficial copies may be provided for the application review process.

Admitted students must provide official transcripts from each college/university from which a degree was earned upon notification of admission. The transcript must be provided to the Graduate School directly from the prior, degree-granting institution in a sealed envelope in order for that document to be considered official. Alternatively, it may be provided to the Graduate School electronically by

way of a secure, encrypted platform. Each transcript should bear the signature of the registrar and the seal of the granting institution.

Admitted students must provide all required official documents including official transcripts from each college/university from which a degree was earned no later than the first day of the first term of enrollment at UMB. The UMB Graduate School reserves the right to rescind any offer of admission if discrepancies are found between uploaded/unofficial documents and the official documents, including test scores and transcripts.

Letters of Recommendation

Applicants to MS and PhD programs must provide three recommendations, preferably from professors or others who can attest to the quality of the applicant's academic performance and scholastic potential.

Recommendations are not required for applicants to postbaccalaureate certificate programs and those seeking approval to enroll on a nondegree or coursework-only basis.

Essay/Statement of Goals and Objectives

Applicants must write and submit a 300- to 500-word statement outlining their academic and/or professional goals and objectives in pursuing graduate study.

Standardized Test Scores

Some graduate programs require the submission of scores earned on the Graduate Record Examinations (GREs) general aptitude test. Information about registering for the GREs is available from the testing agency:

Graduate Record Examinations Educational Testing Service
Princeton, NJ 08540
609-771-7670
www.gre.org

The UMB Graduate School's GRE institution code number 5848. GRE department codes are published by ETS.

Official Score Reports and Time Limitations of Standardized Tests

Applicants for admission must have the respective testing agency — Educational Testing Service or the International English Language Testing System (IELTS) — provide the Graduate School with official score reports to be considered for admission. Candidates are encouraged to

verify the identification of the correct University of Maryland campus (UMB) upon selection of score routing.

Graduate Record Examinations must have been taken within five years of the start of the desired admission term, and English language proficiency exams — Test of English as a Foreign Language (TOEFL) or the IELTS exam — must have been taken within two years of the start of the desired admission term to be considered valid scores for admission consideration.

Transfer of Credit

[updated February 7, 2023]

The Graduate School does not accept transfer credit for postbaccalaureate certificate programs at UMB.

No more than 6 credits (or two courses) of graduate-level coursework taken at other regionally accredited institutions may apply toward a master's degree at UMB. The courses being requested for transfer must have been completed within the five-year limit for completing the master's degree at UMB. The UMB graduate program must agree (approve and certify) that the requested transfer credit is appropriate to, and acceptable in, the student's program. Students must have earned grades of B or better in such courses to be considered for transfer. Approved courses and related credits are transferred, grades are not. Transfer credits must be approved before the end of the student's first semester of enrollment.

No more than 9 credits of graduate-level coursework taken from other regionally accredited institutions may apply toward a Doctor of Medical Science (DMSc) degree at UMB. The courses being requested for transfer must have been completed within the five-year limit for completing the DMSc degree at UMB. The five-year limit may be extended for students who provide documentation of current National Commission on Certification of Physician Assistants (NCCPA) certification and State Licensure. The UMB graduate program must agree (approve and certify) that the requested transfer credit is appropriate to, and acceptable in, the student's program. Students must have earned grades of B or better in such courses to be considered for transfer. Approved courses and related credits are transferred, grades are not. Transfer credits must be approved during the first semester of enrollment.

The Graduate School does not require or accept transfer of credit for courses taken at other institutions for Doctor of Philosophy (PhD) students. Graduate -level coursework taken at other regionally accredited institutions that are

approved by the UMB graduate program are listed on the Application for Admission to PhD Candidacy at the time of admission to candidacy. These courses do not appear on the University of Maryland, Baltimore transcript. If approved by the program or department, may be used to waive course requirements in the student's degree program.

International Applicants

International applicants must adhere to application deadline dates and submit all required documents as early as possible. The Graduate School or an individual graduate program may request that a credential evaluation be done by an outside agency. In addition to meeting the requirements for all applicants cited previously, international applicants must: (1) hold a degree that is equivalent or comparable to a four-year U.S. bachelor's degree and have a cumulative grade-point average equivalent to a B or GPA, or the first- or high-second division or comparable class ranking, and (2) provide proof of financial sponsorship for immigration and visa status purposes.

Transcripts, Academic Records, Mark Sheets

International applicants must provide their full post-secondary (college/university) transcripts or academic record(s) translated into English. You must submit transcripts from each college/university attended, including work in progress at time of application. Unofficial copies may be provided for the application review process.

The Graduate Programs in Life Sciences (GPILS) requires international applicants to provide a transcript evaluation from a credentials evaluation agency such as WES, SpanTran, or ECE (or any NACES member evaluation agency) in addition to official transcripts or academic records.

English Language Proficiency

Applicants whose native language or language of the home is not English must take the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exam. The TOEFL and the IELTS exam are the only measures of English language proficiency accepted by the Graduate School. The minimum acceptable TOEFL score for admission is 80 for the Internet-based test (IBT). IELTS test takers must score no less than Band 7 (total). Some graduate programs have higher minimum score requirements. The same IBT TOEFL and IELTS requirements apply for applicants to online, hybrid, and campus-based programs.

TOEFL registration information is available from:

Test of English as a Foreign Language
Educational Testing Service
P.O. Box 899
Princeton, NJ 08540
www.toefl.org

The UMB Graduate School's TOEFL institution code number is 5848. TOEFL department codes are published by ETS.

IELTS test center, exam, and scoring information is available from:

IELTS International
100 E. Corson St., Suite 200
Pasadena, CA 91103
626-564-2954; 626-564-2981 (fax)
www.ielts.org

Candidates are encouraged to verify the identification of the correct University of Maryland campus (UMB) upon selection of score routing. Graduate students whose work suggests English language deficiencies may need to take remedial English courses at their own expense.

Students who have received a degree from an accredited institution in the United States or who completed their studies in another approved English-speaking country may be exempt from providing TOEFL IBT or IELTS scores. The candidate must have studied in the country and not at a foreign branch campus to be granted an exemption. The Graduate School maintains a list of countries from which such a candidate may be TOEFL or IELTS exempt.

Nondegree (Coursework Only) Student Status

Students who desire to take graduate-level courses for personal or professional enrichment but who do not necessarily want to enter a graduate degree program at UMB may apply to enroll as a nondegree (coursework only) student. Students must complete an application for nondegree admission accompanied by unofficial transcripts, a professional vita/resume, and the application fee. Official transcripts, letters of recommendation, and GRE score reports are not required.

Applicants for admission for nondegree status must hold a bachelor's degree from a regionally accredited institution and have a B or 3.0 grade-point average or hold equivalent education and training from a foreign college or university. International applicants in the United States whose immigration status permits them to enroll on a nondegree basis must meet the language proficiency requirements of

the Graduate School (i.e., the TOEFL or IELTS exam). Students applying for nondegree status also must obtain approval to enroll from the graduate program offering the applicant's desired course(s). Some degree and certificate programs do not permit students to enroll in program courses as nondegree students.

Students admitted under this status may enroll for and complete a maximum of two graduate-level courses, or one course if the course is affiliated with a certificate program. Exceptions to this two-course limit may be considered only by the Graduate School and the program/department in which the student desires to study.

Enrollment for nondegree status does not guarantee future admission into a degree program. In the event that a student is admitted to a Graduate School degree program at a later date, courses completed in the nondegree status may be applied to the degree program contingent upon program approval. Nondegree students must maintain a 3.0 GPA and abide by UMB rules, regulations, and policies related to academic and student conduct. Students in this status are not eligible for financial aid, fellowships, or appointments as graduate teaching or research assistants. Other services, such as parking and library privileges, are the same as those accorded to other graduate students. Enrollment in this status may continue for five years. If there is no enrollment for two consecutive semesters the student must request permission to re-enroll. This request should be made in writing at least two weeks prior to the start of desired re-entry term. Students that wish to be considered for a degree program at a later date must complete a new application for admission.

The nondegree status includes the subcategory of "visiting students." Visiting students are degree-seeking graduate students at other universities. Besides the application for nondegree admission and the fee, visiting students must provide written certification from their home institution's graduate dean that they are in good standing in a graduate-degree program. This certification must accompany the application form.

Fraudulent Reporting

Applicants must provide accurate and complete information on all application documents. Intentional omission or falsification of information during the application process will result in the immediate rejection of the application and dismissal of the student if they have enrolled at UMB. Application misrepresentation includes, but is not limited to: (1) false, omitted, or misleading information on the application, medical or immunization forms, financial aid disclosures, or information provided

during the personal interview, (2) fake, forged, or altered transcripts, standardized test scores, or letters of recommendation.

Offers of Admission

The Graduate School offers admission based on program recommendations. Each offer specifies the time (semester and year) and program of admittance. Each offer requires an immediate, written response. The applicant may accept or decline the offer, or request to change the effective date of the offer. Failure to respond to the Graduate School's offer before the first day of class, or failure to register for the authorized semester or session, voids the offer of admission. The applicant must then submit a written request to be considered for a subsequent semester or session and may need to submit additional credentials.

Students are admitted only to a specified academic program and only for the specified objective — i.e., certificate, or Master of Science, or Doctor of Philosophy degree. Students who are offered admission to more than one program must notify the Graduate School of their choice. Students may matriculate in only one graduate program at a time unless admitted to an approved dual-degree program or admitted to programs that permit dual enrollment. Students who accept the admission offer and enroll agree to abide by the rules and regulations of the University of Maryland, Baltimore.

An offer of admission made to students enrolled in their final semester of work toward a bachelor's degree is contingent upon their completion of that degree at or above their academic standing at the time the offer was made. The offer may be rescinded if the student's final academic standing is below the standing at the time the offer of admission was made, or the student may be admitted on a probationary basis. Applicants engaged in graduate study at another institution also are subject to this policy. Students admitted pending receipt of a bachelor's degree must submit an official transcript reflecting all coursework and award of the degree before their first semester of enrollment at UMB.

Admitted students who supplied unofficial documents and credentials for review must provide official versions of all academic documents (i.e., transcripts, test score reports) before their first semester of enrollment. These items become part of the student's permanent record at the University, and the student's continued matriculation is contingent upon having these items on file.

Regular Admission Status

Students admitted to full or regular graduate status must have submitted official documents showing a completed bachelor's degree from a regionally accredited institution and must qualify without terms or conditions in the judgment of admissions officials of the individual program and the Graduate School.

Provisional Admission

The offer of admission stipulates, upon the student's enrollment, a specific academic requirement or requirements that must be met to progress in a degree program. The offer will stipulate a defined time period (typically the first semester of study) in which the requirement(s) must be met. Essentially, the candidate is admitted on academic probation. The Graduate School grants regular status to the student when they satisfy the provision(s) stated in their admission letter. Failure to meet the stated stipulations within the defined time period will result in academic dismissal.

Conditional Admission

The offer of admission stipulates conditions, terms, requirements, etc., that must be satisfied or met before the student's enrollment at UMB. The Graduate School grants regular status to the student when they satisfy the conditions stated in their admission letter. The student must present evidence or verification of having satisfied the stated condition(s) before their enrollment at UMB. If the conditions are not met, the admission offer is rescinded and the student is not eligible to enroll.

Immigration Requirements for International Students

International students who receive an offer of admission must obtain the immigration form required for the appropriate visa. Accordingly, each international student must certify that they have sufficient funds (exclusive of travel expenses) for University tuition, fees, books, supplies, and living expenses. The total amount required for educational and living expenses (based on current tuition and fees) is available from the campus Office of International Services (OIS). Acceptable sources of documents for certifying financial support include: a notarized letter with the full name, occupation, and address of a parent or sponsor who will assume the financial responsibility for the applicant's education and living expenses; an original, current statement from a bank confirming that sufficient funds are available to cover educational and living expenses; or official notification of

grant, loan, or scholarship funds showing the name and address of the awarding institution, amount of funds, extent of expenses covered, and number of years the grant runs. New international students at UMB must report to the OIS upon arrival.

Visiting International Students

A visiting international student is a non-U.S. citizen who is pursuing a graduate degree at a university outside the United States and has been invited to UMB to conduct research with a UMB faculty member. A visiting international student must submit the following documents in addition to the application:

- A signed memorandum of understanding between UMB, the international university, the visiting student, and the UMB mentor.
- Evidence of English language proficiency. See Language Requirements on Page 7.
- Written certification from the student's home institution's graduate dean that the student is in good standing in a graduate-degree program.

Upon the student's admission to the UMB Graduate School, the student will be enrolled and billed for 1 research credit. The Office of International Services (OIS) will communicate directly with the student regarding required documents for the visa process.

Students will be required to show sufficient funds to support their tuition, fees, and living expenses to receive J-1 visa sponsorship. Once issued visa documents by the OIS, the visiting student will apply for a J-1 visa at a U.S. embassy or consulate overseas. Upon arrival, the student will be required to check in with the OIS.

If the student is paid by UMB, the hiring department must submit a student contract to the Office of Student Employment. Visiting international graduate students are limited to 20 hours per week of employment during the academic year and 29 hours per week of employment during the summer.

Other Enrollment Programs

Golden ID Program

The Golden ID program extends enrollment privileges to Maryland's senior citizens based on a space-available basis. Those who qualify receive a waiver of graduate tuition for up to three courses per semester. Fees are not waived. Eligible candidates must be at least 60, retired, not

employed full time, and dependent upon retirement income benefits as their chief source of income. Not all degree programs accept eligible Golden ID recipients. Qualifying guidelines and additional information is provided by the UMB Office of the Registrar.

Interinstitutional Enrollment

The University System of Maryland encourages graduate students enrolled at one institution to avail themselves of course offerings, research facilities, and special faculty expertise at the other institutions. The home institution retains responsibility for admission, academic advising, the collection of tuition and fees, grants of financial aid, the academic transcript, and awarding of the graduate degree.

Additional Guidelines

Applicant/Student Records

Application materials of admitted students become part of the student's official file and property of the Graduate School upon the student's enrollment. Under no circumstances will the Graduate School provide photocopies of official transcripts or score reports received from other institutions. The Family Educational Rights and Privacy Act (Buckley Amendment), outlines the terms by which students may review their records once enrolled. Credentials of applicants who do not register for courses for the term for which they have been admitted, whose application has been disapproved, who do not respond to requests for additional information, or whose application is not complete with respect to the receipt of all transcripts or test results are retained for only one academic year.

Immunization and Health Policy

Except for those enrolled exclusively in an online program of study, all UMB graduate students are expected to satisfy the University's immunization policy requirements. Health care coverage also is required for all students. The University's complete immunization policy — including citations for waivers or exceptions — may be obtained from the student health office and can be read at www.umaryland.edu/studenthealth.

Student Identification Numbers

The Graduate School assigns an identification number to each applicant. This number becomes the student number for those who are admitted and subsequently enroll. The student's Social Security number, if supplied on the application, is used only for federal aid, payroll, and other University-related purposes permitted by law.

All students must hold a valid photo identification card during their studies. The Graduate School provides information on obtaining a photo ID to students upon their admission or arrival on campus.

Mandatory Drug and Criminal Background Check Requirements for Certain Study or Research Areas

Certain study or research activities of students may require access to biological or chemical materials that are subject to special restrictions under federal law. Individuals who wish to be authorized to have access to such materials must comply with UMB policy, state law, and federally mandated drug and criminal background checks. Students who cannot maintain eligibility to engage in study or research with biological or chemical materials have no assurance that UMB will provide an alternative path of study or research. Therefore, students may not be able to enroll or to continue enrollment and advancement at UMB. Because of the serious financial and academic consequences of failure to obtain and maintain ongoing eligibility with legal requirements, students should plan in advance to ask advisors, faculty, and mentors about authorization for access to biological and chemical materials. Students should carefully consider the drug and criminal background check requirements before selecting a course of study or research that may be subject to special restrictions.

Special Services/Accommodations

Individuals who are offered admission and who need accommodation under the Americans with Disabilities Act should contact the University's Office of Student Services and the respective graduate program director in a timely manner. Accommodations will not be made retroactively.

UMB Office of Student Services
Southern Management Corporation Campus Center
621 W. Lombard St., Suite 302
Baltimore, MD 21201
410-706-3171
Hearing impaired-Maryland Relay Service: 711 in Maryland or 800-735-2258 elsewhere.

Registration, Enrollment, and Grades

Abidance of Guidelines

All students, including visiting, inter-institutional, and professional school students, enrolled in Graduate School courses at UMB are subject to Graduate School grading and registration guidelines and policies.

Students must have been approved for admission by the Graduate School to be eligible for registration and enrollment; only those who have been approved to enroll may attend classes.

Students are not officially enrolled without an active course registration entered into the University's student information management system (SIMS). If a student does not register for at least one course in each semester (fall and spring), their registration eligibility is interrupted; they may request a leave of absence or must request re-entry and permission to re-enroll.

Full- and Part-Time Enrollment

Graduate students must be registered for a minimum of 9 total credit hours per semester to be considered a full-time student or to be enrolled on a full-time basis.

Students receiving a graduate assistantship must be enrolled on a full-time basis. Graduate assistants must register for 7 credits of ABGA 900, 901, or 902, whether receiving a half-time or a full-time assistantship. Thus, graduate assistants must register for an additional (minimum) 2 credits to be enrolled on a full-time basis. Additional information regarding the terms of enrollment for a graduate assistant are cited in the Financial Assistance/Graduate Assistantships part of this publication.

Students receiving need-based assistance (federal Title IV funds) need to be registered for at least 6 credit hours to be eligible for federal aid. Enrollment must include "regular" credit-bearing courses; courses taken for audit do not count.

Summer Term Registration

In general, degree students are not required to be registered during the summer term as part of the Graduate School's Continuous Enrollment policy. And, with the exception of first-term international students, there is no full-time enrollment requirement in the summer term. Full-time enrollment in the summer is defined as at least 9 credit hours of course registration. Summer term registration,

however, is expected for certain student groups, such as 12-month graduate assistants and students attempting to qualify for need-based federal financial assistance.

Changing a Schedule or Course Registration(s)

Students must register for coursework each term (except summer and winter) to maintain eligibility for a degree. Adjustments to course registrations should only be made before the start of the semester and should be undertaken in consultation with the students' instructors and/or advisors. After the start of the term, changes may be made only in accordance with stated timetables. Further, students must file the necessary form(s) for registration changes with the appropriate University officials' signature(s) of approval before changes are complete or official.

Add

Week 1: Fall, spring, or summer term – Students may add course(s) through the end of Week 1 only. (Winter term — Students may add a course through the end of Day 2 only.) Complete an Add/Drop form.

Drop

Week 1: Complete an Add/Drop form with the instructor and advisor or program director approval. Partial (80 percent) refund for the first week. No refund after the first week. No transcript notation.

Weeks 2-8: Fall and spring sixteen week semester course (through end of Day 18 in the summer, Fall A, Fall B, Spring A or Spring B) – Students may withdraw from a course(s) through the end of Week 8 with instructor and advisor or program director approval. A notation of WD will appear on the grade history transcript. Complete an Add/Drop form with the instructor and advisor or program director. Course(s) dropped counts as an attempt. There is no refund.

Beginning the ninth week of the fall and spring sixteen week semester course (or beginning Day 19 of the summer term Fall A, Fall B, Spring A or Spring B, or from Day 3 to the end of the winter term), students are not permitted to withdraw from a course. The student must complete the course, request an Incomplete, or request the instructor to grant a Withdraw Pass or Withdraw Fail (WP/WF – use the Course Withdraw Form). There is no refund.

Graduate nursing students — i.e., nondegree/CWO, PhD, MS, and DNP students — are expected to abide by the

registration change (add/drop) timelines, rules, and guidelines established by the School of Nursing.

Withdrawing From a Course Withdraw Pass/Withdraw Fail

If a student withdraws from a course after the first eight weeks of a fall or spring semester sixteen week course or the first two weeks of a summer or eight-week (Fall A/B or Spring A/B) course, and the Course Withdrawal Request form is appropriately completed and filed with signature approvals, the student will receive a withdrawal mark of a Withdraw Pass (WP) or Withdraw Fail (WF) for each course attempted. A withdrawal mark of WP means that the student was passing the course at the time of withdrawal; a withdrawal mark of WF means the student was failing at the time of withdrawal. Each WP and WF mark will appear on the official transcript. WP/WF marks are not included in the calculation of semester, term, or cumulative grade-point averages. However, WF marks are included as course failures when determinations of academic probation or academic failure are made. There are no refunds for WP or WF marks. A student must repeat any course in which they received a WP or WF. A student may not graduate with a WF on their record.

Cancellation of Registration

Registered students compelled to leave the University before the start of a term must file a notice of cancellation of registration with the Graduate School. Failure to file this notice and obtain approval by the Graduate School will result in loss of refund.

Once the semester begins, students are subject to the other schedule adjustment guidelines, policies, and procedures (add/drop, withdrawing, etc.) cited herein.

Leave of Absence

Students who wish to continue in a degree program but cannot study in a particular semester, session, or year must take a leave of absence with the approval of their academic advisor and the Graduate School. Students must complete a Leave of Absence Request form and present it to their program director and the Graduate School for approval. The Graduate School notifies students of leave approvals and the terms of re-enrollment. While there is no limit to the number of times a student may request a leave of absence, leaves do not extend the time required to complete degree requirements. Leaves of absence are not required for the summer term and are not required of nondegree/coursework-only students.

A student who is in academic jeopardy (academic

probation) or who is otherwise not making satisfactory progress toward their degree – and who is granted an approved leave of absence – may be subject to additional review and modified terms of enrollment upon their return.

Withdrawing From the Graduate School

Once admitted to a graduate program, students are obligated to continue their course of studies. Students who desire or need to cease pursuing their degrees after registration and after the start of the term must submit a notice of withdrawal from the University, bearing the proper (program/department) signatures, to the Graduate School. The date used in computing a refund is the filing date of the document for withdrawal. Students who withdraw during a semester and do not file an application for withdrawal receive marks of failure in all courses and forfeit the right to any refund that they would otherwise receive. Students seeking to re-enter graduate study after withdrawal must reapply for admission and compete with a new entering class.

Administrative Withdrawal From the Graduate School

All graduate school students are expected to continuously enroll and to participate fully in their graduate courses. Once admitted to a graduate program, each student has the obligation to continue a course of study and must register every semester in the academic year (fall and spring semesters) unless on an approved leave of absence. Failure to comply with the requirement to register every semester will be taken as evidence that the student has terminated their program and admission status in the Graduate School. The Graduate School will withdraw you from the program. The student will need to re-apply to the program.

If a student does not participate during the first two weeks of class during the summer, Fall A, Fall B, Spring A or Spring B term, the student will be administratively withdrawn from the course with no refund.

Reinstatement

Students who “stop out” — that is, leave their studies for a period of time without formally withdrawing or taking an approved leave of absence — must request to be reinstated as returning students. The request may be made directly to the program/ department for review, with accompanying notification to the Graduate School. A student who has been away from studies (i.e., no active enrollment or registration) for more than two years must appeal for reinstatement to the student’s program and the Graduate School. This request must be made in writing and

addressed to the program director and the Graduate School.

Depending upon the student's academic standing at the time of departure and/or the length of departure, the student may be required to reapply and compete with a new entering class. The department is under no obligation to readmit the student. For students reinstated, a reassessment of the relevancy and applicability of prior courses toward the degree may be undertaken. Students in graduate studies in the School of Nursing must comply with its Policy on Students Who Stop-Out.

Change of Degree Intent

An enrolled student who needs or desires a change of degree intent (master's to PhD or vice versa) must submit a written request to their advisor and program director. The request should include the reason(s) for the request and the effective semester of change. The request must be approved by the advisor and the program director and forwarded to the Graduate School for final approval.

Change of Program

An enrolled student who desires to change their program of study within the Graduate School must submit a written request to the program director of the desired program. The request must include the reason(s) for the request and the effective semester of change. The request also must be copied to the director and advisor from the program the student is leaving and to the Graduate School. In most cases, a new application for admission and supplemental documentation may be required.

Undergraduates Taking Graduate Courses for Undergraduate Credit

Subject to requirements decided by the program offering the course, undergraduate students may register for graduate-level courses — i.e., those numbered from 600 to 898 (except 799) — for undergraduate credit. A student seeking this option normally will be in their senior year; have earned an accumulated grade-point average of 3.0; have successfully completed, with a grade of B or better, the prerequisite and correlative courses; and be majoring in an appropriate department. Enrollment in a graduate-level course does not in any way imply subsequent Graduate School or program approval for credit for a graduate degree at the University of Maryland except in relation to approved five-year bachelor's or master's programs.

Undergraduates Taking Courses for Graduate Credit

UMB undergraduate students who have a grade-point

average of at least 3.0 in the discipline in which they wish to take the course, and are within 7 credits of graduation, may register for some 400- to 600-level-and-above courses, which may later count for credit toward a graduate degree at UMB. Except in approved bachelor's or master's programs, the credits must be beyond those required for the student's undergraduate degree. Credits in the senior year over those required for graduation cannot count for graduate credit without prior, written approval of the instructor in the course, the director of the respective graduate program, and the Graduate School dean.

Grades

The Graduate School permits instructors to assign final grades using the "plus or minus" grading system. The available letter grades and corresponding quality point values used for grade-point average calculations are as follows:

A	4.00
A-	3.67
B+	3.33
B	3.00
B-	2.67
C+	2.33
C	2.00
C-	1.67
D+	1.33
D	1.00
D-	0.67
F	0.00

All graduate students must have a cumulative GPA of 3.0 or better to remain in good academic standing and to graduate. If no grade is given to a student, the student automatically receives a No Mark (NM) on their record at the end of the term.

The NM remains on the record until a final letter grade is submitted. All No Marks and Incompletes on a student's record must be reconciled (i.e., given the appropriate terminal grade) before the student graduates. Since graduate students must maintain an overall B grade-point average (a B- average does not constitute satisfactory academic progress), every credit hour of C in coursework must be balanced by a credit hour of A. However, a grade of A in master's thesis or doctoral dissertation research will not balance a grade of C in a course.

Repeating a Course

Students must repeat courses in which they receive a D or F. No student may graduate with an unresolved or unrepeated D or F on their record. Students who earn a grade lower than a B may repeat the course. A student must repeat any course in which they receive a WP or WF in that policy. A WP and WF count as a grade and an attempt. The grade on any repeated course, whether it is higher or lower than the original grade, takes the place of the original grade. Students may repeat a course only once, unless the course has been designated or approved as a multiple repeat course for degree completion (e.g., lab rotations, special topics, thesis/dissertation registrations).

Pass/Fail

Programs may use a Pass/Fail (P/F) grading system at their discretion for independent field work, special projects, independent study, seminars, workshops, and departmental courses in instructional methods.

Audit

Courses taken for Audit (AU) do not count toward the minimum credit requirement for degree or postbaccalaureate certificate completion. Charges for audit courses are the same as credit courses, except for ABGA courses.

Changes to Grade Method

Changes to the method used for a student's final course grade (i.e., letter grade to pass/fail or letter grade to audit) may not be made after the last day to drop a course (end of Week 8) for the term.

Temporary and Final Grades (Incompletes and No Marks)

Students should complete all the requirements of graduate coursework during the semester in which they take the course. The graduate faculty should issue final grades by the date listed on the final report of grades. No student may graduate with an Incomplete (I), No Mark (NM), or failing grade (F) in courses required for their degree program.

Incomplete Grades

An Incomplete grade (I) is appropriate (i.e., may be assigned by the instructor) when a student has an unexpected inability to complete a final assignment in a class. Students should not re-register for a course when an Incomplete has been assigned.

The student and the instructor/faculty member should

create and sign a contract that facilitates completion of the outstanding assignment(s). Graduate faculty must change Incomplete (I) grades to final letter grades for all courses required for the degree.

They must assign letter grades within one academic year of the time at which the required course ended. If a grade has not been assigned within one year, the grade of "F" will be assigned. This policy does not apply to the 799 and 899 research grades, where the graduate faculty may assign letter grades, Pass/Fail (P/F) grades, or Incomplete grades. Incomplete grades should be replaced by appropriate terminal grades before the examining committee approves the applicable research.

No Mark Grades

A No Mark grade (NM) is put in place opposite courses in which no final grade has been posted (i.e., when a faculty member is unable to submit a grade by the grade deadline). Students should not re-register for a course when a No Mark has been assigned except in the case of lab rotations and thesis/dissertation research.

Appeal of Grade

A student who thinks that a final grade in a course is the result of arbitrary or capricious grading may appeal to the Graduate School dean. The procedural guidelines for handling allegations of arbitrary and capricious grading appear in the Policies section of this catalog.

Credit by Examination

A graduate student may obtain graduate credit by examination in courses at the 400 level previously identified as acceptable by the appropriate program. Generally, credit by examination is not available for courses at the 600, 700, or 800 levels for courses that, in the judgment of the Graduate Council, require a continuing interaction between faculty and students to achieve the educational goals of advanced study. Students may receive credit by examination only for a course in which they are otherwise eligible to receive graduate credit. Programs may establish limits on the number of credits students may earn through credit by examination. Graduate students seeking this option must obtain the consent of their advisors. The fee for each examination is equivalent to the cost of graduate tuition for 1 credit. Students must pay the nonrefundable fee upon application for the examination.

Academic Record (Transcript)

A graduate student's academic record (transcript) serves as a complete, official history of their academic progress at

the University of Maryland, Baltimore. As such, it will not change except in accordance with stated Graduate School policies. Under no circumstances will the academic records change because of dissatisfaction with a grade or other academic accomplishment.

supervision is ensured and learning is documented.

COMAR - 13B.02.02.16
- <https://dsd.maryland.gov/regulations/Pages/13B.02.02.16.aspx>

Course Numbering System

Course levels are designated as follows:

- 100-399: Undergraduate courses not acceptable for credit toward graduate degrees.
- 400-499: Junior and senior courses acceptable for credit toward some graduate degrees if specifically approved by the Graduate Council.
- 500-599: Professional school courses and certain postbaccalaureate courses acceptable for graduate degree credit only if approved by the Graduate Council.
- 600-898: Courses normally reserved for graduate students.
- 799: Master's thesis research.
- 899: Doctoral dissertation research.
- 901-999: Interprofessional courses acceptable for graduate degree credit only if approved by the Graduate Council.

Credit Hour Definition

1. An in-state institution shall award 1 credit hour for:
 - a. A minimum of 15 hours, of 50 minutes each of actual class time, exclusive of registration, study days, and holidays;
 - b. A minimum of 30 hours, of 50 minutes each of supervised laboratory or studio time, exclusive of registration, study days, and holidays;
 - c. A minimum of 45 hours, of 50 minutes each of instructional situations such as practica, internships, and cooperative education placements, when supervision is ensured and learning is documented; or
 - d. Instruction delivered by electronic media based on the equivalent outcomes in student learning of this regulation, and may include a combination of telelessons, classroom instruction, student consultation with instructors, and readings, when

Academic Standards, Policies, and Degree Requirements

Responsibility for progress in a graduate degree program is shared by the student, faculty advisor, program, and Graduate School administration. Students are responsible for compliance with the Graduate School's rules and procedures and all other program requirements. Students should actively seek the advice of their faculty mentors, graduate program directors, and Graduate School staff members.

Complete information on the special requirements for degrees is found in the publications of the individual programs. The general requirements common to all graduate programs are as follows.

Advisement

Program faculty coordinate academic advising for graduate students. Students are encouraged to seek the advice and counsel of graduate advisors and program directors in planning their curriculum. In addition, the Graduate School provides graduate assistants with the Graduate Assistant Guide, which describes relevant policies and guidelines. Other policies related to student enrollment activities are in the University's *Student Answer Book*.

Minimum Grade-Point Average

The Graduate School requires all graduate students to maintain a minimum, cumulative grade-point average (GPA) of 3.0 on a scale during their studies to remain enrolled. The Graduate School reviews students' academic performances each semester. Failure to maintain the minimum GPA requirements may result in academic dismissal. No student may graduate with a cumulative grade-point average of less than 3.00.

The Graduate School expects students to meet the highest standards of academic integrity — the success of the entire academic enterprise depends on them doing so. Cheating, plagiarism, fabrication, falsification, or abetting the academic dishonesty of another will result in sanction and may lead to academic dismissal.

Continuous Enrollment

Once admitted to a graduate program, each student has the obligation to continue a course of study and must register every semester in the academic year (fall and spring semesters) unless on an approved leave of absence. Failure

to comply with the requirement to register every semester will be taken as evidence that the student has terminated their program and admission status in the Graduate School.

Notice of Dismissal

If a student fails to meet Graduate School standards of satisfactory academic performance and progress, they shall be given written notice of academic dismissal by the Graduate School. The notice will include the reason for the dismissal. A copy of the notice will be provided to the student's graduate program director. Notice of dismissal will be mailed to the student's address of record as noted on file with the UMB registrar. Notice is deemed received by the student within 10 calendar days from the date of the notice. Each student is expected to notify the Graduate School and the graduate program of changes in address and to check for correspondence at their address of record in a timely fashion.

Appeal of Academic Dismissal

The Appeal of Academic Dismissal policy outlines the appeal procedures for a student dismissed for poor academic performance. Students dismissed for cheating or plagiarism may appeal under the guidelines provided by the Student Academic Misconduct policy. Both documents are on file with the office of the dean of the Graduate School and are printed in the Policies section of this catalog.

Academic Performance and Progress in Postbachelor's Certificate Programs

Satisfactory academic performance and progress within the UMB certificate programs is a responsibility shared by the Graduate School, the certificate program, and students. Certificate programs with additional criteria and requirements approved by the Graduate School are covered under this policy. Students should review all graduate program handbooks and standards.

Satisfactory performance and progress is demonstrated by adherence to the following Graduate School standards:

- Graduate students must maintain a minimum, cumulative grade-point average (GPA) of 3.0 on a 4.0 scale. Further, two or more grades of C or lower denote unsatisfactory progress in a certificate program and subject the student to academic

dismissal regardless of cumulative GPA.

- All courses must be taken for letter grade; courses taken as pass/fail (P/F) or audit (AU) may not be counted toward the certificate.
- The course of study undertaken for a postbaccalaureate certificate must be ascertained from an approved program consisting of at least 12 graduate-level credit hours.
- All requirements for the certificate must be completed within three years after admission. Periods of nonregistration (“stopping out” or approved leaves of absence) are included within this three-year period.
- All credits for a certificate must be completed at the University of Maryland, Baltimore.
- Students are expected to meet the highest standards of integrity; cheating, plagiarism, fabrication, or abetting the academic dishonesty of another will result in sanction and may lead to academic dismissal.

These guidelines are applicable to all UMB graduate students regardless of instructional delivery mode (i.e., traditional, online, or hybrid).

Failure to satisfy the Graduate School’s standards of satisfactory academic performance and progress — or nonadherence to program-specific policies and requirements — subjects a student to possible academic probation and/or dismissal.

Academic Performance and Progress in Master of Science Programs

Satisfactory academic performance and progress within the UMB Master of Science (MS) programs is a responsibility shared by the Graduate School, the graduate programs, and students. This policy specifies the elements of satisfactory academic performance and progress for students in UMB programs required by the Graduate School. MS programs with additional criteria and requirements approved by the Graduate School are covered under this policy. Students should review all graduate program handbooks and standards.

Failure to satisfy the Graduate School’s standards of satisfactory academic performance and progress subjects a student to possible academic dismissal, as does nonadherence to program-specific policies and requirements.

Satisfactory performance and progress is demonstrated by

adherence to the following Graduate School standards:

- All graduate students must maintain a minimum, cumulative grade-point average (GPA) of 3.0 on a 4.0 scale. The Graduate School reviews students’ academic performances each semester and session. Failure to maintain the minimum GPA requirement may result in academic dismissal.
- Once admitted to a graduate program, a student has the obligation to continue a course of study and must register every semester in the academic year (fall and spring semesters) unless on an approved leave of absence. Failure to comply with the requirement to register every semester will be taken as evidence that the student has terminated their program and admission status in the Graduate School.
- Any student admitted provisionally will be granted full graduate status when the provisions have been satisfied. Provisionally admitted students who fail to meet the terms of their admission may be dismissed.
- The entire course of study undertaken for the Master of Science degree must form a unified, coherent program approved by the student’s advisor and the Graduate School. Students inadequately prepared for the required graduate courses may need to take additional courses to supplement their undergraduate work. These courses may not be considered as part of the graduate program.
- The minimum number of credits required by the University and the Graduate School for the master’s degree is 30. Some programs or degree specializations require more credits. Students in a thesis option program must complete a minimum of 6 credits of master’s thesis research.
- No more than 6 credits or two courses of graduate coursework taken as a nondegree student or at other regionally accredited institutions before matriculation in the Graduate School may apply toward the master’s degree. A request for transfer of credit should be completed shortly after matriculation. The student’s advisor and graduate program director must approve the form and submit it to the Graduate School. Official transcripts of the courses for which credit is requested must accompany the Transfer Request form. The student is subject to final examination in all work offered for the degree.
- The Graduate School does not allow transfer credit for any courses applied to any other degree. The

Graduate School does not grant credit for correspondence courses or “credit by examination” courses taken at other universities. Also, note that the Graduate School only transfers credit, not grades, from other universities.

- Students must satisfactorily complete coursework and the required curriculum in a timely fashion. All requirements for the master’s degree must be completed within a five-year period. Courses completed more than five years before the expected date for receiving the master’s degree will not count toward that degree. The period of an approved leave of absence is included within the five-year period.
- Students must adhere to the appropriate thesis or nonthesis guidelines outlined by the Graduate School and the program.
- Students in an MS program with clinical or experimental requirements are expected to meet the requirements, standards, and expectations of those experiences.
- Students are expected to meet the highest standards of integrity; the success of the entire academic enterprise depends on them doing so. Cheating, plagiarism, fabrication, or abetting the academic dishonesty of another will result in sanction and may lead to academic dismissal.

Stackable Certificates (Dual Enrollment)

Stackable certificates can be earned while enrolled in a primary degree curriculum. The current Post-baccalaureate (PBC) Master’s (MS) stackable student enrollment and graduate degree conferral must follow federal regulations.

- MS students may **NOT** earn a certificate without completing the MS degree requirements.
- Dually enrolled students will receive both a certificate and Master’s degrees **AFTER** the completion of all certificate and MS degree requirements.
- Students wishing to earn a certificate while completing a Master’s degree will need to **be admitted to the certificate program beginning in their first semester** (PBC and MS)

Master of Science Thesis Option Requirements

Students must complete a minimum of 30 credits, including 6 credits of master’s thesis research (799), for the Master of Science degree. Of the remaining 24 credit hours required in graduate courses, no fewer than 12 must be selected from courses numbered 600 or above.

Examination of the master’s thesis is conducted by the candidate’s master’s examination committee. This committee comprises a minimum of three and a maximum of five voting members, all of whom must hold the doctoral degree or the highest degree for the discipline. The committee must include the candidate’s master’s thesis advisor. One or two members may be from programs separate from the candidate’s. At least three of the committee members must be graduate faculty members. The Graduate School dean selects one committee member as the Graduate School representative. The Graduate School representative, who must be a member of the graduate faculty and not the committee chair, is responsible for ensuring that the examination is conducted according to established procedures.

The committee chair must be a member of the graduate faculty and is normally the candidate’s advisor. The chair is responsible for nominating the committee members to the Graduate School dean. If a candidate’s advisor is not a member of the graduate faculty, the candidate’s program director is responsible for appointing a graduate faculty member from within the program to serve as chair. Nomination of committee members must be made by the chair at least two months before the date of the final master’s examination. After receiving the completed nomination form, the dean of the Graduate School appoints the committee and designates the Graduate School representative.

The chair must sign the Certification of Completion of Master’s Thesis form and return it to the Graduate School at least two weeks (a minimum of 10 working days) before the proposed examination date. The signature of the chair certifies that the master’s thesis is ready to be defended. Any minor or typographical corrections or amendments resulting from the master’s examination must be incorporated in the master’s thesis by the student before the student turns in/uploads a final master’s thesis to the Graduate School. The signature of the student’s advisor on the approval sheet certifies that the student has made all required corrections. Beyond the oral master’s examination, the program committee may require a comprehensive written examination.

Complete final examination policies and procedures, including a description of the conduct and outcomes of the examination, are in the Procedures for Examination of the Master's Thesis section. This document is available from the Graduate School and online.

Master of Science Nonthesis Option

The requirements for the Master of Science degree without thesis vary among programs in which this option is available. Standards for admission, however, are identical to those for admission to any master's program. The quality of the work expected of the student also is identical to that expected in the thesis programs. The general requirements for students choosing the nonthesis option are: an overall average grade of B in all coursework taken; of the total credits required by a program, a total of 18 numbered 600 or above; and a passing grade on a written comprehensive examination. The program must certify, on the form provided for that purpose, that the student has completed all requirements for the degree.

Academic Performance and Satisfactory Progress in PhD Programs

The Graduate School has established standards and requirements regarding minimum grade-point average, continuous enrollment, time to degree, advancement to candidacy, academic integrity, and other elements of satisfactory academic progress and degree completion. All doctoral degree candidates are expected to review and comply with these standards and requirements.

The Doctor of Philosophy degree (PhD) is the highest degree awarded by the University. The degree is granted to those candidates who demonstrate a high level of scholarship and the ability to conduct independent research. It is not awarded for the completion of course and seminar requirements alone. Beyond the following requirements, the program may have special requirements.

Consult the program descriptions in this catalog and the program director for more information.

Satisfactory academic performance and progress within the UMB Doctor of Philosophy (PhD) programs is a shared responsibility of the Graduate School, the doctoral programs, and graduate students. This policy specifies the elements of satisfactory academic performance and progress for students in UMB Graduate School PhD programs.

Satisfactory performance and progress in a UMB Graduate School doctoral program is demonstrated by adherence to the following Graduate School standards:

- After admission to a doctoral program, each student must continue a course of study and register for fall and spring semesters unless on an approved leave of absence. Failure to comply with the requirement to register every semester will be taken as evidence that the student has terminated their program and admission status in the Graduate School.
- Students accepted provisionally will have provisional admission status removed only after all provisions have been satisfied and the student has fulfilled all other Graduate School and doctoral program requirements for nonprovisional admission. This determination will be made by the Graduate Program director and the Graduate School.
- Graduate students must maintain a minimum cumulative grade-point average (GPA) of 3.0 on a 4.0 scale during the course of their studies.
- The UMB Graduate School does not impose a uniform protocol for preliminary, qualifying, or comprehensive examinations. Admission to candidacy occurs after fulfilling the respective doctoral program requirements.
- Students must establish and maintain a professional relationship with a faculty research advisor. The advisor must hold regular membership in the graduate faculty with the appropriate knowledge and expertise to serve as a research advisor.
- Students must demonstrate the ability to conduct independent research by developing, presenting, and defending an original dissertation on a topic approved by the doctoral program. Evidence of completion of this requirement is submission of the committee-approved dissertation to the Graduate School.
- The Graduate School requires that students take and pass a doctoral examination of the dissertation composed of an open presentation and a formal examination. The formal examination can only be attempted twice. A failure on the second attempt means the PhD degree is forfeited.
- Students must be admitted to candidacy within five academic years of the first term of enrollment in the doctoral program and at least two full sequential semesters or sessions (spring, summer, or fall) before graduation. All degree requirements, including the final examination of the dissertation, must be completed within four years of admission to candidacy and no more than nine years after

admission into the doctoral program.

- Students are expected to meet the highest standards of academic integrity. Plagiarism, fabrication, falsification, cheating, and other acts of academic dishonesty, or abetting the academic dishonesty of another, will result in sanctions and may lead to academic dismissal.

Students must meet all doctoral program requirements for satisfactory academic performance and progress as well as Graduate School requirements. Students are advised to be familiar with all handbooks, requirements, and standards of their doctoral program:

- Doctoral programs may have requirements that are in addition to the Graduate School standards listed previously. Examples of additional graduate program requirements are laboratory rotations, journal clubs, presentation of papers/abstracts, and publication(s).
- Doctoral programs may have more stringent standards than the Graduate School. Examples of more stringent standards are higher than the 3.0 minimum GPA required by the Graduate School, advancement to candidacy within four years instead of five, and program completion within seven instead of nine years.

The student is expected to meet the most stringent standard for each requirement, whether it is a standard of the UMB Graduate School or the doctoral program.

Failure to meet any of the Graduate School and doctoral program standards of academic performance and progress subjects a student to automatic academic probation and the possibility of dismissal.

Placement on Academic Probation or Dismissal

If a student does not meet the Graduate School and the doctoral program's standards of satisfactory academic performance or progress, the student will automatically be placed on probation or be dismissed. Written notice of this action, including the reason for the action, is provided by the Graduate School. A copy of the notice is provided to the student's doctoral program director.

Notice is mailed to the student's address of record as noted on file with the UMB registrar. Notice is deemed received by the student within 10 calendar days from the date of the notice. Each student is expected to notify the registrar, the Graduate School, and the doctoral program of changes in address and check for correspondence at his or her address of record in a timely fashion.

For information on Graduate School policy and procedures for appeal of probation or academic dismissal, go to <http://graduate.umaryland.edu/Policies>.

Doctoral Program Course Requirements

There is no Graduate School requirement on the number of courses students must take in either the major or minor fields. The Graduate School policy encourages the development of individualized programs for students who seek the doctoral degree. The academic departments and interdisciplinary programs have been directed to decide major and minor requirements, levels or sequences of required courses, and similar requirements for submission to the Graduate Council for approval.

Courses taken at other institutions approved by the graduate program for partial fulfillment of requirements for the degree at UMB are listed on the Application for Admission to PhD Candidacy at the time of admission to candidacy (see the Admission to Candidacy section that follows).

Doctoral Program Time Required

The Graduate School requires a minimum of three years or its equivalent of full-time graduate study and research. Of the three years, at least one year or its equivalent must be spent at the University of Maryland, Baltimore. Students must submit all work at other institutions in partial fulfillment of the requirements for a doctoral degree to the Graduate School with the program recommendation for approval at the time of admission to candidacy. Official transcripts of this work must be on file in the Graduate School.

Students must be admitted to candidacy within five years of admission to the doctoral program and at least two full sequential semesters or sessions (spring, summer, or fall) before graduating. All degree requirements, including the doctoral dissertation and final doctoral examination, must be completed within four years of admission to candidacy and no more than nine years after admission into the doctoral program. Failure to complete all requirements within the time allotted requires another application for admission to the Graduate School with the usual requisites as decided by the program committee. The Graduate School grants extensions of time only under the most unusual circumstances.

Doctoral Program Registration Requirements

Doctoral students may not enroll for 899 research credits (if/when conducting research) until reaching candidacy; before candidacy, they may enroll in Pre-candidacy

Research 898 (1 to 8 variable credits) in preparation for candidacy and to ensure full-time enrollment at that stage in their studies. Students should enroll in the appropriate number of credits to reflect their work toward the dissertation before reaching candidacy. 898 credits are not counted as part of the 899 credits required for graduation and are only offered as a pass/fail grading option.

Once admitted to candidacy, doctoral students must successfully complete a minimum of 12 credit hours of doctoral dissertation research (899).

Admission to Candidacy

Doctoral students must complete an application for admission to candidacy when they fulfill all requirements for candidacy. Preliminary examinations, grant writing, or other substantial tests as the program/department may elect are frequently prerequisites for admission to candidacy.

Students must submit the following to the major advisor and program director for review: the application, an unofficial UMB transcript, and official transcript(s) showing relevant external graduate coursework to be used in partial fulfillment of the UMB degree (if applicable). The advisor and program director indicate which courses are to be used to fulfill degree requirements. The student must forward the application and attachments to the Graduate School for final review.

Courses taken at other regionally accredited institutions that are approved by the UMB graduate program are listed on the Application for Admission to Candidacy at the time of admission to candidacy. These courses do not appear on the UMB transcript, but, if approved by the program or department, may be used as partial fulfillment of the doctoral student's degree program completion requirements.

Doctoral Dissertation

Students must prove the ability to do independent research by an original dissertation on a topic approved by the department or program graduate committee. During the preparation of the dissertation, all candidates for the doctoral degree must complete a minimum of 12 credit hours of doctoral dissertation research (899) at the University of Maryland, Baltimore.

A PhD student must establish and maintain a professional relationship with a member of the graduate faculty with the appropriate knowledge and expertise to serve as their research advisor. If no appropriate graduate faculty member is available or no appropriate graduate faculty member agrees to be the student's research advisor, the

student cannot continue in the PhD program.

Students also must have a doctoral examination committee nominated by the graduate program. The doctoral examination committee comprises a minimum of five scholars: the advisor, who is a regular member of the graduate faculty; at least two additional regular members of the graduate faculty; and at least one individual from outside the program, department, or discipline. Two committee members are designated as readers.

The student must submit their dissertation to the chair and two other readers at least one month before the defense date. When the dissertation is completed to the satisfaction of this committee and at least 10 days before the defense, the advisor and both readers sign the form verifying that the dissertation is ready for defense.

Often, students will submit the results of their dissertation research for publication. Students should obtain authorization from research advisors for publication of all or part of the dissertation before its defense. A manual to help students in the preparation of their doctoral dissertations, *Electronic Dissertation and Thesis Style Guide*, is available online and from the Graduate School.

Procedures for Examination of The Candidate's Doctoral Dissertation

The purpose of the defense is to allow the candidate to demonstrate that they:

- Have mastered a field of knowledge.
- Have successfully completed a program of research in their chosen field.
- Are able to discuss and defend a research question and the results of the research project with colleagues and the general public.

The examination of the doctoral dissertation is conducted by the doctoral examination committee. Described below are the:

1. Composition of the doctoral examination committee.
2. Documentation and actions required before the doctoral examination.
3. Conduct of the doctoral examination.

Composition of the Doctoral Examination Committee

The committee must have a minimum of five and a maximum of seven voting members, all of whom must

hold a doctoral degree or the terminal degree in their discipline. The committee must include the candidate's dissertation advisor, two readers, and one member who is external to the candidate's program, department, or discipline. One of the committee members (other than the chair) is appointed by the dean of the Graduate School as graduate school representative and serves as the dean's surrogate. At least three of the members of the committee must be regular members of the graduate faculty.

At least six months before the proposed defense date, the committee chair will prepare and send a list of potential committee members to the dean of the Graduate School (Nomination of Members of Final Doctoral Examination Committee) for approval. If changes need to be made in committee composition, the committee chair must request approval from the dean of the Graduate School. If last-minute changes need to be made to the membership of the committee, the chair is to contact the office of the dean of the Graduate School and inform the office of the needed change and the reason for the change.

- **Chair:** The committee chair must be a regular member of the graduate faculty and is normally the candidate's advisor. If a candidate's advisor is not a member of the graduate faculty, the candidate's program director is responsible for appointing a regular graduate faculty member from within the program to serve as the chair. In this case, it is expected that the dissertation advisor would serve on the committee as one of the other members.
- **Readers:** In addition to the chair, two members of the committee must be identified as readers. The chair and readers serve to certify that the dissertation is ready to be defended and do so by signing the Certification of Completion of the Doctoral Dissertation. This form must be returned to the Graduate School at least two weeks before the proposed examination date (see the Documentation and Actions Required Prior to the Doctoral Examination section that follows). The candidate will provide the chair and the readers a copy of the dissertation at least two weeks before the deadline for submitting the Certification of Completion of the Doctoral Dissertation. By signing the certification, the readers and the chair are indicating that the dissertation is a presentable, interpretable, and complete document. The three signatures attest that the dissertation conforms to these criteria; however, they do not indicate a determination of the ultimate acceptability or approval of the dissertation, which can only occur after the final examination session.

The candidate's program director also must sign the Certificate of Completion form. By signing, the program director indicates that all other University and program criteria pertaining to completion of the PhD are satisfied and that the exam may go forward.

- **External Member of the Examination Committee:** One of the members of the committee must be an external member. This individual must be from a separate program, department, or discipline from that of the candidate. The role of the external member is to provide a broader perspective within the examination process. The external member must hold a doctoral degree or a terminal degree in their field. The individual may be from within the University or may be a scholar from another institution. If the external member is a member of the graduate faculty, the individual may also serve as the Graduate School representative or as a reader. If the external member is not a member of the graduate faculty, a curriculum vitae must accompany the nomination.
- **Graduate School Representative:** One member of the committee, designated by the office of the dean of the Graduate School, serves as the dean's surrogate. The representative must be a regular member of the graduate faculty and cannot be the committee chair. In addition to the normal responsibilities as a member of the committee, the representative has the responsibility of ensuring that the examination is conducted according to established procedures. Any questions or disagreement over the examination procedure are referred to the Graduate School representative for a decision. Upon designation, the Graduate School representative will receive from the Graduate School a copy of the Procedures for Examination of the Doctoral Dissertation.
- **Other Committee Members:** There may be up to seven members on the committee. Beyond the five required members described previously, up to two additional individuals may be appointed to the committee. These members may be individuals within or outside the candidate's program and may include scholars from other institutions or other components of the UMB Graduate School. All such members must hold a doctoral degree or a terminal degree in their field. A curriculum vitae must accompany the nomination form submitted by the committee chair to the dean of the Graduate School for any committee nominees who are not members of the graduate faculty.

Documentation and Actions Required Prior to the

Doctoral Examination

Prior to the doctoral examination, the following actions need to be completed:

- **Nomination of Final Doctoral Examination Committee members:** Must be submitted to the dean's office.
- **Certification of Completion of the Doctoral Dissertation:** Must be submitted to the dean's office.
- **Announcement of Doctoral Dissertation Defense:**
 - a) The dean of the Graduate School has the responsibility for making all members of the graduate faculty aware of the candidate's doctoral examination at least one week before the examination date.
 - b) Graduate programs are responsible for notifying their students about the examination. The time and place of the examination will be established by the chair.
- **Submission of the Doctoral Dissertation:** All members of the committee must receive a final version of the dissertation, as described previously, two weeks (i.e., a minimum of 10 working days) before the proposed examination date. This version of the dissertation should be substantially the same as that which was certified by the chair and the two readers as ready to be defended.

Conduct of the Doctoral Examination

The doctoral examination normally comprises two components: an open presentation by the doctoral candidate and a formal examination by members of the committee.

- **Open Presentation by the Doctoral Candidate:** Each candidate is expected to give a presentation of their dissertation in a forum open to the general public and moderated by the committee chair. The open presentation should take place as close as possible to the time scheduled for the doctoral examination. In many cases the open presentation will immediately precede the formal doctoral examination; however, the exact timing and notice of the presentation will be in keeping with the usual policy of the candidate's program. All members of the committee must be present (see the following for definition of "present") at the open presentation. Those attending the open presentation may ask questions of the candidate within a reasonable time interval set by the candidate's committee.
- **Formal Doctoral Examination Procedures:** The

formal doctoral examination is open only to members of the candidate's committee and other members of the graduate faculty who wish to be present and is conducted under the direction of the examination committee's chair. All members of the committee must be present for the examination. Committee members may participate by video conference or by telephone, if necessary. In such cases, arrangements for the member not physically present should be made such that their participation can be interactive and they have access to all audio and visual materials used by the candidate or committee members during the formal doctoral examination, can ask questions and hear the candidate's answers, and can fully participate in the committee's discussions. This may require that the member not physically present participate by a video connection or have access to presentation slides (sent in advance to the member), or that other appropriate arrangements are made to allow the member to be an active member of the committee's deliberations. The dean of the Graduate School must be notified of an absence and the accommodations made. The formal examination is moderated by the committee chair, and only committee members may ask questions of the candidate. Other members of the graduate faculty who attend the examination do so only as observers. They are not permitted to participate verbally or otherwise in the proceedings.

The formal doctoral examination has the following components:

1. An initial private discussion among the members of the committee only (the candidate and other graduate faculty members are not present during the discussion). This discussion should determine whether the written document is presentable as a dissertation and hence defensible. If a majority of the committee agrees that the dissertation is not defensible, the examination is canceled. Otherwise, the examination proceeds. The committee then determines procedures for the examination, including the order and manner of questioning.
2. A presentation of the dissertation by the candidate (if required by the committee) is followed by questions from the committee members. At the discretion of the candidate's program and the Doctoral Examination Committee, the open presentation may serve as the doctoral examination presentation. In this case, no further formal presentation by the candidate will be required and committee members may immediately

begin questioning the candidate. No time limit is set for this period, but it would be considered unusual if the entire period exceeded three hours.

Outcome of the Examination

At the end of the examination, the candidate and any others in attendance who are not part of the committee withdraw, and the committee deliberates in private on the acceptability of the written dissertation and the oral performance of the candidate. The chair asks each member for an opinion, and after these deliberations, the members vote on whether the candidate has passed or failed. There are two levels of pass: 1) the dissertation is accepted with very minor changes, if any; or 2) the dissertation requires significant, nontrivial revisions. In the latter case, the committee sets a timeline for completion of revisions and names the committee members who will certify satisfactory completion of the revisions. The members sign the report of the committee and register their votes. The affirmative votes of a majority plus one of the committee members constitute a successful defense of the dissertation; this means that the required number of affirmative votes is four from a five-member committee or five from a six- or seven-member committee.

The candidate may be failed if the committee finds that the quality of the written dissertation or the candidate's presentation is wanting. The committee may find that, despite a decision that the dissertation document was defensible, it has defects that prevent it from being accepted. If these defects are minor in nature, the committee may vote to accept the dissertation pending remedial modifications. If the defects are more serious, the committee may decide to fail the candidate and require a new examination. Alternatively, the dissertation document may be determined to be sound but the candidate's defense inadequate. In this case, the committee must decide on a date for a new examination.

The Report of the Examination Committee form signed by the committee must be returned by the Graduate School representative to the Graduate School office no later than two working days after the examination. The candidate's program director also must be provided with a copy of the report.

The candidate should be informed of the decision as soon as possible. If the candidate fails the examination, the Graduate School representative will submit a letter within two working days to the dean of the Graduate School stating that the candidate has failed, the reasons for the failure, the decisions concerning necessary remedial action, and approximately when a new examination will be held.

The Graduate School representative must return the letter with the signed Report of the Examination Committee. Copies of the letter must be provided to the candidate, the chair, and the Graduate Program director. The new examination must be conducted within one year from the date of the defense of the first examination. The chair must notify the Graduate School of the date of the second examination so that the necessary paperwork may be sent to the Graduate School representative. The candidate may present himself or herself for the doctoral examination at most twice.

Degree Certification and Awarding of Diploma

The Graduate School publishes a calendar each year showing dates by which students who are in the last semester of their programs must submit forms and meet requirements for graduation. Graduate students are responsible for meeting these deadlines. Students must file their applications for diplomas with the University registrar by the published diploma application deadline date.

The University issues diplomas at the end of the summer, fall, and spring terms. Students who have applied for a diploma but are not able to complete degree requirements as planned must inform the Graduate School as soon as it is determined they will not finish. These students must reapply and complete all remaining requirements for the semester in which they expect to graduate. Students do not need to pay another diploma fee, but they must register for at least 1 credit per semester or session until graduation.

Financial Information

Tuition

Tuition is charged to students and applied to all instructional programs. Students admitted to the Graduate School must pay graduate tuition and fees whether the credits satisfy program requirements or not.

University of Maryland Baltimore (UMB) students are expected to accept full responsibility to pay all tuition, fees and other associated costs assessed as a result of registration and/or receipt of services in accordance with the published UMB Policy on payment of tuition and fees <http://www.umaryland.edu/policies-and-procedures/library/financial-affairs/policies/viii-220a.php>

Notwithstanding any other provisions of this or any other University publication, the University reserves the right to change tuition, fees, and other charges at any time such changes are deemed necessary by the University or the University System of Maryland Board of Regents. The Graduate School tuition and fees schedule is located at <https://www.umaryland.edu/student-financial-services/tuition-and-fees-by-school/>.

According to University regulations, graduate students dropping courses receive a full refund of tuition if they drop courses before the first day of the semester.

Students who withdraw from some or all classes are responsible for paying all or a portion of tuition and fees in accordance with the published tuition refund policy at <http://www.umaryland.edu/registrar/academic-calendar/refund-policies/> and schedule at <http://www.umaryland.edu/registrar/academic-calendar/refund-schedule/>.

Students who completely withdraw from UMB, must first consult with the school/program regarding specific policies and procedures relating to registration, cancellations, and withdrawals.

Fees

In addition to tuition, graduate students are charged mandatory technology, auxiliary, and other fees. Auxiliary fees include University Student Government Association, supporting facilities, student activity, and shuttle fees. Some online programs are exempt from the supporting facilities and shuttle fees.

Indebtedness to the University

Delinquent account/debt collection (financial hold): If students fail to pay their student account in full by the scheduled due date, UMB will place a financial hold on the student account, preventing the student from registering for future classes, receiving transcripts and/or any diploma.

Late Payment Charge: If students fail to pay their student account in full by the scheduled due date, the semester outstanding balance is subject to a one-time late fee of 5% to a maximum of \$200.00.

Collection Agency Fees: If students fail to pay their student account in full by the scheduled due date and fail to make acceptable payment arrangements to bring the account current, UMB may refer the delinquent account to the State of Maryland Central Collection Unit (SCCU). If UMB refers the student account balance to SCCU for collection, a collection fee of 17% will be assessed.

Student Account, eBilling and Payment of Tuition and Fees

University of Maryland Baltimore has partnered with TouchNet® to provide eBills through TouchNet® Bill+Payment™ suite. Students are responsible for paying tuition and fees by the due date even if the student does not receive an eBill notification.

eBills are a snapshot in time and do not reflect any activity (payments, credits, or adjustments) until the next billing cycle.

To view current account balances, recent activity, and estimated financial aid, students may log in to the TouchNet® link via SURFS.

Students may access TouchNet® by logging in to SURFS, then clicking on the TouchNet® link in the Main Menu.

Students are encouraged to review their accounts regularly to ensure all charges and payments are posted correctly. Failure to make payment in full for all outstanding charges results in late fee assessment and registration/transcript holds being placed on your account. Students whom do not have an Authorized User set up are responsible for printing a PDF copy of their bill and

sending it to the payer.

Please contact Student Financial Services if you have any concerns so that discrepancies can be addressed and resolved quickly at: studentaccounthelp@umaryland.edu.

ACH payments are accepted online via the TouchNet® link in SURFS. You may access TouchNet® by logging in to SURFS, then clicking on the TouchNet® link in the Main Menu. *Service fees will not be assessed for online payments made via a checking account (ACH)*

Visa, MasterCard, Discover, and American Express are only accepted via the TouchNet® link in SURFS. You may access TouchNet® by logging in to SURFS, then clicking on the TouchNet® link in the Main Menu. *A non-refundable convenience fee of 2.85% (minimum \$3.00) will be charged for all payments made via credit card*

Due Date and Methods of Payment

UMB accepts payments online, by mail and in person. Please visit <https://www.umaryland.edu/student-financial-services/payments-and-billing/due-dates-and-payment-options/> for more information on payment due dates and methods of payment. Additionally, UMB offers an Installment Plan. A student seeking to pay in installments should email Student Financial Services at studentaccounthelp@umaryland.edu to initiate and execute the agreement before the original due date of the bill.

The terms of the Installment Plan are as follows:

An administrative fee of \$10 per semester is added to the outstanding balance.

One-third (1/3) of the charges plus the \$10 administration fee are due on the original due date.

One-third (1/3) of the charges is due 30 days after the original due date.

One-third (1/3) of the charges is due 60 days after the original due date.

If an installment is received 15 days after the due date, it is considered late and subject to a late fee of \$200 or 5% of the total account balance due, whichever is less.

Returned Check Policy

A service charge of \$25 is assessed for each check that is returned unpaid by the bank for any reason.

Health Insurance Coverage

All full-time students (Graduate Level – 9 credit hours or more, Undergraduate Level – 12 credit hours or more) are automatically billed for and enrolled in the Student Health Insurance Plan (SHIP). This does not include students enrolled in designated Online Only Programs. If students have comparable health insurance coverage they are able to waive the SHIP by completing the online Decision Form by the required waiver deadline, and the SHIP charge will be removed if the waiver is approved.

If full time students are enrolled in online classes that are not part of a designated Online Only Program, they are subject to the health insurance requirement as noted above.

Any students taking fewer than 9 credit hours for Graduate Programs and 12 credit hours for Undergraduate Programs will not be automatically billed for SHIP, but are eligible to enroll on a voluntary basis, excluding students enrolled in a designated Online Only Program. Students who want to enroll in the UMB SHIP will need to complete the Gallagher Decision Form prior to the deadline.

Generally, students enrolled in UMB designated Online Only Programs are not eligible to participate in the UMB SHIP and are not charged the health insurance fee because of the nature of their educational work. This does not include the MSHS Physician Assistant Concentration; these students are enrolled in clinical activities and are required to have health insurance.

For the most up to date information on SHIP and how to complete the decision form, please visit <https://www.umaryland.edu/student-financial-services/student-insurance/>.

Determination of Residency For Tuition Purposes

Applicants seeking classification as a Maryland resident for tuition and charge-differential purposes must complete a Maryland In-State Status form that accompanies the application for admission. It is important that all questions be answered on the form; omitting information will result in out-of-state classification. The statement of residency determination, as defined by the University System of Maryland Board of Regents, and the procedures and policies of in-state residency determination may be found on the Office of the Registrar's website, www.umaryland.edu/orr/. An initial determination of in-state status for admission, tuition, and charge-differential purposes is made by the registrar when a student's application for admission is under consideration. The

determination made at that time and any determination made thereafter shall prevail for each subsequent semester until the determination is challenged successfully in a timely manner. Students may request a re-evaluation of their status by filing a petition for in-state classification for admission, tuition, and charge-differential purposes.

Students must meet the requirements for in-state status and submit a completed petition (including all documents required therein) by the last day of late registration for the semester in which they wish to be classified as in-state. The burden rests upon students to demonstrate to the satisfaction of the University that an in-state classification is appropriate. No change in status requested by students shall be given retroactively. A determination of in-state status is valid only if a student enrolls in the semester for which they applied. Determinations made in cases in which students do not enroll are not valid for a subsequent semester (all requirements must be satisfied independently and a new and timely petition must be submitted).

Graduate Assistantships

Graduate assistantships are available to qualified, full-time, degree-seeking graduate students. An assistantship is awarded to students to enable them to make progress toward a graduate degree and obtain academic or research experience. The duties of a graduate assistant must be consistent with the teaching and research missions of the University. Assistantships are awarded by the program in which the student is enrolled. The assignment depends on the program's needs and the experience and qualifications of the student. Applicants should apply for an assistantship directly to the program in which they wish to study.

Programs offer assistantships based on the availability of funds and admission of the student to degree-seeking status at the University. Graduate assistants must register as full-time students, enroll in degree programs, and make satisfactory progress toward their degrees. Programs normally award assistantships to students who have shown superior aptitude in their fields of study and appear likely to render a high quality of service to the University with their teaching and research activities. All graduate assistants are eligible for tuition remission. A full assistantship carries up to 10 credits of tuition remission each semester — fall and spring. All other fees are the responsibility of the graduate student. Graduate assistantships are awarded with the intent of providing financial support and contributing to the recipient's professional development. In all instances, it is understood that the graduate student's priority should be their studies and research, and that 100 percent of their effort will be devoted to this endeavor. Therefore, graduate assistants are

ineligible for additional awards or employment that includes a work component. A graduate assistant who receives external support for their research will be expected to end their graduate assistantship. These principles also will apply during the summer months for graduate assistants with a 12-month appointment.

Exceptions to this policy require the prior approval of the Graduate School. The Graduate School produces the *Graduate Assistant Policies and Guidelines* handbook, which is available from the Graduate School and is on the Graduate School website.

Other Funding Opportunities

Funding opportunities also are available to graduate students through National Science Foundation and National Institutes of Health programs and many other public and private foundations. Students must apply directly to these programs or foundations. Students eligible for federal Veterans Affairs (VA) benefits should contact the VA representative in the School of Nursing or the Graduate School regarding processing requirements and services for VA benefits.

Need-Based Financial Assistance - Office of Student Financial Assistance and Education

Students may apply for need-based assistance to help meet the costs of tuition, fees, books, supplies, and normal living expenses not covered by tuition remission or other resources. Need-based assistance includes Federal Direct Stafford loans and Federal Direct Grad PLUS. Students seeking assistance from these programs must file a Free Application for Federal Student Aid (FAFSA) for the enrollment year. Students may apply online at <https://studentaid.gov/>. More information is available from the Office of Student Financial Assistance and Education, which may be reached at 410-706-7347, via email at aidtalk@umaryland.edu, or by viewing the eligibility for need-based assistance at www.umaryland.edu/fin.

Graduate School Programs

Aging and Applied Thanatology

<http://graduate.umaryland.edu/thanatology/>

Degree Offered

Postbaccalaureate Certificate

Program Description

Aging and Applied Thanatology is a one-year, 12-credit, online postbaccalaureate certificate program. Students learn about the key issues, theories, research, and clinical practices related to aging, dying, death, and grieving. Students work with leaders in the field, studying topics such as psychosocial perspectives in aging, ethical and legal issues in death and dying, palliative care, and caring for the bereaved.

This program was designed with three guiding principles in mind: translating knowledge into action, taking a holistic and personal approach to learning, and making education available to all. These principles allow students to be better prepared to achieve success in the program while working in the thanatology field.

Three Guiding Principles

- **Translating Knowledge into Action:** We believe it is important that a student's educational experience is relevant, applicable, and practical. As such, course material and experiences focus on skill-based learning and application, particularly in professional contexts.
- **Taking a Holistic and Personal Approach to Learning:** Our integrative and interdisciplinary stance is that the professional is an instrument, be that a healing instrument, an educational instrument, a service instrument, or otherwise. Our motto is to prepare the participant, not just their mind, to work effectively and compassionately in a chosen vocation. We believe that to effectively work with others who are dealing with dying, death, and grief, the professional needs to have addressed their own personal issues related to these areas. As such, courses include relevant self-awareness and self-reflection exercises to prepare the individual personally and professionally.
- **Making Education Available to All:** We believe

the most effective way to ensure availability to all interested individuals is to use online delivery methods. This allows participants from across the nation, and even across the world, to participate in a flexible and convenient manner.

Certificate Objectives

Our goal is to provide our students with advanced knowledge and practical training to ensure that learning is relevant and applicable to each student's professional goals. The program is designed to ensure students gain a greater sense of comfort and competence in addressing the sensitive and complex issues of aging, dying, death, and grieving.

Learning Outcomes

Upon completion of this certificate, students will be able to do the following:

- Recognize common responses to aging, death, dying, and grief as experienced by adults and children.
- Demonstrate sensitivity to individual, developmental, and cultural variations in addressing and coping with aging, dying, death, and grief.
- Communicate effectively with those who are dying and grieving, as well as recognize barriers that can impede effective communication with these populations.
- Use patient-sensitive methods of palliative care based upon an interdisciplinary perspective.
- Describe and apply empirically based methods of therapeutic grief intervention.
- Analyze and evaluate legal and ethical principles and dilemmas regarding death, dying, and end-of-life choices.
- Work effectively as an interprofessional team member around issues related to aging, dying, and grief by developing and applying the competencies of interprofessional practices.
- Evaluate the societal, cultural, and religious/spiritual influences on responses to death and dying.
- Develop greater self-awareness of and coping skills for one's own experiences of and attitudes toward

aging, death, and grief.

- Apply this training for certification through the Association for Death Education and Counseling (ADEC).

Program Admission

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. The Graduate Record Examination is not required for admission.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

Completion of these four courses (3 credits each) is required to obtain a certificate in Aging and Applied Thanatology:

THAN 609	PERSPECTIVES IN AGING	3
THAN 604	DEATH AND DYING: ETHICAL AND LEGAL CONSIDERATIONS	3
THAN 605	PALLIATIVE CARE	3
THAN 606	CARING FOR THE BEREAVED	3

Details are given in the Course Descriptions part of this catalog.

Biomedical Sciences-Dental School

<https://www.dental.umaryland.edu/research/graduate-programs/biomedical-phd-program/>

Degrees Offered

MS, PhD

Program Objectives

DBMS MS

The specific objectives of the DBMS MS are to prepare dentists enrolled in Advanced Dental Education Programs at the University of Maryland School of Dentistry to:

- Advance knowledge in the area of Dental Biomedical Sciences.
- Apply scientific principles to learning and to providing oral health care.
- Critically evaluate the scientific literature through their career.
- Acquire skills in research design and methodology.
- Develop teaching skills and become leading members of the general scientific community.
- Understand multidisciplinary clinical care.
- Conduct their professional practice according to the values of professional ethics and acceptance of cultural diversity.

DBMS PhD

Upon completion of the program, DBMS PhD students will be able to:

- Independently design, conduct and analyze ethical and rigorous biomedical research addressing clinically relevant problems affecting the dental, oral, and craniofacial complex.
- Demonstrate effective scientific oral and written communication skills.
- Appreciate, promote, and advance team science based on the diverse, inclusive, and transdisciplinary nature of dental, oral, and craniofacial research.

Program Description

MS Program

The Dental Biomedical Sciences Master of Science degree (DBMS MS) is designed to complement training undertaken by students in the dental school's certificate

programs, i.e., dental postgraduate trainees. This stand-alone degree is offered exclusively to residents in the dental school's clinical specialty programs who wish to earn the MS degree as part of their advanced training. The DBMS MS prepares dentists for careers in dental education and research. Trainees receive graduate training in the basic sciences, oral biology, and dentistry. Although lecture courses comprise most of the curriculum, many basic science courses include a laboratory component. A significant portion of the program focuses on the design and completion of a master's thesis research project - a requirement of the program. Students may select research advisors from several disciplines and topics from many basic science and clinical research areas. Specialty certificate programs that offer the master's degree in oral biology include:

- Advanced General Dentistry
- Endodontics
- Orthodontics
- Pediatric Dentistry
- Periodontics
- Prosthodontics

PhD Program

The Dental Biomedical Sciences Doctor of Philosophy degree (DBMS PhD) offers a unique program aimed at educating and training dentists in dental, oral, and craniofacial sciences. Our program seeks to build the next generation of new clinician-scientists properly equipped with fundamental scientific knowledge and skills to lead and promote a transdisciplinary approach to research and education in dentistry, nationally and globally. Faculty mentors in the program are internationally renowned scientists carrying out innovative studies to answer timely research questions in broad areas of dental, oral, and craniofacial sciences including dental biomaterials; oral oncology; oral microbial pathogenesis; orofacial neural and pain sciences; tissue engineering, nanotechnology and regenerative medicine; skeletal biology and pathology. The DBMS MS and PhD are offered by the Graduate School in conjunction with the School of Dentistry.

Program Admission

Program Admission DBMS MS Information about the DBMS MS program is presented during the July

orientation for new postgraduate dental students. To be eligible for the DBMS MS, applicants must have a professional degree in dentistry and acceptance into one of the specialty certificate programs listed previously. In addition, they must meet the Graduate School's minimum requirements for admission. Interested students must complete the Graduate School's application. The program coordinator at the School of Dentistry will obtain copies of the necessary documents (e.g., transcripts, TOEFL scores) from the applications to the certificate program and submit them to the Graduate School. The graduate application fee is waived for dental residents. Applicants from outside the United States are required to demonstrate English proficiency.

The Graduate School accepts the TOEFL (Test of English as a Foreign Language), the IELTS (International English Language Testing System) and the Duolingo English Test. Minimum required scores are 80 on the Internet-based TOEFL, 7.0 on the IELTS or 115 on the DET. Scores must be sent directly from TOEFL (please use ETS institution code #5848), the IELTS agency or the Duolingo portal to the Graduate School. DBMS PhD Applicants to the DBMS PhD program must apply directly to the Graduate School by December 15.

Applicants must meet all minimum admission requirements and have a professional dental degree with courses in biology, physics, chemistry, and mathematics through calculus. Applicants from outside the United States are required to demonstrate English proficiency. The Graduate School accepts the TOEFL (Test of English as a Foreign Language), the IELTS (International English Language Testing System) and the Duolingo English Test. Minimum required scores are 80 on the Internet-based TOEFL, 7.0 on the IELTS or 115 on the DET. Scores must be sent directly from TOEFL (please use ETS institution code #5848), the IELTS agency or the Duolingo portal to the Graduate School.

Degree Requirements

DBMS MS

Students pursuing the DBMS MS degree must successfully complete a minimum of 30 credits, which includes 6 credits of master's degree research.

DBMS PhD

In the DBMS PhD program at least 30 credits earned from coursework and laboratory rotations is required prior to advancement to candidacy. PhD candidates must complete

an additional 12 credits of doctoral dissertation research. As part of the graduation requirements, students must have at least one first-author research paper that is either published or accepted for publication.

DBMS MS Required Courses

DBMS 608	INTRODUCTION TO BIOMEDICAL SCIENCES RESEARCH	1
DBMS 638	BIOSTATISTICS	1 TO 3
DBMS 708	LABORATORY ROTATIONS	1 TO 3
DBMS 799	MASTER'S THESIS RESEARCH	1 TO 12

DBMS PhD Required Courses

DBMS 608	INTRODUCTION TO BIOMEDICAL SCIENCES RESEARCH	1
DBMS 618	SPECIAL TOPICS IN BIOMEDICAL SCIENCE	1 TO 3
DBMS 638	BIOSTATISTICS	1 TO 3
CIPP 907	RESEARCH ETHICS	1
DBMS 708	LABORATORY ROTATIONS	1 TO 3
DBMS 898	PRE-CANDIDACY RESEARCH	1 TO 8
DBMS 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12

Available Electives

In the DBMS PhD program, all pre-candidacy students are expected to enroll in advanced DBMS and/or GPLS 600+ level courses. Students have maximum flexibility in selecting these courses based on their area of research interest. See DBMS and other GPLS courses in the Course Descriptions part of this catalog.

Details are given in the Course Descriptions part of this catalog.

Clinical Aspects of Hospice and Palliative Care

<https://www.graduate.umaryland.edu/palliative/About-the-Program/>

Degree Offered

Postbaccalaureate Certificate

Program Description

Clinical Aspects of Hospice and Palliative Care is a 12-credit, online postbaccalaureate graduate certificate program designed to provide learners with experiences designed to foster a deeper knowledge and understanding of the numerous clinical issues in advanced illness. Specifically, participants learn to perform an advanced assessment of a pain complaint (history, physical exam, diagnostics/imaging as necessary) and to demonstrate advanced and in-depth knowledge of the pathogenesis of pain. Participants also acquire in-depth knowledge of evidence-based non-pharmacologic management of pain, and evidence-based advanced pharmacology (including drug therapy selection, dosing, monitoring, and titration), designed to meet patient-centric therapeutic goals. Participants also develop advanced skills used to manage special populations with advanced illness including pediatrics, geriatrics, palliative care emergencies, advanced assessment, and management skills to facilitate withdrawal of life-sustaining treatments, and manage the days before death.

Clinical Aspects of Hospice and Palliative Care is also a concentration of study within the Master of Science in Palliative Care (PALC-MS) program. Credits earned in the stand-alone certificate program may be applied toward the PALC-MS degree requirements.

Program Admission

The target learner audience includes practitioners who are working in hospice and palliative care or aspire to do so, including physicians, advance practice nurses, nurses, pharmacists, and physician assistants.

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is highly selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after admission and all credits for the certificate

must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

PALC 615	ADVANCED PAIN MANAGEMENT AND OPIOID DOSING	3
PALC 611	ADVANCED NON-PAIN SYMPTOM MANAGEMENT	3
PALC 612	ADVANCED DISEASE STATE MANAGEMENT	3
PALC 602	PRINCIPLES AND PRACTICES OF PALLIATIVE CARE EDUCATION	3

Details are given in the Course Descriptions part of this catalog.

Clinical Informatics

Degree Offered

MS, Certificate

<https://www.graduate.umaryland.edu/ClinicalInformatics/>

Program Description

The Clinical Informatics' program curriculum focused on biomedical data, computational systems, and clinical process improvement, which students will apply to the practice of medicine, in order to enhance health outcomes, improve patient care, and strengthen the clinician-patient relationship. Coursework will also address bias, equity, and social determinants of health. This certificate can be applied toward the 34-credit in M.S. in Clinical Informatics.

Students must complete 4 core courses at UMB (12 credits) to complete their graduate certificate in Clinical Informatics. Students will continue their studies, by completing 3 courses (10 credits) in practical activities at UMB, and an additional 4 courses at University of Maryland Baltimore County (12 credits) to complete a PBC in Data Science, for a total of 34 program credits.

The instruction will be conducted in a hyflex environment. All didactic courses will be accessible online. The practical courses will have both on-site and online options.

The degree is designed for completion within 3 years academic years, but students are allowed up to 5 years to complete the program.

Participants can start the program in the fall semester.

Required Courses w/ approved course description.

Clinical Informatics PBC, UMBC's Data Science PBC and the Practical coursework combined makeup the MS program.

MS Program Description:

The 34-credit M.S. in Clinical Informatics was created for physicians, advanced practice providers, nurses, pharmacists, other healthcare professionals, biologists, and computer scientists who are committed to improving the quality of care provided to patients by analyzing information collected by healthcare organizations. The M.S. in Clinical Informatics is organized around two 12-credit graduate certificates in Clinical Informatics and Data Science, along with hands-on practicums and conferences.

PBC Program Description:

The 12-credit graduate certificate Clinical Informatics is created for physicians, nurses, pharmacists, other healthcare professionals, biologists, and other scientists committed to improving the quality of care provided to patients by analyzing information collected by healthcare organizations.

Program Admission

Physicians, nurses, pharmacists, scientists, and researchers trained in informatics will be uniquely equipped to direct optimal implementation of health information technology for clinical care delivery and continuous quality improvement. The MS in Clinical Informatics is designed for professionals who are committed to improving our national health agenda.

Here's what you'll need:

Transcripts

Upload your transcripts as a supplemental item to the online application.

You must submit transcripts from each college/university attended, including coursework in progress at time of application. Unofficial copies may be provided for the application review process.

If you are offered admission, you must then provide official transcripts from each college/university from which a degree was earned. The transcript must be provided to the Graduate School directly from the prior, degree-granting institution in a sealed envelope in order for that document to be considered official. Alternatively, it may be provided to the Graduate School electronically by way of a secure, encrypted platform. Each transcript should bear the signature of the registrar and the seal of the granting institution.

Transcripts (US only) may be obtained from/provided by one of the following secure, encrypted transcript services:

<https://www.parchment.com/>
<https://studentclearinghouse.org/transcriptservices/fast/>

Send **encrypted, electronic transcripts** from your issuing institution to: gradapply@umaryland.edu

If provided by mail, send official transcripts in sealed envelopes to:

ATTN: Admissions
University of Maryland, Baltimore
Graduate School
620 West Lexington Street
Baltimore, Maryland 21201-1508

Essay and Resume

Essay

Your essay must be uploaded as a supplemental item to the online application. The statement should be between 300- to 500-words and should address your academic and/or professional career goals and objectives in pursuing graduate study.

CV or Resume

A Curriculum Vitae (CV) or resume is required by most graduate programs. Your CV or resume must be uploaded as part of the online application.

Residency Specific

English Language Proficiency (International Applicants Only)

The Graduate School accepts the TOEFL (Test of English as a Foreign Language) or the IELTS (International

English Language Testing System) as a measure of English proficiency. Minimum, required scores are 80 on the Internet-based TOEFL, and 7.0 on the IELTS. Scores must be sent directly from ETS (for TOEFL, use institution code #5848) or the IELTS agency to the Graduate School.

Application for in-state status classification

Maryland residents only. If you wish to be considered for in-state residency status for admission and tuition purposes you must complete an Application for In-State Classification and submit it to the campus classification officer within the Office of the Registrar.

If you have problems with or questions about the application process, please contact us at 410.706.7131 or gradapply@umaryland.edu

Degree Requirements

Clinical Informatics PBC Coursework (12 Credits)

Foundations in Clinical and Health Informatics (3 Credits)

This course will cover the fundamentals of informatics as it applies to healthcare and research. The course focuses on the expanding role of information technology for the delivery of healthcare, and provides a theoretical and practical introduction to the assessment, implementation, and management of these systems. The course underscores the application of these systems to the practice of medicine, in order to enhance health outcomes, improve patient care, and strengthen the clinician-patient relationship. Topics will emphasize the clinical informatics board-certification core content, which include fundamentals of clinical and biomedical informatics, clinical decision making and process improvement, health information systems, equity and social determinants of health, and management.

Clinical Information Systems (3 credits)

This course will cover advanced concepts of informatics as it applies to healthcare and research, with a focus on critical thinking skills. The course is the second of a two-part series of courses in Clinical Informatics. The focus of the course will be on the software engineering and socio-technical challenges specific to the design, development,

validation, and implementation of these systems. Topics will include clinical software engineering, continuous process improvement, decision support systems, bioinformatics, public health informatics, telehealth, clinical imaging systems, personalized medicine, and health informatics literature.

Computer Literacy and Programming for Healthcare Personnel (3 Credits)

This course will provide an introductory overview of computer science and programming for students who are not working in technology-based professions. This course is meant for beginners, with no prior experience in computer programming, and is meant to introduce healthcare professionals to the fundamentals of computer programming and information systems. Topics include fundamental programming concepts, fundamental data structures, scripting languages, web-based systems, algorithm design, database design, human factors, and software lifecycles.

Decision Support Systems in Healthcare (3 credits)

This course will give students an overview of information systems and decision systems used in health organizations. The course will examine the design, development, and implementation of decision support systems, focusing on how they fit into clinical workflows across various healthcare settings. Students will examine the analytical foundations of these systems, identify areas that might benefit from these systems, and gain an understanding in the challenges surrounding their implementation. Topics include decision support, evidence-based care, process improvement, privacy and security, unintended bias, database analysis and design, and data and information flow.

UMBC Data Science PBC Coursework (12 Credits)

Intro to Data Science (3 credits)

The goal of this class is to give students an introduction to and hands on experience with all phases of the data science process using real data and modern tools. Topics that will be covered include data formats, loading, and cleaning; data storage in relational and non-relational stores; data analysis using supervised and unsupervised learning using Python; data visualization; and scaling up for Big Data.

Intro to Data Analysis and Machine Learning (3 credits)

This course provides a broad introduction to the practical side of machine-learning and data analysis. Topics covered

include decision trees, logistic regression, linear discriminant analysis, linear and nonlinear regression, basic functions, support vector machines, neural networks, ensemble methods, evaluation methodologies, experiment design, and Bayesian networks.

Platforms for Big Data Processing (3 credits)

The goal of this course is to introduce methods, technologies, and computing platforms for performing data analysis at scale. Topics include the theory and techniques for data acquisition, cleansing, aggregation, management of large heterogeneous data collections, processing, information and knowledge extraction. Students are introduced to map-reduce, streaming, and external memory algorithms and their implementations using Hadoop and its eco-system (HBase, Hive, Pig and Spark). Students will gain practical experience in analyzing large existing databases.

Data Management (3 credits)

This course is specifically designed to support the range of complex data challenges data practitioners face today from optimizing relational database systems to managing big data. Students will get an overview of relational database management systems, SQL programming, and emerging big data technologies. Advanced topics include parallel and GPU computing using expert driven course materials and hands on labs from Nvidia.

Practical Coursework (10 Credits)

Clinical Informatics Conference (1 Credit)

This course will give students the opportunity to discuss and learn about important issues in the use of information technology to improve patient care. The conference meets monthly each semester, with students required to enroll for a minimum of 4 semesters to complete the M.S. in Clinical Informatics. Activities in the conference include grand rounds, journal club, and board review activities. Student can join the conference in-person or online.

Clinical Informatics Practicum (3 Credits)

This course will give students the ability to demonstrate the knowledge and skills that have been acquired, with a focus on data collection, project management, and presentation skills. Students will be embedded in an informatics setting within the University of Maryland Medical System, work with interdisciplinary teams to address significant informatics challenges in both clinical and academic settings. As an alternative to embedding students on-site at the University of Maryland, distance-

learning students can work online to develop a proposal and perform independent work under the supervision of an advisor.

Advanced Clinical Informatics Practicum (3 Credits)

This course will give advancing students the ability to demonstrate substantive application of the knowledge and skills that have been acquired, with a focus on performing independent research. Students will be embedded in an informatics setting within the University of Maryland Medical System or an academic setting within the University of Maryland. As an alternative to embedding students on-site at the University of Maryland, distance-learning students can work online to develop a proposal and perform independent work under the supervision of an advisor.

Diversity Equity and Inclusion Leadership - MS

Degree Offered

Master of Science in Diversity, Equity, and Inclusion Leadership

Program Description

The 31-credit MS in Diversity, Equity and Inclusion Leadership provides learners with the tools necessary to serve in leadership roles that marshal agency, organizational, and/or institutional efforts to create and maintain environments that go further than supporting the needs of individuals of diverse identities, but center belongingness and the critical examination of policies and practices that disproportionately impact individuals and groups based on their group membership. Diversity, equity, and inclusion practitioners are vital in supporting organizations as they work to optimize and/or re-imagine organizational culture to meet diversity, equity, and inclusion goals.

Students will examine critical theories and frameworks that will guide their practice and practical application. The MS in Diversity, Equity and Inclusion Leadership will explore race, ethnicity, gender, and culture in the U.S. context, leadership, executive writing, statistics and evaluation, evidence-based practices, and the role of laws and policies. Intercultural and inclusive learning competencies will be addressed as a thread through the curriculum.

Program Admission

Candidates for admission must meet the minimum standards of admission established by the Graduate School

and provide the requisite credentials. Admission to the certificate program is selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Degree Requirements

The MS in Diversity, Equity and Inclusion Leadership will consist of 11 courses with a total of 31 credits. The instruction will primarily occur online and will include both synchronous and asynchronous learning. While asynchronous activities will concentrate on lectures, readings, discussions, and critical reflection, etc., the synchronous activities will consist of real-time discussions, small group work, role-playing exercises, and mock facilitation essential to building the capacity to serve as a diversity, equity, and inclusive practitioner. The one-credit Intercultural Impact Institute is currently designed as a two-day in-person institute consisting of face-to-face lectures, trainings, discussions, and presentations at UMB's campus in Baltimore, MD.

Required Courses

HPE 615	FOUNDATIONS IN STATISTICS FOR SOCIAL SCIENCES	3
MLL 625	INTERCULTURAL AND CROSS-CULTURAL COMMUNICATION	3
INCL 632	HISTORICAL EXPLORATION OF RACE IN THE US	3
INCL 633	HISTORICAL EXPLORATION OF CULTURE IN THE US	3
INCL 640	PRACTICAL APPLICATION OF INTERCULTURAL LEADERSHIP	3
INCL 643	INTERCULTURAL IMPACT INSTITUTE	1
DEIL 710	EMPLOYMENT DISCRIMINATION LAW & POLICY	3
DEIL 720	CRITICAL APPRAISAL OF DIVERSITY, EQUITY, AND INCLUSION LITERATURE	3
DEIL 740	STRATEGIC EXECUTIVE WRITING	3
DEIL 790	DEI EVIDENCE-BASED LEADERSHIP TOOLKIT	3
DEIL 798	CAPSTONE FOR	3

DIVERSITY, EQUITY AND
INCLUSION LEADERSHIP

Subtotal: 31

Details are given in the Course Descriptions part of this catalog.

Forensic Medicine

<http://www.graduate.umaryland.edu/forensicmedicine/>

Degree Offered

MS

Program Description

Forensic medicine applies the principles and knowledge of medical sciences and technologies to the purposes of the law, as in determining the cause of death. This program is designed to give its graduates the knowledge and skills to allow them to contribute to the medico-legal death investigation system and to the legal justice systems. These contributions include the generation of knowledge in the field through submission of a manuscript for publication. Students also may be seeking enhanced professional training or may desire a career in the following areas:

- Death investigation supporting forensic Pathologists's
- Assistance for Pathologists's in autopsy performance
- Forensic Pathologists'
- Police organizations
- Prosecutors' offices
- Departments/divisions of forensic medicine/science in medical colleges and universities
- Government or private forensic medical societies

The Master of Science (MS) in Forensic Medicine is a full-time, nonthesis, 12- to 18-month graduate degree program that prepares students for careers in forensic medicine.

Students participate in classroom and online lectures, case discussions, and laboratory training. The curriculum focuses on forensic pathology, forensic autopsy, medico-legal death investigation, postmortem radiology, forensic odontology, and forensic anthropology. The state's Office of the Chief Medical Examiner and the University of Maryland, Baltimore offer this program collaboratively, giving students the opportunity to study in one of the nation's best medical examination facilities under the

guidance of licensed and board-certified forensic Pathologists's at a University renowned for biomedical science research. Graduates will be prepared for job opportunities such as death investigation, assisting the Pathologists's in autopsy performance, and working in police organizations, prosecutors' offices, and departments of forensic medicine.

The program also offers preparation for medical school and a specialization in forensic pathology.

In addition to the 30-credit full-time program, a dual-degree MS/JM is offered with the China University of Political Science and Law (CUPL). Through a sharing of credits between the two universities, students may earn a Master of Science from UMB and a Juris Masters from CUPL.*

Program Admission

The Master of Science in Forensic Medicine program is designed for individuals who have an undergraduate degree and a background in health or biological sciences. Candidates with backgrounds in other areas such as forensic studies, criminal justice, and legal studies also may be considered, provided they have the prerequisite coursework cited below.

Candidates who wish to enter the MS in Forensic Medicine program must have a bachelor's degree (BA or BS) from an accredited U.S. institution. The students' undergraduate program must reflect the successful completion of the following coursework: biology, general chemistry, organic chemistry, biochemistry, microbiology, mathematics, and English composition. International candidates with a bachelor's degree in medicine (BM) or a similar degree who possess adequate preparation for the graduate program also may be considered. An outstanding candidate will demonstrate proficiency in anatomy and physiology.

In addition to qualifications previously noted, candidates for admission must meet the minimum qualifications and standards established by the Graduate School. Graduate Record Examinations scores are required to be considered for admission. In addition, an interview may be requested. International students must provide current, official results of the Test of English as a Foreign Language (minimum score of 80 for the internet-based test) or the International English Language Testing System (minimum score of Band 7). Application deadlines and required credentials are regularly published by the Graduate School and the

Forensic Medicine program.

Degree Requirements

The master's degree program requires a minimum of 30 credits. Students must maintain a minimum cumulative grade-point average of 3.0 to remain in good standing in the program. A complete description of progression guidelines and degree requirements is provided in the Degree Requirements section of this catalog.

Required Courses

FMED 710	FORENSIC PATHOLOGY	6
FMED 720	FORENSIC AUTOPSY	3
FMED 730	MEDICO-LEGAL DEATH SCENE INVESTIGATION	1 TO 3
FMED 740	EPIDEMIOLOGICAL DATA RESEARCH CAPSTONE PROJECT	1 TO 6
PATH 602	SYSTEMIC PATHOLOGY	3
	Or	
PATH 603	GENERAL PATHOLOGY	3
TOXI 607	FORENSIC TOXICOLOGY	3
FMED 610	FORENSIC TOXICOLOGY LABORATORY	3
FMED 830	FORENSIC RADIOLOGY	1 TO 2
FMED 840	FORENSIC ODONTOLOGY AND FORENSIC ANTHROPOLOGY	2
LAW 515S		

Available Electives

MHS 652	LEADERSHIP AND COMMUNICATION	3
DBMS 638	BIOSTATISTICS	1 TO 3
MEDT 631	RESEARCH DESIGN	2

Details are given in the Course Descriptions part of this catalog.

*This option is a nonthesis, full-time, one-year program available to CUPL Juris Masters (JM) students only. Students in this option earn 20 credits at UMB and 65 credits at CUPL and are awarded the MS by UMB and the JM by CUPL. Specifically, 10 credits of coursework from the CUPL are applied to the MS degree at UMB. Courses offered by CUPL (Beijing) before enrollment at UMB include: Introduction to Forensic Science, Evidence Investigation, Forensic Biological Evidence, and Clinical Forensic Medicine.

Global Health

<https://www.graduate.umaryland.edu/globalhealthms/>

Degree Offered

MS

Program Description

The Master of Science (M.S.) in Global Health is a fully online, 31-credit program that will allow students to be trained in best practices of global health education, research, and practice and to specialize in one of two areas of concentration. The M.S. in Global Health program is organized around a completely online core curriculum (19 credits). The areas of concentration are: 1) Implementation and Dissemination Science (online); 2) Global Health Program Monitoring and Evaluation (online); . Students can also pursue the degree with no concentration but rather pursue a generalized 31-credit M.S. in Global Health. Degree students are required to complete a research seminar (online) followed by a capstone project (online) on a global health topic chosen in cooperation with UMB faculty. Full- and part-time plans of study are available to students.

Learning Outcome

By the completion of the proposed M.S. in Global Health and consistent with the Consortium of Universities for Global Health (CUGH) competencies, students will be able to:

1. Understand the Global Burden of Disease, and
 - a. Describe the major cause of morbidity and mortality around the world, and how the risk of disease varies with regions
 - b. Analyze major public health efforts to reduce disparities in global health (such as Sustainable Development Goals (SDGs) and Global Fund to Fight AIDS, TB, and Malaria).
 - c. Validate the health status of populations using available data (e.g., public health surveillance data, vital statistics, registries, surveys, electronic health records and health plan claims data).
2. Understand Globalization of Health and Health Care, and
 - a. Critically evaluate different national models or

- health systems for provision of healthcare and their respective effects on health and healthcare expenditure.
- b. Analyze how global trends in healthcare practice, commerce and culture, multinational agreements and multinational organizations contribute to the quality and availability of health and healthcare locally and internationally.
 - c. Describe how travel and trade contribute to the spread of communicable and chronic disease.
 - d. Critique general trends and influences in the global availability and movement of health care workers.
3. Understand Social and Environmental Determinants of Health, and
 - a. Describe how cultural context influences perceptions of health and disease.
 - b. List major social and economic determinants of health and their impacts on the access to and quality of health services and on differences in morbidity and mortality between and within countries.
 - c. Analyze the relationship between access to and quality of water, sanitation, food and air on individual and population health.
 4. Understand Capacity Strengthening, and
 - a. Collaborate with a host or partner organization to assess the organization's operational capacity.
 - b. Co-create strategies with the community to strengthen community capabilities and contribute to reduction in health disparities and improvement of community health.
 - c. Integrate community assets and resources to improve the health of individuals and populations.
 5. Understand Collaboration, Partnering and Communication, and
 - a. Include representatives of diverse constituencies in community partnerships and foster interactive learning with these partners.
 - b. Demonstrate diplomacy and build trust with community partners.
 6. Understand Global Health Ethics, and
 - a. Demonstrate an understanding of and an ability to resolve common ethical issues and challenges that arise in working within diverse economic, political and cultural contexts as well as working with vulnerable populations and in low resource settings to address global health issues.
 - b. Demonstrate an awareness of local and national codes of ethics relevant to one's working environment.
 - c. Apply the fundamental principles of international standards for the protection of human subjects in diverse cultural settings.
 7. Understand Professional Practice, and
 - a. Exhibit integrity, regard and respect for others in all aspects of professional practice.
 - b. Articulate barriers to health and healthcare in low-resource settings locally and internationally.
 - c. Demonstrate the ability to adapt clinical or discipline-specific skills and practice in a resource-constrained setting.
 8. Understand Health Equity and Social Justice, and
 - a. Apply social justice and human rights principles in addressing global health problems.
 - b. Implement and evaluate strategies to engage marginalized and vulnerable populations in making decisions that affect their health and well-being.
 - c. Demonstrate a basic understanding of the
 - c. Communicate joint lessons learned to community partners and global constituencies.
 - d. Exhibit interprofessional values and communication skills that demonstrate respect for, and awareness of, the unique cultures, values, roles/responsibilities and expertise represented by other professionals and groups that work in global health.
 - e. Acknowledge one's limitations in skills, knowledge, and abilities.
 - f. Apply leadership practices that support collaborative practice and team effectiveness.

relationship between health, human rights, and global inequities.

- d. Describe the role of WHO in linking health and human rights, the Universal Declaration of Human Rights, International Ethical Guidelines for Biomedical Research involving human subjects.
 - e. Exhibit a commitment to social responsibility.
 - f. Develop understanding and awareness of the health care workforce crisis in the developing world, the factors that contribute to this, and strategies to address this problem.
9. Understand Program Management, and
 - a. Plan, implement, and evaluate an evidence-based program.
 - b. Apply project management techniques throughout program planning, implementation, and evaluation.
 10. Understand Sociocultural and Political Awareness, and
 - a. Model the roles and relationships of the major entities influencing global health and development.
 11. Understand Strategic Analysis, and
 - a. Identify how demographic and other major factors can influence patterns of morbidity, mortality, and disability in a define population.
 - b. Execute a community needs assessment.
 - c. Conduct a situational analysis across a range of cultural, economic, and health contexts.
 - d. Design context-specific health interventions and evaluations based upon situational analysis.

Program Admission

The minimum academic standard for admission to the Graduate School is a B average, or 3.0 on a 4.0 scale, in a program resulting in the award of a bachelor's degree from a regionally accredited college or university, or an equivalent degree and standing from a comparable foreign institution.

Degree Requirements

Degree candidates must complete a minimum of 31 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the degree. All requirements for the degree must be completed within three years after admission and all credits for the degree must be completed at the University of Maryland, Baltimore. Complete guidelines and requirements for progression and completion are outlined in the Academic Performance and Progress section of this catalog.

Required Courses

MHS 600	INTRODUCTION TO LIBRARY RESOURCES AND SCHOLARLY WRITING	1
MHS 605	PERSPECTIVES ON GLOBAL HEALTH	3
CIPP 960	GLOBAL WOMEN'S HEALTH	3
ETHC 638	ISSUES IN INTERNATIONAL RESEARCH ETHICS	3
MHS 608	RESEARCH SEMINAR I	3

Concentrations and Elective Courses

Global Health Innovation Concentration

Global Health Program Monitoring and Evaluation Concentration

This curriculum prepares student to understand and analyze the key elements of program monitoring and evaluation: assess population health needs using qualitative and quantitative information, identify key program elements and their implementation, monitor the program's cost and efficiency, and evaluate the success of implementation, including program outcomes.

GLBH 607	GLOBAL HEALTH PROGRAM MONITORING & EVALUATION I	3
MHS 610	NATIONAL AND INTERNATIONAL APPROACHES TO HEALTHCARE AT THE COMMUNITY LEVEL	3
GLBH 612	GLOBAL HEALTH	3

	PROGRAM MONITORING & EVALUATION II	
GLBH 620	GLOBAL DISEASE CONTROL	3

Implementation and Dissemination Science
Concentration

Students interested in Implementation and Dissemination Science will have the opportunity to learn about a field that is quickly emerging worldwide. With this degree, students will be able to study methods that promote systematic uptake and translate the results of clinical and population research into everyday clinical practice and public health. We also intend to help students ensure that the knowledge and materials produced by health research will improve individual and population health.

MHS 613	RESEARCH IMPLEMENTATION AND DISSEMINATION I	3
MHS 614	RESEARCH IMPLEMENTATION AND DISSEMINATION II	3
MHS 630	ESSENTIALS OF CHRONIC INFECTIOUS EPIDEMIOLOGY	3
MHS 631	GLOBAL NON- COMMUNICABLE (NCD) EPIDEMIOLOGY	3

Details are given in the Course Descriptions part of this catalog.

Global Health Monitoring and Evaluation

Degree Offered

Certificate

Program Description

The 12-credit Global Health Monitoring and Evaluation graduate certificate program equips students with the essential tools needed to understand and judge the impact that global health interventions and policies have in communities. This curriculum prepares students to understand the global burden of disease; globalization of health and health care; social and environmental determinants of health; global health ethics; professional practice and various other proficiencies.

At the conclusion of their studies, students in the Global Health Monitoring and Evaluation program will be prepared to:

- Understand program management.
- Plan, implement, and evaluate an evidence-based program.
- Apply project management techniques throughout program planning, implementation, and evaluation.
- Comprehend strategic analysis and identify how demographic and other major factors can influence patterns of morbidity, mortality, and disability in a define population.
- Execute a community needs assessment.
- Conduct a situational analysis across a range of cultural, economic, and health contexts.
- Design context-specific health interventions and evaluations based upon situational analysis.

Program Admission

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Degree Requirements

Students must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

GLBH 607	GLOBAL HEALTH PROGRAM MONITORING & EVALUATION I	3
MHS 610	NATIONAL AND INTERNATIONAL APPROACHES TO HEALTHCARE AT THE	3

	COMMUNITY LEVEL	
GLBH 612	GLOBAL HEALTH PROGRAM MONITORING & EVALUATION II	3
GLBH 620	GLOBAL DISEASE CONTROL	3

Details are given in the Course Descriptions part of this catalog.

Global Health Systems

<https://www.graduate.umaryland.edu/globalinnovation/>

Degree Offered

Postbaccalaureate Certificate

Program Description

The Global Health Innovation Certificate is a 12-credit, five course graduate certificate program that takes place during a 10-week living and learning experience in Costa Rica. Although the certificate is considered a semester-long program, the entirety of each course is taught in-person during the 10-week experience in Costa Rica. Some orientation and assignments will take place in an online format (which will be available in Costa Rica). The program offers courses in Intercultural Communication, Conflict Resolution, Global Health and Social Innovation, Innovations for Universal Health Care, and Urban Health, all of which are taught by bilingual Costa Rican faculty from the InterAmerican Center for Global Health (CISG).

The program is taught by Costa Rican facilitators from the InterAmerican Center for Global Health (CISG) who have faculty appointments at the University of Maryland Baltimore Graduate School. Instruction is in English. While in Costa Rica, field visits are conducted (with interpreters when necessary) to communities, organizations, and important leaders engaged in public health and innovation. The final 4-week practicum project challenges students to identify an innovation in Costa Rica and create a roadmap for scaling the innovation and delivering it to the US and broader contexts. Throughout this process, students work closely with CISG faculty and a local, project-specific preceptor. While studying concepts in innovation, students learn about community development priorities, human rights, health care access challenges, social justice initiatives, environmental sustainability programs and other important elements of innovation aimed at protecting the most vulnerable.

Certificate Objectives

- Understand practical issues in global health and development, including concepts in the fields of innovation, complexity science, social determinants of health, health care disparities, community engagement, and product development that influence innovation in this dynamic sector.
- Identify a health (or health care) challenge and describe the process of working with community partners and other stakeholders (e.g. private sector, government institutions, and academia) to define and design a solution to the issues related to the challenge.
- Describe the economic, technical, political and other systemic factors that pull innovation forward, that push it from behind, and often block its successful implementation and scaling.
- Apply and develop innovation and entrepreneurial models and processes to resolve challenges and advance global health, particularly in the translation of ideas and interventions across borders.
- Demonstrate the capacity to engage in ethical and respectful relations and make ethical and responsible decisions that benefit individuals, communities and other stakeholders.

Program Admission

Applicants for admission must meet the minimum admission requirements of the Graduate School. The interprofessional program is open to students with diverse academic backgrounds.

Additionally, admitted students will need a valid passport, airplane ticket, visa (if necessary – not necessary for US passport holders), and CDC-required and recommended vaccinations to participate in the program.

Admitted students are automatically be enrolled in the UMB Student Health Plan, and will need to process a waiver request if they have proof of alternative insurance.

Degree Requirements

Students must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after

admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

The program requires travel to and from Costa Rica and a 10-week intensive study and work experience on the ground in various locations in Costa Rica.

Much of the program takes place in rural and hard-to-access areas of Costa Rica where certain services and amenities (such as wi-fi and grocery stores) may not be available at all times.

Required Courses

INNO 601	INTERCULTURAL COMMUNICATION AND CONFLICT RESOLUTION	1
INNO 602	GLOBAL HEALTH AND SOCIAL INNOVATION	2
INNO 603	Health Systems: Innovations for Universal Health Care	2
INNO 604	Urban Health and Social Innovation Lab	2
INNO 605	Global Health and Social Innovation Practicum	5

Details are given in the Course Descriptions part of this catalog.

Graduate Program in Life Sciences

<http://lifesciences.umaryland.edu/>

Degrees Offered

PhD, MS, Postbaccalaureate Certificate, MD/PhD

Overview

The Graduate Program in Life Sciences (GPILS) in the School of Medicine offers cutting-edge research training in basic, biomedical, translational, clinical, and population sciences.

Our graduate programs in biochemistry and molecular biology, epidemiology and human genetics, gerontology, molecular medicine, molecular microbiology and immunology, neuroscience, and physical rehabilitation science award the PhD degree emphasizing the continuum from bench to bedside to population. Additionally, there are three MS programs: cellular and molecular biomedical science, epidemiology and preventive medicine, and

toxicology. GPILS hosts a postbaccalaureate certificate program in clinical research as well. In all of these programs, students are provided integrative training that will meet the demands of the era that now follows the structural elucidation of the genome and the urgent need to translate biomedical advances to patients and communities. Students are well-prepared for careers in academia, industry, or government. Our ideal location within the nexus of biomedical research on the East Coast provides students with an unparalleled breadth and depth of expertise.

Program Admission

In addition to meeting the Graduate School's minimum admission requirements, applicants should have a bachelor's degree with training in an appropriate major field of biology or biomedical sciences. All supporting documents for admission are shared with the respective GPILS programs. While each GPILS program has its own admissions criteria, the quality of students each program aims to enroll is of a high caliber. A competitive applicant achieves upper-percentile scores on the Graduate Record Examinations, a cumulative grade-point average above 3.0 (on a 4.0 scale), and some degree of research experience. While all elements of an applicant's background are considered, letters of recommendation and practical experience weigh heavily in admissions decisions.

Interested applicants are encouraged to contact the appropriate program staff. Contact information can be found on each program's website at <http://lifesciences.umaryland.edu/>.

Courses

See listings under GPILS in the Course Descriptions part of this catalog.

Biochemistry And Molecular Biology

Graduate Program in Life Sciences

<http://lifesciences.umaryland.edu/biochemistry/>

Degrees Offered

PhD, MD/PhD, MS

Program Description

The combined graduate program in biochemistry and molecular biology is an intercampus program combining training opportunities at the University of Maryland, Baltimore (UMB) and the University of Maryland,

Baltimore County (UMBC). Students in this joint program benefit from the extensive facilities and resources of both campuses and the opportunity to interact with a large pool of scientists.

The program offers a wide range of research training opportunities with particular strengths in molecular biology, protein structure and function, membrane biochemistry, and physical biochemistry. These areas include but are not limited to: mechanisms and regulation of gene expression, DNA packaging and repair, protein and RNA structural biology, cancer and epithelial cell biology, stem cell biology, calcium and signal transduction pathways, metabolism and bioenergetics, the cellular matrix and migration, fluorescence spectroscopy, membrane and cytoskeletal biology, retrovirus structure and function, prion structure and function, computational biology, and bacterial pathogenesis.

Program Admission

Applicants must receive the approval of the Biochemistry and Molecular Biology Graduate Governing Committee for admission. Approval is normally based upon undergraduate courses and grades, letters of recommendation, and, wherever possible, personal interviews. Previous success in graduate education also is taken into consideration. In addition to meeting the Graduate School's requirements for admission, each entering student is expected to satisfy minimum requirements in the fields of biochemistry, organic chemistry, and physical chemistry or molecular/cell biology. Students with deficiencies in these areas will not ordinarily be considered for admission.

Degree Requirements

The MS and PhD degrees in biochemistry and molecular biology require the completion of 30 course credits. For thesis-master's students, master's thesis research under the supervision of a faculty mentor, culminating in the preparation and defense of the research thesis, replaces 6 of these credits. PhD candidates must successfully complete a minimum of 12 credits of doctoral dissertation research in addition to all required coursework.

1. Qualifying exam: PhD students are required to pass an oral qualifying exam no later than six months after the completion of their course requirements. Two weeks before the exam, students are required to submit a National Institutes of Health-style research proposal to their advisory committee that is based on their proposed PhD research. The format of this proposal must follow the page limits and any other rules and regulations of an actual NIH

predoctoral fellowship proposal. Students may submit this proposal to the NIH or another appropriate granting agency (e.g., the American Heart Association), although this is not required. The research proposal must be defended orally to the student's advisory committee as part of the exam.

During the oral qualifying exam, students also are tested on their general knowledge of biochemistry and molecular biology, including: molecular biology, enzymology and bioorganic chemistry, physical and structural biochemistry, and metabolism and regulation.

The outcome of the oral exam can be: pass; fail, with retake within three months; or fail, with the possibility of being awarded a terminal MS (MS is awarded only if in good academic standing with a 3.0 or better grade-point average). In cases in which a student fails and cannot retake the exam, the program director will determine whether the student qualifies for a terminal master's degree.

In addition to meeting the Graduate School's GPA requirement, PhD students must achieve at least a B average (GPA of 3.0 or higher) over the first two years of enrollment. The program generally dismisses students who have a GPA below 3.0 at this time. At the discretion of the Graduate Governing Committee, students who do not meet the GPA requirement may be permitted to take an additional course if they are doing well in the program and it would mathematically allow them to achieve an overall GPA of 3.0 or better (i.e., for students whose GPA is nearly 3.0). Such decisions are made on a case-by-case basis by the Graduate Governing Committee.

2. Core course requirement:

Students have the option to choose from the GPILS core course (GPLS 601; 8 credits) or the two-semester biochemistry course at UMBC (CHEM 437, CHEM 638; 8 credits). The decision regarding the core course(s) for a student is based upon their undergraduate record in biochemistry and other advanced science courses.

3. Additional Courses

GPLS 709	ADVANCED BIOCHEMISTRY	3
GPLS 701	ADVANCED MOLECULAR BIOLOGY	3
GPLS 713	BIOCHEMISTRY STUDENT SEMINAR	2
GPLS 608	SEMINAR	1 OR 2
GPLS 609	LABORATORY ROTATIONS	1 TO 3
CIPP 907	RESEARCH ETHICS	1

6 credits of general electives, including at least one course at UMBC, are also required.

GPLS 713: two semesters

GPLS 608: two semesters

Details are given in the Course Descriptions part of this catalog.

Cellular and Molecular Biomedical Science

Graduate Program in Life Sciences

<http://lifesciences.umaryland.edu/CMBS/>

Degree Offered

MS

Program Description

The Cellular and Molecular Biomedical Science (CMBS) MS Program at the University of Maryland emphasizes medically-relevant scientific research and education, utilizing state-of-the-art resources. The program is designed as a 2-year curriculum for full-time students, but may be completed over 5 years for part-time, working students. Students will become fluent in the study and implementation of biomedical research and will be well prepared as skilled researchers for careers in academic research centers, government, and industry, including biotechnology firms and pharmaceutical companies.

The CMBS MS Program combines traditional areas of biomedical study, including molecular and cell biology, neuroscience, pharmacology, physiology, cancer biology, and genomics into a unique interdisciplinary graduate training program. Specifically designed to develop scientists for the post-genomic era, CMBS students will gain knowledge, research skills, and familiarity with the state-of-the-art biomedical tools and methodologies to solve important and timely questions in biomedical science.

Graduate students from the program have gone on to enter PhD, MD, MD/PhD, and DO programs, and become research assistants or project managers.

Program Admission

Applicants should have a bachelor's degree and have undergraduate experience or training in the biological sciences, chemistry, mathematics, and general physics. Research experience in the biomedical sciences is

desirable, but not required. The Admissions Committee evaluates the entire application packet from a holistic standpoint. Applicants are encouraged to have very strong letters of recommendation, and a cumulative grade-point average of 3.0 or above.

Additionally, all international students must meet the Graduate School's minimum requirements for scores from the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exam. The Graduate Programs in Life Sciences (GPILS) requires international applicants to provide a transcript evaluation from a NACES member evaluation agency in addition to official, translated transcripts or mark sheets. The deadline for priority and international applicants is March 1. Admission to the program is highly competitive, and offers of admission are made on a monthly basis and will start going out at the beginning of April. It is highly recommended that all documentation and materials are submitted as early as possible so that a complete application is available for review. Incomplete applications will not be reviewed, and applicants will have to apply for the following application cycle.

Degree Requirements

In the first semester, students participate in an innovative and intensive core course, Mechanisms in Biomedical Sciences (GPLS 601), or Cellular and Molecular Basis of Translational Research (GPLS 600) depending on the student's goals upon completion of the program. These courses are supplemented with material in one of the following: Current Topics in Vascular/Stem Cell Biology (GPLS 690), Current Topics in Neuroscience (GPLS 691), Current Topics in Genome Biology (GPLS 692), or Current Topics in Microbiology (GPLS 693).

Students in the program must complete a course in ethics and in biostatistics. Subsequent coursework and laboratory rotations are tailored to meet each student's research interests and career goals from the rich opportunities available. Students can pursue a thesis or nonthesis track.

Students pursuing an MS degree in the CMBS program must maintain a GPA of 3.0 or better in a total of 30 credit hours. Of the 30 credits, approximately 20 to 25 will be directly from coursework (see below). A minimum of 3, and a maximum of 6, credits are generated from laboratory research rotations (graded as pass/fail) lasting approximately eight to ten weeks each. For students pursuing the thesis MS, one of the rotation labs usually becomes the thesis lab. Selection of courses, rotations, and thesis labs should be in consultation with the program director.

For students seeking a thesis MS, a faculty mentor is selected in consultation with the program director. The mentor, who must be a member of the graduate faculty, is responsible for supervising the research. The thesis defense consists of a public presentation of the thesis work followed by a closed oral examination by the thesis defense committee, which determines whether the student has presented an acceptable thesis.

Laboratory Rotations

Graduate faculty in many GPLS programs are interested in mentoring CMBS-MS students for laboratory rotations and thesis research. To facilitate selection of rotation and/or thesis laboratories, and to ensure student exposure to the range of research opportunities, students attend weekly informal luncheon meetings during the first semester. These meetings invite members of the graduate faculty give brief presentations describing the research activities of their labs, and potential projects that students would be able to contribute to.

Required Courses

GPLS 600	CELLULAR AND MOLECULAR BASIS OF TRANSLATIONAL RESEARCH	5
	Or	
GPLS 601	MECHANISMS IN BIOMEDICAL SCIENCES: FROM GENES TO DISEASE	8
one of the following:		
GPLS 690	CURRENT TOPICS IN VASCULAR AND STEM CELL BIOLOGY	1
GPLS 691	CURRENT TOPICS IN NEUROSCIENCE	1
GPLS 692	CURRENT TOPICS IN GENETICS AND GENOMICS	1
GPLS 693	Current Topics in Microbiology	1
and:		
CIPP 901	RESEARCH ETHICS	1
GPLS 630	FUNDAMENTALS OF BIOSTATISTICS	3

Details are given in the Course Descriptions part of this catalog.

Epidemiology and Clinical Research

Graduate Program in Life Sciences

<https://www.medschool.umaryland.edu/k30/Master-of-Science-in-Epidemiology-and-Clinical-Research--Clinical-Research-Track-/>

<https://www.medschool.umaryland.edu/k30/Certificate-Program-in-Clinical-Research/>

Degrees Offered

MS, Certificate

Program Description

The **MS in Epidemiology and Clinical Research (Clinical Research Track)** is a 30-credit program designed specifically to meet the needs of clinicians and scientists by providing a combination of coursework and research experiences needed for a successful career in clinical investigation. Students may select from multiple concentration areas: epidemiologic research, patient-oriented research, outcomes/health services research, human genetics, and research ethics.

Objectives and Learning Outcomes

Upon graduation, students will gain the ability to identify important research questions, develop research protocols, select appropriate study designs, generate pilot data, conduct clinical investigations, analyze, and write the results in a publishable form, and develop and submit grant proposals. The program will prepare students to be competitive in seeking external support and be knowledgeable in the complex issues associated with conducting sound clinical research. A total of 30 credits is required for the degree, which can be completed on a part-time basis within two years. Students may select from multiple concentration areas including Epidemiologic Research, Patient-Oriented Research, Human Genetics, Outcomes/Health Services Research, and Research Ethics.

The **Certificate in Clinical Research** is a 12-credit program that provides training in the core competencies of clinical research, including study design, biostatistics, data management, scientific communication, and the ethical, legal, and regulatory issues in clinical research. The certificate is designed specifically to meet the needs of

busy clinicians and scientists who wish to gain skills in the conduct of clinical research but are not able to complete the MS in Epidemiology - Clinical Research track.

Program Admission

Degree-seeking students are admitted into the program during the fall semester only. The MS and certificate application deadline is May 15 of the year in which the student intends to enroll. Graduate Record Examinations (GREs) are mandatory; Medical College Admission Test scores may replace GRE scores for physician applicants. In addition to meeting the minimum requirements of the Graduate School and the Graduate Program in Life Sciences (GPILS), applicants should have completed coursework in biology relevant to understanding health and disease processes and have taken college-level math. The program evaluates each applicant individually with attention to areas of strength that relate to the skills and background necessary to succeed in graduate study in epidemiology and human genetics.

Degree Requirements

Required Courses: MS Epidemiology and Clinical Research

PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3
PREV 619	INTRODUCTION TO SAS	1
PREV 620	PRINCIPLES OF BIOSTATISTICS	3
PREV 648	INTRODUCTION TO HEALTH SYSTEM AND HEALTH POLICY MANAGEMENT	3
PREV 659	OBSERVATIONAL STUDIES IN EPIDEMIOLOGY	3
PREV 720	STATISTICAL METHODS IN EPIDEMIOLOGY	3
PREV 747	EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM I	3
PREV 748	EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM II	2
PREV 799	MASTER'S THESIS RESEARCH	1 TO 6
CIPP 907	RESEARCH ETHICS	1

8-9 elective credits or as needed to meet 30-credit requirement

PREV 747 and PREV 748: or MS thesis

PREV 799: 6 credits minimum if master's thesis option

Required Courses: Certificate in Clinical Research

PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3
PREV 616	INTRODUCTION TO CLINICAL AND TRANSLATIONAL RESEARCH AT UMB	2
PREV 621	BIOSTATISTICAL METHODS	3
Or		
PREV 619	INTRODUCTION TO SAS	1
PREV 620	PRINCIPLES OF BIOSTATISTICS	3
PREV 633	APPLICATION OF LEGAL AND REGULATORY ISSUES IN CLINICAL RESEARCH	2
PREV 710	CLINICAL AND TRANSLATIONAL RESEARCH PROJECT DESIGN AND IMPLEMENTATION	1 TO 2

PREV 620 and PREV 619 must be taken together.

Details are given in the Course Descriptions part of this catalog.

Epidemiology and Human Genetics

Graduate Program in Life Sciences

<http://lifesciences.umaryland.edu/epidemiology/>

Degrees Offered

PhD, PhD/MD, MS, MS/MD, Certificate

Program Description

The graduate program in Epidemiology and Human Genetics (EHG) within GPILS at the School of Medicine offers a diverse array of integrated opportunities to develop skills for discovering how population, molecular, and genetic variations relate to health and disease. These skills are essential for translating new basic research findings into clinical practice and applying them to public health. New findings from epidemiology and human genetics research consistently make the news. Students in this

program become leaders in improving the health of local, regional, and global populations. The program combines traditional areas of biomedical, genetic, clinical, and community studies with opportunities to learn and apply observational, biostatistical, molecular, and genomic tools in their investigations.

The PhD program consists of three tracks: epidemiology, molecular epidemiology, and human genetics, each with a tailored program of study. There are two MS degrees, the MS in Epidemiology and Clinical Research with two tracks (one in epidemiology and one in clinical research) and the MS in Human Genetics. Dual-degree programs enable students to earn an MS degree in combination with one of several PhD programs.

The PhD in Epidemiology and Human Genetics (Epidemiology Track) allows students to acquire advanced knowledge, skills, and experience in completing independent epidemiological research in a biomedical setting. This track has a strong quantitative focus, necessary for providing students with the tools needed to conduct world-class research on epidemiologic topics and to participate in multidisciplinary research in a broad range of specialties.

The PhD in Epidemiology and Human Genetics (Molecular Epidemiology Track) is designed for students who wish to undertake research that combines molecular, genetic, and epidemiologic techniques and to apply these technologies to the understanding of risk factors for disease transmission or acquisition. Students in this track are provided with a solid knowledge base in epidemiology and biostatistics while gaining the laboratory and informatics skills needed to incorporate genomic data into their research.

The PhD in Epidemiology and Human Genetics (Human Genetics Track) provides broad training for students wanting to understand human genetic variation and its relation to health and disease. Students receive an overview of human genetics (molecular, biochemical, clinical, cytogenetics, and genetic epidemiology/genomics) and then specialize in their areas of interest.

The MS in Epidemiology and Clinical Research (Epidemiology Track) is designed to offer an MS degree to students pursuing a PhD in Gerontology or in Pharmaceutical Health Services Research as part of our dual-degree programs. Also, students wishing to leave the Epidemiology and Human Genetics PhD program can opt to get the MS in lieu of their PhD.

Program Admission

Degree-seeking students are admitted into the program during the fall semester only, and the Graduate School must receive PhD application materials by December 1st. The MS applications deadline is February 15 (March 1 for internal candidates) of the year in which the student intends to enroll. Graduate Record Examinations (GREs) are mandatory; Medical College Admission Test scores may replace GRE scores for physician applicants. In addition to meeting the minimum requirements of the Graduate School and the Graduate Program in Life Sciences (GPILS), applicants should have completed coursework in biology relevant to understanding health and disease processes, and college algebra. The program evaluates each applicant individually with attention to areas of strength that relate to the skills and background necessary to succeed in graduate study in epidemiology and human genetics.

Degree Requirements

Doctoral students in the human genetics track are required to take 32 course credits. The doctoral degree in the epidemiology and molecular epidemiology tracks requires up to 44 course credits, depending on the student's research interests and previously completed coursework. Students may need to take additional coursework as background preparation or in preparation for an area of specialization. PhD candidates must successfully complete a minimum of 12 credits of doctoral dissertation research.

The master's degree for the epidemiology and clinical research track requires a total of 30 credits. A thesis is optional for students in this track; however, students who opt out of the thesis must complete Research Practicum I and II.

Required Courses: PhD Epidemiology Track

PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3
PREV 619	INTRODUCTION TO SAS	1
PREV 620	PRINCIPLES OF BIOSTATISTICS	3
PREV 659	OBSERVATIONAL STUDIES IN EPIDEMIOLOGY	3
PREV 716	CHRONIC DISEASE EPIDEMIOLOGY	3
PREV 720	STATISTICAL METHODS IN EPIDEMIOLOGY	3
PREV 730	INTRO TO R STATISTICAL ANALYSIS	1-6
PREV 747	EPIDEMIOLOGY AND	3

PREV 748	PREVENTIVE MEDICINE RESEARCH PRACTICUM I EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM II	2	PREV 747	ANALYSIS EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM I	3
PREV 749	INFECTIOUS DISEASE EPIDEMIOLOGY - A GLOBAL PERSPECTIVE	3	PREV 748	EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM II	2
PREV 758	HEALTH SURVEY RESEARCH METHODS	3	PREV 780	MOLECULAR EPIDEMIOLOGY	3
PREV 803	CLINICAL TRIALS AND EXPERIMENTAL EPIDEMIOLOGY	3	PREV 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12
CIPP 907	RESEARCH ETHICS	1	CIPP 907	RESEARCH ETHICS	1
<i>CIPP 907: or equivalent</i>			<i>11 credits of general electives</i>		
Select three of these statistical analyses courses:			<i>CIPP 907: or equivalent</i>		
PREV 721	REGRESSION ANALYSIS	2	<i>PREV 899: 12 credits minimum</i>		
PREV 724	INTRODUCTION TO CAUSAL INFERENCE AND MACHINE LEARNING	2	Required Courses: PhD Human Genetics Track		
PREV 801	LONGITUDINAL DATA ANALYSIS	3	GPLS 601	MECHANISMS IN BIOMEDICAL SCIENCES: FROM GENES TO DISEASE	8
PREV 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12	GPLS 716	GENOMICS AND BIOINFORMATICS	3
<i>8 credits of general electives</i>			HGEN 601	BASIC HUMAN GENETICS I	4
<i>PREV 899: 12 credits minimum</i>			HGEN 602	BASIC HUMAN GENETICS II	4
Required Courses: PhD Molecular Epidemiology Track			HGEN 608	HUMAN GENETICS SEMINAR	1
PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3	CIPP 907	RESEARCH ETHICS And	1
PREV 619	INTRODUCTION TO SAS	1	PREV 619	INTRODUCTION TO SAS	1
PREV 620	PRINCIPLES OF BIOSTATISTICS	3	PREV 620	PRINCIPLES OF BIOSTATISTICS	3
PREV 659	OBSERVATIONAL STUDIES IN EPIDEMIOLOGY	3	Or		
PREV 711	GENETIC EPIDEMIOLOGY	3	PREV 621	BIOSTATISTICAL METHODS	3
GPLS 716	GENOMICS AND BIOINFORMATICS	3	<i>HGEN 608: four semesters</i>		
GPLS 718	PROGRAMMING FOR BIOINFORMATICS	2	Select two or more of the following:		
PREV 720	STATISTICAL METHODS IN EPIDEMIOLOGY	3	HGEN 701	HUMAN CYTOGENETICS	2
PREV 724	INTRODUCTION TO CAUSAL INFERENCE AND MACHINE LEARNING	2	PREV 711	GENETIC EPIDEMIOLOGY	3
GPLS 728	GENOMIC DATA SCIENCE	3	GPLS 717	GENOMICS OF MODEL SPECIES AND HUMANS	3
PREV 730	INTRO TO R STATISTICAL	1-6	GPLS 718	PROGRAMMING FOR BIOINFORMATICS	2
			GPLS 750	TOPICS IN MOLECULAR MEDICINE	2
			HGEN 720	METABOLIC GENETICS	2
			HGEN 728	CLINICAL GENETICS I	2 TO 4
			HGEN 731	CLINICAL GENETICS II	2

HGEN 760	CLINICAL CANCER GENETICS	2	PREV 619	INTRODUCTION TO SAS	1
PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3	PREV 620	PRINCIPLES OF BIOSTATISTICS	3
PREV 780	MOLECULAR EPIDEMIOLOGY	3	PREV 659	OBSERVATIONAL STUDIES IN EPIDEMIOLOGY	3
CIPP 907	RESEARCH ETHICS	1	PREV 720	STATISTICAL METHODS IN EPIDEMIOLOGY	3
PREV 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12	PREV 721	REGRESSION ANALYSIS	2
<i>CIPP 907: or equivalent</i>			PREV 724	INTRODUCTION TO CAUSAL INFERENCE AND MACHINE LEARNING	2
<i>PREV 899: 12 credits minimum</i>			Or		
Required Courses: MS in Epidemiology and Clinical Research (Epidemiology Track)			PREV 801	LONGITUDINAL DATA ANALYSIS	3
This program is only open to current students at UMB.					
PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3	PREV 758	HEALTH SURVEY RESEARCH METHODS	3
PREV 619	INTRODUCTION TO SAS	1	PREV 803	CLINICAL TRIALS AND EXPERIMENTAL EPIDEMIOLOGY	3
PREV 620	PRINCIPLES OF BIOSTATISTICS	3	Epidemiology electives from among PREV courses not already taken		3
PREV 648	INTRODUCTION TO HEALTH SYSTEM AND HEALTH POLICY MANAGEMENT	3	<i>Other courses required for the Gerontology PhD</i>		
PREV 659	OBSERVATIONAL STUDIES IN EPIDEMIOLOGY	3	Required Courses: MS Epidemiology/ PhD Pharmaceutical Health Services Research Joint Degree		
PREV 720	STATISTICAL METHODS IN EPIDEMIOLOGY	3	(open only to students in the Pharmaceutical Health Services Research PhD program)		
PREV 747	EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM I	3	PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3
PREV 748	EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM II	2	PREV 619	INTRODUCTION TO SAS	1
PREV 799	MASTER'S THESIS RESEARCH	1 TO 6	PREV 620	PRINCIPLES OF BIOSTATISTICS	3
CIPP 907	RESEARCH ETHICS	1	PREV 659	OBSERVATIONAL STUDIES IN EPIDEMIOLOGY	3
<i>Electives as needed to meet 30-credit requirement</i>			PREV 720	STATISTICAL METHODS IN EPIDEMIOLOGY	3
<i>PREV 747 and PREV 748: or MS Thesis</i>			PREV 721	REGRESSION ANALYSIS	2
<i>CIPP 907: or equivalent</i>			PREV 724	INTRODUCTION TO CAUSAL INFERENCE AND MACHINE LEARNING	2
<i>PREV 799: 6 credits minimum if master's thesis option</i>			PREV 803	CLINICAL TRIALS AND EXPERIMENTAL EPIDEMIOLOGY	3
Required Courses: MS Epidemiology/ PhD Gerontology Joint Degree			<i>6 credits of Epidemiology electives from among PREV courses not already taken</i>		
(open only to students in the Gerontology PhD program)					
PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3	<i>Other courses required for the Pharmaceutical Health</i>		

Services Research PhD

Available Electives

See PREV and other GPLS courses in the Course Descriptions part of this catalog.

Details are given in the Course Descriptions part of this catalog.

Gerontology - PhD**Graduate Program in Life Sciences**

<http://lifesciences.umaryland.edu/gerontologyphd/>

Degrees Offered

PhD

Program Description

The Doctoral Program in Gerontology at the University of Maryland, Baltimore and the University of Maryland, Baltimore County (UMBC) will train a new generation of scholars conversant with interdisciplinary and integrative paradigms and research designs to examine the unique, reciprocal, and dynamic nature of aging in context. UMB's six professional schools (dental, law, medicine, nursing, pharmacy, and social work) and UMBC's College of Arts, Humanities and Social Sciences departments (public policy, psychology, and sociology, anthropology, and public health) combine to make this mission possible by offering three tracks of study:

1. Aging policy issues
2. Epidemiology of aging
3. Social, cultural, and behavioral sciences.

The program also offers a dual-degree program between gerontology and epidemiology and a combined degree program between gerontology and applied sociology. Students earn a PhD in gerontology and a master's degree in epidemiology or applied sociology.

Learning Outcomes

Upon completion of the program, students are equipped with interdisciplinary and integrative perspectives and relevant research skills on the process of human aging. Students will be knowledgeable about the complex, dynamic, and bi-directional relationships among individuals and the historical, political, economic, environmental, psychological, social, cultural, and

biological contexts in which aging occurs. Graduates will be prepared for employment in positions in academic institutions, government agencies, as well as those in private and non-profit organizations. We have embraced nonacademic positions as valuable venues for contribution by our alumni.

Program Admission

Applications are accepted for fall admission only. All application materials must be received by December 15 in year prior to year of intended enrollment. Three letters of recommendation, transcripts, a personal/goals statement, and a CV are required of all applicants. Graduate Record Examinations (GRE) scores are not required for admission. The Test of English as a Foreign Language or the International English Language Testing System exam is required for all international students who do not have a bachelor's or master's degree from a U.S. institution and/or whose native language or language of the home is not English. The program encourages the application of candidates from racial and ethnic minorities under-represented in the sciences. The program offers graduate research assistantships that provide a stipend, tuition remission, and student health insurance.

Degree Requirements

The PhD program consists of a minimum of 49 course credits (21 core course credits, 12 research methods and statistics course credits, 9 track specialization course credits, 6 elective course credits, and 1 ethics course credit). Comprehensive exams are required to be admitted to doctoral candidate status. These exams take place in the summer after completion the second year for full-time students. All students must complete at least 12 credits of dissertation research and successfully defend a dissertation. In addition, students attend a bimonthly aging forum and required seminars.

Required Courses at UMB

GERO 672	ISSUES IN AGING POLICY	3
GERO 681	EPIDEMIOLOGY OF AGING	3
GERO 711	BIOLOGY OF AGING	3
GERO 786	PSYCHOLOGICAL ASPECTS OF AGING	3
GERO 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12
CIPP 907	RESEARCH ETHICS	1

Required Courses at UMBC

Students are required to take three courses at UMBC. To view UMBC course catalog description, click [here](#).

GERO 700 - Sociocultural Gerontology (3 credits)

GERO 750 - Gerontology Theory/Methods Seminar I (3 Credits)

GERO 751 - Gerontology Theory/Methods Seminar II (3 Credits)

Available Track and Elective Courses

Track courses and electives are selected from available courses for each track as well as from courses offered on each campus that contribute to the student's area of research in consultation with the student's advisor.

Details for each track are given [here](#).

Details are given in the Course Descriptions part of this catalog.

Gerontology - MS

<https://graduate.umaryland.edu/gerontology/>

Degree Offered

MS

Program Description

The Master of Science in Gerontology is a 36-42* credit program offering flexible online and hybrid course delivery formats designed to provide individuals with an integrated perspective on the scope, challenges, and opportunities arising from an aging society. The program prepares students with core knowledge and training related to fundamental issues in the interdisciplinary field of gerontology, a foundation in research methods, and familiarity with questions of central concern in an aging society. Upon completion of the program, students should be able to successfully apply gerontological concepts to policies and programs so that effective services, care, and support to, and on behalf of, older adults and their families can be achieved. The program thoroughly reviews the biopsychosocial-spiritual process of aging through a life course lens to promote quality of later life; apply effective decision-making methodologies rooted in the realities of

the aging experience, and promote behavior to interact effectively, ethically, and sensitively to meet the needs of older persons.

Learning Outcomes

Learning Outcomes**

Upon completion of the MS in Gerontology students will be able to:

- Gain an understanding and appreciation for the interdisciplinary and interconnected nature of the aging process and theories relating to these perspectives.
- Reflect, write, and learn to discuss critically and insightfully about fundamental theories, research, and controversies in the field of aging.
- Identify and challenge common (generally negative) myths, stereotypes, and false beliefs regarding older adults.
- Demonstrate effective oral and written communication skills with and on behalf of older persons.
- Gain working knowledge in research methods commonly used in gerontological research
- Articulate issues of central concern in an aging society.

Students select either the generalist area of study or one of three areas of concentration:

Aging & Applied Thanatology

Develop the advanced and practical skills needed to provide compassionate care to those dealing with dying, death, and grief - all fundamental and significant aspects of the human experience.

Learning Outcomes:

- Demonstrate sensitivity to individual, developmental, and cultural variations in addressing and coping with aging, dying, death, and grief;
- Describe and apply empirically-based methods of therapeutic grief intervention;
- Analyze and evaluate legal and ethical principles and dilemmas regarding death, dying, and end-of-life

choices;

- Work effectively as an interprofessional team member around issues related to aging, dying, and grief by developing and applying the competencies of interprofessional practices; and
- Evaluate the societal, cultural, and religious/spiritual influences on responses to death and dying

Health & Social Innovation

Innovate with purpose. The social entrepreneurship centered curriculum provides you with the fundamental tools and competencies needed to take idea to action and prepares you to build your own venture or lead change in an existing organization.

Learning Outcomes:

- Apply principles of innovation, entrepreneurship, and design-thinking to solve complex health and social challenges resulting from an aging society;
- Examine and impact innovation within existing organizations serving older adults and/or their families;
- Use the principles of human-centered design to identify the needs of older persons at the societal, community, and individual levels;
- Understand how change can be realized by examining policy and regulations; and
- Develop innovative initiatives that support the health of older persons

Principles in the Management of Aging Services

Gain the competencies needed to identify and articulate gaps between need and the management of aging services. Use innovation and forward thinking to achieve optimal aging from the perspective of individuals, families, and communities.

Learning Outcomes:

- Describe challenges and discover opportunities to achieve optimal aging from the perspective of individuals, families, and communities;
- Recognize and refute stereotypic and misleading notions of aging that are pervasive in the culture and some current service models.
- Gain a broad, management-level understanding of

management accounting, decision-making budget functions, and performance metrics.

- Understand the necessity of forward-thinking leadership in the management of aging services.
- Apply integrative thinking to an identified gap or entrepreneurial opportunity in aging services

*Number of credits required vary based on student’s employment history and selection of the thesis or non-thesis option.

** Learning outcomes are consistent with the Academy for Gerontology in Higher Education (AGHE) and the Accreditation for Gerontology Education Council (AGEC) standards of practice.

Program Admission

Applications are accepted for fall and spring admission dates. All candidates applying for admission must meet the minimum qualifications and standards established by the Graduate School, which are outlined in the Admissions section of this catalog. A letter of interest including personal goals, resume/CV, and one letter of recommendation are required.

Admission to this online program is selective. A U.S. bachelor’s degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. The Graduate Record Examination (GRE) is not required. International applicants must provide acceptable results of the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exam.

Degree Requirements

Required Courses

THAN 609	PERSPECTIVES IN AGING	3
	Or	
AGNG 600	SOCIAL & ECONOMIC CONTEXT OF AGING (UMBC Course)	3
GERO 700	SOCIOCULTURAL GERONTOLOGY	3
GERO 711	BIOLOGY OF AGING	3
GERO 750	THEORY AND METHODS I	3
GERO 672	ISSUES IN AGING POLICY	3
GERO 786	PSYCHOLOGICAL ASPECTS OF AGING	3
GERO 799	MASTER'S THESIS	1 TO 6

	RESEARCH	
CIPP 907	RESEARCH ETHICS	1
Concentration Courses		
Concentration Courses (Select based on area of concentration; Generalist select nine [9] elective credits in consultation with a program adviser/director)		
THAN 604	DEATH AND DYING: ETHICAL AND LEGAL CONSIDERATIONS	3
THAN 605	PALLIATIVE CARE	3
THAN 606	CARING FOR THE BEREAVED	3
INNO 600	FOUNDATIONS IN HEALTH AND SOCIAL INNOVATION	3
INNO 602	GLOBAL HEALTH AND SOCIAL INNOVATION	2
INNO 622	PROJECT MANAGEMENT	3
INNO 650	COMMUNITY ENGAGEMENT AND PARTNERSHIPS	3
AGNG 604	POLICY FOUNDATIONS OF AGING SERVICES (UMBC Course)	3
AGNG 611	LEADERSHIP, MANAGEMENT & ORGANIZATION II (UMBC Course)	3
AGNG 612	FINANCE & ACCOUNTING (UMBC Course)	3

Details are given in the Course Descriptions part of this catalog.

Human Genetics and Genomic Medicine

Graduate Program in Life Sciences

<https://lifesciences.umaryland.edu/epidemiology/Masters-Program/MS-in-Human-Genetics-and-Genomic-Medicine/>

Degree Offered

MS

Program Description

The **MS in Human Genetics and Genomic Medicine** is designed for students contemplating careers in human genetics, especially as it relates to health and disease. This track includes coursework, seminars, and supervised research culminating in a thesis.

Program Admission

Degree-seeking students are admitted into the program during the fall semester only. The deadline is February 15 (March 1 for internal candidates) of the year in which the student intends to enroll. Graduate Record Examinations (GREs) are mandatory. In addition to meeting the minimum requirements of the Graduate School and the Graduate Program in Life Sciences (GPILS), applicants should have completed coursework in biology relevant to understanding health and disease processes, and college algebra. The program evaluates each applicant individually with attention to areas of strength that relate to the skills and background necessary to succeed in graduate study in human genetics.

Degree Requirements

Students in the human genetics track are required to develop a thesis project in addition to completing a minimum of 24 course credits and 6 research credits.

Required Courses: MS in Human Genetics

HGEN 601	BASIC HUMAN GENETICS I	4
HGEN 602	BASIC HUMAN GENETICS II	4
HGEN 608	HUMAN GENETICS SEMINAR	1
GPLS 716	GENOMICS AND BIOINFORMATICS	3
PREV 619	INTRODUCTION TO SAS And	1
PREV 620	PRINCIPLES OF BIOSTATISTICS Or	3
PREV 621	BIOSTATISTICAL METHODS	3

HGEN 608: every semester

Select two or more of the following:

PREV 600	PRINCIPLES OF EPIDEMIOLOGY	3
HGEN 701	HUMAN CYTOGENETICS	2
PREV 711	GENETIC EPIDEMIOLOGY	3
GPLS 717	GENOMICS OF MODEL SPECIES AND HUMANS	3
GPLS 718	PROGRAMMING FOR BIOINFORMATICS	2
GPLS 750	TOPICS IN MOLECULAR MEDICINE	2
HGEN 720	METABOLIC GENETICS	2
HGEN 728	CLINICAL GENETICS I	2 TO 4
HGEN 731	CLINICAL GENETICS II	2

HGEN 750	ADVANCED TOPICS IN GENETIC COUNSELING	2
HGEN 760	CLINICAL CANCER GENETICS	2
PREV 780	MOLECULAR EPIDEMIOLOGY	3
CIPP 907	RESEARCH ETHICS	1
PREV 799	MASTER'S THESIS RESEARCH	1 TO 6

Electives as needed to meet 30-credit requirement

CIPP 907: or equivalent

PREV 799: 6 credits minimum

Details are given in the Course Descriptions part of this catalog.

Molecular Medicine

Molecular Medicine, Graduate Program in Life Sciences

<https://lifesciences.umaryland.edu/molecularmedicine/>

Degrees Offered

PhD, PhD/MD, PhD/DDS

PhD Program Description

Molecular Medicine combines traditional areas of biomedical study – including cancer biology, molecular genetics, genomics and bioinformatics, molecular and cell biology, pathology, toxicology, pharmacology, and physiology – into a unique interdisciplinary research and graduate training program. Specifically designed to develop scientists for the postgenomic era, students gain knowledge, research skills, and familiarity with the state-of-the-art biomedical tools and methodologies needed to solve important and timely questions in biomedical science. The program is organized into three tracks: Cancer Biology; Genome Biology; Molecular and Cellular Physiology and Pharmacology. The more than 170 faculty in the Molecular Medicine graduate program are internationally recognized for their research in genomics and computational biology, cancer, vascular and renal cell biology, evolutionary genomics and genetics, membrane biology, musculoskeletal biology, neuroscience and neurotoxicology, molecular and environmental toxicology, pharmacology, reproduction, and cardiovascular disease.

PhD Program Admissions

In addition to meeting the Graduate School’s minimum admission requirements, applicants should have a

bachelor’s degree with training in an appropriate major field. The program is particularly interested in applicants with strong undergraduate training in the biological sciences, chemistry, biochemistry, mathematics, and general physics, as well as research experience in the biomedical sciences. Successful applicants have strong letters of recommendation, significant laboratory research experience and high cumulative grade-point averages. Additionally, all international students must meet the Graduate School’s requirements for scores from the Test of English as a Foreign Language or the International English Language Testing System exam. Applications should be received no later than December 1 for fall admission. Admission to the program is highly competitive and acceptances are made as qualified candidates are identified. Students accepted into the PhD program receive graduate fellowships or assistantships that consist of an annual stipend, tuition remission, and health insurance.

PhD Degree Requirements

In the fall of the first year, students participate in an innovative core course: Mechanisms in Biomedical Sciences: From Genes to Disease (GPLS 601 (p. 115)). Students then complete track-specific coursework and three laboratory rotations, tailored to meet each student’s research interests and career goals. A professional development skills course is offered in the second year to address areas such as public speaking and presentations, critical evaluation of scientific data, and grant writing. During the second year of study, students prepare for a qualifying examination in which they are tested on their fundamental understanding of topics in molecular medicine and their ability to design a coherent series of experiments addressing an original research question, usually related to the student’s research interests. The qualifying exam consists of a written grant proposal and an oral defense. After successful completion of the exam, students advance to candidacy for the PhD degree. As a PhD candidate, the student’s primary focus is their dissertation research, with participation in advanced elective courses as recommended by the mentor and research track leader and continued attendance and participation in journal clubs and seminars.

Required PhD Courses

GPLS 601	MECHANISMS IN BIOMEDICAL SCIENCES: FROM GENES TO DISEASE	8
GPLS 608	SEMINAR	1 OR 2
GPLS 609	LABORATORY ROTATIONS	1 TO 3

GPLS 647	MOLECULAR MEDICINE SURVIVAL SKILLS	2	
GPLS 691	CURRENT TOPICS IN NEUROSCIENCE	1	• Breast and prostate cancer
GPLS 692	CURRENT TOPICS IN GENETICS AND GENOMICS	1	• Leukemia and lymphoma
GPLS 693	Current Topics in Microbiology	1	• Cytokine and growth factor biology
CIPP 907	RESEARCH ETHICS	1	• Hormonal control of tumor growth
GPLS 898	PRE-CANDIDACY RESEARCH	1 TO 8	• Molecular and structural biology
GPLS 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12	• Mechanisms of signal transduction
			• Tumor immunology and immunotherapy
			• DNA replication, damage, and repair

Information regarding required courses can be found here.

Molecular Medicine Track Descriptions

Study and Research Focus Areas — Cancer Biology

1. Cancer Biology: Cancer is a complex group of diseases that causes ~600,000 deaths in the United States each year. Our understanding of cancer has reached new heights with the discovery of fundamental aspects of cell and molecular biology combined with significant advances in our understanding of the process of tumorigenesis. The identification of oncogenes, tumor suppressor genes, pathways of DNA damage and repair, growth and cell cycle regulatory factors, and mechanisms of immune suppression have provided exciting new insights into the development and progression of cancer. Technological advancements in genomics, proteomics as well as spatial and single cell transcriptomics have led to significant insight into the tumor microenvironment and led to the development of successful cancer therapies that target specific molecules driving tumor growth and metastasis. The Cancer Biology graduate track offers an exciting and stimulating academic environment to pursue interdisciplinary cancer research. The primary objective of the Cancer Biology track is to provide students with a strong educational experience combined with modern research training that will enable them to make significant contributions to our understanding of this complex disease. The University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center, a National Cancer Institute-designated center, and its core facilities, researchers, and physicians provide a state-of-the-art environment for conducting basic and clinical cancer research.

- Carcinogenesis
- Cancer genetics
- Viral and cellular oncogenes
- Tumor suppressor genes
- Genome instability and genetic mutations
- Apoptotic cell death
- Tumor invasion and metastasis
- Proteases and tumor biology
- Cytoskeleton and cell motility
- Angiogenesis and blood vessel formation
- Cancer drug resistance
- Cancer stem cells
- Diagnostic and prognostic markers
- Experimental therapeutics Study and

Course Requirements by Cancer Biology Track

GPLS 665	CANCER BIOLOGY: FROM BASIC RESEARCH TO THE CLINIC	3
GPLS 790	ADVANCED CANCER BIOLOGY	3

Study and Research Focus Areas — Genome Biology

2. Genome Biology: Recent advances in next-generation DNA sequencing and bioinformatics are transforming biomedical sciences. These technologies are being used to sequence and analyze genomes at unprecedented rates, and

we are rapidly approaching an era in which human genome sequences will be used routinely to diagnose diseases and predict the future health of individuals. The Genome Biology track offers doctoral and postdoctoral training in this rapidly evolving area. This track is part of a university-wide graduate program, with participating faculty drawn from diverse departments, centers, and institutes at the University of Maryland, Baltimore. The track is affiliated with the Institute for Genome Sciences (IGS), which has established an exceptional environment for conducting genomics and computational biology studies on campus. The IGS has made significant investments in genome sequencing platforms (Sanger, 454, Illumina HiSeq, and PacBioRS) and an extensive computational grid. Affiliated faculty study a range of research topics with an emphasis on exploring questions related to human health and disease. The up-to-date curriculum incorporates many cutting-edge tools of genetics, genomics, bioinformatics, machine learning, data science, and systems biology. Dissertation research projects may employ technologies such as Artificial Intelligence (AI), high-throughput DNA sequencing, and postgenomic approaches to address problems central to molecular medicine. Thesis topics include microbial pathogenesis and the human microbiome, evolutionary genetics, genetic epidemiology, tumor genetics, diseases of hematopoiesis and the cardiovascular system, muscular dystrophies, skeletal diseases, neurodegenerative diseases, DNA replication and cell division, DNA repair and mutation, and gene regulation and development, which are of fundamental biological importance. The approaches used in genome biology laboratories are broad in terms of systems, organisms, and technologies employed, the focus of the program is then on training in high-throughput techniques and computational biology approaches to analyses either in the creation of new tools to application and refinement of existing pipelines. The genome biology track leads to outstanding PhD-level training and employment opportunities in leading academic, government, and industrial settings.

- **Cancer genomics:** Tumor genome and transcriptome sequencing; genome mutagenesis, instability, and repair; tumor suppressors and oncogenes; gene networks; signaling pathways; genomics-based drug discovery and treatment.
- **Human genomics:** Human genome and transcriptome sequencing; genetic variation; GWAS studies; predictive health and personalized medicine.
- **Microbial genomics:** The human microbiome in health and disease; pathogenic microorganisms (including yeast

and bacteria); host/pathogen interactions; archaea; extremophiles; viruses and phages; bioterrorism.

- **Model organism genomics:** Studies conducted in yeast, flies, worms, and mice exploiting the outstanding genomics resources that have been developed for these organisms (genome sequences, gene annotations, gene knockout collections, plasmid collections, etc.).
- **Evolutionary and comparative genomics:** Sequence comparisons within and between species to study gene, protein, and genome and molecular evolution.
- **Genetics, molecular biology, biochemistry:** Basic molecular processes surrounding gene and genome function, such as bulk and single-cell RNA transcription, gene regulation, DNA damage and repair, DNA folding/packaging, and chromosome function.
- **Data Science and Big-Data analysis:** Multi-omics, special transcriptomics, data integration and accessibility, biobank-scale omics.

Course Requirements by Genome Biology Track

GPLS 716	GENOMICS AND BIOINFORMATICS	3
GPLS 717	GENOMICS OF MODEL SPECIES AND HUMANS	3
GPLS 718	PROGRAMMING FOR BIOINFORMATICS	2
GPLS 728	GENOMIC DATA SCIENCE	3

Study and Research Focus Areas — Molecular and Cell Physiology

3. Molecular and Cellular Physiology and

Pharmacology: Research in this track seeks to uncover the mechanisms and develop novel therapies for human diseases, including Alzheimer's, cancer, cystic fibrosis, diabetes, cardiovascular disease, kidney disease, osteoporosis, muscular dystrophy, and brain injury. Faculty interests focus on systems integration of cells and tissues in physiological and pathophysiological states. The diversity of research interests and the availability of sophisticated imaging, electrophysiology, molecular, genomic, and structural analyses allow students to gain expertise in cutting-edge techniques. The track is highly integrative, and collaborations occur with other basic science and clinical faculty at the University of Maryland, many of whom are associated with organized research centers, as well as with other institutions across the United States and around the world. The goal of the Molecular and Cellular Physiology and Pharmacology track is to provide an outstanding intellectual and physical environment that is

tailored to each student's professional goals.

- Cardiac and vascular biology
- Synaptic transmission and neurophysiology
- Ion channels and electrophysiology
- Metabolism and endocrinology
- Skeletal Muscle and Bone biology
- Developmental and Cell biology
- Molecular Biology and Gene regulation
- Epithelial and Kidney biology
- Stem cell biology
- Protein and vesicle trafficking
- Cytoskeleton
- Protein structure and interactions
- Infectious disease
- Functional and Physiological genomics
- Receptor biology and Signal transduction mechanisms
- Reproductive biology
- Radiation biology
- Integrative physiology
- Cellular and Molecular imaging

Course Requirements by Molecular and Cell Physiology Track

GPLS 630	FUNDAMENTALS OF BIostatistics	3
GPLS 645	CELL AND SYSTEMS PHYSIOLOGY	3
GPLS 750	TOPICS IN MOLECULAR MEDICINE	2

Details are given in the Course Descriptions part of this catalog.

Molecular Microbiology and Immunology

Graduate Program in Life Sciences

<http://lifesciences.umaryland.edu/microbiology/>

Degrees Offered

PhD, PhD/MD, PhD/DDS

Program Description

The Doctor of Philosophy program in molecular microbiology and immunology provides training opportunities in a variety of subdisciplines, including tracks in immunology, cancer immunology, bacteriology, virology, parasitology, fungal pathogenesis, microbial genomics, and cell biology. The program emphasizes molecular aspects of host defense and host-pathogen relationships. A rigorous curriculum and advanced research training prepare students for careers in biomedical research. Students accepted into the program receive graduate fellowships or assistantships that consist of an annual stipend, tuition remission, and health insurance.

Program Admission

In addition to meeting the Graduate School's minimum admission requirements, applicants generally have strong undergraduate training in the biological sciences, chemistry, mathematics, and general physics. Applicants should have A or B grades in undergraduate science courses. Strong preference goes to applicants with combined verbal and quantitative Graduate Record Examinations scores of 310 or above. The program encourages the application of women and candidates from racial and ethnic minorities under-represented in the sciences. Applications are due by Jan. 15 for the fall semester. The program only admits students for the fall semester.

International applicants must score at least 100 on the Test of English as a Foreign Language or a comparable score on the International English Language Testing System exam assessment to be considered for admission.

Degree Requirements

First-year students participate in an innovative core course, Mechanisms in Biomedical Sciences: From Genes to Disease (GPLS 601), in the first semester. Students then take required, program-specific courses that include: immunology; microbial pathogenesis; virology; an elective advanced course (several options available); and research ethics. Additional elective courses may be added. Students must maintain a 3.0 GPA to remain in good academic standing. Averages below this will lead to academic probation during which the student must raise their GPA or be dismissed. As a complement to the coursework, all students participate in program or schoolwide seminars, career development workshops, discipline-specific journal

clubs, and a research-in-progress student presentation series throughout their time in the program.

During the first semester, students are introduced to potential thesis mentors through faculty presentations and each student conducts three laboratory rotations to familiarize themselves with prospective research labs. By the end of the first year, students should select a dissertation mentor. Students take an oral qualifying exam in the spring semester of their second year. They must also pass a thesis proposal defense by the end of their third year, then continue with full-time thesis research. PhD candidates must successfully complete 12 credits of doctoral dissertation research in order to graduate.

Required Courses

(In addition to GPLS 601)

GPLS 601	MECHANISMS IN BIOMEDICAL SCIENCES: FROM GENES TO DISEASE	8
GPLS 710	MICROBIAL PATHOGENESIS	3
GPLS 702	BASIC IMMUNOLOGY	4
GPLS 704	PRINCIPLES OF VIROLOGY	3
GPLS 608	SEMINAR	1 OR 2
CIPP 907	RESEARCH ETHICS	1
GPLS 609	LABORATORY ROTATIONS	1 TO 3
GPLS 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12

One elective from the courses below or others (listed in GPILS Program Description):

GPLS 769	ADVANCES IN IMMUNOLOGY	2
GPLS 725	SYSTEMS-RESEARCH IN MICROBIAL PATHOGENESIS	3
GPLS 719	ADVANCED PARASITOLOGY	3

Details are given in the Course Descriptions part of this catalog.

Neuroscience

Graduate Program in Life Sciences

<http://lifesciences.umaryland.edu/neuroscience/>

Degrees Offered

PhD, PhD/MD, PhD/DDS

Program Description

The Graduate Program in Neuroscience (PIN) is an interdisciplinary program of study leading to a PhD degree in Neuroscience. For over 20 years, PIN has been a center of excellence for graduate training in the life sciences. PIN faculty expertise and research interests range from molecular to clinical realms. Our program enhances interaction among our internationally renowned faculty and enables graduate students to take advantage of the full depth and breadth of Neuroscience research conducted at the University of Maryland, Baltimore. Our PhD students are highly sought after, routinely being appointed as postdoctoral fellows at other prestigious academic institutions or finding employment at one of the many Neuroscience-related occupations in industry and government that the greater Washington D.C./Baltimore area offers.

Program Admission

In addition to meeting the Graduate School's minimum admission requirements, applicants often have strong academic records having earned a bachelor's degree in neuroscience or other major fields of biology. Applicants with mathematical, computer science or biomedical engineering backgrounds are also highly encouraged to apply. The program is particularly interested in candidates with independent research experience conducted in the undergraduate setting and/or beyond. The program encourages the application of women and candidates from racial and ethnic minorities under-represented in the sciences. Our application deadline is Dec. 1. Admission to the program is highly competitive, and, after interviews, acceptances are made as qualified candidates are identified. Additional information is available from the program manager at <http://lifesciences.umaryland.edu/neuroscience/>.

Degree Requirements

PhD candidates must successfully complete a minimum of 12 credits of doctoral dissertation research and all required classes. All students are required to rotate through three laboratories prior to choosing their dissertation research lab/advisor. Additionally, students must maintain a minimum cumulative grade-point average of 3.0 to remain in good standing in the program. A complete description of progression guidelines and degree requirements is provided in the Degree Requirements section of this

catalog.

Required Courses

GPLS 601	MECHANISMS IN BIOMEDICAL SCIENCES: FROM GENES TO DISEASE	8
GPLS 691	CURRENT TOPICS IN NEUROSCIENCE	1
GPLS 620	SYNAPTIC PHYSIOLOGY AND PHARMACOLOGY	4
GPLS 641	SYSTEMS AND COGNITIVE NEUROSCIENCE	4
GPLS 630	FUNDAMENTALS OF BIOSTATISTICS	3
GPLS 737	PROSEMINAR IN EXPERIMENTAL DESIGN	2
GPLS 609	LABORATORY ROTATIONS	1 TO 3
GPLS 629	JOURNAL CLUB	1
GPLS 608	SEMINAR	1 OR 2
CIPP 909	RESPONSIBLE CONDUCT OF RESEARCH	1 TO 2

GPLS 609: three

GPLS 608: for proposal and defense presentations

Available Electives

GPLS 781	TRANSLATIONAL PSYCHIATRY	3
GPLS 780	CNS DISEASES	
GPLS 627	DEVELOPMENTAL NEUROBIOLOGY	3
GPLS 613	NEUROENDOCRINOLOGY	3
GPLS 642	NOCICEPTION OF PAIN	2
GPLS 721	MICROSCOPY FUNDAMENTALS AND MODERN IMAGING APPLICATIONS	2

In addition to the above, 1 credit nanocourses are also offered on a host of topics depending on student interest. (ex: Addiction, Neuromethods, Coding and Intro to Logic, etc.)

Courses

See course listings under GPLS program descriptions.

Details are given in the Course Descriptions part of this catalog.

Physical Rehabilitation Science

Graduate Program in Life Sciences

<http://pt.umaryland.edu/>

Degree Offered

PhD

Program Description

The Department of Physical Therapy and Rehabilitation Science offers a Doctor of Philosophy degree in physical rehabilitation science. The concentration area is neuromotor control and rehabilitation. Related cognate or complementary areas are usually one of the following: applied physiology, cognitive motor neuroscience, epidemiology, human-centered computing, rehabilitation biomechanics, or rehabilitation engineering. Note that some of these courses are not available on the UMB campus but require travel to the University of Maryland, College Park or the University of Maryland, Baltimore County.

A combined Doctor of Physical Therapy/Doctor of Philosophy (DPT/PhD) option also is offered and should be discussed with the PhD and a DPT program director before making a formal application. This option can be applied for only after an individual is accepted into the DPT program.

Research Areas

The nationally and internationally recognized interdepartmental faculty includes 34 PhDs, nine MDs, and nine PTs. Major research interests include balance stability and falls in older adults, motor control and rehabilitation after stroke and in people with Parkinson's disease, neuroplasticity, and technologies including neuroimaging and rehabilitation robotics. A variety of contemporary and innovative approaches is used to understand the neuromotor, physiological, biomechanical, and behavioral bases of movement problems that lead to dysfunction and disability, and to develop rehabilitation approaches for maximizing movement function and promoting independence. Studies employ three-dimensional motion analysis and kinetic and electromyographic (EMG) recording techniques to evaluate localized and whole-body movements. Other methodologies may include functional/structural magnetic resonance imaging (MRI), transcranial magnetic stimulation (TMS), electroencephalographic (EEG) recording, computed tomography (CT), acoustic startle, peripheral nerve and muscle stimulation, and clinical testing. Robotics applications are employed to

study and rehabilitate upper and lower limb movement problems and to test and train balance and gait disorders.

The program combines faculty, physical, and financial resources from several departments within the School of Medicine and the Baltimore Veterans Affairs Medical Center and from related graduate programs within the University System of Maryland. The program trains researchers so they may advance the field of physical rehabilitation and ultimately improve the lives of people with functional deficits and disability. Individual courses of study serve the interests and educational needs of the student and the principal faculty advisor. The program educates students with the systemic biological, physical, and behavioral sciences and conceptual models of current biomedical thought, and trains them in the application of pertinent disciplines to the field of rehabilitation. Graduates of the program can find careers in academia, research, and industry.

Program Admission

Beyond the Graduate School's minimum admission requirements, applicants must hold a bachelor's or master's degree in a health- or rehabilitation-related discipline or a related biological science. Experience in rehabilitation is preferred but not essential. Potential candidates should contact a potential advisor before applying to the program. Three letters of recommendation, transcripts, and a written statement of interests and career goals are required of all applicants. Graduate Record Examinations (GRE) scores are preferred for applicants without a doctor of physical or occupational therapy degree. All international students must meet the Graduate School's requirements for scores from the Test of English as a Foreign Language or the International English Language Testing System exam. Other selection criteria may be used independently by specific advisors. All application materials must be received by Dec 15 if seeking a graduate assistantship for fall semester start date. Otherwise, applications are accepted on a rolling basis throughout the year. The program encourages the application of women and candidates from racial and ethnic minorities under-represented in the sciences. For more information, visit <http://lifesciences.umaryland.edu/rehabscience/>.

Degree Requirements

Students must complete at least 60 credits of supervised work beyond the bachelor's degree to receive the doctoral degree in physical rehabilitation science. The 60 credits must include a minimum of 10 credits of interdisciplinary science foundation, 12 credits of tools, 22 credits of

concentration/cognate, 12 credits of doctoral dissertation research, and 4 credits that can be distributed in any area. The program may waive some credit requirements if there is evidence that an accredited graduate school or program verifies academic competency in pertinent coursework. The advisor and program administration must approve the waiving of credit requirements. Other requirements include passing the (a) plan of study meeting (typically at the end of the first year), (b) written and oral comprehensive exams (typically at the end of the second year); and (c) the dissertation proposal (six months after passing the comprehensive exams). At this stage, the student advances to candidacy for the PhD degree, ideally during the third year. Once candidacy has been achieved, the student's primary focus is on dissertation research, with progress monitored and advice on executing the research program provided by the dissertation committee. The doctoral dissertation must be an original scientific and scholarly work consisting of at least two empirical papers of publishable quality, completed according to Graduate School guidelines and program policies.

Students pursuing the doctoral degree in physical rehabilitation science participate in research throughout their studies. They are expected to demonstrate continuous evidence of scholarship through an average of three presentations a year and at least two submitted papers before the dissertation. Graduate research and teaching assistantships may be available to highly qualified applicants. Progress monitoring and academic/research planning are provided on an annual basis by the student's advisory committee and through ongoing interactions with the primary advisor.

Required Courses (Credits)

Please see our PhD Curriculum Page.

Health Science

<http://www.graduate.umaryland.edu/healthscience/>

Degree Offered

MS

Program Description

The Master of Science in Health Science is a 30-credit online program designed to provide individuals with the education and training needed to engage with and respond to civic, social, environmental, and economic challenges at the local, national, and global levels. The program prepares

students to search, interpret, and evaluate medical literature, including interpretation of biostatistical methods, by accessing common medical databases and using sampling methods. Upon completion of the program, students should be able to deliver instruction in health care delivery systems and health policy as well as provide instruction on the principles and practice of medical ethics. Students are provided an overview of health care system delivery, patient safety, and quality and risk management. The program thoroughly reviews public health as it relates to the prevention of disease, maintenance of public health, and participation in disease surveillance, reporting, and intervention.

Program Admissions

Physician Assistant

All PA collaborative candidates must apply online through the Central Application Service for Physician Assistants (CASPA); the portal is open in mid-April each year. CASPA is a web-based application service that allows applicants to submit an application to the Physician Assistant Program, which is received by AACC's Health Professions Admissions Office. Complete application instructions and required credentials are published by CASPA and AACC at <http://www.aacc.edu/about/schools-of-study/health-sciences/physician-assistant/>.

In addition to meeting CASPA application requirements, candidates for admission must meet the minimum qualifications and standards established by the Graduate School.

Non-PA Tracks

Applicants who are interested in the Master of Science in Health Science (MSHS) who wish to complete the UMB coursework can apply through the University of Maryland, Baltimore Graduate School. A letter of interest including personal goals and a CV should be sent to the MSHS administrative program director, with three letters of recommendation.

All candidates applying for admission must meet the minimum qualifications and standards established by the Graduate School, including the successful completion of a bachelor's degree program listed previously and a minimum, cumulative grade-point average (GPA) of 3.0 on a 4.0 scale. International students must provide current, official results of the Test of English as a Foreign Language (minimum score of 80 for the internet-based test) or the International English Language Testing System exam (minimum Band 7).

Degree Requirements

The Physician Assistant track of the MSHS degree program requires a minimum of 30 credits from UMB and 6 credits of approved AACC PA coursework, which is transferred into the master's program.

All admitted MSHS students must maintain a minimum GPA of 3.0 to remain in good standing in the program. A complete description of progression guidelines and degree requirements is provided in the Degree Requirements section of the catalog.

*Descriptions of the non-PA tracks also are described as stand-alone certificate programs in this section of the catalog.

Program Tracks

Physician Assistant (PA)

This track is a collaborative arrangement between Anne Arundel Community College (AACC) and the University of Maryland, Baltimore (UMB) Graduate School. It prepares students to become competent, ethical, and compassionate health care providers who are ready to fulfill the roles and duties of a primary care physician assistant. The program seeks those who recognize and promote the value of diversity and are committed to lifelong learning. Students who successfully complete all coursework from both institutions will receive a Master of Science in Health Science (MSHS) from UMB and a Certificate of Physician Assistant Studies from AACC. Graduates will be eligible to sit for the national certification exam for physician assistants. The Master of Science degree program at UMB is offered completely online. This full-time, 25-month program includes subjects in applied medical and behavioral sciences, patient assessment, clinical medicine, procedural skills, health policy, professional practice issues, and supervised clinical practice. The program is accredited by the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA).

*Non-PA track students specialize in one of seven concentrations, each of which culminates in a stackable certificate that can be applied to the master's program in Health Science.**

Aging and Applied Thanatology

This track is intended to meet the needs of individuals who are involved in any or all aspects of the dying, death, and grieving processes. It is, therefore, an interdisciplinary program intended to be of interest to a wide range of

professionals with baccalaureate or advanced degrees, including physicians, nurses, psychologists, social workers, hospice professionals, bereavement counselors, clergy and chaplains, death educators, teachers, police, firefighters, paramedics, funeral directors, and others who provide support and assistance for those affected by death, as well as those who want to expand their own knowledge and skills on dying, death, and grieving.

Global Health Systems and Innovation

The focus of this track is to introduce basic global health systems and services to health professionals interested in short- or medium-term consultation/projects overseas and subsequent opportunities. Most students are already trained/ licensed experienced practitioners. This online program and track is offered in partnership with the University of Maryland University College's (UMUC) Online Postbaccalaureate Certificate in Global Health Management. UMB's Global Health Systems and Services certificate and UMUC's Global Health Management certificate share two common core courses.

This UMB-UMUC partnership takes advantage of UMB's extensive graduate health professional, clinical, practice, and global expertise and UMUC's extensive online and health management expertise. It offers UMB and UMUC graduates and students interested in global health management and global health systems and services options unavailable through their home institutions. This program's goal is to apply skills to improve delivery of global health systems, policies, and services.

Integrative Health and Wellness

Students in this track will study the differences between the philosophy, theory, and application of allopathic medicine and integrative medicine. Students will critically evaluate the benefits and drawbacks of both approaches as well as the strengths and limitations of the empirical evidence for the efficacy and safety of integrative health therapies. By participating in this program, students will have the chance to practice the key integrative skills they are learning, including popular forms of mind-body interventions, health coaching strategies, and integrative assessments and treatment plans. In addition to professional growth, students will have the opportunity to benefit personally from self-reflection exercises and guided experiential learning.

Research Administration

This track is designed to ensure that students have a greater understanding of the many behind-the-scenes aspects of

research so they can successfully manage grants, understand legalities in research administration, and become familiar with the transfer of intellectual properties. Students in this track will gain advanced knowledge and practical training to ensure that learning is relevant and applicable to each student's professional goals.

Research Ethics

This track was created to provide individuals with an understanding of the ethical and regulatory aspects of human subjects research and give them the skills needed to analyze ethical issues that arise in the conduct of research in domestic and international arenas. The certificate program interrelates with the Fogarty International Center/National Institutes of Health training program that is focused in the Middle East (MERETI). The inclusion of these targeted audiences will ensure an interprofessional and global experience for all participants. The program is particularly designed for investigators, clinical research coordinators, nurses, and individuals from institutional review boards, contract research organizations, pharmaceutical industry representatives, and others involved in research. The exclusive use of distance learning technologies meets the needs of professionals worldwide who may have few opportunities to enroll in an on-site program.

Research Implementation and Dissemination

This track's goal is to translate the results of clinical and population research into everyday clinical practice and public health. Additionally, research implementation and dissemination science seeks to ensure that the knowledge and materials produced by health research lead to improved individual and population health by reaching the people for whom they are intended; being adapted to local circumstances; and being implemented effectively, safely, equitably, and in a timely and patient-centered manner.

Students in this program will study methods that promote systematic uptake and will translate the results of clinical and population research into everyday clinical practice and public health. The program also is intended to help students ensure that the knowledge and materials produced by health research will improve individual and population health.

Science Communication

This track is designed to equip students to communicate effectively with a variety of audiences using different forms and styles of writing. By providing students with advanced knowledge and practical training, this program

strives to ensure that learning is relevant and applicable to each student's professional goals. Students learn how to strategically plan, craft, edit, and execute their writing to communicate in an engaging, scientifically informed manner about health-related topics.

Details are given in the Course Descriptions part of this catalog.

Health Professions Education - MS

<https://graduate.umaryland.edu/healthprofessionsed/>

Degree Offered

MS

Program Description

The Master of Science in Health Professions Education is a 32-credit program of study that aims to provide students with the necessary tools to further develop interprofessional health profession course and curricular design, research, and assessment skills. Learners will build on existing health professional competencies gained through their professional education. Topics such as educational theory and using educational research to advance knowledge in teaching and the learning in health professions are core to this program. The primary discipline will serve as one lens through which educational theory and phenomena can be examined. There are two concentrations within the MS degree: educational research and educational leadership.

Objectives and Learning Outcomes

Upon completion of the program, students will be able to:

1. Articulate how people learn and the strategies that achieve effective learning processes and outcomes.
2. Demonstrate proficiency in curriculum design, delivery, and evaluation.
3. Demonstrate evidence-based teaching and assessment methods at the course or program level.
4. Work effectively in interprofessional teams.
5. Demonstrate the ability to apply analytical skills to improve educational programs and institutional effectiveness.
6. Demonstrate the ability to formulate research

questions and prepare a research prospectus using appropriate research methodologies. (*Educational Research Concentration*)

7. Demonstrate academic and executive-level administration and leadership skills needed to lead higher education programs, institutions, agencies, and organizations in the health professions. (*Educational Leadership Concentration*)

Program Admission

Candidates for admission apply through the Graduate School. Proof of current professional licenses for applicants who are clinically practicing, a CV, and three letters of recommendation are required. All candidates applying for admission must meet the minimum qualifications and standards established by the Graduate School, including the successful completion of a bachelor's degree and a minimum, cumulative grade-point average (GPA) of 3.0 on a 4.0 scale. Graduate Record Examinations (GRE) scores are not required for admission. International students must provide current, official results of the Test of English as a Foreign Language (minimum score of 80 for the internet-based test) or the International English Language Testing System exam (minimum Band 7).

Degree Requirements

The master's degree requires students to take 32 credits of coursework for successful completion. Students must maintain a minimum, cumulative grade point average of 3.0 on a 4.0 scale to remain in good standing in the program. Complete guidelines and requirements for progression and completion are outlined in the Degree Requirements section of this catalog.

Areas of Concentration

There are two concentrations within the degree: educational research and educational leadership.

The concentration in **Educational Research** provides students with the fundamental knowledge and skills needed to conduct empirical educational research. Students develop a broad understanding of quantitative, qualitative, and mixed methods approaches and how/when they should

be employed. They learn how to search, evaluate, critically appraise, and synthesize literature as well as interpret educational research.

The concentration in **Educational Leadership** provides students with the knowledge and skills needed to lead educational programs, institutions, agencies, and organizations in the health professions. Students develop an understanding of the qualities, behaviors, and characteristics of leaders through examining and analyzing key principles of traditional and contemporary leadership theories and practice.

Required Courses

HPE 605	CURRICULUM THEORY AND ANALYSIS	3
HPE 610	THEORETICAL FOUNDATIONS OF TEACHING AND LEARNING IN THE HEALTH PROFESSIONS	3
HPE 615	FOUNDATIONS IN STATISTICS FOR SOCIAL SCIENCES	3
HPE 620	EVALUATION AND SYNTHESIS OF LITERATURE	3
HPE 625	INSTRUCTIONAL STRATEGIES AND ASSESSMENT IN HPE	3
HPE 660	MEASUREMENT, ASSESSMENT, AND EVALUATION	3
HPE 800	INNOVATIONS IN HEALTH PROFESSIONS EDUCATION	2
HPE 840	EDUCATIONAL PROGRAM EVALUATION	3
HPE 870	CAPSTONE IN HPE	3

Required Courses for Educational Research Concentration

HPE 725	QUALITATIVE RESEARCH METHODS	3
HPE 760	MIXED METHODS RESEARCH	3

Required Courses for Educational Leadership Concentration

HPE 670	LEADERSHIP THEORY	3
---------	-------------------	---

HPE 710	LEADERSHIP IN HIGHER EDUCATION	3
---------	--------------------------------	---

Details are given in the Course Descriptions part of this catalog.

Health Professions Education - PhD

<https://graduate.umaryland.edu/healthprofessionsed/>

Degree Offered

PhD

Program Description

Health professions education (HPE) is critical to the task of meeting the healthcare needs of communities. Few healthcare professionals and faculty are formally prepared in consuming and applying evidence on how people learn to curricular and instructional design, assessment, program evaluation, and institutional leadership. The University of Maryland Baltimore (UMB) is uniquely prepared to meet the growing need for health professions educators and to advance the scholarship of professional education in these fields.

Learners in the UMB HPE program will build on existing health professional competencies gained through their education and practice, examine the historical and current theoretical foundations of learning, and engage in the practical application of emerging science of teaching and learning. Learners will examine current educational and curricular challenges faced by health professions programs and institutions to advance their skills and knowledge. By conducting rigorous research studies, graduates will contribute to the transformation of educational practice and knowledge in their discipline.

Graduates of this program will:

- demonstrate high quality and effective teaching methods.
- demonstrate proficiency in curricula design, delivery, and assessment at the course and program level.
- advance theoretical research and models, generate and disseminate scholarship in their educational areas of interest
- demonstrate the ability to integrate systematic evaluation and research techniques to demonstrate program or institutional effectiveness, improvement, and sustainability.
- demonstrate academic and executive leadership

qualities needed to lead program, institutions, agencies, and organizations in the health professions.

- participate in community engagement to improve educational access and quality.

Graduates will be prepared to apply the skills that they have acquired through the degree to academic research and leadership roles, as well as employment in the private sector, and local, state or government positions in healthcare and education.

Program admission

Admission to UMB’s PhD programs is highly selective. In addition to meeting the Graduate School’s minimum admission requirements, candidates for admission must provide evidence of a minimum of an earned master’s degree or equivalent education and training from an overseas college or university; proof of current professional license to practice (as applicable to one’s field or discipline); and a statement of proposed research interests. Individuals whose profession does not require a license to practice will still be considered for admission. Finalists for admission will be invited to interview with the program’s admissions committee.

Degree Requirements

The Ph.D. in health professions education consists of seventeen courses with a total of 60 credits. The instruction occurs online utilizing distance learning technologies in addition to a mandatory on-site residency taken in tandem with the beginning of years 1 and 2 in the program and at the conclusion. The mandatory residency requires students to attend four consecutive days of face-to-face lectures, training, discussions, and presentations at UMB’s campus in Baltimore, MD. The in-person interactions assist in facilitating the peer learning, research, reflection, and group discussion that is essential to creating an interdisciplinary team of faculty and scholars.

Complete guidelines and requirements for progression and completion are outlined in the Academic Performance and Progress in a PhD Program section of this catalog.

Required Courses

HPE 610 THEORETICAL 3

	FOUNDATIONS OF TEACHING AND LEARNING IN THE HEALTH PROFESSIONS	
HPE 615	FOUNDATIONS IN STATISTICS FOR SOCIAL SCIENCES	3
HPE 620	EVALUATION AND SYNTHESIS OF LITERATURE	3
HPE 625	INSTRUCTIONAL STRATEGIES AND ASSESSMENT IN HPE	3
HPE 660	MEASUREMENT, ASSESSMENT, AND EVALUATION	3
HPE 710	LEADERSHIP IN HIGHER EDUCATION	3
HPE 715	QUANTITATIVE RESEARCH METHODS 1	3
HPE 720	QUANTITATIVE RESEARCH METHODS 2	3
HPE 725	QUALITATIVE RESEARCH METHODS	3
HPE 805	IMPACT INSTITUTE	2
HPE 840	EDUCATIONAL PROGRAM EVALUATION	3
HPE 850	ADVANCED TEACHING SEMINAR	3
HPE 851	RESEARCH SEMINAR 1	6
HPE 899	DISSERTATION RESEARCH	12
Electives		
MHS 607	WRITING FOR SCHOLARLY JOURNALS	3
HPE 860	TEACHING IN ONLINE LEARNING ENVIRONMENTS	3

Details are given in the Course Descriptions part of this catalog.

Implementation and Dissemination Science

<http://graduate.umaryland.edu/research/>

Degree Offered

Postbaccalaureate Certificate

Program Description

The program in Implementation and Dissemination Science is a 12-credit, online postbaccalaureate graduate certificate program.

Dissemination science is the process of the distribution of information and intervention materials to a specific public health or clinical practice audience. Translating research into practice is a complex process that involves dissemination science. The purpose of dissemination science research is to translate evidence-based interventions into practice to improve lives and to help translate the results of clinical and population research into everyday clinical practice and public health.

Additionally, implementation and dissemination science seeks to ensure that the knowledge and materials produced by health research lead to improved individual and population health by reaching the people for whom they are intended; being adapted to local circumstances; and being implemented effectively, safely, equitably, and in a timely and patient-centered manner.

Many students interested in this certificate work in the following fields: clinical research, data analysis, program management, learning and development, strategy, laboratory research, and related areas.

Students in this program will study methods that promote systematic uptake and translate the results of clinical and population research into everyday clinical practice and public health. The program also intends to help students ensure that the knowledge and materials produced by health research will improve individual and population health.

Implementation and Dissemination Science also is a concentration of study within the Master of Science in Health Science (MSHS) program. Credits earned in the stand-alone Implementation and Dissemination Science certificate program may be applied toward MSHS degree requirements.

Program Admission

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is highly selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended.

Graduate Record Examinations are not required for

admission.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

MHS 613	RESEARCH IMPLEMENTATION AND DISSEMINATION I	3
MHS 614	RESEARCH IMPLEMENTATION AND DISSEMINATION II	3
MHS 630	ESSENTIALS OF CHRONIC INFECTIOUS EPIDEMIOLOGY	3
MHS 631	GLOBAL NON- COMMUNICABLE (NCD) EPIDEMIOLOGY	3

Details are given in the Course Descriptions part of this catalog.

Integrative Health and Wellness

<http://graduate.umaryland.edu/wellness/>

Degree Offered

Postbaccalaureate Certificate

Program Description

The Integrative Health and Wellness postbaccalaureate certificate is a 12-credit program that can be completed entirely online.

This program teaches students about integrative therapies and how individuals can bring these therapies into their own professional and personal experiences. The Integrative Health and Wellness certificate is designed for students who are interested in learning more about an integrative, holistic approach to health and healing. This holistic approach appreciates and attends to the role of the body,

mind, and spirit in creating and maintaining health and wellness. In this program, students study the differences between the philosophy, theory, and application of allopathic medicine and integrative medicine. Students critically evaluate the benefits and drawbacks of both approaches as well as the strengths and limitations of the empirical evidence for the efficacy and safety of integrative health therapies. In this program, students may practice the key integrative skills they are learning, including popular forms of mind-body interventions, health coaching strategies, and integrative assessments and treatment plans. In addition to professional growth, students can benefit personally from self-reflection exercises and guided experiential learning. Individuals interested in this program will have backgrounds in health care, fitness, nutrition, or psychology. However, the concepts presented in this certificate are useful for students from a variety of backgrounds who are interested in integrative medicine and how it can benefit them professionally and personally. Graduates of this program will have the unique advantage of having studied with leading professionals in this field and possessing a sound knowledge of the empirical research in integrative medicine and basic proficiency in fundamental skills for the practice of integrative health and wellness. Integrative Health and Wellness also is a concentration of study within the Master of Science in Health Science (MSHS) program. Credits earned in the stand-alone Integrative Health and Wellness certificate program may be applied toward MSHS degree requirements.

Certificate Objectives

This certificate is designed to:

- Provide students with empirically based knowledge of holistic approaches to health and wellness.
- Improve the quality and breadth of care of health care practitioners.
- Plan and facilitate programs that will bring awareness to integrative health and wellness health care options.
- Work effectively within various health care facilities to provide complementary and integrative approaches for those seeking nonallopathic treatments.
- Build interdisciplinary teams and communicate with clinical providers, administrators, and patients using integrative approaches.

Learning Outcomes

At completion of the program, students will be able to:

- Describe the fundamental concepts of integrative health and wellness, including the history, philosophies, theories, and methods of prominent integrative therapies.
- Identify the differences between, and applications of, allopathic medicine and integrative medicine.
- Explain the interaction among emotional, physical, mental, social, and spiritual aspects of health and well-being.
- Describe the types, uses, benefits, and potential adverse effects of commonly used mind-body approaches in the United States.
- Critique the strengths and limitations of the empirical evidence for the efficacy, safety, and mechanisms of action of integrative health therapies.
- Demonstrate basic proficiency in skills for communicating and educating patients about integrative health and wellness approaches.
- Use scientific evidence for clinical decision-making, treatment recommendations, and outcome evaluation.
- Contrast integrative assessment with conventional medical assessment and develop an integrative treatment plan.
- Analyze case studies demonstrating the application of integrative approaches for the treatment and prevention of common and chronic diseases.
- Apply the philosophy and fundamental principles of health and wellness coaching in your chosen health care profession.
- Use knowledge of health behavioral change theories to inform coaching strategies and empower clients' change process.
- Experience and reflect upon the use of integrative approaches for health and healing through guided experiential learning and self-practice.

Program Admission

General application requirements for admission to postbaccalaureate certificate programs are outlined in the Admissions section of this catalog. UMB recognizes that the coursework designed for the Integrative Health and Wellness certificate has the potential to benefit learners who are pursuing multiple clinical and professional degrees and credentials. To apply for this

postbaccalaureate certificate, individuals should have at least a bachelor's degree and a professional or personal interest in integrative health and wellness. No specific undergraduate course of study is required.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade. All requirements for the certificate must be completed within three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guidelines and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

All courses are eight weeks in length, 3 credits, and offered online.

MHS 612	INTRODUCTION TO INTEGRATIVE HEALTH AND WELLNESS	3
MHS 636	ADVANCED SKILLS IN INTEGRATIVE MIND-BODY INTERVENTIONS	3
MHS 628	INTEGRATIVE HEALTH AND WELLNESS COACHING	3
MHS 619	CLINICAL APPLICATION OF INTEGRATIVE HEALTH AND WELLNESS	3

Details are given in the Course Descriptions part of this catalog.

Intercultural Leadership

<http://www.graduate.umaryland.edu/Intercultural/>

Degree Offered

Post_baccalaureate Certificate

Program Description

The post-baccalaureate certificate in Intercultural Leadership equips professionals with an understanding of intercultural competence and the necessary tools for working across cultural differences. The program is a partnership of the UMB Graduate School and the University of Maryland Baltimore County's (UMBC)

department of Modern Languages, Linguistics and Intercultural Communication.

The program consists of five courses totaling 13 credits. Instruction occurs predominantly online with a mandatory on-site residency. The residency requires students to attend two consecutive days of face-to-face lectures, trainings, discussions, and presentations at UMB. The in-person interactions facilitate the group discussions that are essential to intercultural learning and engagement.

Students build on existing competencies by exploring attitudes and perceptions of self and others, by examining the historical foundations of different cultural groups, by learning effective strategies for interacting with diverse cultural groups, and by engaging in the practical application of cultural responsiveness to actual scenarios at institutions. Completion of the program will result in increased knowledge and understanding of concepts related to culture, diversity, and inclusion; effective principles for engaging in dialogue; an individual's personal level of intercultural competence, and; knowledge of past and present national policies and legislation impacting racial and cultural groups. The program will also engage students in the practical application of strategies to positively influence the climate for diversity.

Program Admission

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Degree Requirements

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Required Courses

MLL 625	INTERCULTURAL AND CROSS-CULTURAL COMMUNICATION	3
---------	--	---

INCL 632	HISTORICAL EXPLORATION OF RACE IN THE US	3
INCL 633	HISTORICAL EXPLORATION OF CULTURE IN THE US	3
INCL 640	PRACTICAL APPLICATION OF INTERCULTURAL LEADERSHIP	3
INCL 643	INTERCULTURAL IMPACT INSTITUTE	1

Details are given in the Course Descriptions part of this catalog.

Leadership and Administration in Hospice and Palliative Care

<https://www.graduate.umaryland.edu/palliative/About-the-Program/>

Degree Offered

Postbaccalaureate Certificate

Program Description

Leadership and Administration in Hospice and Palliative Care is a 12-credit, online postbaccalaureate graduate certificate program designed to provide learners with experiences designed to foster a deeper knowledge and understanding of the numerous administrative issues in caring for patients with a serious illness. Specifically, participants learn about assessing the need for a hospice program or palliative care program, and how to develop each program. Leadership and administrative skills such as team building, quality improvement, service and performance excellence, staffing, operational aspects, financial management, human resources management, organizational integrity and compliance will be covered for both hospice and palliative care practice. Participants will become intimately knowledgeable about the standards and regulations for hospice and palliative care practice, and their incumbent compensation models. Enrollees will also learn how to develop, implement and maintain an ongoing data driven process that reflects the complexity of the organization and focuses on clinical, economic and humanistic outcomes. Learners will also assure strategic alignment of program operationalization with established organizational mission and vision with consideration for growth. Last, participants will learn about the principles of adult learning and staff development, including principles of instructional design, and methods of informal learning (including social media).

Leadership and Administration in Hospice and Palliative Care is also a concentration of study within the Master of Science in Palliative Care (PALC-MS) program. Credits earned in the stand-alone certificate program may be applied toward the PALC-MS degree requirements.

Program Admission

The target learner audience includes practitioners who are working in hospice and palliative care or aspire to do so, including physicians, advance practice nurses, nurses, pharmacists, physician assistants, social workers, chaplains and grief/bereavement specialists.

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is highly selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

PALC 608	HOSPICE LEADERSHIP AND ADMINISTRATION	3
PALC 609	PALLIATIVE CARE LEADERSHIP AND ADMINISTRATION	3
PALC 610	PRACTICE DEVELOPMENT AND STRATEGIC PLANNING	3
PALC 602	PRINCIPLES AND PRACTICES OF PALLIATIVE CARE EDUCATION	3

Details are given in the Course Descriptions part of this catalog.

Marine Estuarine Environmental Sciences

University System of Maryland

<http://mees.umd.edu/>

Degrees Offered

PhD, MS

Program Description

The specific objective of the systemwide University graduate program in Marine Estuarine Environmental Sciences (MEES) is the training of qualified graduate students, working toward an MS or PhD degree, who have research interests in fields of study that involve interactions between biological systems and physical or chemical systems in marine, estuarine, or terrestrial environments. The program comprises six areas of specialization: ecology, environmental chemistry, environmental molecular biology and biotechnology, environmental science, fisheries science, and oceanography. Students work with their advisory committee to develop a customized course of study based on research interests and previous experience.

Each student is required to complete a thesis or dissertation reporting the results of an original investigation. The research problem is selected and pursued under the guidance of the student's advisor and advisory committee.

Students may conduct their research in the laboratories and facilities of the University of Maryland, College Park; University of Maryland, Baltimore; University of Maryland, Baltimore County; or University of Maryland, Eastern Shore; or in a laboratory of the University of Maryland Center for Environmental Science: Chesapeake Biological Laboratory in Solomons, Md.; the Horn Point Laboratory in Cambridge, Md.; and the Appalachian Laboratory in Frostburg, Md.; or at the Center of Marine Biotechnology in Baltimore. The Chesapeake and Horn Point laboratories are located on the Chesapeake Bay. They include excellent facilities for the culture of estuarine organisms. The laboratories are provided with running saltwater, which may be heated or cooled and may be filtered. At Horn Point, there are extensive marshes, intertidal areas, oyster reefs, tidal creeks, and rock jetties. The Appalachian Laboratory, located in the mountains of Western Maryland, specializes in terrestrial and freshwater ecology.

Program Admission

Applications for admission in the fall semester must be

filed by Feb. 1; however, to be considered for financial support, it is better to apply by Dec. 1. Some students will be admitted for the semester starting in January, for which the deadline is Sept. 1. Applicants must submit an official application to the Graduate School at the University of Maryland, College Park along with official transcripts of all previous collegiate work, three letters of recommendation, and scores on the general test (aptitude) of the Graduate Record Examinations. It is particularly important that a student articulate clearly in the application a statement of goals and objectives pertaining to their future work in the field. Because of the interdisciplinary and interdepartmental nature of the program, only students for whom a specific advisor is identified in advance can be admitted. Prior communication with individual members of the faculty is encouraged.

Required Courses

Students plan their courses under the direction of their academic advisors and an advisory committee. Students must complete graduate course requirements as determined by the area of specialization through which they are enrolled. Students may take courses from departments of several University System of Maryland institutions approved by the MEES program committee. Students conducting research for a master's or doctoral degree under the direction of a faculty member must enroll in one of the following:

MEES 799	MASTER'S THESIS RESEARCH	1 TO 6
MEES 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12

Students enrolled in the MEES program at UMB are encouraged to avail themselves of the course offerings (GPLS) of the school's Graduate Program in Life Sciences.

Medical and Research Technology

<http://medschool.umaryland.edu/dmrt/>

Degree Offered

MS

Program Description

The Medical and Research Technology Master of Science program provides medical technologists and laboratory scientists with advanced knowledge and skills to enhance their professional development. Graduates of the program hold a variety of jobs, including laboratory supervisors and managers, medical technology educators, academic and

biotechnology researchers, technical representatives for industry, directors of marketing, clinical trial coordinators, and scientists in governmental regulatory agencies.

Designed for medical technologists and students with undergraduate life science degrees, the program offers two tracks: biomedical science (research track; thesis required) and laboratory management (management track; nonthesis option). In the biomedical science track, the student acquires the advanced training and skills needed for research in the biomedical field. The laboratory management track develops skills in laboratory administration. Students will find the program flexible and may tailor and arrange the program to fit individual interests and backgrounds.

Program Admissions

Beyond the Graduate School's minimum admission requirements, applicants must have a bachelor's degree in medical technology or a life science discipline related to laboratory sciences. Examples of related life science disciplines include biochemistry, microbiology, molecular biology, immunology, cell biology, and biotechnology.

Degree Requirements

The master's degree program requires a minimum of 24 credits and 6 master's thesis research credits (30 credits total) for the biomedical research track and a minimum of 36 credits for the laboratory management track. Courses are selected with the approval of the program director and graduate faculty committee, from the following categories:

Required Core Courses

MEDT 628	SEMINAR	1
MEDT 630	SCIENTIFIC AND TECHNICAL WRITING	3
MEDT 635	TEACHING PRACTICUM MINOR	2
MEDT 687	QUALITY CONTROL AND REGULATIONS IN LABORATORY SCIENCES	2
CIPP 909	RESPONSIBLE CONDUCT OF RESEARCH	1 TO 2
DBMS 638	BIostatISTICS	1 TO 3
	Or	
PREV 620	PRINCIPLES OF BIostatISTICS	3
	Or	
POSI 604		

MEDT 628: three semesters

POSI 604: University of Maryland, Baltimore County

courses

Required Courses (Biomedical Research Track)

CHEM 437	COMPREHENSIVE BIOCHEMISTRY I	
MEDT 631	RESEARCH DESIGN	2
MEDT 799	MASTER'S THESIS RESEARCH	1 TO 6

CHEM 437: University of Maryland, Baltimore County courses

Suggested Elective Courses

MEDT 634	TEACHING PRACTICUM MAJOR	4
MEDT 638	SPECIAL TOPICS	1 TO 4
MEDT 654	ADVANCED TOPICS IN LABORATORY SCIENCES	2
MEDT 671	MOLECULAR AND CELL BIOLOGY	3
CHEM 638	COMPREHENSIVE BIOCHEMISTRY	
BIOL 614	GENETICS AND EUKARYOTIC MOLECULAR BIOLOGY	
GPLS 635	BACTERIAL GENETICS	
GPLS 702	BASIC IMMUNOLOGY	4
GPLS 710	MICROBIAL PATHOGENESIS	3
GPLS 704	PRINCIPLES OF VIROLOGY	3

CHEM 638 and BIOL 614: University of Maryland, Baltimore County courses

Required Courses (Management Track)

MEDT 639	MANAGEMENT PRACTICES IN LABORATORY SCIENCES	1 TO 6
ACCT 504	INTRODUCTION TO ACCOUNTING	
	Or	
ACCT 610	FINANCIAL ACCOUNTING	
FIN 504	FINANCIAL MANAGEMENT	
	Or	
MGMT 640	FINANCIAL DECISION- MAKING FOR MANAGERS	
MGMT 600	LEADING WITH INTEGRITY	

Or
 MGMT 640 TECHNOLOGY TRANSFER

ACCT 504, FIN 504 and MGMT 600: University of Baltimore courses

ACCT 610 and MGMT 640: University of Maryland University College courses

Suggested Elective Courses

MEDT 634	TEACHING PRACTICUM MAJOR	4
MEDT 638	SPECIAL TOPICS	1 TO 4
PREV 648	INTRODUCTION TO HEALTH SYSTEM AND HEALTH POLICY MANAGEMENT	3
HCAD 640	FINANCIAL MANAGEMENT FOR HEALTH CARE ORGANIZATIONS	3
ECAD 489	SEMINAR IN ADMINISTRATION	3
MGMT 610	THE MANAGER IN A TECHNOLOGY SOCIETY	3
PUBL 615	MANAGERIAL LEADERSHIP AND COMMUNICATION SKILLS	3
TMAN 633	MANAGING PEOPLE IN TECHNOLOGY BASED ORGANIZATIONS	3
MGMT 650	RESEARCH METHODS FOR MANAGERS	3
HRMD 610	ISSUES AND PRACTICES IN HUMAN RESOURCE MANGEMENT	3
EDUC 601	HUMAN LEARNING AND COGNITION	3

ECAD 489, PUBL 615 and EDUC 601: University of Maryland, Baltimore County courses

HCAD 640, MGMT 610, TMAN 633, MGMT 650 and HRMD 610: University of Maryland University College courses

Details are given in the Course Descriptions part of this catalog.

Medical Cannabis Science and Therapeutics

<https://www.pharmacy.umaryland.edu/academics/ms-medical-cannabis-science-and-therapeutics/>

Degree Offered

MS, Certificate

Program Description

The Master of Science program in Medical Cannabis Science and Therapeutics provides students with experiences designed to foster a deeper knowledge and understanding of the science, clinical therapeutics, and policy related to medical cannabis. The four core required courses in the program cover the principles of drug action and cannabinoid pharmacology; cannabinoid chemistry and drug delivery; clinical uses and effects of medical cannabis; and an overview of current state and federal laws and regulations along with a historical overview of medical cannabis use. Students also take four elective courses followed by two final advanced courses (Research Methodology and Expert Seminars and Discussion). Students may choose to take elective courses in the basic sciences, therapeutics, or policy. The program blends online and face-to-face instruction, and includes both synchronous (e.g., live) and asynchronous (e.g., pre-recorded) lectures, readings, and reflections, along with active learning elements, including discussion boards and individual and group assignments. The program is offered at the Universities at Shady Grove through the University of Maryland, Baltimore.

The Graduate Certificate in Medical Cannabis Science, Therapeutics, and Policy provides the flexibility of learning in an online environment. The program is designed to be completed in one year. Students will take four foundational courses that are the first four in the MS in Medical Cannabis Science and Therapeutics program. Students have the option to transition to the MS program after completing the Graduate Certificate.

Program Admission

Targeted students include health care practitioners, scientists, growers, policy professionals, and others with an interest in medical cannabis. Candidates for admission must meet the minimum qualifications and standards established by the Graduate School including an earned baccalaureate degree or equivalent education and training from an overseas institution. Graduate Record Examinations scores are not required for admission. International applicants must meet the minimum English language proficiency requirements set by the Graduate School.

MS Degree Requirements

The master’s degree program requires the successful

completion of all required and elective coursework totaling 30 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale to remain in good standing in the program. Complete guidelines and requirements for progression and completion are outlined in the Degree Requirements section of this catalog.

Required Courses

MCST 601	INTRODUCTION TO MEDICAL CANNABIS HISTORY, CULTURE, AND POLICY	3
MCST 602	PRINCIPLES OF DRUG ACTION AND CANNABINOID PHARMACOLOGY	3
MCST 603	BASIC CANNABINOID CHEMISTRY AND DRUG DELIVERY	3
MCST 604	THE CLINICAL EFFECTS OF MEDICAL CANNABIS	3
MCST 605	ADVANCED CANNABIS THERAPEUTICS I	3
MCST 606	ADVANCED CANNABIS THERAPEUTICS II	3
MCST 607	NEGATIVE EFFECTS OF CANNABIS	3
MCST 608	CANNABIS GENOMICS AND PHARMACOGNOSY	3
MCST 609	ADVANCED CANNABINOID CHEMISTRY AND ANALYTIC TESTING METHODOLOGY	3
MCST 610	STATE AND FEDERAL CANNABIS LAWS AND POLICIES	3
MCST 611	RESEARCH DESIGN AND MEDICAL CANNABIS	3
MCST 612	EXPERT SEMINARS AND CASE STUDIES	3

Details are given in the Course Descriptions part of this catalog.

Available Electives

Electives are in the basic sciences, therapeutics, or policy.

Certificate Degree Requirements

The Graduate Certificate consists of the first four courses of the MS in Medical Cannabis Science and Therapeutics program, for a total of 12 credits.

Required Courses

MCST 601	INTRODUCTION TO MEDICAL CANNABIS HISTORY, CULTURE, AND POLICY	3
MCST 602	PRINCIPLES OF DRUG ACTION AND CANNABINOID PHARMACOLOGY	3
MCST 603	BASIC CANNABINOID CHEMISTRY AND DRUG DELIVERY	3
MCST 604	THE CLINICAL EFFECTS OF MEDICAL CANNABIS	3

Medical Physics

Degree Offered

Certificate

Program Description

The graduate certificate in Medical Physics is designed for professionals with a doctoral degree, related work experience and course work in physics and engineering who are delving into a field of medical physics. The program curriculum emphasizes concepts, practices, and skills that professionals need to be effective in a wide range of medical physics concepts and who are positioned to apply for further clinical training named Medical Physics Residency.

The Medical Physics Certificate Program consists of 6 courses with a total of 18 core credits. The instruction will primarily occur online and will include both synchronous and asynchronous learning. Students enrolled continuously will enroll in fall (2 courses) spring (2 courses) and summer (2 courses-alternate) and will be able to complete the program in 24 months. Courses in the programs will be taught in predominately hybrid formats.

Program Completion Timeline

- The degree is designed for completion within 2 years academic years, but students are allowed up to 3 years to complete the program.
- Participants can start the program in the summer term.

Learning Outcomes

- an understanding of the role of patient safety in the clinical practice of medical physics;
- an understanding of how research and inquiry lead to the creation of new knowledge;
- the ability to critically evaluate research and scholarship in medical physics;
- the competent use of research to pose new questions and to solve problems in research and clinical settings;
- the communication and interpersonal skills that are necessary to function in a collaborative, multidisciplinary environment;
- the professional attributes and the ethical conduct and actions that are required of medical physicists; and
- a valuing of career-long continuing education to keep scientific knowledge and skills current.

Program Admission

Candidates should hold a doctoral degree in physics, physical science, or engineering, with either an undergraduate degree in physics or at least three upper-division (3rd or 4th year undergraduate) physics courses. Candidates who wish to enter the certificate program will be asked to provide 2 letters of recommendation in addition to requirements outlined in the Certificate Program Applicants instructions.

Applicants will be accepted on a rolling basis. Summer Session: May 15th; Fall Session: July 15th; Spring Session: December 15th

International students: International applicants may be eligible for J-1 Short Term Scholar visa sponsorship for the in-person observation requirement of this program. Visa sponsorship will only cover the time required to be in-person, and not for the duration of the certificate program.

Medical Science - DMSc

Degree Offered

Doctor of Medical Science (DMSc)

Program Admissions

Application requirements are listed below:

- An official application

- 75.00 application fee
- **No GRE Required**
- Official transcripts from all former institutions
- Statement detailing a practice based issue or problem you are interested in improving.
- 3 letters of recommendation
- Current CV/Resume
- NCCPA Certification, current and active
- Current Licensure in the US, preference for regional licensure- MD, DC,DE, PA
- 2 years minimum clinical experience or graduation from an accredited post graduate residency

Admission requirements are listed below:

- A copy of your valid, unrestricted (current) Physician's Assistant (PA) license in the United States. Students enrolled in the DMSc program must have an unencumbered license to be admitted and they must maintain licensure for the duration of their enrollment.
- Applicants must report board actions and other professional actions on acceptance of admission. Students who are subject to actions during the time of their enrollment are required to inform the DMSc Graduate Program Director. Certain actions may limit the student's clinical placement.
- The date varies each semester, but students should be compliant at least two weeks prior to the start of the semester and remain compliant throughout enrollment. If you are not compliant before the start of the semester, you may be ineligible to register for and/or attend clinical. UMB Student Health may also place a registration hold on your account.

Program Description

The DMSc curriculum was designed to prepare PA leaders to navigate the complexity of healthcare delivery while improving healthcare outcomes and access. The curriculum was informed by the national PA competencies, PA educators, PA researchers from the Physician Assistant Leadership and Learning Academy (PALLA), alumni and students.

The UMB DMSc is unique in its design, we provide a

common foundational core to all students and allow our students to choose focus areas from the myriad of courses we offer at UMB. Examples include taking elective courses in palliative care, thanatology, social innovation, intercultural leadership, health professions education, integrative medicine, or health informatics.

Educational-Learning Outcomes

Upon the completion of the Doctor of Medical Science for PAs, graduates will be able to:

1. Demonstrate knowledge about established and evolving biomedical and clinical sciences and the application of this knowledge to patient care.
2. Demonstrate interpersonal, verbal, and written communication skills that result in the effective exchange of information, advancing learning, and healthcare in collaboration with patients, families, and health professional team members.
3. Demonstrate leadership ability to engage with a variety of other health care professionals in a manner to optimize safe, effective, patient- and population-centered care.
4. Engage in reflection and critical analysis of one’s own practice experience, the medical literature, and other information resources for the purposes of self-evaluation, lifelong learning, practice improvement, and organizational health.
5. Demonstrate a commitment to practicing medicine ethically and in legally appropriate ways and emphasizing professional maturity and accountability for delivering safe, quality, affordable health care to patients and populations.
6. Provide person-centered care that includes patient- and setting-specific assessment, evaluation, and management and healthcare that is evidence-based, supports patient safety, and advances health equity.
7. Recognize and understand the influences of the ecosystem of person, family, population, environment, and policy on the health of patients and integrate the knowledge of these determinants of health into patient care decisions.
8. Utilize principles of intercultural leadership, health system science, implementation and dissemination science when dealing with complex problems to promote the strategic use of resources to improve care and operational effectiveness.

Degree Requirements

The following coursework will be offered *online*. These courses are generally 8-weeks in length and delivered in sequential order. With asynchronous and select synchronous options, students may study anytime, or anywhere.

- 15 credits (6 courses) from the MS Health Science - PA curriculum
- 5 credits (2 courses) from elective based on student interest/need
- 24 credits (8 courses) of didactic coursework

The following coursework will take *place in-person*, under the supervision of PA faculty with clinical practice and leadership experience within the state and at UMB.

- 16 credits (3 courses) of clinical and impact labs and capstone

The in-person component of the curriculum (impact labs/clinical symposiums) will require students to attend about four days of face-to-face lectures, training, discussions, and presentations at UMB’s campus in Baltimore, MD during the summer session.

Exact dates will depend on faculty, student, and facility availability. Students entering the programs in the fall will be expected to report to campus the following summer.

Program Completion Timeline

- The degree is designed for completion within three academic years of part-time study. Students will have up to six years to complete curriculum.
- Participants can start the program in the fall term **only**.

Required Coursework

DMSC 710	HEALTHCARE SYSTEM SCIENCE, ORGANIZATIONAL MICROECONOMICS AND FINANCE	3
DMSC 712	HEALTHCARE AND EDUCATION LAW AND ETHICS	3
DMSC 713	CLINICAL SYMPOSIUM 1	6
DMSC 714	LEADERSHIP AND ADVOCACY	3
DMSC 716	CLINICAL LEARNING AND PRACTICE REFLECTION	3

INFO 604	DECISION SUPPORT SYSTEMS IN HEALTHCARE	3
MHS 600	INTRODUCTION TO LIBRARY RESOURCES AND SCHOLARLY WRITING	1
MHS 602	LEGAL AND ETHICAL ISSUES FOR HEALTH, HUMAN SERVICES AND CLINICAL PROFESSIONALS	2
MHS 608	RESEARCH SEMINAR I	3
MHS 615	BIOSTATISTICS FOR HEALTH PROFESSIONALS	3
MHS 630	ESSENTIALS OF CHRONIC INFECTIOUS EPIDEMIOLOGY	3
MHS 652	LEADERSHIP AND COMMUNICATION	3

Previous MHS coursework is transferrable.

Nursing

<https://www.nursing.umaryland.edu/academics/doctoral/nursing-phd/>

Degrees Offered

PhD

Special note: Students in the PhD program in the School of Nursing are expected to adhere to the policies and guidelines outlined in the nursing school’s student handbook and Catalog, as well as those of the Graduate School.

Program Description

This program is designed to meet the educational needs of students who are committed to advancing discovery nursing science and undertaking research-focused careers in academic health sciences settings. The program’s purpose is to prepare nursing scientists who will advance the theoretical and empirical basis for nursing practice and expand healthcare research. In addition to the program’s research core courses, specialty focused courses allow students to develop individualized programs of research.

Learning Outcomes

Graduates from the PhD program will be prepared to:

- Design, conduct, analyze, and disseminate research

findings to expand knowledge in nursing and related disciplines.

- Initiate, facilitate, and participate in interdisciplinary research with nurses and scholars from related disciplines.
- Disseminate research findings through presentations, publications, and other media mechanisms.
- Mentor students, junior faculty, and investigators.
- Assume leadership roles in academic and healthcare settings.

Program Admissions

Candidates for admission must meet the minimum standards of admission established by the PhD program in nursing and by the Graduate School and must provide the requisite credentials. Admission to the PhD program is highly selective. A U.S. bachelor’s degree or its equivalent from a non-U.S. educational institution is required. Graduate Record Examinations (GRE) may be required for some candidates for admission (refer to the admissions qualifications form the School of Nursing PHD program website). Applicants are encouraged to contact the PhD program office at nrsphd@umaryland.edu early in the application process to explore the fit of the applicant’s research interest with current faculty expertise. The program is committed to providing financial support for selected full-time students through graduate research assistantships and many other scholarship opportunities.

For more detailed information about the program, sign-up for the monthly virtual information session offered by SON PhD Program (<https://www.nursing.umaryland.edu/admissions/visit-us/>) or visit the program website (<https://www.nursing.umaryland.edu/academics/doctoral/nursing-phd/>).

Degree Requirements

Students must maintain a minimum cumulative grade-point average of 3.0 to remain in good standing in the program. PhD candidates must successfully complete a minimum of 12 credits of doctoral dissertation research and all required classes.

Required Courses

Doctor of Philosophy Curriculum
 NURS 840 PHILOSOPHY OF SCIENCE 3

	AND DEVELOPMENT OF THEORY	
NURS 850	EXPERIMENTAL NURSING RESEARCH DESIGNS	3
NURS 851	INTRODUCTORY ANALYSIS FOR NURSING RESEARCH	3
NURS 802	RESEARCH AND SCHOLARSHIP SEMINAR	1
NURS 802		1
NURS 841	THEORY AND CONCEPTUALIZATION IN NURSING SCIENCE	3
NURS 814	DESIGN OF NURSING RESEARCH II	3
NURS 815	QUALITATIVE METHODS IN NURSING RESEARCH	3
NURS 818	SPECIAL TOPICS IN NURSING RESEARCH	1 TO 6
NURS 819		1 TO 5
NURS 811	MEASUREMENT OF NURSING PHENOMENA	3
NURS 816	MULTIVARIATE ANALYSIS IN SOCIAL AND HEALTH CARE RESEARCH	4
NURS TBD		
NURS 819	RESEARCH ROTATION	1 TO 5

**Credits may be taken over multiple semesters.*

TBD: Course numbers to be determined.

A complete description of progression guidelines and degree requirements is provided in the Degree Requirements section of this catalog.

Oral and Experimental Pathology

www.dental.umaryland.edu/ods/education/

Degrees Offered

PhD (4-5 years)

MS (2 years)

PhD Program Description

The PhD program in Oral and Experimental Pathology (Department of Oncology and Diagnostic Sciences in the School of Dentistry) provides broad training in oral and experimental pathology. Students admitted to the program have obtained at least a dental degree. During the first two

years, the students participate in didactic courses in the basic and clinical sciences. They also are introduced to the department's clinical practice and research endeavors. Students entering with marginal preparation may need additional coursework. The remaining two years include mastery of research leading to a PhD dissertation. By the end of the third year, students must have completed all requirements for admission to candidacy for the PhD and obtain their PhD about one to two years later. The Ph.D. Students interested in the combined residency in Oral and Maxillofacial Pathology and Ph.D. in Oral and Experimental Pathology will need to apply to both, the dental school and the graduate school, respectively. The combined residency/Ph.D. program includes clinical rotations and extra credits and is four to five years long.

PhD Program Admissions

Students admitted to the program have obtained at least a dental degree. Students generally have a strong undergraduate background in the biological sciences and chemistry. Applicants lacking prerequisites will be required to correct these deficiencies by enrolling in undergraduate-level courses.

Minimum standards for admission to graduate programs at the University of Maryland, Baltimore are specified in the Graduate School catalog. The department requires an undergraduate grade-point average of at least 3.0 on a scale of 4.0, and grades of A or B in science courses are expected. Applicants are expected to take the Graduate Record Examinations (GRE). Students who hold degrees from foreign colleges or universities — or whose native language or language of the home is not English — must submit acceptable scores on the Test of English as a Foreign Language or the International English Language Testing System exam. A supplementary course in English may be recommended for some students. Foreign students eligible for admission must comply with all requirements of the Department of Homeland Security including evidence of financial support. Interviews are not required; however, the Graduate Program Committee may invite some applicants for an interview to discuss their career goals and research interests.

Degree Requirements and Advisory System

Each new student is assigned to a faculty advisory committee until they have selected a dissertation advisor. The advisory committee helps the student prepare a tentative doctoral program, advises the student and recommends for faculty approval a dissertation advisor, and provides continuing evaluation of the student's progress. This committee is replaced by the dissertation

advisor when one is selected. The student will do rotations of about eight to 10 weeks in faculty research laboratories. First-year students select the laboratories in which they will work at after consulting the departmental file on opportunities and their faculty advisory committee. Additional laboratory rotations may be done at the student's request.

Students will be expected to have basic knowledge of cell biology, biostatistics, and computer use in addition to the above subject areas. Students must take at least 36 credit hours of coursework beyond the 12 required credits of dissertation research. Courses covering areas of special interest will be selected by the student in consultation with, and with the concurrence of, the faculty advisory committee or the dissertation advisor.

Students are expected to earn grades of B or better in all courses. Those who fail to maintain a B average are subject to the rules of the Graduate School, which are published in this catalog. Competence for progression is judged based on the preliminary examination. This assessment is designed to test the student's mastery of a broad field of knowledge including the integration of their coursework with their research area. Upon completion of the dissertation research, a student shall present their results in the form of a dissertation. A PhD student is expected to publish (or receive acceptance for publication of) a significant part of their PhD dissertation findings in peer-reviewed journals of the corresponding field of research before graduation. A dissertation defense is required. Students may attempt to defend a dissertation no more than twice. Financial aid in the form of Graduate School fellowships and graduate assistantships is available to qualified students. Applications for Graduate School fellowships may be obtained directly from the Graduate School. They require three letters of recommendation and the filing of a financial aid form. While the latter is necessary to complete the application procedure, preference for the fellowship is based primarily on past academic performance. The fellowships generally provide a small stipend and remission of tuition and are renewable on a yearly basis.

PhD Required Courses

DBMS 638	BIOSTATISTICS	1 TO 3
GPLS 601	MECHANISMS IN BIOMEDICAL SCIENCES: FROM GENES TO DISEASE	8
DPAT 612	PROBLEMS IN ORAL PATHOLOGY I	2
DPAT 613	PROBLEMS IN ORAL	2

	PATHOLOGY II	
DPAT 618	SEMINAR	1
DPAT 898	PRE-CANDIDACY RESEARCH	1 TO 8
DPAT 899	DOCTORAL DISSERTATION RESEARCH	1 TO 12
CIPP 907	RESEARCH ETHICS	1

MS Program Description

The Master of Science program (Department of Oncology and Diagnostic Sciences in the School of Dentistry) provides broad training in oral and experimental pathology. Students admitted to the program have obtained at least a dental degree. During the first year, the students participate in didactic courses in the basic biomedical sciences. They also are introduced to the department's clinical practice and research endeavors. Students entering with marginal preparation may need additional coursework. The second year includes mastery of the research leading to the master thesis dissertation. Students interested in the combined residency in Oral and Maxillofacial Pathology and Master in Oral and Experimental Pathology will need to apply to both the dental school and the graduate school. The combined residency/master is a three-year program.

MS Program Admissions

Follows minimum standards for admission to graduate programs at the University of Maryland, Baltimore, specified in the Graduate School catalog. Students admitted to the master's program generally have a strong undergraduate background in the biological sciences and chemistry. Applicants lacking prerequisites will be required to correct these deficiencies by enrolling in undergraduate-level courses.

The department requires an undergraduate grade-point average of at least 3.0 on a scale of 4.0, and grades of A or B in science courses are expected. Applicants are expected to take the Graduate Record Examinations (GRE). Students who hold degrees from foreign colleges or universities — or whose native language or language of the home is not English — must submit acceptable scores on the Test of English as a Foreign Language or the International English Language Testing System exam. A supplementary course in English may be recommended for some students. Foreign students eligible for admission must comply with all requirements of the Department of Homeland Security including evidence of financial

support. Interviews are not required; however, the Graduate Program Committee may invite some applicants for an interview to discuss their career goals and research interests.

Degree Requirements and Advisory System

Each new student is assigned to a faculty advisory committee in the first year until they have selected a dissertation advisor. The advisory committee helps the student prepare a tentative research project and advises the student and recommends for faculty approval a dissertation advisor and provides continuing evaluation of the student's progress. This committee is replaced by the dissertation advisor when one is selected.

On the first-year students select the laboratories in which they will work at after consulting the departmental file on opportunities and their faculty advisory committee. Additional laboratory rotations may be done at the student's request.

Students will be expected to have basic knowledge of cell biology, biostatistics, and computer use in addition to the above subject areas. Students must take at least 14 credit hours of didactic coursework beyond the 15 required master research. Courses covering areas of special interest will be selected by the student in consultation with, and with the concurrence of, the faculty advisory committee or the dissertation advisor.

Students are expected to earn grades of B or better in all courses. Those who fail to maintain a B average are subject to the rules of the Graduate School, which are published in this catalog. Competence for progression is judged based on 6 months progress report. The committee members may advise if the student and the research data is ready for thesis defense or recommended to extend for a third year. This assessment is designed to test the student's ability of the integration of their coursework with their research area. Upon completion of the thesis research work a student shall present their results in the form of a dissertation at the end of the second year. A master student is expected to publish (or receive acceptance for publication of) a significant part of their thesis in peer-reviewed journals of the corresponding field of research before graduation. A thesis defense is required. Students may attempt to defend a thesis no more than twice. Financial aid in the form of Graduate School fellowships and graduate assistantships is available to qualified students. Applications for Graduate School fellowships may be obtained directly from the Graduate School. They require three letters of recommendation and the filing of a financial aid form. While the latter is necessary to complete the application

procedure, preference for the fellowship is based primarily on past academic performance. The fellowships generally provide a small stipend and remission of tuition and are renewable on a yearly basis.

Required Courses

Year 1		
DPAT 618	SEMINAR	1
GPLS 600	CELLULAR AND MOLECULAR BASIS OF TRANSLATIONAL RESEARCH	5
DPAT 612	PROBLEMS IN ORAL PATHOLOGY I	2
DPAT 613	PROBLEMS IN ORAL PATHOLOGY II	2
DPAT 799	MASTER'S THESIS RESEARCH	1 TO 8
Year 2		
CIPP 907	RESEARCH ETHICS	1
DPAT 618	SEMINAR	1
DPAT 799	MASTER'S THESIS RESEARCH	1 TO 8

Proposal and thesis presentation by the end of year 2.

Elective Courses

The following pathology related coursework are electives available at the graduate school catalog for masters or PhD students.

DPAT 614	HISTOPATHOLOGY TECHNIQUE I	4
DPAT 615	HISTOPATHOLOGY TECHNIQUE II	4
DPAT 616	PATHOLOGY OF ORAL LESIONS I	3
DPAT 617	PATHOLOGY OF ORAL LESIONS II	3
PATH 602	SYSTEMIC PATHOLOGY	3
PATH 608	AUTOPSY PATHOLOGY	3
PATH 609	SURGICAL PATHOLOGY	3
PATH 751	CLINICAL PATHOLOGY AND MICROBIOLOGY	3

Palliative Care

<http://graduate.umaryland.edu/palliative/>

Degrees Offered

PhD, Master of Science, & Postbachelor's Certificates

Program Description

Palliative care works to improve the quality of life of patients who are facing problems associated with life-threatening illness and their families through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual (**World Health Organization**).

The online PhD, MS, and Graduate Certificates in Palliative Care programs at the University of Maryland, Baltimore (UMB) have been designed to meet the educational needs of individuals who are currently working or who wish to work in hospice and palliative care and want to gain a deeper understanding of the physical, psychological, spiritual and social needs of patients and families affected by serious illness.

PhD in Palliative Care

The Doctor of Philosophy (PhD) in Palliative Care builds on an advanced degree in palliative care or another pertinent field. An interprofessional program designed for physicians, pharmacists, nurses, physician assistants, social workers, administrators, chaplains, researchers, and others, the PhD in Palliative Care aims to develop outstanding researchers in palliative care, while concurrently honing skills in leadership, education, and engagement in the profession and the palliative care community.

Graduates will be well-equipped for leadership positions in academia, tertiary care or palliative care centers, granting/funding institutions, and foundations associated with palliative care, as well as working with accountable care organizations to identify patients who would benefit from palliative care.

MS in Palliative Care

The Master of Science (MS) in Palliative Care meets the educational needs of individuals who are currently working or wish to work in hospice and palliative care and want to gain a deeper understanding of the physical, psychological, spiritual and social needs of patients and families affected by serious illness. **Learners are also able to earn two graduate certificates while completing the master's degree.**

Graduates of this program are able to work in the specialty practice of palliative care or add this skillset to their primary area of expertise. This program is highly interprofessional, with learners from medicine, pharmacy, nursing, physician assistant, social work, chaplaincy, therapists, counselors, administrators, veterinarians,

dentists, death doulas, child life specialists and more. Four elective pathways allow for personalization of the learning experience.

The Master of Science program in Palliative Care provides interprofessional education and training for professionals who wish to gain experience in caring for patients with advanced and terminal illnesses and their families, emphasizing and integrating the unique contributions made by all disciplines that provide palliative care. The program also provides learners with experiences designed to foster a deeper knowledge and understanding of the numerous clinical, social, psychosocial, spiritual, ethical, and grieving issues in advanced illness. Participants learn to critically evaluate evidence and apply these findings to best practices in patient care. Participants include practitioners who are working in hospice and palliative care or aspire to do so; physicians, advance practice nurses, nurses, pharmacists, physician assistants, social workers, administrators, chaplains and grief/bereavement specialists, and others. The program covers the basic principles of hospice and palliative care in four foundation core courses. The completion of these four core courses leads to a graduate certificate in Principles and Practice of Hospice and Palliative Care. Learners also may select another track or area of focus (Clinical, Administrative, Psychosocial/Spiritual, or Thanatology) or select electives from among all focus areas. Four courses successfully completed in a noncore track will constitute award of a second graduate certificate. The MS in Palliative Care is taught entirely online. To be successful, the learner must complete all required and elective coursework totaling 30 credits. The program utilizes asynchronous lectures (e.g., prerecorded), readings, reflections, practice assignments, and active-learning instruction such as interprofessional group work.

Graduate Certificate in Palliative Care

Several Graduate Certificates in Palliative Care are available, including the introductory Principles and Practice of Hospice and Palliative Care and advanced certificates in Clinical Aspects of Hospice and Palliative Care, Leadership and Administration in Hospice and Palliative Care, and Psychosocial/Spiritual Aspects of Hospice and Palliative Care.

Graduate certificates are an excellent opportunity for all interprofessional providers to add an extra layer of expertise to their current skillset.

Program Admission

Candidates for admission must meet the minimum qualifications and standards established by the Graduate School. Graduate Record Examinations scores are not required for admission. Candidates will minimally have a baccalaureate degree, and most will have an entry-level health care disciplinary degree (MD, PharmD, RN, APRN, PA-C, LCSW, etc.). International applicants must meet the minimum English language proficiency requirements set by the Graduate School.

Degree Requirements

The master's degree program requires a minimum of 30 credits. Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale to remain in good standing in the program. Complete guidelines and requirements for progression and completion are outlined in the Degree Requirements section of this catalog.

Postbaccalaureate Graduate Certificate Students who successfully complete the first four core courses (PALC 601, 602, 603, 604) will be awarded a graduate certificate titled Principles and Practice of Hospice and Palliative Care. Students who successfully complete four courses (12 credits in a given track) will be awarded a graduate certificate as follows:

- Clinical Aspects of Hospice and Palliative Care (PALC 605, 606, 607, 608)
- Psychosocial/Spiritual Aspects of Hospice and Palliative Care (PALC 609, 610, 611, 612)
- Leadership and Administration in Hospice and Palliative Care (PALC 613, 614, 615, and THAN 604)
- Aging and Applied Thanatology (THAN 604, 605, 606, 609)

The Aging and Applied Thanatology Certificate is an existing program offered by the Graduate School.

Program Outcomes

- Apply the knowledge of one's own role and those of other professions to appropriately assess and address the health care needs of patients with serious or life-threatening illnesses and their families.*

- Assess and develop practices that reflect the patient's or surrogate's goals, preferences, and choices for care within currently accepted standards of medical care, professional standards of practice, and applicable state and federal law.
- Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver patient/population-centered care that is safe, timely, efficient, effective, and equitable.*
- Collaborate with the interdisciplinary team in a climate of mutual respect and shared values to identify and manage the symptoms of patients at the end of life and the needs of patients and families.*
- Contribute as part of the interdisciplinary team in the assessment and management of pain and/or other physical symptoms that demonstrate evidence-based best practices.
- Contribute as part of the interdisciplinary team in the assessment and management of psychological and psychiatric aspects of care that demonstrates evidence-based best practices.
- Complete a comprehensive, person-centered interdisciplinary assessment that identifies the social strengths, needs, and goals of each patient and family and develop a care plan designed to meet these needs, promote achievement of goals, and maximize strengths and well-being.
- Conduct an interdisciplinary assessment of spiritual, religious, and existential aspects of care and facilitate a plan that reflects rituals or practices as desired by patient and family, including at and after the time of death.
- Develop practices that reflect consideration of patient, family, and community cultural beliefs and linguistic needs.
- Identify, acknowledge, and resolve ethical issues that arise in the care of patients with advanced illnesses.
- Communicate with patients, families, communities, and other health professionals in a responsive and responsible manner that supports the interdisciplinary team approach to the management of patients with advanced illnesses and their families.*
- Demonstrate a commitment to excellence through continuing professional development and lifelong

learning, and the education and training of patients, families, caregivers, interdisciplinary team members, other health care professionals, and other relevant stakeholders.

- Describe the strategic planning process of hospice and palliative care program development and management and data-driven processes that drive programmatic continuing quality improvement.
- Implement self-care strategies to support coping with suffering, loss, moral distress, and compassion fatigue.

***Interprofessional Collaborative Practice Competency Statement**

Required core, and required for graduate certificate in Principles and Practice of Hospice and Palliative Care

PALC 601	PRINCIPLES AND PRACTICE OF HOSPICE AND PALLIATIVE CARE	3
PALC 603	COMMUNICATION AND HEALTHCARE DECISION MAKING	3
PALC 604	PSYCHOSOCIAL, CULTURAL AND SPIRITUAL CARE	3
PALC 605	SYMPTOM MANAGEMENT IN ADVANCED ILLNESS	3

Electives in Clinical Track, and for graduate certificate in Clinical Aspects of Hospice and Palliative Care

PALC 615	ADVANCED PAIN MANAGEMENT AND OPIOID DOSING	3
PALC 611	ADVANCED NON-PAIN SYMPTOM MANAGEMENT	3
PALC 612	ADVANCED DISEASE STATE MANAGEMENT	3
PALC 607	CLINICAL MANAGEMENT OF SPECIAL PATIENT POPULATIONS	3

Electives in Administration, and for graduate certificate in Leadership and Administration in Hospice and Palliative Care

PALC 608	HOSPICE LEADERSHIP AND ADMINISTRATION	3
PALC 609	PALLIATIVE CARE LEADERSHIP AND ADMINISTRATION	3
PALC 610	PRACTICE DEVELOPMENT	3

PALC 602	AND STRATEGIC PLANNING PRINCIPLES AND PRACTICES OF PALLIATIVE CARE EDUCATION	3
----------	--	---

Electives in Psychosocial/Spiritual Track, and for graduate certificate in Psychosocial/Spiritual Aspects of Hospice and Palliative Care

PALC 613	ADVANCED DECISION-MAKING AND COMMUNICATION SKILLS	3
PALC 614	ADVANCED SPIRITUALITY AND PSYCHOSOCIAL SKILLS	3
PALC 615	ADVANCED PAIN MANAGEMENT AND OPIOID DOSING	3
PALC 602	PRINCIPLES AND PRACTICES OF PALLIATIVE CARE EDUCATION	3
THAN 604	DEATH AND DYING: ETHICAL AND LEGAL CONSIDERATIONS	3

Electives in Thanatology Track, and for graduate certificate in Aging and Applied Thanatology

THAN 604	DEATH AND DYING: ETHICAL AND LEGAL CONSIDERATIONS	3
THAN 605	PALLIATIVE CARE	3
THAN 606	CARING FOR THE BEREAVED	3
THAN 609	PERSPECTIVES IN AGING	3

Required Core

PALC 616	RESEARCH AND OUTCOMES ASSESSMENT IN HOSPICE AND PALLIATIVE CARE	3
PALC 617	ADVANCED TEAM-BASED PALLIATIVE CARE	3

Pathologists' Assistant Program

[http://www.medschool.umaryland.edu/pathology/Pathologists's-Assistant-Program/](http://www.medschool.umaryland.edu/pathology/Pathologists-s-Assistant-Program/)

Degree Offered

MS

Program Description

The program aims to prepare students for a career as a Pathologists' assistant in a clinical laboratory environment. The entire curriculum prepares students for the practice of the profession. The Pathologists' assistant is an allied health professional, qualified by academic and practical training to provide service in anatomic pathology under the direction and supervision of an anatomic Pathologists'. The high degree of responsibility assumed by the Pathologists' assistant requires skills and abilities including, but not limited to, the following:

- **Surgical Pathology:** The Pathologists' assistant performs surgical specimen dissection by identifying the anatomical structures within the specimen and assessing the nature and extent of the pathological process. The Pathologists' assistant also assures appropriate specimen accessioning, obtains and assesses pertinent clinical information and ancillary studies, describes the gross anatomic pathology, and selects tissue to be submitted for further histologic processing and microscopic examination by the Pathologists'. The Pathologists' assistant also submits specimens for additional analytic procedures, such as immunohistochemical staining, flow cytometry, image analysis, microbiological cultures, genetic analysis, chemical analysis, and toxicology, and assists in the photography of pathological specimens as indicated or requested.
- **Autopsy Pathology:** The Pathologists' assistant may be involved in the performance of postmortem examination, including the assessment of death certificates and obtaining proper legal authorization, and the reviewing of the patient's medical record and pertinent clinical data.

The Pathologists' assistant may perform evisceration, organ- block dissection per the departmental protocol, and triage autopsy specimens for special procedures and techniques as required. The Pathologists' assistant may further select tissue for histologic processing and special studies, obtain specimens for biological and toxicologic analysis, assist in photography of gross specimens, and communicate with clinicians regarding autopsy findings. The Pathologists' assistant also may be assigned to teaching, administrative, supervisory, and budgetary functions in anatomic pathology, depending on how the position is structured.

Pathologists' assistants are employed in a variety of settings, which include community and regional hospitals, university medical centers, private pathology laboratories, and medical examiner offices. The ability to relate to people, a capacity for calm and reasoned judgment, and a demonstration of commitment to quality patient care are essential for Pathologists' assistants. They must demonstrate ethical and moral attitudes and principles that are essential for gaining and maintaining the trust of professional associates, the support of the community, and the confidence of the patient and family. Respect for the patient and confidentiality of the patient's records and/or diagnoses must be maintained.

The Pathologists' Assistant Program track is full time; no part-time option is available. The program calendar begins in July and ends in May. The first year of the program is largely concentrated on didactic coursework. During the second year of the program, Pathologists' assistant students learn essential technical skills through affiliate clinical laboratory rotations. Program affiliates include, but are not limited to, the University of Maryland Medical Center, Johns Hopkins Hospital, and Maryland's Office of the Chief Medical Examiner.

The University of Maryland, Baltimore Pathologists' Assistant Program is accredited by:

National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)

5600 N. River Road, Suite 720
Rosemont, IL 60018
773-714-8880; 773-714-8886 (fax)
<https://www.naacls.org/>

Program Admissions

Completed application packets must be received by Feb. 1 to be considered for admission in July of the same year. All completed application packets, international and domestic, are reviewed by the Program Admissions Committee and receive equal consideration. From these completed applications, the committee invites selected candidates to participate in an interview. These students meet with select faculty, tour the facilities, and are given the opportunity to discuss their career goals. No admissions are deferred for subsequent years. If a student who is accepted into the program declines admission, but desires admission the following year, the application materials (transcripts, letters of recommendation, Graduation Record Examinations scores, etc.) will be held by the department; however, the student must reapply.

The program adheres to the minimum standards and

requirements for admission to graduate programs at the University of Maryland, Baltimore, outlined in this catalog, including the requirement of an undergraduate grade-point average (GPA) of at least 3.0 on a scale of 4.0. The program prefers grades of A or B in all science courses. Applicants must take the general aptitude GRE. Preference is given to students with verbal and quantitative scores above the 50th percentile and greater than or equal to 4.5 in the analytical writing scoring section. International applicants who meet the application, coursework, grade, and GRE requirements previously stated, and who hold degrees from foreign colleges or universities where English is not the primary language, must pass the Test of English as a Foreign Language with a score above 100 on the internet-based test as proof of their proficiency in English.

Applicants are required to have successfully completed a minimum of one semester of each of our prerequisites, as follows: biology, general chemistry, organic chemistry or biochemistry, microbiology, mathematics, and English composition.

Applicants are encouraged to use the application essay to describe their interest and experience in the Pathologists' assistant field, rather than contemplated research projects.

Degree Requirements

The required curriculum includes courses in general pathology, systemic pathology, clinical pathology, surgical pathology, autopsy pathology, lab management, physiology, and structure and development (anatomy training). The minimum number of credits required for the master's degree in the Pathologists' Assistant Program track is 38. The program is structured to comply with University standards and standards from the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Students must maintain a minimum 3.0 cumulative GPA for the duration of the program. Students whose cumulative GPA falls below 3.0 are placed on academic probation. They will not be permitted to graduate without remediation, and they face possible dismissal from the University.

The MANA 601 course, Structure and Development (Anatomy, Histology, and Embryology), is offered during the second semester of enrollment and is a benchmark course. MANA 601 comprises a concentrated learning experience in human anatomy, histology, and embryology, which are essential for entry-level competency as a Pathologists' assistant. This course also provides a foundation for the remainder of the two-year curriculum. Therefore, students must demonstrate a mastery of these

subject areas by achieving a grade of C or better in MANA 601. Failure to do so will result in academic dismissal.

Beginning with the summer semester between the first and second years, Pathologists' assistant students fulfill clinical laboratory rotation requirements. Each rotation provides ample time to familiarize students with the duties and responsibilities of a Pathologists' assistant for each particular institution and training site.

Completion of the Pathologists' Assistant Program requires 22 consecutive months of instruction as a full-time student. There is no part-time option available.

Required Courses (Credits)

MANA 601	STRUCTURE AND DEVELOPMENT (ANATOMY, HISTOLOGY, AND EMBRYOLOGY)	9
PATH 602	SYSTEMIC PATHOLOGY	3
PATH 603	GENERAL PATHOLOGY	3
PATH 751	CLINICAL PATHOLOGY AND MICROBIOLOGY	3
PATH 789	SPECIAL TOPICS: PATHOLOGY	1 TO 3
PATH 608	AUTOPSY PATHOLOGY	3
PATH 609	SURGICAL PATHOLOGY	3
DBMS 618	SPECIAL TOPICS IN BIOMEDICAL SCIENCE	1 TO 3
MEDT 680	LABORATORY MANAGEMENT	3

Pharmaceutical Health Services Research

<http://pharmacy.umaryland.edu/academics/phsr/>

Degrees Offered

PhD, MS

Program Description

The primary mission of the Pharmaceutical Health Services Research (PHSR) Graduate Program at the University of Maryland School of Pharmacy is to train strong researchers in a variety of important areas.

PhD in Pharmaceutical Health Services Research

The widespread use of medications in society has created a demand for individuals skilled in the evaluation of pharmaceutical services and interventions. The dynamic health care environment has created a number of critical factors that are constantly shaping and reshaping the health policies of the United States and countries around the

world.

The PhD in PHSR provides graduates with the theory, practical experience, and decision-making skills needed to address a wide range of pharmaceutical services-related problems. Pharmaceutical services are a vital part of health care, and factors affecting health care inevitably affect pharmacy, the pharmaceutical industry, and pharmacy practitioners. Some of the factors that are of academic and research interest include:

- Patient-centered outcomes analyses
- The role of the federal and state governments in health and pharmaceutical care policy
- Financing and economics of pharmaceutical care
- Drug utilization and pharmacoepidemiologic issues
- Cost containment and other benefit design issues
- Pharmaceutical care in vulnerable populations
- Pharmacovigilance and drug safety
- Pharmaceutical economics

PhD in Pharmaceutical Health Services Research and MS in Epidemiology Dual Degree

The dual-degree program offered by PHSR and the Department of Epidemiology and Public Health (DEPH) at the University of Maryland School of Medicine seeks to:

- Provide an opportunity for students in PHSR to augment their skills by adding more extensive training in epidemiologic methods.
- Provide formal recognition of training and expertise in epidemiology among students who complete the specified program.
- Formalize collaborations between the two departments in the training of these students.

This program is available only to students accepted into the PhD in PHSR program. Any PHSR graduate student is eligible to apply for admission to the dual-degree program, and students must remain in good standing with the PhD in PHSR Program and the Graduate School. Students admitted into the program will be awarded MS and PhD degrees simultaneously at the completion of their studies in the dual-degree program.

MS in Pharmaceutical Health Services Research

Adapted from the top-tier PhD in PHSR Program, the MS in PHSR is geared toward experienced professionals. Core courses for the MS in PHSR Program are identical to those in the PhD in PHSR Program and are taken alongside doctoral students. While the doctoral students go on to take additional courses, students in the MS in PHSR Program can complete their courses in as little as two years. Those courses also can be applied to the PhD in PHSR Program should a student in the MS in PHSR Program later decide to pursue the advanced degree.

Through a series of seven courses, students in the MS in PHSR Program will be introduced to four key research areas:

- Pharmacoeconomics
- Pharmacoepidemiology
- Pharmaceutical policy
- Comparative effectiveness and patient-centered outcomes research

Upon completion of the program, graduates will be able to serve as knowledgeable consultants to the public and private sectors of the health care and pharmacy/pharmaceutical communities and interact with members of other health, social, and administrative disciplines.

Program Admission

Applicants to the Doctor of Philosophy in Pharmaceutical Health Services Research Program should possess a bachelor's or master's degree from an accredited college or university.

Applicants without a Bachelor of Science in Pharmacy or a Doctor of Pharmacy degree will be considered as students who can be successful in the program with no previous pharmacy-related education and/or experience.

All applicants must submit the following materials to be considered for admission:

- One official transcript from any undergraduate and graduate schools
- Three letters of recommendation
- Curriculum vitae
- Essay describing your academic goals and research

interests

Test of English as a Foreign Language or International English Testing System exam scores (international students only)

To apply for Fall admission to the PhD in PHSR Program, please go to <https://www.pharmacy.umaryland.edu/academics/phsr/how-to-apply/>. Application deadlines for fall admission to the MS in PHSR program can be found at <https://www.pharmacy.umaryland.edu/academics/ms-phsr/how-to-apply/>.

Degree Requirements

PhD in Pharmaceutical Health Services Research

Required courses include a group of core graduate courses in pharmaceutical health services research, research methods, and statistics. The students also must complete at least 12 credits of advanced courses in their research track beyond core courses. It generally takes about 2 to 2½ years to complete the core and advanced course requirements.

While many students enter with prior graduate work, we require that they take the core courses here unless waived. When a core course is waived, students must take another course to meet the credit requirements. When noncore courses or the beginning/intermediate statistics requirements are waived, students are expected to take more advanced courses to complete the course requirements. To allow flexibility and ensure that students are well prepared in their area of specialization, students are asked to establish a curriculum committee by the end of their first semester of study.

MS in Pharmaceutical Health Services Research

The MS in PHSR is designed to be completed in two years. To receive a master’s degree, students must successfully complete select required courses – which include a group of core graduate courses in pharmaceutical health services research, research methods, and statistics – as well as 6 credits of advanced courses in their chosen research area.

Some students might be required to take additional courses as deemed appropriate by the program. In particular, students without strong computer programming skills may need elective courses.

Required Courses

PhD in Pharmaceutical Health Services Research		
PHSR	PHARMACY, DRUGS, AND THE	3

610	HEALTH CARE SYSTEM	
PHSR	COMPUTING AND ANALYTIC	3
631	METHODS FOR	
	OBSERVATIONAL STUDIES	
PHSR	CER AND	3
650	PHARMACOECONOMICS I	
PHSR	RESEARCH METHODS I	3
701		
PHSR	RESEARCH METHODS II	3
702		
PHSR	PHARMACOEPIDEMOLOGY	3
704		
PHSR	GRADUATE SEMINAR	1
709		
PREV	PRINCIPLES OF	3
600	EPIDEMIOLOGY	
PREV	INTRODUCTION TO SAS	1
619		
PREV	PRINCIPLES OF	3
620	BIOSTATISTICS	

Advanced cognate courses include:

Electives as determined by student and curriculum committee: (12 credits)

PHSR 899	DOCTORIAL	1 TO
	DISSERTATION	12
	RESEARCH	

MS in Pharmaceutical Health Services Research

PHSR	PHARMACOEPIDEMOLOGY	3
604		
PHSR	PHARMACY, DRUGS, AND THE	3
610	HEALTH CARE SYSTEM	
PHSR	COMPUTING AND ANALYTIC	3
631	METHODS FOR	
	OBSERVATIONAL STUDIES	
PHSR	CER AND	3
650	PHARMACOECONOMICS I	
PHSR	RESEARCH METHODS I	3
701		
PREV	PRINCIPLES OF	3
600	EPIDEMIOLOGY	
PREV	INTRODUCTION TO SAS	1
619		
PREV	PRINCIPLES OF	3
620	BIOSTATISTICS	

Advanced courses include:

Electives as determined by student and program director (6 credits)

PHSR 799	MASTER'S THESIS	1 TO 6
	RESEARCH	

Pharmaceutical Sciences

www.pharmacy.umaryland.edu/graduate/psc/

Degree Offered

PhD, MS

PhD Program Description

The PhD in Pharmaceutical Sciences (PSC) at the University of Maryland, Baltimore offers students outstanding opportunities to be part of cutting-edge biomedical and pharmaceutical research while preparing them for careers in academia, government, and industry. A wide range of research is conducted in the Department of Pharmaceutical Sciences, including medicinal chemistry, biochemistry, bioinorganic chemistry, cellular and molecular biology, computational chemistry, biophysics, microbiology, neuroscience, pharmacometrics, pharmacokinetics, drug formulation, drug transport and delivery, industrial pharmaceutical research, and translational and regulatory sciences. Research is interdisciplinary, and students have access to state-of-the-art facilities that include the Computer-Aided Drug Design Center, Mass Spectrometry Center, Nuclear Magnetic Resonance, Good Manufacturing Labs, Bio- and Nanotechnology Center, Center of Excellence in Regulatory Science and Innovation, Metallotherapeutics Research Center and more.

The program provides a mentor-driven plan of study that is individualized and dependent on the student's and mentor's specific research interests. Each student in the program develops their educational experience with the advice of their mentor and an advisory/thesis committee.

Graduate students enrolled in the PhD in Pharmaceutical Sciences program are fully funded, typically by teaching and research assistantships. This support includes an annual stipend, tuition remission, health insurance, and student fees.

PhD Program Admission

Candidates for admission must meet the minimum standards and requirements of the Graduate School which include a bachelor's degree from a regionally-accredited college or university, or an equivalent degree from a comparable foreign institution. Additionally, the PhD program favors applicants with a BA, BS, or MS degree in the general areas of biology, biochemistry, chemistry, chemical engineering, molecular biology, pharmacy, and pharmaceutical sciences, although related degrees are considered. In addition to the Graduate

School's minimum admission requirements, applicants should have a cumulative grade-point average (GPA) of at least 3.0 with A or B grades in recent science courses, and strong letters of recommendation. Graduate Record Examination (GRE) scores are not required. International applicants whose native language or language of the home is not English must take the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) exam. The minimum acceptable TOEFL score for admission is 80 for the internet-based test. IELTS test takers must score at least Band 7. The program encourages applications from groups under-represented in the sciences.

Degree Requirements

Students pursuing a PhD in Pharmaceutical Sciences must complete a minimum of 32 course credits (24 required, 8 elective) and a minimum of 12 doctoral dissertation research credits.

Students pursuing a MS in Pharmaceutical Sciences must complete a minimum of 35 credits to graduate, including 19 credits in required core courses, 13 credits in research, and three credits in elective courses. There is no thesis required for the MS in PSC, but students are required to complete and present a capstone project in their last semester that highlights the research and findings from their biopharmaceutical research internship.

Required Courses

At a minimum, students must complete the following courses to graduate:

PhD and MS Required Core			
PHAR 600	PRINCIPLES OF DRUG DISCOVERY		3
PHAR 601	PRINCIPLES OF DRUG DEVELOPMENT	1 TO 3	
PHAR 615	PSC ETHICS AND BIOSTATISTICS	1 TO 2	
PHAR 628	BIOANALYTICAL AND PHARMACOLOGICAL METHODS	1 TO 3	
PHAR 639	SPECTROMETRIC METHODS	1 TO 3	
PHAR 705	PSC JOURNAL CLUB		1

Note: Under certain circumstances, students may be exempted from some required core curriculum courses. Examples of this would be in the case of students who have completed the UM PharmD program and are exempt from

parts of PHAR 600/601, or students who find appropriate alternatives to the PHAR 628/639 methods courses. All exemptions must be approved by the graduate program director and the graduate program steering committee.

PHAR 600 and PHAR 601: PharmD students may take 1 to 3 credits.

PHAR 628 and 639: 4 credits out of 6 total from the two courses are required. Credits beyond the 4-credit requirement may count as elective credits.

PHAR 705: Students enroll in PHAR 705 every semester.

MS Required Courses

PHAR 608	INTRODUCTION TO LABORATORY RESEARCH	1 TO 2
PHAR 687	Process Analytical Technologies for Pharmaceutical Manufacturing	1
PHAR 688	Biopharmaceutical Research Internship	1-6
PHAR 689	Research Project Design and Management	1
PHAR 690		2
PHAR 691	MS Departmental Seminar	1

PhD Required Student Rotations

PHAR 608	INTRODUCTION TO LABORATORY RESEARCH	1 TO 2
----------	-------------------------------------	--------

Most students are required to complete two laboratory rotations, minimum of eight weeks per rotation. All students must join a laboratory by the end of their first year.

PhD Required Seminars

Students must complete three seminars.

PHAR 708	COMPREHENSIVE EXAM SEMINAR (THIRD YEAR, FALL SEMESTER)	1
PHAR 709	DEPARTMENTAL SEMINAR	1

Students are required to present one departmental seminar after their comprehensive exam. Students register for 1 credit during the semester in which they are presenting, six to 12 months before their dissertation defense.

Dissertation Defense

Dissertation Research/Thesis Committee

PHAR 899	DOCTORAL DISSERTATION	1 TO 12
----------	-----------------------	---------

RESEARCH

Students need a total of 12 credits to meet graduation requirements. The thesis committee is formed after the comprehensive exam and is required to meet on a yearly basis to evaluate progress and direction (it may need to meet more frequently to suit individual student needs).

Elective Courses

Students must take at least 8 credits of elective courses to fulfill graduation requirements.

Available Electives

Students may select from various graduate-level courses within the department and, with approval, courses within other University of Maryland graduate programs.

Pharmacometrics

www.pharmacy.umaryland.edu/academics/pharmacometrics/

Degree Offered

MS

Program Description

The objective of the Master of Science in Pharmacometrics program is to give current professionals the skills and knowledge to plan, perform, and interpret pharmacometric analyses with the goal of influencing key drug development, regulatory, and therapeutic decisions. The program offers theoretical and applied technical knowledge together with requisite business skills tailored for the pharmaceutical sector. All courses follow case-based study and teaching. All classes are held online.

Program Admissions

Candidates for admission must meet the minimum qualifications and standards established by the Graduate School. Graduate Record Examinations scores are not required for admission. International students must provide current, official results of the Test of English as a Foreign Language (minimum score of 550 for the paper-based test, 80 for the internet-based test), or the International English Language Testing System exam (minimum Band 7). Application deadlines and required credentials are regularly published by the Graduate School and by the pharmacometrics program.

Degree Requirements

The master's degree program requires a minimum of 30

credits. Students must maintain a minimum cumulative grade-point average of 3.0 to remain in good standing in the program. A complete description of progression guidelines and degree requirements is provided in the Degree Requirements section of this catalog.

Required Courses

PHMX 601	BASIC PHARMACOMETRIC TOOLS	3	
PHMX 602	BASIC PKPD MODELING	3	
PHMX 638	INTERMEDIATE PKPDMODELING I	3	
PHMX 663	STATISTICS FOR PHARMACOMETRICIANS I	3	
PHMX 665	DOSE-RESPONSE TRIALS	3	
PHMX 666	STRATEGIC COMMUNICATION AND NEGOTIATIONS	2	
PHMX 747	INTERMEDIATE PKPD MODELING II	3	
PHMX 759	STATISTICS FOR PHARMACOMETRICIANS II	3	
PHAR 758	SPECIAL TOPICS (PROJECT)	1 TO 7	

Listings and details are given in the Course Descriptions part of this catalog.

Physician Assistant

<https://graduate.umaryland.edu/mshs-pa-umb/>

Degree Offered

M.S.

Program Description

We aspire to be a leader in physician assistant (PA) education whose diverse graduates provide superior healthcare within the communities they serve.

The University of Maryland Baltimore Graduate School (UMB) and Anne Arundel Community College (AACC) promote excellence in education to foster the development of competent, ethical and compassionate primary care providers. Together we value diversity, lifelong learning, research, and scholarship.

To accomplish this mission, emphasis is placed on both academics and professionalism. Our students are expected to exemplify the virtues of integrity, honesty, respect, and ethical behavior.

Learning Outcomes

1. Educate physician assistant students to provide delegated services in an ethical, safe, legal, and competent manner under the supervision of a licensed physician.
2. Provide educational and clinical experiences that prepare the physician assistant student to work collaboratively and lead interprofessional teams.
3. Provide an educational experience that stresses the importance of furthering education through advanced study and continuing education, applying the concepts of evidence-based, patient-centered medicine.
4. Provide students with educational opportunities and a wide variety of clinical experiences that will enable them to recognize social determinants of health and work effectively in all primary care settings including underserved and diverse communities.
5. Prepare students to become effective communicators, educators, and responsible members of the community who utilize critical thinking skills in the clinical setting and base their practice on evidence-based, patient-centered medicine and sound ethical values.
6. Enable students to meet the eligibility requirements and successfully pass the *National Commission on Certification of Physician Assistants (NCCPA)* certifying examination upon graduation.

Program Admission

- Applicants to the Physician Assistant program must have a bachelor's degree or higher conferred from a nationally recognized institution.
- Completion of the GRE.
- Completion of the following prerequisite courses with a minimum grade of B in each course: Statistics, General Microbiology, Anatomy and Physiology 1, Anatomy and Physiology 2, Introduction to Psychology or Developmental Psychology, and General Chemistry or Organic Chemistry or Biochemistry. Prerequisites provided in the admissions information to ensure equivalency prior to submitting a CASPA application. Transcript evaluation services are not available. The anatomy and physiology courses are required to have been completed within the last seven (7) years of the date

the CASPA application is submitted.

- Applicants to the Physician Assistant program must submit application materials and complete an application through the Central Application Service for Physician Assistants (CASPA) at www.caspaonline.org. Applicants are encouraged to apply by July 1 since the CASPA application process can take several weeks to be completed. Program requirements such as a bachelor’s degree or higher, minimum cumulative GPA of 3.0, GRE, and equivalency of the six listed prerequisites with a minimum grade of B or better must be reflected in the completed application to be eligible for consideration. UMB must receive the completed CASPA application by the deadline date of September 1. Applicants must also complete three (3) Letters of Recommendation, a Personal Statement and Patient Contact Experience history (a minimum of 1400 hours is preferred) in the CASPA application.
- Foreign educated students must have their international college transcripts from all higher-level institutions attended evaluated by one of the following credential evaluators: ECE (Educational Credential Evaluators) at www.ece.org, WES (World Education Services) at www.wes.org or SpanTran: The Evaluation Company at www.spantran.com. Please be advised that this process may take several months and must be completed in order to submit and complete the CASPA application.
- Applicants whose native language or language of the home is not English must take the Test of English as a Foreign Language (TOEFL). The minimum acceptable TOEFL score for admission is 250 for the computer-based test and 100 for the Internet-based test. Please note that TOEFL scores are only valid for two years. Official TOEFL scores must be reported on the CASPA application and be mailed to CASPA by the application deadline.
- Please refer to the Physician Assistant website for detailed information regarding Physician Assistant admission requirements and process.

Degree Requirements

In order to complete the Physician Assistant Program, the student will complete 116 credits of coursework at UMB.

First Year Summer Term

MSPA 465	Foundation of PA Practice	5
MSPA 470	Applied Medical Sciences	7

MHS 600	INTRODUCTION TO LIBRARY RESOURCES AND SCHOLARLY WRITING	1
MHS 602	LEGAL AND ETHICAL ISSUES FOR HEALTH, HUMAN SERVICES AND CLINICAL PROFESSIONALS	2

Subtotal: 15

First Year Fall Term

MSPA 512	Clinical Medicine 1	8
MSPA 514	Pediatric Medicine 1	2
MSPA 515	Psychiatric Medicine	3
MSPA 520	Pathophysiological Approach to Pharmacotherapeutics 1	3
MHS 615	BIOSTATISTICS FOR HEALTH PROFESSIONALS	3

Subtotal: 19

First Year Spring Term

MSPA 518	Clinical Medicine 2	8
MSPA 519	Pediatric Medicine 2	2
MSPA 521	Emergency Medicine	4
MSPA 522	Clinical Correlations	3
MSPA 523	Pathophysiological Approach to Pharmacotherapeutics 2	3
MSPA 551	Transition to Clinical Clerkships	1
MHS 630	ESSENTIALS OF CHRONIC INFECTIOUS EPIDEMIOLOGY	3

Subtotal: 24

Second Year Summer Term

MSPA 671	Clinical Clerkship 1	4
MSPA 672	Clinical Clerkship 2	4
MHS 633	CLINICALLY APPLIED CONCEPTS IN SOCIAL AND BEHAVIORAL HEALTH	3
MHS 652	LEADERSHIP AND COMMUNICATION	3

Subtotal: 14

Second Year Fall Term

MSPA 673	Clinical Clerkship 3	4
MSPA 674	Clinical Clerkship 4	4
MSPA 675	Clinical Clerkship 5	4
MHS 660	ADVANCED APPLIED PHARMACOLOGY	3
MHS 608	RESEARCH SEMINAR I	3

Subtotal: 18

Second Year Spring Term

MSPA 680	Issues and Trends in Health Care	3
MSPA 676	Clinical Clerkship 6	4
MSPA 677	Clinical Clerkship 7	4
MSPA 678	Clinical Clerkship 8	4
MHS 622	IMPROVING QUALITY OF CARE IN HEALTH SYSTEMS	3
MHS 609	RESEARCH SEMINAR II	3
Subtotal: 21		

Third Year Summer Term

MSPA 679	Clinical Clerkship 9	4
MHS 700	CAPSTONE PRESENTATION	3
Subtotal: 7		
Subtotal: 118		

Details are given in the Course Descriptions part of this catalog.

Principles and Practice of Hospice and Palliative Care

<https://www.graduate.umaryland.edu/palliative/About-the-Program/>

Degree Offered

Postbaccalaureate Certificate

Program Description

Principles and Practice of Hospice and Palliative Care is a 12-credit, online postbaccalaureate graduate certificate program designed to provide learners with experiences designed to foster a deeper knowledge and understanding of the field of hospice and palliative care. Specifically, participants will learn about the patient/family-centric model of hospice and palliative care and the interdisciplinary approach to care. Communication techniques such as delivering bad news, counseling techniques and introductory content on ethical decision-making will be addressed. Participants will also learn how to assess and address psychological, psychiatric, cultural and spiritual aspects of care in serious illness. Last, students will learn how to do a comprehensive assessment of pain and non-pain symptom management, and evidence-based pharmacologic and non-pharmacologic treatment options.

Credits earned in this stand-alone certificate program may be applied toward the PALC-MS degree requirements.

Program Admission

The target learner audience includes practitioners who are working in hospice and palliative care or aspire to do so, including physicians, advance practice nurses, nurses, pharmacists, and physician assistants.

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is highly selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

PALC 601	PRINCLIPLES AND PRACTICE OF HOSPICE AND PALLIATIVE CARE	3
PALC 603	COMMUNICATION AND HEALTHCARE DECISION MAKING	3
PALC 604	PSYCHOSOCIAL, CULTURAL AND SPIRITUAL CARE	3
PALC 605	SYMPTOM MANAGEMENT IN ADVANCED ILLNESS	3

Details are given in the Course Descriptions part of this catalog.

Psychosocial/Spiritual Aspects of Hospice and Palliative Care

<https://www.graduate.umaryland.edu/palliative/About-the-Program/>

Degree Offered

Postbaccalaureate Certificate

Program Description

Psychosocial/Spiritual Aspects of Hospice and Palliative Care is a 12-credit, online postbaccalaureate graduate certificate program designed to provide learners with experiences designed to foster a deeper knowledge and understanding of the psychosocial and spiritual considerations in caring for patients with a serious illness. Specifically, participants will acquire skills necessary to elicit patient and/or family values and delineate goals of care regarding pain and symptom management, advanced life-sustaining therapies, and advanced communication techniques for delivering bad news, establishing goals of care, suspending therapies, and death notification. Participants will also develop advanced skills in the assessment of patients and families to determine psychosocial needs, spiritual and cultural concerns, and address patient and family suffering, coping and healing within the emotional, psychological and social domains. Learners will also learn about common sources of personal stress that arise from working in this field, what self-care is, and why healthcare professionals should practice self-care. Last, participants will learn about the principles of adult learning and staff development, including principles of instructional design, and methods of informal learning (including social media).

Psychosocial/Spiritual Aspects of Hospice and Palliative Care is also a concentration of study within the Master of Science in Palliative Care (PALC-MS) program. Credits earned in the stand-alone certificate program may be applied toward the PALC-MS degree requirements.

Program Admission

The target learner audience includes practitioners who are working in hospice and palliative care or aspire to do so, including physicians, advance practice nurses, nurses, pharmacists, physician assistants, social workers, chaplains and grief/bereavement specialists.

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the

certificate program is highly selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended. Graduate Record Examinations are not required for admission.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

PALC 613	ADVANCED DECISION- MAKING AND COMMUNICATION SKILLS	3
PALC 614	ADVANCED SPIRITUALITY AND PSYCHOSOCIAL SKILLS	3
PALC 606	SELF-CARE FOR HEALTH CARE PROFESSIONALS	3
PALC 602	PRINCIPLES AND PRACTICES OF PALLIATIVE CARE EDUCATION	3

Details are given in the Course Descriptions part of this catalog.

Regulatory Science

www.pharmacy.umaryland.edu/academics/regulatoryscience/

Degree Offered

MS, Post-Baccalaureate Certificate

Program Description

The Master of Science in Regulatory Science is designed to provide graduates with the knowledge and skills necessary to contribute to drug regulation and pharmaceutical product life cycles. The program primarily focuses on drugs, although aspects of biologics, diagnostics, devices, and nutritional products also are

addressed. The program covers all major areas of drug product regulatory science, including:

- Chemistry, manufacturing, and controls (CMC)
- Clinical research
- Pharmacovigilance
- Phase IV research (e.g., pharmacoepidemiology)
- Drug discovery

The strength of the program is its science-driven understanding of drug product development and regulation. The program covers regulatory affairs in a global manner, including the application of regulatory principles worldwide. Graduates of this program will be fluent in the science of developing new tools, standards, and approaches to assess the safety, efficacy, quality, and performance of products regulated by the U.S. Food and Drug Administration. They will possess the knowledge and skills needed to:

- Devise and implement global strategies for drug, biologic, and device development and evaluation.
- Differentiate U.S. and other regional requirements for drug product development and registration.
- Apply principles of basic and applied pharmaceutical sciences in drug discovery and development.
- Formulate critical elements of CMC to drug development.
- Relate principles of clinical research design to practices in clinical trial management.
- Apply critical methods of risk assessment and drug utilization from pharmacoepidemiology and postmarketing surveillance, and evaluate economic and sociodemographic factors that influence drug use.

This is an online program designed for working professionals who would like to obtain a formal degree in regulatory science. The program primarily focuses on drugs and drug development. Each of the program's 6-credit courses consists of about 70 hours of prerecorded lectures, seven hours of live web conferencing, and 13 hours of active-learning instruction. In addition, there are individual projects, team presentations, and mini-reviews.

Post-Baccalaureate Certificate

The Post-Baccalaureate Certificate (PBC) requires

successful completion of the first two six-credit courses (i.e. 12 credits total) of the MS degree program, with the aim of completion in two semesters. The courses are PHAR 603 Drug, Biologic, and Device and Regulation (6 credits) and PHAR 614 Drug and Biologics Discovery (6 credits). By completing these two courses, students will understand critical steps in the development and approval of drugs, biologics, and devices; and b) know approaches to discover new drugs. Students would also be well suited to subsequently complete the MS in Regulatory Science credential.

Program Admissions

Candidates for admission must meet the minimum qualifications and standards established by the Graduate School. Graduate Record Examinations scores are not required for admission if the applicant has five years or more of related work experience. International students must provide current, official results of the Test of English as a Foreign Language (minimum score of 550 for the paper-based test, 80 for the internet-based test) or the International English Language Testing System exam (minimum Band 7). Application deadlines and required credentials are regularly published by the Graduate School and the Regulatory Science program.

Degree Requirements

The master's degree program requires a minimum of 30 credits. Students must maintain a minimum cumulative grade-point average of 3.0 to remain in good standing in the program. A complete description of progression guidelines and degree requirements is provided in the Degree Requirements section of this catalog.

Required Courses

REGS 603	DRUG, BIOLOGIC, AND DEVICE REGULATION	6
REGS 614	DRUG DISCOVERY	6
REGS 621	CLINICAL RESEARCH	6
REGS 631	DRUG AND BIOLOGICS DEVELOPMENT	6
REGS 641	REGULATED PRODUCTS IN THE MARKETPLACE	6

Details are given in the Course Descriptions part of this catalog.

Research Administration

<http://graduate.umaryland.edu/researchadmin/>

Degree Offered

Postbaccalaureate Certificate

Program Description

Research Administration is a 12-credit, online postbaccalaureate graduate certificate program designed to ensure that students have a greater understanding of the many behind-the-scenes aspects of research so they can successfully manage grants, understand legalities in research administration, and become familiar with the transfer of intellectual properties. Students in this track will gain advanced knowledge and practical training to ensure that learning is relevant and applicable to each student's professional goals.

This program provides students with the opportunity to learn about the complex environment that supports academic research. This includes topics such as historical and evolutionary perspectives, legal issues in research, contract management, and safeguarding confidential information. Students in this program typically work in the following fields: data analysis, grant writing, clinical research, patient care, mental health, epidemiology, clinical trials, collaborations, personnel management, and related areas.

Research Administration also is a concentration of study within the Master of Science in Health Science (MSHS) program. Credits earned in the stand-alone Research Administration certificate program may be applied toward the MSHS degree requirements.

Program Admission

Candidates for admission must meet the minimum standards of admission established by the Graduate School and provide the requisite credentials. Admission to the certificate program is highly selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended.

Graduate Record Examinations are not required for admission.

Degree Requirements

Certificate candidates must complete a minimum of 12 credits. Students must maintain a minimum, cumulative grade-point average of 3.0 on a 4.0 scale. All courses must be taken for letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) do not count toward the certificate. All requirements for the certificate must be completed within

three years after admission and all credits for the certificate must be completed at the University of Maryland, Baltimore. Complete guideline and requirements for progression and completion are outlined in the Academic Performance and Progress in a Postbaccalaureate Certificate Program section of this catalog.

Required Courses

These courses are required to complete the Research Administration program:

MHS 601	INTRODUCTION TO RESEARCH ADMINISTRATION	3
MHS 618	REGULATORY & LEGAL ISSUES IN RESEARCH	3
MHS 635	GRANT AND CONTRACT MANAGEMENT IN RESEARCH	3
MHS 640	TECHNOLOGY TRANSFER	3

Global Research Ethics

<http://www.graduate.umaryland.edu/research-ethics/>

Degree Offered

Postbachelor's Certificate

Program Description

The purpose of this 12-credit, six-course online certificate program is to equip participants with an understanding of the ethical and regulatory aspects of human subjects research. It aims to develop their ability to analyze ethical challenges in research both domestically and internationally. The certificate program offers a globally-oriented and interdisciplinary learning experience to all enrolled students.

The program targets investigators, clinical research coordinators, members of institutional review boards and contract research organizations, pharmaceutical industry representatives, and others involved in research activities. By exclusively employing distance learning technologies, the program caters to the needs of professionals worldwide who may have limited access to on-site educational opportunities.

All six courses are available during the fall, spring, and summer semesters enabling participants to complete the program within an academic year. Since each course is self-contained and does not rely on the other courses, participants have the flexibility to take courses in any sequence and at their own pace. Consequently, completion

of the entire program may extend beyond one year depending on individual preferences and scheduling.

Program Objectives

Upon completion of the Certificate in Global Research Ethics students will be able to: Explain the significance of past research ethics abuses on current research ethics concepts. • Apply knowledge of research ethics guidelines to emerging research issues. • Describe the ethical requirements for the review of research. • Evaluate protections for vulnerable populations. • Describe the impact of globalization on research practices. • Integrate ethical theories into the analysis of research ethics issues. • Analyze ethical questions and issues in international collaborations and research. • Demonstrate the ability to collaborate within interprofessional teams.

Program Admission

Applicants to the Graduate School certificate program must meet strict admission criteria, including holding a U.S. bachelor's degree or its equivalent from a non-U.S. educational institution. Proof of English Proficiency is also necessary, such as passing TOEFL or IELTS scores and having attended a university where English is the primary language of instruction. The submission of Graduate Record Examinations is not mandatory for admission.

Certificate Requirements

Participants for the certificate must complete a minimum of 12 credits. A minimum cumulative GPA of 3.0 on a 4.0 scale is required. All courses must be taken for a letter grade; courses taken as Pass/Fail (P/F) or Audit (AU) will not count toward the certificate. All requirements for the certificate must be fulfilled within three years of admission, and all credits must be earned at the University of Maryland, Baltimore. Detailed guidelines and requirements for progression and completion can be found in the Academic Performance and Progress in a Post-baccalaureate Certificate Program section of this catalog.

Required Courses

ETHC 629	INTRODUCTION TO ETHICAL THEORY	2
ETHC 637	INTRODUCTION TO RESEARCH ETHICS	3
ETHC 638	ISSUES IN INTERNATIONAL RESEARCH ETHICS	3
ETHC 639	REGULATORY AND LEGAL ASPECTS OF INSTITUTIONAL REVIEW	2

	BOARDS	
ETHC 640	ETHICS OF GLOBALIZATION	1
ETHC 665	RESPONSIBLE CONDUCT OF RESEARCH INTERNATIONAL AFFAIRS	1

Science Communication

<http://www.graduate.umaryland.edu/scicomm/>

Degree Offered

Postbaccalaureate Certificate

Program Description

Students in the Science Communication certificate program will have the opportunity to strengthen their skills in writing and communication for academia and the general public. In this one-year, 12-credit postbaccalaureate certificate program, students study topics such as science writing, technical writing skills, writing for scholarly journals, writing proposals and grants, and writing for the public. Students learn the principles of scientific writing and gain exposure to a wide variety of scientific writing genres. Students also learn how to write a journal article editors want to publish and how to use the key principles for writing, submitting, and revising grants and proposals. The program also provides students with opportunities to draft pieces for publication, allowing them to add to their writing portfolio and academic CV. Each student receives frequent and detailed individual feedback to improve their writing over the course of the program. No specific undergraduate course of study is required or recommended.

Science Communication also is a concentration of study within the Master of Science in Health Science (MSHS) program. Credits earned in the stand-alone Science Communication certificate program may be applied toward MSHS degree requirements.

Certificate Objectives

This program is designed to equip students to communicate effectively with a variety of audiences using different forms and styles of writing. By providing students with advanced knowledge and practical training, this program strives to ensure that learning is relevant and applicable to each student’s professional goals. Students learn how to strategically plan, craft, edit, and execute their writing to communicate in an engaging, scientifically informed manner about health-related topics.

Learning Outcomes

Upon completion of this program, students will be able to:

- Develop proficiency in technical writing (including proper sentence and paragraph structure, transitions, punctuation, coherence, and grammar).
- Rigorously analyze scientific writing on the sentence and paragraph level.
- Describe the form and content of research articles, case studies, meta-analyses, theoretical articles, and book reviews.
- State the requirements and expectations of writing and submitting scholarly research articles.
- Apply the principles of planning and writing a research paper.
- Summarize research findings in a clear, engaging, and concise manner.
- Describe the purpose of grant writing in academic and nonacademic careers.
- Critique the essential elements of grants and proposals.
- Draft a grant or proposal on a health-related topic of interest.
- Demonstrate basic proficiency in various writing forms and techniques for communicating effectively with general, nonacademic audiences.
- Identify and avoid common mistakes academic writers make when writing for the public.
- Produce a writing product for the general public that is ready to submit for publication.

Program Admission

General application requirements for admission to postbaccalaureate certificate programs are outlined in the Admissions section of this catalog. Admission to this online certificate program is selective. A U.S. bachelor's degree or its equivalent from a non-U.S. educational institution is required. No specific undergraduate course of study is required or recommended.

Degree Requirements

Students must maintain a minimum cumulative grade-point average of 3.0 to remain in good standing in the program.

A complete description of progression guidelines and degree requirements is provided in the Degree Requirements section of this catalog. Students must successfully complete a minimum of 12 credit hours to earn the certificate.

Required Courses

MHS 603	SCIENCE WRITING PRINCIPLES	3
MHS 607	WRITING FOR SCHOLARLY JOURNALS	3
MHS 627	SCIENCE COMMUNICATION WITH DIVERSE AUDIENCES	3
MHS 637	WRITING PROPOSALS AND GRANTS	3

- Describe the form and content of research articles, case studies, meta-analyses, theoretical articles, and book reviews.
- State the requirements and expectations of writing and submitting scholarly research articles.

Social Entrepreneurship

<https://www.graduate.umaryland.edu/socialentrepreneurship/>

Degree Offered

Certificate

Certificate Objectives

Upon completion, students will be able to:

- Use the principles of human-centered design to identify societal, community, and individual needs.
- Apply concepts of innovation and entrepreneurship in new ventures and existing ventures.
- Identify and apply tools, methods, and self-reflection techniques necessary to evaluate the market viability of new ideas.
- Identify various social, health, and biomedical enterprise strategies and critically assess their effectiveness in economic development and social transformation.
- Demonstrate the ability to develop and execute a work plan leading to a social, health, or biomedical innovation.

- Build strong professional relationships with and draw upon the resources of faculty, community practitioners and entrepreneurs, student colleagues, and external advisors.
- Explain basic principles of accounting, financing models, equity financing, investing and different types of funding including crowdfunding, angel investors, grants, and venture capital.
- Develop a sustainable business and financing model to advance a health or social innovation concept, emphasizing principles of growth strategies and scaling.
- Conduct a market analysis and apply the marketing mix as it relates to health and social enterprises.
- Develop a marketing plan for a social, health, or biomedical venture.

Degree Requirements

Course content will focus on the professional application of Design Thinking, Customer Discovery & Social Change Theory that will help you develop effective solutions to real world problems.

Required Courses

INNO 600	FOUNDATIONS IN HEALTH AND SOCIAL INNOVATION	3
INNO 602	GLOBAL HEALTH AND SOCIAL INNOVATION	2
INNO 640	FUNDING SOCIAL ENTERPRISE	3
INNO 642	MARKETING FOR SOCIAL ENTERPRISE	3

Social Work

<http://www.ssw.umaryland.edu/phd/>

Degree Offered

PhD

Program Description

The School of Social Work’s Doctor of Philosophy program is designed to prepare graduates to conduct interdisciplinary research and become exemplary social work scholars and educators.

Program Features

- Highly competitive, nationally renowned program
- Small class sizes
- Individualized, one-on-one advising from dissertation chairs
- Rigorous curriculum
- Educational environment conducive to academic success
- Integrative approach to research applications
- All full-time students are supported with graduate research assistantships that provide a stipend, tuition remission, and health insurance
- Numerous campus resources and amenities

Program Admission

General application requirements for admission are outlined in the Admissions section of this catalog. To be considered for admission to the PhD Program in Social Work, applicants must have or be in the process of completing an MSW or equivalent degree.

The PhD Program in Social Work maintains a strict language requirement for non-native speakers of English. All applicants to the PhD program whose native language and/or language of the home is not English are required to submit results from the Test of English as a Foreign Language or the International English Language Testing System exam. This guideline includes international students/non-native speakers of English who have completed a Master of Social Work or similar degree from a U.S. college or university.

Degree Requirements

The 53-credit curriculum begins with 23 credits of core courses: research seminar (2 credits); quantitative and qualitative research design and methods (9 credits); data analysis and statistics (6 credits); and research practicum (6 credits). Additional required courses include intervention research (3 credits), theory and philosophy of teaching (3 credits), an integrative seminar (3 credits), an advanced research or data analysis course in the student's area of interest (3 credits), and a theory course in the student's area of interest (3 credits). Students also take an elective (3 credits) and complete at least 12 credits of dissertation research.

After completing the required courses, students complete a comprehensive examination and defend a dissertation proposal. The final phase of the program is completion of the doctoral dissertation.

See complete Social Work (SOWK) offerings in the Course Descriptions part of this catalog.

Learning Outcomes

- Develop the skills and experience required to conduct high-quality research, individually and as part of a research team.
- Gain a thorough understanding of research design, data collection strategies, and analysis methods appropriate to multiple types of research questions, social problems, and populations of interest.
- Apply theoretical models to research studies and critique existing theory in a particular content area.
- Critically evaluate the state of the knowledge base in a content area of the student's choice.
- Develop a research agenda in a content area of the student's choice.
- Gain knowledge and experience in teaching and apply the best available evidence regarding adult learning to the classroom.
- Disseminate findings through peer-reviewed publications and/or presentations.

Required Courses

SOWK 804	RESEARCH METHODS IN SOCIAL WORK I	3
SOWK 805	DATA ANALYSIS I	3
SOWK 806	RESEARCH METHODS IN SOCIAL WORK II	3
SOWK 807	DATA ANALYSIS II	3
SOWK 810	RESEARCH PRACTICUM I	3
SOWK 811	RESEARCH PRACTICUM II	3
SOWK 812	INTEGRATIVE SEMINAR	3
SOWK 814	INTERVENTION RESEARCH	3
SOWK 816	PHILOSOPHY OF SOCIALLY JUST RESEARCH SEMINAR	1
SOWK 817	PHILOSOPHY OF SOCIALLY JUST RESEARCH SEMINAR	1
SOWK 826	QUALITATIVE RESEARCH METHODS	3
SOWK 835	THEORIES AND PRACTICE OF SOCIAL WORK TEACHING	3

Course Descriptions

AGNG

AGNG 600 - SOCIAL & ECONOMIC CONTEXT OF AGING (UMBC Course) (3)

This course is offered and taken at UMBC only. Please view UMBC Graduate catalog.

***Students who select the Principles in Aging Services Management Concentration must take Social & Economic Context of Aging**

This course presents an overview of the many changes at all levels, from individual to societal, driven by the aging of the population in the United States. An interdisciplinary synthesis is the basis for understanding normal human aging in a cultural and community context and examining the harmful effects of stereotypes and ageism.

AGNG 604 - POLICY FOUNDATIONS OF AGING SERVICES (UMBC Course) (3)

This course is offered and taken at UMBC only. Please view UMBC Graduate catalog.

The course operates on two parallel tracks. First, it examines fundamental and theoretical underpinnings of public policy goals, the strategic construct of problem identification and definition, processes of policy initiation, development and advocacy and specifically, how to construct and implement a strategic plan to successfully advance policy initiatives. Secondly, and in the process, significant emphasis is placed on discussions of current policy issues affecting older adults and the organizations that provide services to them.

AGNG 611 - LEADERSHIP, MANAGEMENT & ORGANIZATION II (UMBC Course) (3)

This course is offered and taken at UMBC only. Please view UMBC Graduate catalog.

Students will begin to explore, acquire and apply the skills needed to drive larger organizational change. AGNG 611 focuses on effective tools and resources necessary for developing strategy and tactics to manage change in aging service organizations. The course divides into three segments around leadership: organizational assessment, strategy development, and managing change.

AGNG 612 - FINANCE & ACCOUNTING (UMBC Course) (3)

This course is offered and taken at UMBC only. Please view UMBC Graduate catalog.

This course introduces students to the fundamentals of financial accounting and its use in managerial control systems to enhance organizational performance, with a particular focus on the aging services industry. Emphasis is placed on strengthening the students' ability to interpret and apply financial information as opposed to an in-depth study and application of accounting theory and practice.

CIPP

CIPP 650 - CLIMATE CHANGE, HEALTH AND SOCIETY (2)

Causes and impacts of climate change will be examined, emphasizing impacts on human health and society in Maryland and Baltimore, including health equity, environmental laws, and governmental policies. Case studies will be presented, and students will work in teams to suggest ways to address climate change-driven environmental challenges and support the development of innovative ideas to address these challenges.

CIPP 901 - RESEARCH ETHICS (1)

CIPP 907 - RESEARCH ETHICS (1)

Various aspects of research ethics are examined, including data collection and ownership, issues in the use of human and animal subjects, responsibilities of authorship, identifying and handling conflicts of interest, scientific misconduct, the peer review system, collaborative research in academia and industry, mentor/mentee relationships, contemporary ethical issues, and the role of the scientist as a responsible member of society. Each session has a readings list assigned and involves in-depth small group discussions of relevant cases with faculty in small group discussions. Postdoctoral fellows, and students not needing the credit may sign up for the course informally, but are expected to participate fully in order to receive a letter of course completion. Grading is based on group participation and leadership of at least one group discussion.

CIPP 910 - STEM TEACHING FELLOWSHIP (1)

This course provides students with the opportunity to participate in a multi-month (up to 4 months) teaching

fellowship. The goal of this teaching fellowship is to provide a mentored teaching experience during which the student develops teaching skills in a higher education classroom. In collaboration with an on-site mentor, students will 1. Learn about effective teaching strategies, 2. Apply them in a classroom setting, 3. work in a teaching environment, and 4. acquire skills for job preparation.

CIPP 924 - GERIATRIC IMPERATIVE (1 TO 2)

This minimester course is a week-long course scheduled each January which offers a review of current clinical, policy and research trends in the field of aging. Presentations are made by faculty, regional leaders in the field of aging and family caregivers. Lectures, case simulations, panel discussions and videos are the teaching methodology utilized during the week. Field trips are taken to geriatric health care facilities to meet with staff and residents.

CIPP 932 - CRITICAL ISSUES IN HEALTH CARE (3)

This course is open to students from the Schools of Law, Medicine, Social Work, Nursing, Pharmacy, Dentistry and the graduate schools at UMB and UMBC. The course is designed to: (1) provide students with an opportunity to reflect on the legal, ethical and policy issues surrounding a number of health care delivery problems; (2) expose participants to the basic skills necessary to analyze problems from a legal, ethical and policy perspective; and (3) offer participants from different disciplines an opportunity to interact and share information and perspectives about their professions with one another. A variety of teaching techniques, including case studies, simulations, and video clips are used to explore such topics as medical malpractice, rights of patients to refuse treatment, informed consent and substituted consent in medical decision making, regulation of experimental drugs, and health care reform. The course is taught by faculty from a variety of disciplines. During the course, students have an opportunity to work in multidisciplinary teams to analyze a particular health care problem and to develop a position paper on a health care policy issue

CIPP 960 - GLOBAL WOMEN'S HEALTH (3)

This course is a comprehensive examination of the complex issues facing women and children's health globally. Emphasis is on a comprehensive and multi-disciplinary perspective based on World Health Organization's (WHO) 2007 'Framework For Action' structure for strengthening health systems, the United Nation's (UN) Millennium Development Goals (MDGs), and the Universal Declaration of Human Rights (UDHR).

This survey course addresses biological and medical issues, reproductive health, violence against women and children and its impact on health, infectious and chronic disease, and the environmental and social relationships to health issues. Analysis covers current national, regional, and global trends, program and policy responses to these trends, and prospects for the future.

CIPP 970 - INTERPROFESSIONAL SERVICE (1)

This course links the experiential with the theoretical by providing hands-on professional experience in the University of Maryland, Baltimore's surrounding community. The goal of this course is to offer true service-learning in which students learn by providing for the expressed need of the community through a social justice lens. Students learn how community health and human service programs are developed, organized, implemented and evaluated; how inter-professional teams successfully function; how to interact with individuals and groups living in our community; and how to report back their observations to peers and supervisors. Students work with organizations with which the University has formed partnerships to meet course learning objectives. Service-learning is a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development. Through the reciprocity associated with service-learning, students gain a better sense of belonging to that community while community members are empowered to address and advocate for their own needs.

CIPP 971 - POPULATION HEALTH IN BALTIMORE (1)

This one credit, inter-professional course provides students with an inside perspective on addressing health disparities and inequities in Baltimore from both academic and community perspectives. Faculty Fellows of the UMB Center for Community Based Engagement and Learning (CBEL) and their affiliated community partners present course content. Through the lens of case studies and personal narratives or stories, faculty from UMB professional schools (medicine, social work, nursing, law, physical therapy, pharmacy, and dentistry) describe their community-based work and their collaboration with community partners, emphasizing barriers on, and solutions towards, achieving health equity and population health in Baltimore. Learning about Baltimore history, local contextual factors, and neighborhood resources highlight opportunities where the realities of health disparities can be seen. Using the WHO Social Determinants of Health framework, social concepts such as

place and race are explored. Foundational principles of social justice are also emphasized. ?Population health? and ?culture of health? and its relevance to Baltimore-based solutions are described in order for students to identify opportunities to address Interprofessional health disparities in their own careers.

CIPP 980 - ENTREPRENEURSHIP IN LIFE SCIENCES (3)

Students explore the development of a life sciences start-up venture, and in some cases, begin to create their own start-up ventures. Students learn how to assess the feasibility of a life science start-up venture, evaluate financial and market opportunities, explore the customer discovery process, author a business plan, and build financial projections. Students discuss a wide range of issues of importance and concern to life science entrepreneurs and learn to recognize opportunity, assess the skills and talents of successful entrepreneurs, network with life science entrepreneurs, and learn models and approaches that help them analyze entrepreneurial opportunities throughout their career. Successful life science entrepreneurs will highlight real world experiences in guest lectures.

DBMS

DBMS 604 - CURRENT TRENDS IN CELLULAR AND MOLECULAR BIOLOGY OF ORAL TISSUES (1)

Presentations by students, faculty members, and guest speakers consist of original research work and related issues and trends in molecular biology research of oral tissues. The course emphasizes new methods in molecular and cell biology.

DBMS 605 - SCIENTIFIC METHOD, WRITING, AND ETHICS (1)

Covers the scientific method, including the relationship of empirical vs. rational approaches. Emphasizes the formulation of hypothesis and experimental design and critical review of literature. The course also covers ethical issues and writing styles for scientific papers and research grant proposals.

DBMS 608 - INTRODUCTION TO BIOMEDICAL SCIENCES RESEARCH (1)

This course introduced new BMS graduate students to the program degree requirements and expectations, and it is recommended to be taken in the first year of the program, concurrent with the scientific writing course. Assignments

pertain to assisting the student in selecting a research topic and mentor. Assignments include literature searches and description of three to five research questions of interest to the student, refining to one to three potential projects and meeting with potential mentors, and mentor selection and submission of final proposal.

DBMS 611 - PRINCIPLES OF MAMMILIAN PHYSIOLOGY (6)

This course focuses on ideas of human physiology. Topics include cardiovascular, respiratory, gastrointestinal, nervous, renal, and endocrine systems; didactic method and seminar methods of instruction; and research aspects of physiology.

DBMS 614 - PHYSIOLOGY OF AGING (2)

This course for graduate students in health professions and others with an interest in gerontology focuses on cell biology, metabolic processes, cardiovascular, and neurobiological aspects of aging. Covers a pathophysiological basis for health problems of older adults. Students study alterations at the cell, organ, and system levels to provide the basis for clinical management of common health problems. Prerequisite: DBMS 611 or MPHY 600, or equivalent.

DBMS 618 - SPECIAL TOPICS IN BIOMEDICAL SCIENCE (1 TO 3)

This multi-sectioned course offers students research and educational opportunities in both the traditional biomedical disciplines and in several new, emerging areas of biology. Small groups of students and graduate faculty arrange the offerings. Areas of specialization include: Anatomy- Sect. 2 Biochemistry- Sect. 3 Microbiology- Sect. 4 Microbiology- Sect. 4 is offered for 1 to 3 credits. A student may elect to take a 10 hour lecture portion on advanced oral microbiology for 1 hour credit and/or do special microbiology projects for 1 to 3 credits. The lecture segment covers oral microbial aspects of oral ecology, oral biofilms, dental caries, endodontic disease, periodontal disease, oral malodor, candida infections, viral infections and treatment strategies for oral infections. The other options may be laboratory or library special projects in oral or general microbiology. Any professor in the Department of Microbial Pathogenesis can sponsor these projects. Pharmacology- Sect. 5 Physiology - Sect. 6 Neuroscience - Sect. 7 Immunology Sect. 8 Molecular and Cell Biology - Sect. 9 Molecular endocrinology - Sect. 10 Mineralized tissues Sect- 11

DBMS 619 - BIOMEDICAL SCIENCES SEMINAR (1)

Presenting seminars and participating in discussions is an

important part of graduate education. Attendance at departmental seminars is a program requirement. The multidisciplinary program provides students and faculty the opportunity to learn about research across the curriculum. Students must present one seminar each year. Students register for and earn 1 credit hour in the semester that they present. Students must earn at least 4 credits with a minimum grade of B for graduation.

DBMS 620 - BIOMEDICAL ASPECTS OF DENTAL CARIES (2)

This course presents current, evidence-based information about biological aspects of dental caries. Topics include microbial mechanisms of caries; histopathology of enamel, dentin, and root surface caries; composition and functions of saliva as they relate to dental caries; fluorides in dentistry, their mechanisms against dental decay, and systemic effects; dietary and nutritional aspects of caries; salivary dysfunction; remineralization of enamel; anti-cariogenic properties of chlorhexidine and xylitol; and caries risk assessment.

DBMS 621 - ADVANCED DENTAL MICROBIOLOGY (4)

This course, intended for graduate students of oral microbiology, is supplemented with library readings and advanced laboratory experimentation. Four lecture hours each week with some laboratory experience.

DBMS 622 - IMMUNOLOGY AND ORAL DISEASES (3)

This course covers basic immunologic principles, clinical immunology, and immunologic studies of oral diseases. Offered spring semester.

DBMS 625 - MAMMILIAN ORAL HISTOLOGY EMBRYOLOGY (2)

Developing and definitive oral and paraoral structures are presented, with special emphasis on recent advances in this field of study.

DBMS 626 - ADVANCED ORAL RADIOLOGY (1 TO 2)

This course provides advanced specialty education students advanced training in current oral and maxillofacial radiology techniques. The primary, technical focus of the course is on dental cone beam computed tomography. During the didactic portion of the course, we also discuss the principles of magnetic resonance imaging. The course begins with lectures by the course director to introduce the topic of advanced oral radiographic methods and

interpretation. Using lectures assisted with PowerPoint presentations, small groups of three to four graduate students then present on the following assigned topics: developmental anomalies; inflammatory diseases of the jaws; cysts; benign neoplasms; malignant neoplasms; fibro-osseous neoplasms; and systemic diseases. We complete the course with a review of incidental findings and lectures on CBCT diagnosis in the fields of implantology, endodontics, and growth and development. Our final lecture is seminar-style with presentation of unknown cases, with open discussion by students.

DBMS 628 - ADVANCED HEAD AND NECK ANATOMY (2 TO 4)

This course gives students a working knowledge of the functional anatomy of the head and neck through detailed dissection and lectures.

DBMS 631 - ORAL MOTOR FUNCTION (2)

This course provides biomedical sciences students with an updated, in-depth presentation of mandibular function and neuromuscular control mechanisms involved in mastication, swallowing, and speech. Lectures and student presentations cover the morphology, physiology, pharmacology, and pathology of structures required for oral motility. Emphasis is on the clinical relevance of basic science information. Prerequisite: DBMS 611 or equivalent.

DBMS 633 - THE ANATOMY OF THE TEMPOROMANDIBULAR JOINT (1)

Graduate and postgraduate students learn about developmental, microscopic, and gross anatomic features of the temporomandibular joint through lectures and seminars by the Department of Anatomy and Neurobiology and clinical disciplines.

DBMS 635 - BACTERIAL GENETICS (4)

This course covers induction, expression, and selection of mutants; molecular basis of mutations; transfer of genetic information by transformation, transduction, and conjugation; complementation and recombination in phage and bacteria; plasmids; and recombinant DNA. Offered first semester. Two lectures/discussion periods per week deal with the genetics of bacteria and bacterial viruses. Cross-listed with GPLS 635.

DBMS 636 - PHARMACOLOGY OF ANESTHETIC DRUGS (3)

This course covers basic pharmacologic aspects of general and local anesthetic drugs and drugs used for pain control. Topics include theories on the mechanism of action,

structure-activity relationships, physiological effects of these agents, and drug interactions and clinical aspects.

DBMS 637 - PEDIATRIC DENTAL PHARMACOLOGY (1)

This course consists of current topics related to drug actions in pediatric dental pharmacology. The course is structured as an online series of lecture presentations on the pharmacology of pediatric dental drugs and their importance to patient care.

DBMS 638 - BIOSTATISTICS (1 TO 3)

This course introduces students to research design and statistics as they apply to dentistry to allow students to evaluate literature in their fields and work cooperatively with a statistician on research projects.

DBMS 639 - ADVANCED DENTAL BIOMATERIALS I (2)

This course has three primary objectives. The first objective is to develop a student's understanding of the physical and chemical properties of dental biomaterials and the correlation of these materials' characteristics with the selection of dental biomaterials for clinical use. The second objective is to develop an understanding of how dental biomaterials behave in the clinical setting and which characteristics determine their selection and clinical application. The third objective is to develop the ability to read dental biomaterials research papers, to follow the progress of dental biomaterials' new development and research activities, and to be able to summarize and present literature review findings.

DBMS 640 - ADVANCED DENTAL BIOMATERIALS II (2)

This course provides doctoral students in the BMS PhD Program with advanced training in the use of advanced dental biomaterials. The primary technical focus of this course is on an enhanced understanding of the physical and chemical properties of dental biomaterials and the correlation of these materials' characteristics with the selection of dental biomaterials for clinical use, including preventive and restorative dental materials. In addition, this course provides students with an understanding of how dental biomaterials behave in the clinical setting, which characteristics determine their selection and clinical applications, and the importance of physical, mechanical and biological properties including biocompatibility and long-term durability. Furthermore, the course provides training for the students to research the literature, study research papers on dental biomaterials, follow the progress of new dental biomaterials RD, and to be able to

summarize and present literature review findings. Pre-Requisite: DBMS 639

DBMS 642 - NOCICEPTION, PAIN, AND ANALGESIA (2)

Emphasis is on the nervous system mechanisms responsible for nociception, pain, and the alleviation of pain. Classical and current research in the neuroanatomy, neurochemistry, and neurophysiology of pain relate to clinical observations, pain syndromes, and mechanisms of analgesic drugs. Material is most relevant for dental, medical, and nursing graduate students. Offered fall semester. Prerequisite: DBMS 611 or equivalent.

DBMS 643 - THE NEUROBIOLOGY OF NOCICEPTION AND PAIN (3)

Designed for neuroscience graduate students in all health disciplines, this course focuses on the basic science and research aspects of nociception and pain. Topics include the neuroanatomy, neurophysiology, neuropharmacology, and the psychophysics of nociception and pain. Weekly, two-hour class meetings consist of student presentations and group discussions, based on a reading list provided by the faculty. Cross-listed with GPLS 643. Prerequisite: GPLS 641.

DBMS 653 - TECHNIQUES IN MICROSCOPY (4)

Students learn techniques used to prepare biological material for examination with light and electron microscopes. The course covers theory of light and electron optics. Students use various techniques to help solve problems that may require a microscope in individual research projects.

DBMS 668 - ORAL INHALATION SEDATION (1 TO 2)

This intensive course is offered to the dentist for training in the safe and effective use of combined inhalation-enteral conscious sedation in the adult dental patient. This course will follow objectives and course content based on the current American Dental Association (ADA) guidelines for teaching combined inhalation-enteral conscious sedation (combined conscious sedation). The information is designed to cover material necessary to apply for a Class I sedation permit in Maryland. The course is case-based and offers in-depth discussion of each aspect of the sedation regimen including scenarios of how to do things correctly as well as what can go wrong.

DBMS 708 - LABORATORY ROTATIONS (1 TO 3)

This course provides students with practical laboratory

experience in a variety of techniques and allows them to become familiar with the faculty members and their research. Doctoral students are required to complete at least two rotations in different laboratories in the program. Rotations may run either one full semester or one half semester (eight weeks). All rotations should be completed by the end of the fourth semester in the program.

DBMS 799 - MASTER'S THESIS RESEARCH (1 TO 12)

Required enrollment for students engaged in master's thesis studies.

DBMS 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

DBMS 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

DEIL

DEIL 710 - EMPLOYMENT DISCRIMINATION LAW & POLICY (3)

This course examines basic terminology and concepts related to diversity, equity, and inclusion through the exploration of US laws such as Title VII of the Civil Rights Act of 1963, the Age Discrimination in Employment Act of 1967, the Americans with Disabilities Act of 1990, and similar laws and legal protections for certain classes of individuals. This course will help current and aspiring diversity, equity, and inclusion practitioners to establish a structured framework for systematic analysis of employee issues that may have legal implications.

DEIL 720 - CRITICAL APPRAISAL OF DIVERSITY, EQUITY, AND INCLUSION LITERATURE (3)

Critical Appraisal of Diversity, Equity, and Inclusion Literature aims to provide in-depth discussion and relevance of diversity, equity, and inclusion literature. An emphasis will be placed on critical analysis of research articles. Independent thought and critical thinking skills will be addressed. Assigned readings will offer students the opportunity to examine prevailing research in diversity, equity, and inclusion.

DEIL 740 - STRATEGIC EXECUTIVE WRITING

Strategic Executive Writing is an advanced, interdisciplinary writing course for current 15 and aspiring

professionals. The course explicitly focuses on discourses, genres, and writing practices employed in diversity, equity, and inclusion (DEI) work within institutions and beyond. Instruction examines existing literature on DEI writing and unpacks strategies for identifying, acclimating to, and interrogating (with the possibility of resisting and transforming) these discourses and practices to prepare practitioners for engaging contemporary audiences and stakeholders in DEI topics and issues.

DEIL 790 - DEI EVIDENCE-BASED LEADERSHIP TOOLKIT

This course will provide an overview of a collection of evidence-based resources, tools, and services that practitioners can apply to their Diversity, Equity and Inclusion Leadership.

DEIL 798 - CAPSTONE FOR DIVERSITY, EQUITY AND INCLUSION LEADERSHIP

The capstone course is a method of summative evaluation in which students demonstrate integrated knowledge of diversity, equity, and inclusion by applying their learning from their academic career in a comprehensive manner.

DMSC

DMSC 611 - PRINCIPLES OF TEACHING AND LEARNING FOR THE HEALTH PROFESSIONS EDUCATOR (3)

With a special focus on PA educators, this course will prepare future faculty to teach effectively in a health professions program by explaining the roles of an academic faculty member, introducing, exploring, and analyzing adult learning theories. Learners will apply backward design principles to create materials for a themed curriculum suitable for integration in a health professions program. Students will also learn and apply principles of inclusive pedagogy and learner-centered teaching.

DMSC 612 - FOUNDATIONS FOR CAREER SUCCESS IN ACADEMIA: LEADERSHIP, ADVOCACY, AND SCHOLARSHIP FOR HEALTHCARE PROFESSIONALS (3)

With a special focus on PA educators, this course will prepare future faculty for the complexities of the faculty role including navigating the academic job market, upward mobility, developing mentoring relationships with colleagues, cultivating advocacy and leadership skills, and building a research agenda. The course will maximize faculty success during transition from clinic to academia.

DMSC 698 - INDEPENDENT STUDY

Designed to help busy PA professionals advance their knowledge and keep current on a topic of their choosing and professional interest. The student will engage regularly and in a substantive manner with graduate faculty member who is competent in that field.

DMSC 710 - HEALTHCARE SYSTEM SCIENCE, ORGANIZATIONAL MICROECONOMICS AND FINANCE (3)

This course focuses on understanding the healthcare macroeconomic ecosystem and the unique and innovative Maryland waiver system. The course introduces key concepts and analytical methods for formulating strategies that add value for patients as well as for providers and other organizations that affect health care delivery. The course covers foundational concepts of practice coding and reimbursement along with the strategic management of resources, partnerships, and innovation, for organizations that offer healthcare services in multiple areas. Through the application of course concepts to complex cases, the course develops depth of understanding and critical thinking skills in strategy formulation for future leaders involved in health care delivery and ongoing quality improvement.

DMSC 712 - HEALTHCARE AND EDUCATION LAW AND ETHICS (3)

This course covers current federal and state regulatory policy governing the provision of healthcare. The course will focus on three major themes: quality of care, access to care, and cost containment. Students will learn about professional licensure, malpractice, the provider-patient relationship, informed consent, the regulation of healthcare facilities, public and private insurance regulation, and the application of bioethics in healthcare to include issues such as bioethics of organ transplantation and end-of-life care, the Affordable Care Act, and other relevant topics.

DMSC 713 - CLINICAL SYMPOSIUM 1 (6)

Designed to help busy PA professionals advance their knowledge and keep current by providing a review of innovations, recent advances, and best practices. The focus will be on improving care quality and outcomes. Hands on impact labs will be conducted. At the conclusion of the symposium, participants will be able to: describe and implement new diagnostic modalities, therapeutic agents,

and management strategies Recognize and implement best practice, management. and care transfer of complex patients with significant comorbidities. Discuss the current and future management of patients. Impact lab topics may include 1) Ultrasound 2) Telehealth 3) Digital Monitoring 4) Advanced procedures.

DMSC 714 - LEADERSHIP AND ADVOCACY (3)

Leading is a complex endeavor and involves vision, passion, purpose, and the ability to make decisions under pressure and uncertainty while motivating others. This course analyzes the symbiotic relationship between leadership and decision-making, agency and advocacy, combining ethics, recent research, adaptive leadership theory and reflective practice to teach leadership, decision-making and advocacy skills.

DMSC 716 - CLINICAL LEARNING AND PRACTICE REFLECTION (3)

Every doctoral student should be prepared to teach effectively. The focus of this course will be to prepare the student to be an effective clinical or field educator. Students will explore evidence-based practices, grounded in adult learning theory and evidence-based education for delivering and evaluating educational content across various domains (virtually or in-person) for diverse learning audiences. The impact of emotion and learning, intercultural leadership, communication, and professionalism will be explored in this course.

DPAT**DPAT 612 - PROBLEMS IN ORAL PATHOLOGY I (2)**

This course is a lecture based comprehensive survey of the field of oral pathology extending through the entire academic year. The introductory portion of the course involves a comprehensive review of the fundamental pathologic processes: Inflammation, wound healing, pediatric pathology, oral potentially malignant lesions, soft tissue biopsy, infectious diseases, radiology, and neoplasia. Followed by salivary gland tumors and diseases, connective tissue lesions, odontogenic cysts and tumors. The bulk of the course consists of a survey of specific pathological entities affecting the oral cavity and surrounding structures. Both local and systemic diseases are covered. The main emphasis is on classification, and formation of differential and clinical diagnoses.

The evaluation of students will be both objective and subjective. The students will be subject to regular evaluation based on their ability to participate in

discussions. The DPAT 612 fall semester evaluation includes a CPC midterm evaluation and discussion in addition to an end of term exam. The class sessions will be composed mainly of lectures conducted by members of the Department of Oncology and Diagnostic Sciences. Clinical exercises will be used. Students are required to attend and participate in the discussion that will be graded. Unsatisfactory progress will be given prompt attention.

DPAT 613 - PROBLEMS IN ORAL PATHOLOGY II (2)

This course is a lecture based comprehensive survey of the field of oral pathology extending through the entire academic year. The bulk of the course consists of a survey of specific pathological entities affecting the oral cavity and surrounding structures. Both local and systemic diseases are covered. Bone lesions and tumors, skin lesions and mucocutaneous dermatosis, metabolic and hematopoietic disorders, and physical and chemical injuries. The main emphasis is on classification, and formation of differential and clinical diagnoses. The evaluation of students will be both objective and subjective. The students will be subject to regular evaluation based on their ability to participate in discussions. Clinical exercises will be used. The quality of the case presentations will be evaluated at the end of the year. Unsatisfactory progress will be given prompt attention. The last segment of the DPAT 613 in the spring consists of comprehensive case presentations by the students. The class sessions will be composed mainly of lectures conducted by members of the Department of Oncology and Diagnostic Sciences. Students are required to attend and participate in the discussion that will be graded.

DPAT 614 - HISTOPATHOLOGY TECHNIQUE I (4)

This course covers methods used to prepare pathologic tissues for microscopic examination. Prerequisite: a basic course in pathology

DPAT 615 - HISTOPATHOLOGY TECHNIQUE II (4)

This course covers methods used to prepare pathologic tissues for microscopic examination. Prerequisite: a basic course in pathology

DPAT 616 - PATHOLOGY OF ORAL LESIONS I (3)

This is a comprehensive advanced 3 credit course of clinico-pathological cases discussion. Each session will be a simulation of clinical presentation, radiographic findings if applicable, and histological picture. Followed by clinical and histological differential diagnosis, then definitive final diagnosis, prognosis and recommended line of treatment. The course consists of a survey of specific diseases affecting the oral cavity and surrounding

structures. *The Fall DPAT 616 focuses on epithelial lesions (red and white, and pigmented lesions), Connective tissue lesions, and bone lesions.* The main emphasis is on the formation of differential and final diagnoses based on histological findings in correlation with clinical information. Midterm and end of term training on discussion board case threads will be emphasized. The students will be subject to regular evaluation based on their ability to participate regularly in case discussion. The student will experience how definitive diagnosis is reached based on histological criteria. DPAT 612 and DPAT 613 are prerequisites.

DPAT 617 - PATHOLOGY OF ORAL LESIONS II (3)

This is a comprehensive advanced 3 credit course of clinico-pathological cases discussion. Each session will be a simulation of clinical presentation, radiographic findings if applicable, and histological picture. Followed by clinical and histological differential diagnosis, then definitive final diagnosis, prognosis and recommended line of treatment. The course consists of a survey of specific diseases affecting the oral cavity and surrounding structures. The Spring DPAT 617 focuses on salivary gland lesions and tumors. Odontogenic cysts and tumors, and exercise of mixed lesions. The main emphasis is on the formation of differential and final diagnoses based on histological findings in correlation with clinical information. Quizzes and training on discussion board case threads will be emphasized. The students will be subject to regular evaluation based on their ability to participate regularly in case discussion. The student will experience how definitive diagnosis is reached based on histological criteria. DPAT 612/DPAT 613 and DPAT 616 are prerequisites.

DPAT 618 - SEMINAR (1)

DPAT 618 is a seminar-style course in the Department of Oncology and Diagnostic Sciences where departmental research faculty, postdoctoral fellows, graduate students, and staff come together in a bi-weekly basis to discuss research material in the format of a journal club or data club. To this end, in the journal clubs graduate students and postdoctoral fellows present recently published high-impact original articles in the field of their research interest. The oral pathology residents present manuscripts related to advances in pathological entities. Data clubs are devoted to the presentation by principal investigators or laboratory members of recently obtained data from their own research activities in the department. Complementary to these well-attended activities and during each academic term, a guest speaker from the UMB campus, University System of Maryland university or other local/national

institution is invited to present a lecture in his/her area of biomedical research expertise. Overall, the goals and objectives of this course are to: 1- To train and engage postdoctoral fellows and graduate students in an interactive scientific discussion in current topics in biomedical research. 2- To train graduate students in handling, understanding, presenting, and discussing original research articles. 3- To encourage practice of critical thinking, data analysis and evidence based scientific research. 4- To be up to date with the state of the art in biomedical research including specific areas such as oncology, immunology, microbiology, angiogenesis, and skeletal biology. 5- To be introduced to other faculty members and their area of research expertise. 6- To trigger interest and open new opportunities for graduate students into the current research endeavors being carried out in the Department of Oncology and Diagnostic Sciences.

DPAT 799 - MASTER'S THESIS RESEARCH (1 TO 8)

Required enrollment for students engaged in master's thesis studies.

DPAT 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

DPAT 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

ETHC

ETHC 629 - INTRODUCTION TO ETHICAL THEORY (2)

This course introduces students to the prominent theories in ethics and political philosophy that inform our ethical arguments and the articulation of our values. By the end of the course, students are able to articulate ethical problems, understand how these problems differ from problems that can be addressed by empirical investigations or scientific discoveries; and can explain the difference between various schools of thoughts in ethics, and can analyze ethical claims in terms of their theoretical assumptions and commitments.

ETHC 635 - FUNDAMENTALS OF COORDINATING CLINICAL RESEARCH (2)

The clinical research coordinator (CRC) is a specialized

research professional that works with, and under the direction of, the clinical investigator. Although the clinical investigator is legally responsible for the management of the clinical trial at a site, the CRC handles the majority of the daily clinical trial activities and plays a critical role in the study conduct. This course reviews the knowledge and skills necessary to be a good CRC, the duties and responsibilities of a CRC, and the importance of the CRC to be an efficient and effective operative of clinical trials.

ETHC 637 - INTRODUCTION TO RESEARCH ETHICS (3)

This course acquaints students with basic concepts in research ethics, examines the ethical and philosophical issues raised by involving human subjects in research, and reviews concepts of risks and benefits, vulnerability, privacy and confidentiality, undue inducement, exploitation, equipoise, and therapeutic misconception. By the end of the course, students are able to analyze research protocols and assess the ethical appropriateness of such protocols.

ETHC 638 - ISSUES IN INTERNATIONAL RESEARCH ETHICS (3)

This course examines the ethical and philosophical issues raised by research involving human subjects that is conducted in international settings, and examines issues involved with the standard of care, informed consent, exploitation, post-trial benefits, and a developmental and organizational model of ethics review systems. By the end of the course, students are able to construct and support valid arguments in the analysis of exploitative research; analyze ethical questions regarding international collaborations in research, describe methods to achieve a culturally valid informed consent; describe the issues involved with tissue sample research performed between international partners, and assess an ethical review an international protocol.

ETHC 639 - REGULATORY AND LEGAL ASPECTS OF INSTITUTIONAL REVIEW BOARDS (2)

This course covers the legal and regulatory aspects of ethical review systems, and covers topics critical to performing clinical research including structures and operations of institutional review boards, understanding investigational new drug (IND) applications, and conflict of interest issues. By the end of the course, students are able to explain the issues involved with regulating institutional review boards and human subject protection programs.

ETHC 640 - ETHICS OF GLOBALIZATION (1)

This course introduces students to the identification and assessment of moral dilemmas in the context of changes and development in an increasingly globalized world with attention to both its theoretical and practical dimensions, including global health. By the end of the course, students are able to explain the forces associated with globalization; evaluate the impact of globalization on social justice issues; evaluate the moral theories underlying a just globalization; and explain the moral dilemmas posed by an increasingly globalized world.

ETHC 641 - INTRODUCTION TO MEDICAL ETHICS (3)

This course introduces graduate and professional students to clinical ethics consultations as a field of medical ethics and as a field of scholarly inquiry and analysis. It accomplishes this primarily by exploring diverse methods of scholarly inquiry in bioethics, and considers their application to the clinical setting. The course also looks at the historical development of ethics committees and ethics consultation services designed to bring bioethics into the clinical setting. Students explore different disciplinary approaches to bioethics through readings, online class discussions and activities and online presentations. Weekly reading assignments drawn from the literature of bioethics provide context and background for the online discussions. The course concentrates on a variety of controversial topics and issues that are confronted by health care professionals, families, and patients in a tertiary hospital.

ETHC 642 - CLINICAL ETHICS CONSULTATION (1)

This course focuses on the practical aspects of performing ethics consultations in the hospital setting. The course consists of an online component and an on-site component. The online component consists of a comprehensive overview of the history of ethics committees, the ethics consultation process, different models of ethics consultation, case analysis skills, communication skills, and frequent case write-ups based on fictitious cases. The on-site practicum teaches students the hands-on skills required to do ethics consultation and mediation in healthcare settings.

ETHC 665 - RESPONSIBLE CONDUCT OF RESEARCH INTERNATIONAL AFFAIRS (1)

This course examines the ethical responsibilities of conducting research with special emphasis on collaborative international research that involve scientific integrity, determination of authorship, peer review, conflicts of

interest, ownership of data, and intellectual property across borders with differing laws. By the end of the course, students are able to describe examples of research misconduct and methods of dealing with misconduct; can discuss the relationship between authorship and accountability; can discuss the ethical and legal foundations of intellectual property; and can describe how conflicts of interest can corrupt scientific objectivity.

FMED**FMED 610 - FORENSIC TOXICOLOGY LABORATORY (2)**

Forensic toxicology laboratory provides students with basic analytical methods to detect drugs and chemicals in biological samples. Students also learn the procedures of sample collection, storage and testing result analysis. The course is given by case presentation with discussion and hand-on laboratory training.

FMED 620 - HOMICIDE EVIDENCE SEMINAR (3)

This course explores medico-legal death investigation, and basic techniques in forensic pathology and forensic sciences. The week-long seminar provides professionals with training in all aspects of forensic investigation.

FMED 710 - FORENSIC PATHOLOGY (6)

Forensic pathology is the foundation of forensic medicine and deals with the study of the cause and manner of death by examination of a dead body during the medico-legal investigation of death in criminal and civil law cases in some jurisdictions. This course is designed to provide students with the principles and basic knowledge of forensic pathology practice in the US and around the world. It provides the core for the curriculum and is a prerequisite for all the other courses. The elements include the medico-legal death investigation system in the United States and China, the categories of medico-legal cases; the objectives of medico-legal investigation; the concept of cause and manner of death, common types of injuries associated with deaths; investigation of sudden unexpected deaths, the role of forensic pathology in criminal justice, public health and safety, and pattern of various trauma. The course is given by lectures, seminars, laboratory, and by some pre-recorded study lectures, and computer/online.

FMED 720 - FORENSIC AUTOPSY (3)

Forensic autopsy is a key procedure required in all medico-legal cases to identify the cause of death, especially in questionable cases. Forensic autopsy, or post-mortem examination as it is often called, is conducted to identify

any deviation from normal anatomy. These variances from normal include diseases and injuries and help determine: 1) the cause of death, 2) the mechanism of death and 3) the manner of death of the victim in question. This course is designed to teach students to perform eviscerations and organ block dissection; to select tissue for histological processing and special studies; and to obtain specimens for biological and toxicological analysis. The course of forensic autopsy is given by case presentation with discussion and laboratory training with hand-on instruction.

FMED 730 - MEDICO-LEGAL DEATH SCENE INVESTIGATION (1 TO 3)

Medico-legal death scene investigation is often critical in the final determination of the manner of death, documenting observations and collecting physical and trace evidence from death scenes that include homicides, suicides, accidents or natural deaths. The course is designed to show students how to conduct scientific, systematic and thorough death scene investigation for medical examiner and coroner offices; and how to obtain essential facts regarding the death scene, medical history, and social history. The course is given by case presentation with discussion, death scene visits with death scene investigation, and simulation laboratory work (death scene reenactment training).

FMED 740 - EPIDEMIOLOGICAL DATA RESEARCH CAPSTONE PROJECT (1 TO 6)

Well-designed epidemiological data research in the field of forensic medicine is essential to identify risk factors of certain deaths, which in turn produces valuable information useful in public health and public safety. This course is almost a year-long sequence that starts in the spring and ends in the summer. Students learn how to design and conduct epidemiological data analysis and research. Each student is required to develop a formal research proposal, conduct one research project under supervision of a faculty member, complete a publishable paper, and to present his or her paper to the class and faculty panel.

FMED 820 - FORENSIC NEUROPATHOLOGY (1)

Forensic neuropathology is a subspecialty of forensic medicine that focuses on all aspects of neurologic diseases and injuries that are relevant in judicial cases. This course teaches students the mechanisms, morphology, and dating of various neurologic traumas, neurologic causes of sudden death, and the effects of drugs and toxins on the central nervous system. The principles, practices, and current developments in the field of forensic neuropathology are

also discussed. The course is given by lectures with case discussion and laboratory brain and spinal cord examination.

FMED 830 - FORENSIC RADIOLOGY (1 TO 2)

Image technologies are powerful tools in forensic sciences. This course is designed to teach students the basic radiology technologies, including postmortem x-ray and CT scan operations and postmortem radiology case studies. The course is given by lectures, case presentation with discussion, and laboratory training.

FMED 840 - FORENSIC ODONTOLOGY AND FORENSIC ANTHROPOLOGY (2)

Forensic odontology is involved in assisting investigative agencies in the identification of whole or fragmented recovered human remains. This course is designed to teach students the basic skills for determining the age and race of unidentified human remains by comparison of antemortem and postmortem dental records and the use of the unique features visible on dental radiographs. Students also learn how to do the assessment of bite mark injuries and the source of bite mark injuries in cases of assault or suspected abuse. Forensic anthropology is the application of the science of anthropology in criminal investigation where the victim's remains are in the advanced stages of decomposition, severely burned, mutilated, or otherwise unrecognizable. This course is designed to teach students the basic anthropological techniques and analysis to assess the age, gender, race, stature, and evidence for estimation of postmortem interval of the individual, as well as if the individual sustained any trauma or disease prior to or at time of death. The combined course is given by lectures and laboratory case studies.

GERO

GERO 672 - ISSUES IN AGING POLICY (3)

This is an upper-level undergraduate or introductory graduate course on issues in aging policy. Its purpose is to provide an overview of the salient issues in aging policy and to provide the student with a context for understanding the public policy process. The course provides basic information and knowledge which is useful to the student in more advanced policy-related studies in aging and health.

GERO 681 - EPIDEMIOLOGY OF AGING (3)

This core course covers applications of the principle and methods of epidemiology and public health to the study of aging. There is a review of health assessment techniques

that are potentially useful for conducting epidemiological studies of older people; the epidemiology of selected disease common to old age; primary, secondary, and tertiary prevention, as applied to older people, focusing on psychosocial and environmental aspects of health; differing ideas of long-term care, and their roles in the prevention, intervention, and treatment of illness in older people. Students learn how to critically evaluate and present research in a specific area of gerontological epidemiology with faculty supervision. Cross-listed with PREV 681.

GERO 700 - SOCIOCULTURAL GERONTOLOGY

This course is offered and taken at UMBC only. Please view UMBC Graduate catalog.

A required advanced interdisciplinary seminar addressing the fundamental concepts, theories and interests of social scientific inquiry on aging and the aged. Topics include: social demographic aspects of aging in the United States and elsewhere; the cultural contexts of age as a basis for social status, stratification and social organization; societal change and aging; the history and development of social scientific theory and methodology in gerontology.

GERO 711 - BIOLOGY OF AGING (3)

This course provides opportunities to learn about several aspects of biological aging. They include what it is; how it happens; what effects it has on the structure and operations of the human body; how it affects social, psychological, and other aspects of life; how it is related to diseases; and what can or cannot be done about it.

GERO 750 - THEORY AND METHODS I (3)

This course is offered and taken at UMBC only. Please view UMBC Graduate catalog.

The first of a two-semester sequence integrating theory and methods in gerontology. The course provides students with the information and skills to think like a gerontologist, utilizing both theory and methods unique to the field and understanding the language and techniques utilized by a wide range of gerontological researchers. Key to these understandings is making connections between style and techniques of research and theorizing in varied disciplines, application of critical thinking skills, and being able to bridge both linguistic and paradigmatic barriers in an interdisciplinary field. Students completing this sequence will be able to approach problems from an interdisciplinary perspective, 'speak the language' of gerontology across disciplinary barriers of jargon, employ the work of contributing disciplines in their own research, and work as

part of an interdisciplinary research team.

GERO 751 - THEORY AND METHODS II (3)

This course is offered and taken at UMBC only. Please view UMBC Graduate catalog.

The second of a two-semester sequence integrating theory and methods in gerontology. The course provides students with the information and skills to think like a gerontologist, utilizing both theory and methods unique to the field and understanding the language and techniques utilized by a wide range of gerontological researchers. Key to these understandings is reading, evaluating and understanding the connections between research questions, theory and appropriate methods of research. Application of critical thinking skills, and being able to bridge both linguistic and methodological variation in an interdisciplinary field are emphasized. Students completing this sequence will be able to employ the work of contributing disciplines in their own research, produce a 'real world' proposal for research and work as part of an interdisciplinary research team.

GERO 786 - PSYCHOLOGICAL ASPECTS OF AGING

GERO 797 - CAPSTONE IN GERONTOLOGY (3)

The capstone course is a supervised gerontology learning experience and a demonstration of the substantive application of the knowledge and skills that have been acquired in the courses taken as part of the M.S. in Gerontology. It is an opportunity to demonstrate an understanding of how gerontology integrates with areas of a selected concentration (or areas of professional or personal interest, if the student did not select an area of concentration). Under the guidance of the Course Advisor, students must demonstrate in their project that they meet the educational objectives of the Gerontology Program AND apply at least two of the concentration area objectives to a practical challenge.

GERO 798 - SPECIAL TOPICS IN GERONTOLOGY (1 TO 3)

Topics vary from term to term.

GERO 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

GERO 801 - INDEPENDENT STUDY IN GERONTOLOGY (1 TO 3)

The student selects a topic of professional interest and

studies with a graduate faculty member who is competent in that field.

GERO 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

GERO 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

GLBH

GLBH 607 - GLOBAL HEALTH PROGRAM MONITORING & EVALUATION I (3)

Program monitoring and evaluation are essential tools to understanding and judging the impact that global health interventions and policies have in communities. This course introduces students to essential tools and models of both program monitoring and evaluation. Students will understand and analyze the key elements of program monitoring and evaluation: assessing population health needs using qualitative and quantitative information, identifying key program elements and their implementation, monitoring the program's cost and efficiency, and evaluating the success of implementation, including program outcomes. Particular attention is given to involving key community stakeholders throughout the monitoring and evaluation process. The course emphasizes an interdisciplinary approach to global health program monitoring and evaluation and the skills needed to conduct program evaluations.

GLBH 612 - GLOBAL HEALTH PROGRAM MONITORING & EVALUATION II (3)

This course builds upon Program Evaluation and Monitoring I by engaging students in using a health program monitoring and evaluation framework to design credible and feasible global health needs assessments, implementation monitoring systems, and outcome evaluations that involve stakeholders as appropriate. There is a more in-depth analysis of qualitative and quantitative methods including study design and question development frequently used in global health program evaluations. Students learn the importance of an ethical approach to involving stakeholders throughout the monitoring and evaluation cycle that demonstrates integrity and respects people from different cultural backgrounds and communities. Through case studies students will evaluate whether program designs, analyses, and evidence are

credible and conclusions are justified. They will propose how to communicate and use findings and shared lessons learned to improve the health of global communities.

GLBH 620 - GLOBAL DISEASE CONTROL (3)

This course provides in-depth knowledge on principles and strategies of disease control and equips students with the necessary skills to successfully establish, strengthen and systematically review disease control programs. The course focuses on disease control in disadvantaged populations of developing countries. It draws on local, regional and global policies and strategies to analyze strengths and weaknesses in disease control. The course places special emphasis on strengthening multi-disciplinary and inter-sectoral collaboration and effectively involving communities and patients in disease control programs.

GLBH 652 - GLOBAL HEALTH LEADERSHIP AND MANAGEMENT (3)

This course explores key strategy, management, and leadership practices in global health programs and examines the essential components of best practice global health improvement programs. It is designed to train leaders in the application, testing, and refinement of current frameworks in health care delivery. This course will provide an in-depth review of leadership functions to equip students with the knowledge and skills to understand, organize, and manage complex global health delivery organizations. Students will study the theory and practice of health care delivery, various roles within the health system, and how global health delivery organizations function. Students will apply their learning in case-based situations and deploy procedures and processes to effectively improve health outcomes.

GLBH 700 - CAPSTONE PROJECT (3)

The Capstone is designed to demonstrate the substantive application of the knowledge and skills that have been acquired in the courses taken as part of the M.S. in Global Health Program. The Capstone functions as the culminating experience for the program. Through the Capstone, students will develop a Capstone proposal; present their work; and reflect on their learning experience. To meet the needs of diverse learners, students can either complete their Capstone online or participate in an international exchange opportunity.

GPLS

GPLS 600 - CELLULAR AND MOLECULAR BASIS OF TRANSLATIONAL RESEARCH (5)

This course provides a comprehensive and in-depth overview of molecular biology, genetics, protein structure and function, biochemistry, cell signaling, and immunology. The course is designed for incoming master's degree students who are interested in pursuing translational research, and/or who are planning to attend medical school. The course is also designed for post-doctoral fellows, nursing students, clinicians and other professionals and faculty involved in translational research that do not have a traditional background in cellular and molecular biology. This course also forms the backbone for subsequent specialized translational coursework and research. The course is offered in the Fall semester and consists of 4-6 hours per week of on-line lectures recorded from the 8-credit Core Course (GPL 601); the course involves mandatory participation in on-line discussion boards, weekly journal articles or problem sets, and a 2 hour in-class, faculty-led integration session. These integration sessions are used to discuss the weekly lectures, to give students the opportunity to ask faculty members questions, and to present/discuss the weekly journal article and problem sets. Exams (3 in total) are also given during this in-class time.

GPLS 601 - MECHANISMS IN BIOMEDICAL SCIENCES: FROM GENES TO DISEASE (8)

Mechanisms in Biomedical Science is a comprehensive overview of current knowledge in cellular, molecular, and structural biology. This course provides the background necessary for subsequent specialized studies in biomedical research in a concentrated program. The GPLS Core Course is organized into 10 sections that span molecular biology, genetics, proteins, pharmacology, metabolism, membranes and organelles, protein processing, membrane signaling, cell signaling, immunobiology and development. The format is highly interactive, and includes: - Lectures presenting creative, cutting-edge approaches to investigating fundamental, current biomedical questions, together with review of fundamental principles of molecular and cellular biology - Vertically-integrated topics that tie together the study of individual genes, proteins, cellular function and associated clinical disorders - Emphasis on development and critical evaluation of scientific hypotheses - Introduction to state-of-the-art techniques - Mentored discussions of primary papers - Topic-specific seminars, including cancer, neuroscience, and drug development/gene therapy Upon completion of the core curriculum in early December, students may begin

a lab rotation and/or participate in program specific course work.

GPLS 604 - NEUROPHARMACOLOGY (3)

This course focuses on the mechanisms by which drugs act at the molecular level. Topics include drug and neurotransmitter receptors, how they are studied, how they are coupled to responses, and other sites of drug action.

GPLS 607 - PRINCIPLES OF PHARMACOLOGY (3)

This course has three sections: (1) general principles of pharmacology (including pharmacodynamics, pharmacogenomics, and pharmacokinetics), (2) chemotherapeutics of infectious diseases and immunomodulation, and (3) peripheral system pharmacology.

GPLS 608 - SEMINAR (1 OR 2)

A weekly critical review and discussion of original works and recent advances on a variety of research subjects by graduate students, faculty, staff members, and guests. Students take this course for credit at least twice, once when they present their Dissertation Proposal seminar, and once after presenting their Dissertation Defense public seminar. Molecular Medicine students take it for one additional seminar. (section 1, Biochemistry; section 2, Molecular Medicine; section 3, Microbiology; section 4, Neuroscience)

GPLS 609 - LABORATORY ROTATIONS (1 TO 3)

Students gain experience in a variety of techniques, and become familiar with faculty members and their research. Doctoral students generally complete two or three rotations in different laboratories in the program. Rotations usually last six to eight weeks and are graded pass/fail. (section 1, Biochemistry; section 2, Molecular Medicine; section 3, Microbiology; section 4, Neuroscience)

GPLS 610 - PRINCIPLE KIDNEY AND BODY FLUIDS (2)

This course covers contemporary research in renal function and epithelial transport. Students read and present an assigned topic, evaluate methodology, interpret results, and discuss models and their experimental verification.

GPLS 613 - NEUROENDOCRINOLOGY (3)

This course takes an integrative approach to the topic of neuroendocrinology. Didactic lectures review in detail the cellular and molecular mechanisms of steroid and peptide hormones. These processes are placed in the context of the control of female and male reproductive physiology and

extended to the hormonal control of behavior. Other topics include the hormonal basis of and responses to stress, circadian rhythms, and seasonality and feeding behavior. In addition to lectures, each student will make an in-depth presentation on a topic of her/his choice that is relevant to the field of neuroendocrinology. Grades are based on the presentation, a midterm exam, a final exam, and class participation.

GPLS 616 - MOLECULAR MECHANISMS OF SIGNAL TRANSFER (3)

This is a twice-weekly lecture and paper discussion course that focuses on the molecular mechanisms by which growth factors, cytokines, hormones and other signaling molecules act on responsive target cells. Prerequisite: Completion of GPLS Core Course GPLS 601 or MS1 and MS2 of Medical School Curriculum.

GPLS 618 - READINGS AND SPECIAL TOPICS (1 TO 3)

Topics vary from term to term.

GPLS 620 - SYNAPTIC PHYSIOLOGY AND PHARMACOLOGY (4)

Emphasis is on electrophysiological analysis of synaptic transmission. Topics include ionic basis of excitatory and inhibitory postsynaptic potentials, equivalent circuits of transmitter action, mechanisms and regulation of transmitter release, fast and slow synaptic responses, and functional structural plasticity at synapses.

GPLS 623 - MOLECULAR TOXICOLOGY (3)

This course will focus on areas of toxicology in which significant advances are being made into molecular mechanisms. Faculty mentors of the GPILS Toxicology Graduate Program's Track in Molecular and Mechanistic Toxicology will present topics related to their research expertise. Emergent technologies will be introduced ? for example, in toxicogenomics, gene therapy, and metabonomics. The course is intended for students in their third semester of graduate studies. Emphasis will be placed on enhancing skills in interpreting and critiquing the primary research literature. Grading is based on student presentations and a term paper.

GPLS 624 - ONCOPHARMACOLOGY (3)

Molecular therapy approaches will be discussed within the context of modern understanding of cancer biology and target identification. State-of-the-art approaches for cancer diagnosis and treatment will be reviewed. These include signaling pathways associated with tumor development,

the role of endocrine and other receptors as drug targets, the contribution of transcriptional regulation, genome instability and DNA repair, and the harnessing of apoptotic cascades for cancer therapy. Drugs involved in cancer treatment and their mechanism of action, angiogenesis regulation, gene therapy approaches to cancer treatment, the use of stem cells and dendritic cells in therapy and immunotherapy, drug resistance, and toxicity will also be highlighted. The format is lectures followed by student discussion of assigned papers.

GPLS 625 - ION CHANNELS (2)

This course covers the role of voltage- and receptor-gated ion channels in cell function. Although the emphasis is on structure and function of channels in excitable tissues such as nerve and muscle, students gain insight into the rapidly developing field of ion channel function in nonexcitable cells such as lymphocytes, transformed cells, and glial cells, and the roles of ion channels in development. Prerequisites: GPLS 601 and 644, or consent of the instructor.

GPLS 626 - MEMBRANE CARRIERS TRANSPORTERS (2)

This course is designed to prepare students for advanced study and laboratory research on the mechanisms by which ions and small molecules are transported across biological membranes. The course starts with consideration of the general methodology, thermodynamics, and kinetics of transmembrane, transcellular and transepithelial ion transport. The focus then shifts to the biochemistry and molecular and structural biology of common plasma membrane active transport systems for ions, nutrients and neurotransmitters. It also covers the relationships and interactions between transport proteins in the plasma membrane and intracellular membranes. Prerequisites: GPLS 691 GPLS 644 or equivalent or consent of the course director.

GPLS 627 - DEVELOPMENTAL NEUROBIOLOGY (3)

This course introduces students to fundamental processes of neuronal development, including cell proliferation, differentiation of neurons and glia/cell lineage, neuronal migration, development cell death, regional differentiation, the formation of neuronal connections, and plastic reorganization of the nervous system during development and developmental diseases and malformations. The underlying cellular and molecular mechanisms of these processes are also explored. Each topic is covered by a lecture and a discussion of selected current papers in the literature.

GPLS 629 - JOURNAL CLUB (1)

This course exposes students to advances in their specific disciplines through presentations of recent papers by faculty, research fellows, and students.

GPLS 630 - FUNDAMENTALS OF BIOSTATISTICS (3)

This course covers most of the basic types of analysis procedures used for continuous and discrete variables. Topics include statistical inference (p-values, confidence intervals, hypothesis tests), t-tests, chi-square tests, power calculations, nonparametric methods, simple and multiple linear regression, ANOVA, logistical regression and survival analysis.

GPLS 631 - CARDIAC CELLULAR PHYSIOLOGY (2)

This course covers cardiac cellular physiology, electrophysiology, and molecular biology through lectures, readings, and discussions. Topics change yearly. Recent topics have included: channels in the sarcolemma and sarcoplasmic reticulum; ion exchangers and pumps; signal transduction mechanisms; excitation contraction coupling in heart muscle; novel aspects of cardiac muscle mechanics; and review of new molecular, optical, and electrical methods. Students present and discuss assigned papers and write a mock grant application.

GPLS 632 - EXPERIMENTAL DESIGN AND QUANTITATIVE ANALYSIS (2)

This course will introduce the fundamental concepts in biostatistics and how to apply these concepts using the R statistical programming language. This course will also provide the students with an opportunity to learn how statistical methods are used in neuroscience research. During this part of the course, the instructor would initially provide background information on the field of research and the types of data that are collected, and how the statistical test under study is suited to the analysis of these data. This can be followed by providing details about experimental design and how a specific dataset is analyzed. The students are then presented with the dataset(s) (mock or real) to analyze for significance or lack thereof using R. Finally, to allow the students to think about the next step in the experimental design and analysis, they can perform additional analyses to determine if a dataset is overpowered/underpowered or eliminate outliers, etc. Additionally, this course will closely integrate with the Proseminar in Experimental Design course where students will apply the learned statistical skills to develop hypotheses and prepare their

research plans.

GPLS 641 - SYSTEMS AND COGNITIVE NEUROSCIENCE (4)

This course begins with an initial module that covers human neuroanatomy (students take lectures and labs with the medical neuroscience students), followed by lectures on general organizations of brain circuits, and sensory and motor systems. The course closes with lectures covering the neural bases of cognitive functions, language, sleep, etc, and with lectures on disorders of the nervous system.

GPLS 642 - NOCICEPTION OF PAIN (2)

This course is designed for graduate students in all health disciplines. Its focus is on the basic science and research aspects of nociception, pain, and analgesia. Topics include the neuroanatomy, neurophysiology, neuropharmacology, and the psychophysics of nociception and pain.

GPLS 643 - NEUROBIOLOGY OF NOCICEPTION (2)

This course is designed for neuroscience graduate students interested in the neurobiology of nociception and pain. While GPILS 642 provides a general background in this field, GPILS 643 provides a solid foundation of knowledge through a combination of lectures, directed reading, and discussion of the primary literature. The focus is on the most contemporary views of nociceptive processing.

GPLS 644 - INTRODUCTION TO MEMBRANE BIOPHYSICS (1)

This course is designed to provide students with sufficient understanding of a range of electrophysiological concepts, including current flow and intracellular, patch clamp and extracellular recording, which are required for electrophysiological laboratory rotations. In addition, lecture topics will focus on quantitative topics that students must be familiar with for more advanced courses, such as 'Cellular Basis of Synaptic Physiology' and 'Fundamentals of Membrane Transport.' Topics include electrochemical equilibrium, electrochemical potential energy and transport processes, electricity primer, operational amplifiers, equivalent circuits of membranes, voltage-gated channels and action potentials, and extracellular recording and stimulation. This course, in combination with the Core Course and GPLS 691 (Topics in Contemporary Cellular and Molecular Neuroscience), provide neuroscience-oriented students with a strong background in both molecular and cellular neuroscience and electrophysiological concepts, which is necessary for advanced courses in neuroscience. This course is required

for students in the Program in Neuroscience and is recommended for GPILS students interested in cellular and molecular neuroscience.

GPLS 645 - CELL AND SYSTEMS PHYSIOLOGY (3)

This course covers the fundamentals of cellular and organ physiology, the integrative function of physiological systems, and homeostasis. The first half of the class focuses on cellular/tissue physiology (sample topics include epithelial, muscle, neuron, bone, blood, and endocrine cell physiology), with the second half focusing on organs and systems (nervous, cardiovascular, respiratory, renal, digestive, immune, and endocrine systems). Weekly discussion groups focus on important techniques in physiology, integrating class lectures with experimental topics and journal articles. Students are evaluated with 2 exams and a class presentation on a physiological system of their choice.

GPLS 647 - MOLECULAR MEDICINE SURVIVAL SKILLS (2)

The ability to effectively communicate scientific findings and new ideas not only aids the researcher in promoting his/her program, but helps in the conceptualization of new areas of inquiry and generates new insights into recent discoveries. This course is designed to provide second-year Molecular Medicine Graduate students with instruction in five critical areas of scientific communication that underpin a successful graduate career: 1) Grant Writing Skills; 2) Manuscript Preparation Skills; 3) Presentation Skills (preparation and delivery of an oral presentation); 4) Bio-informatics; and 5) People Skills (professional skills for future employment opportunities). The format will include formal lectures on each topic, followed by an accompanying workshop and/or forum in which to engage in interactive learning sessions.

GPLS 648 - ROUNDS IN MEMBRANE BIOLOGY (1)

Two faculty members in the interdepartment program in membrane biology present two topics in the field of biomembranes each week. Time is reserved for questions and discussion.

GPLS 660 - FUNCTIONAL SYSTEMS: CELL FUNCTION (1)

This course provides students with a fundamental knowledge of the biophysical properties of cells and cell membranes in lectures and small-group discussions. Topics include diffusion, permeability, osmotic pressure, electrical consequences of ionic gradients, resting membrane potentials, action potential generation and propagation, ionic channel diversity, active transport, epithelial

transport, excitation contraction coupling in skeletal muscle, and the mechanical properties of muscle. Emphasis is on the experimental basis of the biophysical properties of cells (a component of the medical physiology course).

GPLS 661 - FUNCTIONAL SYSTEMS: ENDOCRINE FUNCTION (1)

Students learn about the endocrine system through lectures and small group conferences. Lectures focus on the biosynthesis of the major hormones, regulation of hormone release, effects of hormones on target tissues, and intracellular mechanisms of hormone action. Students discuss the clinical relevance of endocrine findings and critically evaluate the experimental design, observations, and interpretation of data presented in current papers in small-group conferences (a component of the medical physiology course).

GPLS 662 - FUNCTIONAL SYSTEMS: CARDIOVASCULAR FUNCTION (2)

Students learn about the integrated functioning of the cardiovascular system. Topics include electrophysiology of the heart, at both the cellular and multicellular levels; excitation-contraction coupling mechanisms in cardiac and vascular smooth muscle; cardiac cycle and ventricular mechanics; hemodynamics; short- and long-term mechanisms for regulation of blood pressure; and function of the lymphatic system. Final topics include those that exemplify the integrated functioning of the cardiovascular system: exercise, response to postural changes, heart failure, and others (a component of the medical physiology course).

GPLS 663 - FUNCTIONAL SYSTEMS: RENAL FUNCTION (1)

Students learn about renal mechanisms responsible for water and electrolyte homeostasis in lecture and small-group format. Topics include body fluids, sodium and water balance, renal blood flow and glomerular filtration, tubular mechanisms of NaCl transport and regulation, solute transport, diuresis, concentrating mechanisms, potassium homeostasis, and acid-base homeostasis (a component of the medical physiology course).

GPLS 664 - FUNCTIONAL SYSTEMS: GASTROINTESTINAL AND RESPIRATORY FUNCTION (1)

Students learn about respiratory and gastrointestinal systems through lectures and small-group work. Respiratory physiology topics include lung volumes, ventilation, mechanics of breathing, pulmonary blood flow,

ventilation-perfusion matching, gas transport, control of breathing, and fetal respiration. Gastrointestinal physiology topics include secretions of the salivary glands, stomach, pancreas, and small intestine; enzymatic digestion and absorption; motility; gastrointestinal hormones and the enteric nervous system; and colonic function (a component of the medical physiology course).

GPLS 665 - CANCER BIOLOGY: FROM BASIC RESEARCH TO THE CLINIC (3)

This course is designed to introduce students to both the biology of specific cancers and to how patients with these diseases are managed and treated. The course consists of twice weekly lectures in which a basic or translational scientist is paired with a clinician to describe a specific disease and the major questions that need to be answered to improve treatments. Thus, the lectures alternate between lectures on basic biology and clinical management of cancer patients. The first half of the course deals with hereditary cancers and the second half covers sporadic cancers. In addition to attending the lectures, students attend one relevant tumor board conference (where clinical cases are presented and discussed) each week. Each student is assigned a clinical mentor who helps identify a clinical question or problem of current interest, and each student writes a concise, focused mini-review of the literature and issues related to this question (guidelines are provided).

GPLS 667 - CELLULAR-MOLECULAR BASIS OF AUTISM (3)

This course provides an overview of both clinical and neurobiological research on autism spectrum disorder. After an introduction on understanding what autism is - and how it impacts people's lives - the course examines the neurobiological processes underlying autism spectrum condition in human as well as animal models. It also investigates changes in brain development, gene expression and sex differences, neurotransmitter systems and synaptogenesis, including recent advances in the stem cell research field.

GPLS 690 - CURRENT TOPICS IN VASCULAR AND STEM CELL BIOLOGY (1)

This course introduces students to contemporary topics of scientific and clinical importance in vascular and stem cell biology. This lecture and discussion course covers a series of subjects including the nature and origin of stem cells and their application to medicine, inflammation, proteolytic mechanisms of thrombosis, atherosclerosis, angiogenesis, and vascular disease. Offered in the fall semester. This course complements the GPILS Core

Course.

GPLS 691 - CURRENT TOPICS IN NEUROSCIENCE (1)

This course is a lecture and discussion course that complements the GPILS Core course by introducing a variety of current topics in the area of cellular and molecular neuroscience. The class meets once weekly and consists of a series of lectures that introduce students to topics in cellular and molecular neuroscience, including neurogenetics, neural development, neuroendocrinology, neuropharmacology, neuronal survival and degeneration, neuromodulation and synaptic plasticity. Each lecture includes a general introduction to a topic, followed by discussion of recent studies addressing specific questions relevant to that topic. This course is required for the Program in Neuroscience and is recommended for any student interested in cellular and molecular neurobiology.

GPLS 692 - CURRENT TOPICS IN GENETICS AND GENOMICS (1)

Topics vary from term to term.

GPLS 693 - Current Topics in Microbiology (1)

GPLS 701 - ADVANCED MOLECULAR BIOLOGY (3)

This is an advanced course for graduate students majoring in molecular biology and genetics. Course covers current developments in DNA replication, repair, recombination, gene expression, and RNA processing in both prokaryotes and eukaryotes (with emphasis on eukaryotic systems).

GPLS 702 - BASIC IMMUNOLOGY (4)

This core course introduces basic ideas of Immunity. In a three-tiered format, the cells (Macrophages, DC, NK, T, B, and others) and molecules (cytokines, antigen receptors, signaling pathways, and others) making up the immune system are introduced, detailed and then placed into a bigger picture relevant to host protection, vaccines, autoimmune disorders and immuno-therapy. Course includes lectures, experiment-design workshops, paper discussions and term papers.

GPLS 704 - PRINCIPLES OF VIROLOGY (3)

This course introduces students to animal virology with a concentration on the pathogenesis, molecular biology, and immunology of selected, medically-important viruses. Lecture material is drawn from both classical and current literature. Lectures are supplemented with literature discussions, team-based learning exercises, interactive presentations, and student defenses of mock grant

proposals which highlight key research areas in virology.
Pre-requisite: GPLS 601 or completion of M1 curriculum.

GPLS 705 - BASIC HUMAN GENETICS I (4)

Students learn basic genetic principles as they relate to the study of human health and disease. Topics include an overview of human genetics in Mendelian genetics, cytogenetics, population genetics, molecular cytogenetics, oncocyto-genetics, clinical applications of principles, and the importance and implications of genetic disease at the levels of the population and individual families.

GPLS 709 - ADVANCED BIOCHEMISTRY (3)

This course covers topics not normally covered in other biochemical courses, including an advanced treatment of enzyme kinetics, with emphasis upon two substrate systems; allosteric control mechanisms; replication and transcription; and the biochemistry of specialized tissues.

GPLS 710 - MICROBIAL PATHOGENESIS (3)

The aim of this course is to provide a groundwork in basic principles of bacterial pathogenesis and to illustrate some of the current research topics and methodologies used in this field. It is assumed that students will already be somewhat familiar with fundamentals of bacterial structure and metabolism. The first part of the course covers basic concepts, while the second part examines selected specific organisms and topics in further detail. Classes consist of a mixture of lecture material and discussion of research papers, with the idea of familiarizing students with the basic facts and ideas of a particular subject and exploring methods of study and research questions on that topic. It is expected that students will read the assigned research papers before class and will participate in class discussions of the material. There are two exams covering the material discussed in classes, the first just before spring break and the second towards the end of the semester. Following the second exam, students make presentations based on assigned reading and research topics.

GPLS 711 - GENETIC EPIDEMIOLOGY (3)

This course uses qualitative and quantitative traits to discuss genetic and epidemiologic factors affecting normal and abnormal variation within and between populations. Topics include traditional and modern methods of family data analysis, including segregation and linkage analysis; the underlying assumptions of each method (including Hardy-Weinberg equilibrium); steps in each analysis; and computer programs.

GPLS 712 - HUMAN CYTOGENETICS (2)

This course covers the normal human karyotype, chromosome identification methods, numerical and structural abnormalities and their clinical correlates, X chromosome gene action, chromosomes and cancer, human population cytogenetics, gene mapping, and karyotype evolution. Students give a seminar on a pertinent topic.

GPLS 713 - BIOCHEMISTRY STUDENT SEMINAR (2)

Under the guidance of a faculty mentor, students critically review a recent scientific paper and deliver a formal presentation to their peers and instructor(s). The topics vary each semester it is offered.

GPLS 714 - MUSCLE CONTRACTILITY AND EXCITATION (3)

This course covers basic physiology, biochemistry, and biophysics of cardiac, skeletal, and smooth muscle. Topics include ultrastructure of skeletal muscle, mechanical and biochemical features of the crossbridge cycle in contraction, excitation contraction coupling, calcium-induced calcium release in cardiac muscle, and physiology and pharmacology of smooth muscle.

GPLS 715 - MUSCLE CELL BIOLOGY AND DEVELOPMENT (3)

This course considers the developmental biology of muscle, including its innervation and plasticity. The course begins with a discussion of the factors controlling the proliferation and differentiation of myoblasts. Next are a consideration of fiber type determination, its relationship to use, and the effects of hypertrophy and atrophy on muscle. The structure, function, and formation of the neuromuscular junction and its relationship to the organization of structures in the extrajunctional region forms the next set of topics. Emphasis is placed on the extracellular matrix and the cytoskeleton. The last part of the course deals with the relationship of activity and hormonal influences to the biochemical properties of muscle. The course meets twice weekly and consists of one lecture and one session for student oral presentations and discussion of assigned research pertinent to the lecture topic.

GPLS 716 - GENOMICS AND BIOINFORMATICS (3)

This course provides a comprehensive introduction to genomics and bioinformatics. It focuses on commonly-used skills and tools commonly employed by students in

the analyses of data generated in their thesis work. The course focuses on the uses of genomics and bioinformatics resources, as opposed to the development of these resources. No prior experience with programming, genomics, or bioinformatics is expected or required. Topics include applications of high throughput sequencing common to biological questions, understanding alignment tools and scores, understanding and performing phylogenetic analysis, comparative genomics, metagenomics, expression analysis/transcriptomics, systems biology, and the use of public databases and resources.

GPLS 717 - GENOMICS OF MODEL SPECIES AND HUMANS (3)

This course addresses important aspects of model organismal molecular genetics as well as the application of tools and resources in the field of genomics. Emphasis is on both human and model species, the latter of which includes *E. coli*, yeast, flies and zebra fish. The course covers a broad view of biological processes that are at the frontier of current knowledge in biology. The instructors are specialists in their respective fields and give lectures and assign papers related to the subject of the related lecture or class topic.

GPLS 718 - PROGRAMMING FOR BIOINFORMATICS (2)

This class is designed to teach students robust practices for storing and analyzing large datasets and the accompanying metadata. It provides an introduction to fundamental programming techniques that can be applied to solve straightforward, common analysis tasks. The course is designed for the biologist who has little or no experience in programming. Topics include an introduction to the Linux computing environment, the basics of database structure, design and querying, and an introduction to Python programming.

GPLS 719 - ADVANCED PARASITOLOGY (3)

This course presents a comprehensive review of the parasites of humans and the diseases they cause. Topics include the biology of selected parasites causing human diseases, including host-parasite interactions at the molecular level and vaccine use; immunological aspects of human parasite-interactions, including ways in which the immune response can mediate pathology and protection; and the epidemiology of human parasitic diseases, including parasite population dynamics, ecology, and transmission.

GPLS 721 - MICROSCOPY FUNDAMENTALS AND MODERN IMAGING APPLICATIONS (3)

The goal of this course is for students to gain a comprehensive understanding of modern optical microscopy and its fundamental principles. These principles are explored through discussions of techniques in biological microscopy of living systems. The main, organizational strategy of the course is centered on the student group as a whole building a working super-resolution microscope. Thus, lectures are minimized, and the emphasis is on student presentations of key topics facilitated by outside reading, interactive demonstrations including time in the School of Medicine/Physiology Confocal Microscopy Core Facility, and build-time for the microscope in class. Students may expect 2 hours of class time per week, with demonstrations and hands-on assignments that periodically add additional time.

GPLS 722 - GENETICS AND METABOLISM (2)

Students study mechanisms of gene action as illustrated by inherited human biochemical defects. Topics include fundamental aspects of the function and malfunction of enzymes, vitamins, and structural and regulatory proteins at the biochemical and molecular levels, clinical features of metabolic diseases, differential diagnosis, and laboratory follow-up. Offered in the Fall semester of every other year.

GPLS 725 - SYSTEMS-RESEARCH IN MICROBIAL PATHOGENESIS (3)

This course addresses important aspects of microbial pathogenesis and molecular genetics at an advanced level. The course is based exclusively on current primary research literature; no textbook is assigned for this course. The course is intended to extend students' knowledge from previous courses and to prepare them for PhD level studies in these disciplines. Potential topics include pathogenic mechanisms in relevant organisms while covering both Gram-positive and Gram-negative bacteria, and pathogenic fungi and parasites. Detailed elements of common pathogenic mechanisms including secretion systems, surface structures, toxin production and gene regulation will also be examined. The course attempts to integrate topics of immune modulation and evasion, and to provide a broad view of the host pathogen interaction, and to integrate the newer microbiota studies into the class. The course therefore covers a broad view of biological processes that are at the frontier of current knowledge in biology. The instructors are specialists in their fields and give lectures and assign papers related to the subject of the lecture discussed in class. Additionally, students are involved in lecture and paper presentations that encourage

the interaction and direction of the material covered.

GPLS 726 - SPECIAL TOPICS: NEUROSCIENCE NANO I (2)

This heavily neuroscience-focused course will cover topics that may include addiction, neuroscience methods, quantitative analysis in neuroscience, trauma, and translational psychiatry. Selected topics are taught by subject matter experts who may include lecture, discussion, and literature review components.

GPLS 727 - SPECIAL TOPICS: NEUROSCIENCE NANO II (2)

This heavily neuroscience-focused course will cover advanced topics that may include addiction, neuroscience methods, quantitative analysis in neuroscience, trauma, and translational psychiatry. Selected topics are taught by subject matter experts who may include lecture, discussion, and literature review components.

GPLS 728 - GENOMIC DATA SCIENCE (3)

Understanding of the basic methods in data science, with application to questions in genomics and genetics. The course will begin with a review of basic programming techniques, including essential data science Python packages. It will develop student's confidence in programming, especially through reproducible coding skills (e.g. GitHub and Jupyter Notebooks) as well as a wide range of analysis methods. Topics include: machine learning, supervised and unsupervised learning, regression, dimensionality reduction, prediction, regularization, clustering, and overall assessment of algorithms.

GPLS 732 - POPULATION ASPECTS OF HUMAN GENETICS (1)

This course covers basic concepts in genetic epidemiology, including assessment of familial aggregation. It is designed to provide the student with a basic understanding of approaches used in gene mapping, such as linkage and association analysis.

GPLS 735 - BEHAVIORAL NEUROSCIENCE (3)

Behavioral neuroscience is the study of behavior and of its biological underpinnings. In this course students learn how behavior is generated in response to events in the world around us. Students gain a significant understanding of the nervous system, how it is organized, and how it works in response to the environment. First, the course examines some of the techniques used currently in behavioral neuroscience. Next, it covers how organisms are built to receive information from the senses and how

they turn that information into plans to move our bodies to react to those sensations. The course also covers how the endocrine system, which releases hormones, interacts with the nervous system and influences behavior. Further, it considers a biological basis for higher order function (e.g. learning and memory) as well as psychological disorders such as schizophrenia, mood disorders, and drug addiction. The course also expects students to gain an ability to understand and critique research literature as it applies to the formal study of behavior.

GPLS 737 - PROSEMINAR IN EXPERIMENTAL DESIGN (2)

This course is designed to promote strengths in critical thinking, experimental design and development of testable hypotheses. Skills in both written and oral scientific communication are emphasized. The course format consists of a series of two-hour sessions once per week. Each student does three presentations during the term: a critical analysis of a scientific paper, including identification of hypothesis, predictions, and alternative hypotheses; a proposal based on a previous research experience; and a research project based on a hypothetical data set. For the second and third presentations, students write proposals in the format of NIH predoctoral fellowship applications. Students revise their proposals after receiving oral and written critiques by faculty and students. This course is intended for neuroscience-oriented PhD students in various programs who are about to complete their course work.

GPLS 750 - TOPICS IN MOLECULAR MEDICINE (2)

This course is aimed at developing skills necessary for understanding and discovering how changes in gene function cause human disease. The course revolves around a series of topics that use inherited disease processes to illustrate the physiological consequences of molecular, cellular, genetic phenomena. Recent breakthroughs in the identification of disease-related genes are presented and extended to a discussion about their impact on cell and organ function. Critical reading and discussion of landmark and/or timely papers are stressed. In this way, students learn interesting state-of-the-art material while developing skills and expertise in integrative biology and molecular medicine. Topics change yearly, but have included: paralysis, malignant hyperthermia, cardiac arrhythmias, congestive heart failure, glomerulitis-Alport's, cystic fibrosis, Liddle's syndrome, hyperinsulinemia of infancy, type II diabetes mellitus, influenza, migraine headache and neurogenic inflammation, and Duchenne

dystrophy. Two or three one-hour classes per topic consist of interactive discussions following assigned readings and brief lectures. Required for all molecular cell biology and physiology students, open to others.

GPLS 755 - READINGS IN MOLECULAR SIGNALING AND STRUCTURE (1)

This course teaches advanced students contemporary topics of scientific importance pertaining to the interface between macromolecular structure and intracellular signaling pathways. The course revolves around reading and presenting a series of manuscripts relevant to molecular signaling and structure. Manuscripts are selected by the course director(s) for presentation by the students, focusing on features that will complement the student's thesis research plan. Students work on each manuscript as a team and present the product. New knowledge, critical assessment, and the understanding of methodology are stressed. Students relate their own scientific work to the contents of the paper. Students develop new knowledge and analytical skills. In later sessions students apply these skills by presenting and discussing their independent research projects and by reviewing research projects by other students in the class. The Readings course is required for Molecular Signaling and Structure Training Program (MSSTP) students. Prerequisites: GPLS 601. Completion of GPLS 616 and 709 is recommended.

GPLS 769 - ADVANCES IN IMMUNOLOGY (3)

This course will comprise immunologic topics chosen by faculty students. The material will come mainly from the primary literature and will be a discussion heavy course. Students will be expected to write short summaries of the papers before class begins. In additional question sets will be prepared by the instructors after the discussions which the students will complete before the next class.

GPLS 775 - INTERFACE OF PAIN AFFECT AND ADDICTION (3)

This course integrates various topics in pain, affect, and addiction research, including circuits and behaviors, molecular mechanisms and chemical synapses, neuroimaging and neuromodulation, and treatments. The format of the course is lecture-based discussions, and evaluation is based on participation, a presentation, and an NRSA-style grant application.

GPLS 781 - TRANSLATIONAL PSYCHIATRY (3)

The primary goal of this course is to provide students with an opportunity to integrate molecular and systems models of the brain into the context of thought disorder and mental illness and the translation of this work into the clinical

setting. The course utilizes a paired teaching technique (basic scientist paired with clinician) time for integration and discussion. Field trips to imaging facilities, virtual reality labs and clinical research facilities facilitate a better understanding of translational research. Course work includes a 'translational' grant writing exercise, a mock review and student presentations. The course culminates in a 'reviewed' grant proposal on Innovative Translational research.

GPLS 790 - ADVANCED CANCER BIOLOGY (3)

This course introduces students to the fundamentals of cancer from diagnosis to treatment as well as the latest research discoveries. The course begins with the biology of cancer cells, the stages of cancer and the types of tumors, and ends with topics related to animal models for studying cancer. Lectures include tumor suppressors, oncogenes, signal transduction, disruption of growth control networks, DNA damage, oncopharmacology, drug design, robotics, and common forms of cancer. Required for all molecular and cellular cancer biology students.

GPLS 791 - FROM BENCH TO BEDSIDE: STEPS IN TRANSLATIONAL RESEARCH (3)

Designed to introduce the process of how drugs, devices, and diagnostics are developed, providing students with the experience and skills necessary to facilitate the translation of new biological knowledge into tools to improve human health. A 3-credit course, once a week for 2 hours consisting of a 1-hour lecture by a faculty member, followed by a discussion of an assigned paper. Each student will prepare a 30-minute presentation of a translational study with a faculty mentor.

GPLS 791 - TRANSLATIONAL RESEARCH SEMINAR (2)

This seminar course designed to give scientists (graduate students or postdoctoral fellows), clinicians, and other interested parties the basic information to assess the therapeutic and diagnostic potential of basic science research discoveries. It also provides students with the tools to approach translational research in their present and future work. The course covers the core competencies in clinical and translational research; each session addresses core thematic areas. Students meet once per week for a 1.5-hour period for 10 weeks. Faculty members give a 40-minute lecture, followed by a 20-minute PowerPoint presentation by a student. The presentation is followed by a 30-minute discussion in which all students are encouraged to participate. Students are given a take-home short answer question, based on each lecture. The student presentations and short answers count toward the final

grade. An assigned paper is also given.

GPLS 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

GPLS 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

GPLS 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

HGEN

HGEN 601 - BASIC HUMAN GENETICS I (4)

This course provides an introduction to the application of basic genetic principles to the study of human health and disease. An overview of basic human genetics is provided in Mendelian genetics, cytogenetics, population genetics, molecular cytogenetics, oncocytogenetics and clinical applications of principles. The importance and implication of genetic disease at the levels of the population and individual families are discussed.

HGEN 602 - BASIC HUMAN GENETICS II (4)

Introductory material in basic genetic principles, with emphasis on biochemical and molecular approaches to the study of human health and metabolic disease are provided. Primary genetic defects underlying a diversity of disorders are discussed. Subjects will include molecular and biochemical genetics, immunogenetics, cancer genetics, neurogenetics and developmental genetics. Clinical applications of metabolic and molecular studies are discussed. (Prerequisite: Biochemistry)

HGEN 608 - HUMAN GENETICS SEMINAR (1)

Graduate students, faculty and guests participate in the presentation and critical review of current topics and interests in the field of human genetics. (Prerequisites: Consent of the program director)

HGEN 609 - SPECIAL PROBLEMS IN GENETICS (1 TO 3)

Topics vary from term to term.

HGEN 610 - GENETIC COUNSELING SEMINAR (1)

Through case presentation, group discussion and role-playing with first year M.G.C. students and faculty, 2nd year students evaluate their role and improve his/her skills in the genetic counseling process. The medical, psychosocial and ethical issues encountered in concurrent clinical rotations will be thoroughly explored. Recent literature relevant to these issues will also be reviewed.

HGEN 611 - WORKING WITH SUPPORT GROUPS (2)

This two-semester course will give students hands-on experience with genetic support groups. Each student will be assigned a local, regional, or national support group to work with during their first year of study. Students will assist the group in organizing weekly, monthly, or annual meetings, and other activities of the group including newsletter distributions, sending information packets to interested individuals, updating packet materials, etc. The student will spend at least one day with the family of a child with a genetic disorder, interview a parent of a child with a genetic disorder and write a final paper describing the experience. Students also attend a rotation at the Genetic Alliance in Washington, D.C.

HGEN 615 - CLINICAL APPLICATIONS WORKSHOP (1)

This course is designed to give both 1st and 2nd year students a forum to critically evaluate current topics in the genetics profession and develop various clinical skills that will enhance clinical practice. Students will participate in group discussion of current topics in the genetics literature. Additionally, they will complete a series of assignments and presentations designed to develop creative educational tools and improve familiarity with genetics activities and resources.

HGEN 620 - INTRODUCTION TO GENETIC COUNSELING (2)

This course is designed to introduce the principles of the field of genetic counseling. This lecture series will cover the history behind the development of genetic counseling as a profession, and the concepts of nondirectiveness and patient autonomy will be emphasized through the course. In addition, applications of genetic counseling in medical care will be demonstrated, with special attention to the psychosocial aspects of the field. This course is designed to complement HGEN 728, Clinical Genetics I, and along with HGEN 621, will help prepare students for clinical rotations the following year.

HGEN 621 - GENETIC COUNSELING: PRINCIPLES AND PRACTICE (2)

This course is designed to complement HGEN 620 and introduces the student to advanced topics in genetic counseling. Genetic counseling in specific practice areas including cancer genetics, assisted reproductive technology and teratology will be presented. Client-centered counseling theory and multicultural counseling will also be addressed. To emphasize the psychosocial aspects of genetic disease, guest lecturers who have direct experience with a particular genetic disease will discuss their experiences. This course is designed to fine-tune the students' sensitivity to the psychosocial issues and to prepare them for clinical rotations. Prerequisite: HGEN 620 or equivalent.

HGEN 700 - PSYCHOSOCIAL GENETIC COUNSELING (3)

Through didactic lectures, case discussion and role-playing, students learn to identify and understand the psychosocial aspects of genetic counseling and the impact of genetic knowledge on the individual and the family. Human development and the theoretical underpinnings of various counseling models and psychotherapy, as they relate to genetic counseling, are reviewed. The course focuses on specific techniques of the counseling process, including the rationale for the technique, the timing of the technique and the evaluation of the technique. Students learn to differentiate between content and process in the genetic counseling process and to formulate a comprehensive biopsychosocial assessment, with an appreciation of the function of race, gender, social class and sexual orientation in human behavior.

HGEN 701 - HUMAN CYTOGENETICS (2)

This course covers the normal human karyotype, chromosome identification methods, numerical and structural abnormalities and their clinical correlates, X chromosome gene action, chromosomes and cancer, human population cytogenetics, gene mapping, and karyotype evolution. Students give a seminar on a pertinent topic. Prerequisite: HGEN 601 or equivalent.

HGEN 703 - RESEARCH FOR GENETIC COUNSELORS (1)

This course is designed to introduce the principles of research in the field of genetic counseling. This lecture series will cover an overview of various types of research while students create and develop their own research project.

HGEN 718 - LABORATORY ROTATION (1 TO 3)

Students participate in 1-3 week rotations in each of the University of Maryland Medical System's clinical service laboratories (Cytogenetics, Prenatal Screening, Biochemical Molecular) to gain an understanding of various laboratory techniques as well as an appreciation for the complexity of genetic testing.

HGEN 720 - METABOLIC GENETICS (2)

This course focuses on the study of mechanisms of gene action as illustrated by inherited biochemical defects in man. The function and malfunction of enzymes, vitamins, and structural proteins are discussed. The molecular basis of the specific defects are covered. And the clinical features of metabolic diseases, differential diagnosis, and laboratory follow-up are reviewed. Class discussions assume a prior background in basic biochemistry and human genetics. Prerequisites; Biochemistry and HGEN 602 or equivalent.

HGEN 728 - CLINICAL GENETICS I (2 TO 4)

Topics in this course include collection and interpretation of pedigree information and an introduction to genetic nosology. Normal prenatal and pediatric development and embryology will be reviewed to give the student a better understanding of the disease process. In addition, medical terminology, components of medical charts and physical examinations, and the organizations and administration of medical centers will be covered.

HGEN 731 - CLINICAL GENETICS II (2)

This course is designed to complement HGEN 728, and covers all clinical aspects of genetic disease. This lecture series will cover specific genetic disorders and birth defects, organ systems, and both metabolic and dysmorphic syndromes. Prerequisite: HGEN 728 or equivalent

HGEN 740 - MOLECULAR BASIS OF HUMAN DISEASE (2)

This course provides students with a detailed analysis of molecular approaches used to characterize the genetic defects of inherited human disorders. Topics include the diversity of technical approaches with emphasis on recent developments; the general utility and limitations of various approaches; the importance of analysis of mutational spectra, and; potentials for gene therapy. Prerequisites: biochemistry and HGEN 602 or equivalent.

HGEN 745 - CLINICAL TRAINING SITE ROTATION (3)

Master's in Genetic Counseling (MGC) students gain practical experience through clinical rotations, working at various clinical training sites approved by the American Board of Genetic Counseling (ABGC). Each student is supervised at each site by a board certified genetic counselor or geneticist. Hands on training in genetic counseling is essential to each student's learning experience and allows the student to gain confidence and expertise in the field of genetic counseling.

HGEN 750 - ADVANCED TOPICS IN GENETIC COUNSELING (2)

This course is designed as a forum for discussing the ethical, legal, and societal issues dealing with genetic counseling. Guest lecturers from the Departments of Pastoral Care, Neonatology, and Risk Management, and the Schools of Law and Social Work will present topics relevant to genetic counseling. The National Society of Genetic Counselors' Code of Ethics is critically analyzed.

HGEN 760 - CLINICAL CANCER GENETICS (2)

This course is designed to introduce the principles and practice of genetic counseling for hereditary cancer syndromes. Cancer epidemiology, terminology and pathology; current prevention, surveillance, and treatment options; clinical characteristics of common and rare hereditary cancer syndromes; genetic risk assessment and testing; and the psychosocial aspects of genetic counseling for hereditary cancer syndromes will be covered.

HGEN 780 - ADVANCED CLINICAL GENETICS (1)

This course is a review of various structural fetal abnormalities by organ system (brain, face and neck, limbs and growth, etc.) from a clinical genetics perspective focusing on embryology, differential diagnosis, prenatal diagnosis, and postnatal prognosis.

HGEN 799 - MASTER'S THESIS RESEARCH (1 TO 12)

Required enrollment for students engaged in master's thesis studies.

HPE**HPE 605 - CURRICULUM THEORY AND ANALYSIS (3)****HPE 610 - THEORETICAL FOUNDATIONS OF TEACHING AND LEARNING IN THE HEALTH PROFESSIONS (3)**

Offered: 202009.

HPE 615 - FOUNDATIONS IN STATISTICS FOR SOCIAL SCIENCES (3)

This course covers both theoretical and applied aspects of statistics. Students learn fundamental statistical concepts, scales of measurement, describing data (exploratory data analysis), the normal distribution and probability, the logic of hypothesis testing, elementary research methods, t-tests, chi-square test, and non-parametric tests. The course will emphasize the use of these methods and the interpretation of results using education and health sciences applications.

HPE 620 - EVALUATION AND SYNTHESIS OF LITERATURE (3)

Clinical appraisal skills are now as much a part of the clinician's toolbox as the ability to diagnose conditions and prescribe treatments. Critical appraisal skills allow clinicians to prioritize evidence that can improve outcomes. It is critical that inter-professional team members all demonstrate this skill and that faculty are adept at teaching this skills as it is now routinely tested in medical, dental, pharmacy and nursing examination.

Offered: 202009.

HPE 625 - INSTRUCTIONAL STRATEGIES AND ASSESSMENT IN HPE (3)

the learner, the content to be taught, the behavioral objectives of the learning material, and the processes of learning. The course includes both didactic and experiential experiences and provides a strong linkage to techniques for evaluating the impact of various instructional strategies on learning. Attention is given to basic measurement principles of reliability and validity, test construction, assessing skill acquisition and competence, and interpreting results from measures.

HPE 660 - MEASUREMENT, ASSESSMENT, AND EVALUATION (3)

This course provides an overview of the theoretical principles of assessment and best practices for measuring knowledge and skills in the health professions. The course begins with the fundamentals of assessment then students

extend their skills in development and analysis of effective assessments. Students explore various methods of assessments such as written tests, performance tests, clinical oral and observational assessments, key features, narrative assessments, portfolios, and simulation-based assessments. Students will further learn and apply skills for developing, using, and testing valid, reliable survey instruments

HPE HPE 670 - LEADERSHIP THEORY (3)

Effective leadership is a necessary and critical aspect in the success of any organization. This course explores various leadership models that have been developed from both a theoretical and practical perspective. Through an examination of various theories and approaches to leadership, students will identify the key principles, competencies, and characteristics of effective leaders and integrate these concepts into a personal leader efficacy plan. Students will draw upon multiple leadership paradigms and perspectives to improve their practices as leaders. Common leadership issues and dilemmas will be examined through case studies of real-world scenarios.

HPE 710 - LEADERSHIP IN HIGHER EDUCATION (3)

This course is designed to create a community of scholar-practitioners working together to explore a variety of constructs, principles, and models of leadership and to apply that learning to current, and future leadership experiences and opportunities. The course encourages a scholar-practitioner analysis of these experiences/opportunities with focused application to academic and professional goals of Ph.D. students. Students are expected to draw on learning from prior life experiences, and new learning acquired in this course to complete the course activities and produce products that focus on context-based problems in urban educational organizations (or others) and demonstrate evidenced-based leadership strategies for leveraging change.

HPE 715 - QUANTITATIVE RESEARCH METHODS 1 (3)

This course will provide an overview of bivariate inferential statistics, dependent data analytic techniques, and simple regression. The course assumes a baseline (or greater) understanding of introductory statistics. This course is designed as an applied statistics course, meaning that we will move beyond abstract theoretical discussions and focus on the applications of statistical theory and knowledge to real-world education and health/social science data. The primary aims of this course are to build students' capacity to use knowledge and a statistical

software program to solve statistical problems as well as to analyze and to interpret data.

HPE 720 - QUANTITATIVE RESEARCH METHODS 2 (3)

HPE 725 - QUALITATIVE RESEARCH METHODS (3)

This doctoral course is designed to introduce students to the history, principles, and practice of qualitative research. The course will cover the theoretical and multidisciplinary origins of the methods as well as the application of qualitative methods germane to health professional practice, programs, and policy. This course is an experiential course embedded with the core qualitative methods of observation, interviews and document analysis (including ethnography, narrative analysis text or discourse analysis, visual analysis, case study, grounded theory, oral/life history, focus groups, phenomenology, and action research.

HPE 730 - QUALITATIVE RESEARCH METHODS 2 (3)

This doctoral course aims to deeply explore two distinct qualitative research methodologies: case study and phenomenology. Students will gain a comprehensive understanding of qualitative case study research and phenomenological inquiry, from foundational and theoretical concepts to practical application in research proposals and analysis. Through a combination of discussions, practical exercises, and reflections, students will develop the skills necessary to undertake high-quality qualitative research that provides valuable insights into human experiences and complex phenomena.

HPE 760 - MIXED METHODS RESEARCH (3)

This course will provide an overview of mixed methods research, with an emphasis on its application in the social science. This course will cover the foundations, principles, and procedures of designing and conducting mixed methods research, with a focus on how the single method (qualitative, quantitative) can be integrated and converged during each stage of the research process. The primary aim of this course is to develop student's ability and skills to use this knowledge in designing their own mixed methods study. This course is best suited for students with a basic (or greater) understanding of quantitative and qualitative methods.

HPE 800 - INNOVATIONS IN HEALTH PROFESSIONS EDUCATION (2)

Learners will engage in activities designed to facilitate the development of a framework and implementation design for a culminating capstone project that demonstrates the application of knowledge, skills, and training to a real-world context within health professions education to support advancement in teaching-learning practices and/or scholarship within the field of health professions education. Learners will explore and build upon current research to deeply understand, investigate and engage in data-driven decision making for the development of a practical project of value to the broader educational community.

HPE 805 - IMPACT INSTITUTE (2)

This course provides a foundation in learning and curriculum theory and essential knowledge for understanding how people learn, development of curriculum and research programs, and for the selection of instruction and assessment within curricula. The course begins with an introduction to principles and dimensions of learning and content focuses on the sequential exploration of learning theories critical to the future conduct of inquiries into learning. Prerequisites: HPE 610, 615, 620, 625, 660, 725

HPE 810 - IMPACT INSTITUTE 2 (2)

This course is an in-person intensive designed around dissertation research progress presentations, peer observation, and providing constructive feedback. Learners will also examine research studies with a focus on reporting findings and write-up.

HPE 840 - EDUCATIONAL PROGRAM EVALUATION (3)**HPE 850 - ADVANCED TEACHING SEMINAR (3)****HPE 851 - RESEARCH SEMINAR 1 (6)**

Candidates will work with committee members to advance research and progress of project, dissertation and prepare for publication throughout the semester online and attend a 4-day residency requirement.

HPE 870 - CAPSTONE IN HPE (3)

This is a self-directed capstone project implementation course offered with faculty guidance. Participants in this course will synthesize, integrate, and apply prior knowledge to implement, and evaluate an original and motivating project reflective and responsive to the current needs and challenges of the health professions education community. Capstone projects aim to bridge theory and

practice and support advancement in teaching-learning practices and/or scholarship within the field of health professions education.

HPE 898 - PRE-CANDIDACY RESEARCH (1 TO 6)

This is an independent dissertation proposal development course offered with faculty guidance. Participants in this course will continue to develop or complete a motivating and viable doctoral dissertation proposal aimed at advancing scholarship within the field of health professions education.

HPE 899 - DISSERTATION RESEARCH (12)

Candidates will have completed HPE 851 proposal, literature review, methods, data analysis at this juncture and will continue to work with committee members to advance research and progress of project, dissertation and prepare for publication. Dissertation Boot camp, Defense and publication.

INCL -**INCL 632 - HISTORICAL EXPLORATION OF RACE IN THE US (3)**

This course will build on fundamental terms and concepts discussed in course one while examining identity-specific public policy and its impacts on various communities. Students will develop a deeper understanding of identities and intersectionality through the historical experiences of racial, ethnic, and cultural groups in the U.S.

INCL 633 - HISTORICAL EXPLORATION OF CULTURE IN THE US (3)

Students will continue to examine the history of group identities in the U.S. through public policy and historical experiences. Special attention will be paid to the impact of social movements, advocacy, and allyship, while providing practical skills for self-care.

INCL 640 - PRACTICAL APPLICATION OF INTERCULTURAL LEADERSHIP (3)

In this course students will learn and practice applying concepts of intercultural development to various aspects of their personal and professional life. Students will also gain tools to continue learning and developing their intercultural skills over the course of their lifetime.

INCL 643 - INTERCULTURAL IMPACT INSTITUTE (1)

The Intercultural Leadership Institute is an opportunity for students to engage in face-to-face intercultural learning and

develop a deeper understanding of the concepts and skills learned over the four online courses. Additionally, this institute will provide the reflection and intergroup dialogue that is integral to intercultural development. Students will present their culminating project, an organizational assessment of their professional organization.

INFO

INFO 601 - FOUNDATIONS IN CLINICAL AND HEALTH INFORMATICS (3)

This course introduces biomedical and health informatics. It covers the fundamentals of informatics as it applies to healthcare and research, as well as the expanding role of information technology for the delivery of healthcare. The course underscores the application of these systems to the practice of medicine, in order to enhance health outcomes, improve patient care, and strengthen the clinician-patient relationship. The course also emphasizes the clinical informatics content, which includes fundamentals of clinical and biomedical informatics, clinical decision making and process improvement, health information systems, ethics, and management.

INFO 602 - CLINICAL INFORMATION SYSTEMS (3)

This course covers the basic concepts surrounding clinical information systems as they apply to healthcare. The focus of the course will be on the socio-technical challenges specific to the selection and implementation of these systems, human factors, evidence-based medicine, information retrieval, and clinical research informatics. Additional topics include a survey of other areas of informatics including telemedicine, imaging informatics, nursing informatics, bioinformatics, public health informatics, and consumer health informatics.

INFO 603 - COMPUTER LITERACY FOR HEALTHCARE PROFESSIONALS (3)

This course introduces healthcare professionals to the means to solve real-world problems using computer programs. The course describes the ways in which computers work, and the ways in which computer programs work. The course then details the proper ways to analyze a problem; determine that it can be solved with a

computer program written by the student; and use the proper techniques to combine new, student-written code with existing code libraries to solve the problem; test the solution on realistic data; and document the method of development and solution. The course uses the Python programming language to illustrate the techniques taught.

INFO 604 - DECISION SUPPORT SYSTEMS IN HEALTHCARE (3)

This course focuses on decision support systems that aim to improve healthcare, with an emphasis on clinical decision support (CDS). Through interactive web-based simulators, students will gain familiarity with the following: Common decision support tools used in electronic medical records, decision science and logic as used in CDS, examples of decision tools used at the individual, cohort, and population levels and sharable CDS artifacts using FHIR standards. Common governance, regulatory, legal considerations, and best practices for CDS implementation and evaluation will be discussed. Upon successful completion of this course, students will have the skills to contribute towards designing, implementing, governing, and evaluating decision support systems to improve healthcare.

INFO 610 - CLINICAL INFORMATICS CONFERENCE (1)

This course is a seminar in biomedical and health informatics. Students will have covered the fundamentals of informatics in other courses, such as INFO 601. INFO 610 will complement the introductory courses, by introducing the students to experts in the field of biomedical informatics, exposing students to key experimental and theoretical literature in the discipline, and encouraging discussion and further in-depth exploration of topics in clinical informatics. The course emphasizes the application of informatics to the practice of medicine, in order to enhance health outcomes, improve patient care, and strengthen the clinician-patient relationship. The course expands on fundamental clinical informatics content, including clinical decision making, process improvement, health information systems, ethics, and management.

INFOI 611 - CLINICAL INFORMATICS PRACTICUM (3)

This course will prepare students for engaging in the Clinical Informatics practicum. It will provide students with the tools and skills in the areas of project planning, literature reviews, data analysis, career planning, oral presentations, and technical writing. Students will select an area of interest in which to apply the knowledge and skills

gained during the didactic courses, work with a mentor, develop a specific set of goals to be accomplished, engage in lectures, and participate in peer reviews.

INNO -

INNO 600 - FOUNDATIONS IN HEALTH AND SOCIAL INNOVATION (3)

This course introduces students to social and health entrepreneurship through case studies, key readings, and primary information resources. Students will become familiar with the social determinants of health, systems of public health, the science of team-based innovation, basic business fundamentals, and the essentials of social and health improvement through the lens of entrepreneurship. Students will begin to develop skills demonstrated by successful social entrepreneurs, including team building and leadership, negotiation, and working in complex social and cultural environments. They will explore the sources of funding for social enterprises, including philanthropy, governmental funding, and income generating, self-sustaining social enterprises. Students will also begin to plan their course of study in their selected concentration and consider an initial proposal for a Master's project.

INNO 601 - INTERCULTURAL COMMUNICATION AND CONFLICT RESOLUTION (1)

Intercultural Communication and Conflict Resolution is a growing area of importance in global health considering the pace and volume of global transactions. The ease of global communication using technology, the abundance of cheaper transportation costs, and the frequency of businesses using cross-border talent is fostering millions of interactions a day between people of different cultures. In this course, students will examine how the process of communication can be further complicated during interactions between people of different cultures. The topics of stereotypes, generalizations, communication styles, communication strategies, and communication orientations will be explored.

INNO 602 - GLOBAL HEALTH AND SOCIAL INNOVATION (2)

There is a need to challenge the status quo in global health theory and practice. In a world in which complex challenges are ever emerging, there is a growing demand for new system-wide approaches. New knowledge and technologies are a gateway of opportunities for innovation. This course will introduce students to the concepts, theory, and practice of complexity science. It will allow students to approach global health as a complex adaptive system and understand how this is useful to solve some of the

most challenging issues faced by practitioners when trying to create lasting social change in an effective and ethical way.

Students will learn to understand the nature of complex global health issues and how can they better identify potential avenues to generate social innovations and system-level change. The lectures will be co-facilitated by CISG staff and thought leaders and experts in a wide range of fields, including economics, business, public health, social entrepreneurship, political economy, human rights, ethics, gender, sustainability, and sociology.

By participating in this course, students will acquire knowledge, practical tools, and experiences to approach global health through a "complexity lens," learn about the challenges and opportunities for change agents and systems entrepreneurs in the field, and better prepare them to become global health leaders.

INNO 603 - Health Systems: Innovations for Universal Health Care (2)

A detailed examination and understanding of modern health systems and their multi-layered structures is needed to achieve the goals set out by the United Nations' Sustainable Development Goals (SDG) agenda. This course will provide students an introduction to health systems and how the historical, cultural, political and economic context impacts their funding, design and performance. The students will acquire the knowledge and skills to think critically on how health systems operate in middle and low-income countries and how to address the particular determinants of health of these settings.

Special emphasis will be given to the case of Costa Rica and how it developed its social security system and one of the most effective primary health care systems in the world. Focus points will be on innovations for equity in health access, healthier communities through health promotion and the use of IT in health care. The students will participate in discussions with an interdisciplinary faculty and with policymakers involved in the design and development of the health system in Costa Rica.

INNO 604 - Urban Health and Social Innovation Lab (2)

The year 2009 marked the year in which, for the first time in the Earth's history, more people lived in urban settings than in rural settings. It is estimated that by 2050, two-thirds of the world's population will live in an urban environment. This course brings an interdisciplinary approach to provide students the knowledge and skills to address the global health challenges in rapid urbanizing

regions of middle and low-income countries. Urban areas present particular health risk factors and complex interactions of issues such as climate change, migration, infectious and chronic diseases, and mental health, which requires practitioners to develop cross-sector collaborations and innovative approaches to public policy.

The course will allow students to understand how the social gradient affects populations in urban settings and how to develop health-related interventions that are sensible to the human rights, social and gender disparities in such environments.

Students will have the opportunity to learn from representatives of local governments and non-governmental organizations on how projects to improve urban health indicators are designed, executed and evaluated.

INNO 605 - Global Health and Social Innovation Practicum (5)

This course provides students the opportunity to integrate theory and practice to address real world challenges faced by policymakers and communities looking to create lasting change in the global health area. It will provide students the possibility to engage and support public, private and non-governmental organizations to solve complex issues related to global health in Costa Rica, a developing country with unique demographic, epidemiological and urbanization conditions.

After completing their foundational course requirements, students will have their practicum experience either in the southern region of Costa Rica or in San José and its vicinities. Students will be partnered mainly with non-governmental organizations, although opportunities exist for partnerships with other stakeholders, such as government institutions.

Potential partner organizations facilitated by CISG include:

- La Casona's bicultural clinic
- Houses of Joy
- Rio Sereno Border Crossing
- Hands for Health Oral Health Protection Program
- ASCONA National and Environmental Service Association
- Comprehensive development association of Rincon de Osa and Playa Blanca
- Comprehensive development association of Dos Brazos de Rio Tigre
- Las Cruces Biological Station
- Municipality of Curridabat
- Instituto Mixto de Ayuda Social (IMAS)Ca

- Municipalidad de Coto Brus
- Patronato Nacional de la Infancia
- Seprojovent
- Cen-Cinai
- Hogar de Ancianos

The student's practicum will be based on the student's specific interest expressed during the initial didactic portion of the certificate. During the practicum, students will conduct a case study to evaluate the innovative work of the organization (or a specific component/initiative of the organization), the process that led to the innovation, the iteration cycles to reach impact, and the product/initiative's sustainability.

INNO 612 - IMPACT LABS (1)

Impact labs are co-curricular offerings bundled for academic credit. These programs are designed around themes of innovation and entrepreneurship including concepts such as customer discovery, design-thinking, intellectual property, business model generation, the art of the pitch, social policy, determinants of public health, and regulatory issues. Students will select topics that align with their capstone project. Impact Labs will help students deeply examine their topics through the lens and context of entrepreneurship and design thinking. 1 academic credit is the equivalent of 15 hours of participation in Impact Labs during the course of the semester. Students will take 3 credits of Impact Lab through the course of their program.

INNO 622 - PROJECT MANAGEMENT (3)

Project management has been proven to be the most effective method of delivering products within cost, schedule, and resource constraints. This course teaches students the skills to ensure their projects are completed on time and on budget while giving the user the product they expect. Students will gain a strong working knowledge of the basics of project management and be able to immediately use that knowledge to effectively manage work projects. At the end of the series you will be able to identify and manage the product scope, build a work breakdown structure, create a project plan, create the project budget, define and allocate resources, manage the project development, identify and manage risks, and understand the project procurement process.

INNO 630 - MARKET RESEARCH AND VALUE PROPOSITION (3)

Learn the skills to translate management problems into market research problems. Gain the ability to analyze problems systematically. Develop critical eyes for market research and understand its contributions and limitations.

Gain a working "hands-on" experience with the full process of market research and customer discovery.

INNO 632 - CREATING VALUE IN A VENTURE BASED ON INTELLECTUAL PROPERTY (3)

This course is designed to explore the process of growing and creating enterprise value in a startup venture based upon intellectual property (IP) licensed from a research institution. Topics such as the regulatory landscape, stage-appropriate forms of funding, team building and growth management, and preparing to monetize the venture are elements of this course. While there will be a minimum amount of lecturing, the highlight of each module is the opportunity to hear from subject matter experts, typically in an informal "fireside chat" setting. This format ensures that the student receives real-time insights into the rapidly evolving world of venture creation. In addition to the faculty lecture and interviews with subject matter experts, this course consists of assigned readings, and a semester-long student analysis of an actual university-based startup.

INNO 634 - PRACTICUM IN BIOMEDICAL ENTREPRENEURSHIP (3)

Students in this course are required to identify commercialization opportunities and take a product concept through the commercialization process. Students will be able to conceptualize, strategize, design, plan, and pitch an idea that they have developed. This allows for a unique individual training experience for students to understand the application of their research and shape their research questions as they progress through their careers. Prerequisites: INNO 614, INNO 630, and INNO 632

INNO 640 - FUNDING SOCIAL ENTERPRISE (3)

This course is designed to provide students with an understanding of the essential elements of successful business strategy and financing. Students will create a business canvas and will gain an understanding of basic principles in accounting, financing models, equity financing, and investing. In addition, students will be exposed to different types of funding including crowdfunding, angel investors, grants, and venture capital. At the end of the course, students will be able to develop a sustainable business and financing model to advance their health or social innovation concepts. Emphasis will be placed on principles of growth strategies and scaling growth opportunities and other social enterprises: A benefits approach.

INNO 642 - MARKETING FOR SOCIAL ENTERPRISE (3)

In this course, students learn how to conduct a market analysis and apply the marketing mix as it relates to health and social enterprises. Students will employ techniques to market their ideas effectively using best practices in digital marketing, SEO, social media, and public relations. Emphasis is placed on customer discovery, determining segments and positioning, the importance of branding, consumer behavior, and strategic marketing management. By the end of the course students will be able to develop a marketing plan for their health and social venture and examining marketing needs in context of their goals and business strategy.

Offered: 202009.

INNO 650 - COMMUNITY ENGAGEMENT AND PARTNERSHIPS (3)

This course is designed to help students gain insights into economic and social value creation. Specifically, the purpose of this course is to provide students with hands-on exposure to the entrepreneurial pursuit of social and health impact and innovation. Students will learn to recognize and critically assess various forms of social and health enterprise strategies as tools of economic development and social transformation. Students will gain a greater understanding of the challenges of growing and sustaining a social or health enterprise. Students can expect to improve their consulting skills, including project planning, issue analysis, formulation of strategic and tactical recommendations, and client relationship management. By participating in this course, students will be better able to adapt and apply business skills and academic disciplines in the social and health sectors, and will have increased skills for effective and thoughtful leadership in business and society.

INNO 652 - CAPSTONE PROJECT AND PITCH (3)

This course will draw together the experiential, curricular, and individual components of the Master's degree. The Capstone project serves as a vehicle to integrate what students learn in their graduate coursework, impact lab participation, community engagement field work, and study abroad (if applicable). It does this by providing an opportunity for students to demonstrate their ability to apply what they have learned in the program in a situation that approximates aspects of the post-graduate professional activities in which they intend to engage. It is a bridge between full-time graduate study and fulltime involvement in the world of social and health innovation and entrepreneurship. By the end of the capstone, students

must demonstrate their ability to develop and execute a work plan that leads to a social or health innovation; iterate a project sufficiently to have produced a resume-worthy accomplishment; build strong professional relationships with and draw upon the resources of faculty, community practitioners and entrepreneurs, student colleagues, and external advisors. Students' capstone projects should be creative, have the potential to create positive change, be innovative, and reflect students' personal and professional identity. Capstone projects may be solo efforts or team endeavors, depending on the nature of the proposal. All students engaged in a capstone will meet periodically to both learn techniques that cut across the range of projects undertaken that semester, and to advise, coach, and support each other. Each student or team will conclude the project by presenting it to an audience of students, faculty, community-based entrepreneurs and partners. Because each student's interests are different, their capstone projects may take different forms. They may create a new organization, build a prototype, or apply a social or health enterprise technique to an existing organization. Some students will work in the U.S., some abroad. The common thread is that these are all hands-on efforts intended to result in doing something, in taking an action that leads to some form of societal betterment.

INNO 791 - Creating Intellectual Property in a Research Institution (3)

This course is designed to explore the process of creating valuable intellectual property (IP) within a research institution and preparing it for license to a commercial venture. Topics such as forms of IP; the protection, ownership, and management of IP; the value of technology transfer; and, the license agreement are elements of this course. This is an 8 week course, primarily asynchronous, that consists of faculty lecture, interviews with subject matter experts, assigned readings, and student analysis of an actual piece of IP.

INNO 801 - INTERCULTURAL COMMUNICATION AND CONFLICT RESOLUTION (1)

Intercultural Communication and Conflict Resolution is a growing area of importance in global health considering the pace and volume of global transactions. The ease of global communication using technology, the abundance of cheaper transportation costs, and the frequency of businesses using cross-border talent is fostering millions of interactions a day between people of different cultures. In this course, students will examine how the process of communication can be further complicated during interactions between people of different cultures. The topics of stereotypes, generalizations, communication

styles, communication strategies, and communication orientations will be explored.

INNO 802 - GLOBAL HEALTH AND SOCIAL INNOVATION (2)

There is a need to challenge the status quo in global health theory and practice. In a world in which complex challenges are ever emerging, there is a growing demand for new system-wide approaches. New knowledge and technologies are a gateway of opportunities for innovation. This course will introduce students to the concepts, theory, and practice of complexity science. It will allow students to approach global health as a complex adaptive system and understand how this is useful to solve some of the most challenging issues faced by practitioners when trying to create lasting social change in an effective and ethical way.

Students will learn to understand the nature of complex global health issues and how can they better identify potential avenues to generate social innovations and system-level change. The lectures will be co-facilitated by CISG staff and thought leaders and experts in a wide range of fields, including economics, business, public health, social entrepreneurship, political economy, human rights, ethics, gender, sustainability, and sociology.

By participating in this course, students will acquire knowledge, practical tools, and experiences to approach global health through a "complexity lens," learn about the challenges and opportunities for change agents and systems entrepreneurs in the field, and better prepare them to become global health leaders.

INNO 803 - HEALTH SYSTEMS: INNOVATIONS FOR UNIVERSAL HEALTH CARE (2)

A detailed examination and understanding of modern health systems and their multi-layered structures is needed to achieve the goals set out by the United Nations' Sustainable Development Goals (SDG) agenda. This course will provide students an introduction to health systems and how the historical, cultural, political and economic context impacts their funding, design and performance. The students will acquire the knowledge and skills to think critically on how health systems operate in middle and low-income countries and how to address the particular determinants of health of these settings.

Special emphasis will be given to the case of Costa Rica and how it developed its social security system and one of the most effective primary health care systems in the world. Focus points will be on innovations for equity in health access, healthier communities through health

promotion and the use of IT in health care. The students will participate in discussions with an interdisciplinary faculty and with policymakers involved in the design and development of the health system in Costa Rica.

INNO 804 - URBAN HEALTH AND SOCIAL INNOVATION LAB (2)

The year 2009 marked the year in which, for the first time in the Earth's history, more people lived in urban settings than in rural settings. It is estimated that by 2050, two-thirds of the world's population will live in an urban environment. This course brings an interdisciplinary approach to provide students the knowledge and skills to address the global health challenges in rapid urbanizing regions of middle and low-income countries. Urban areas present particular health risk factors and complex interactions of issues such as climate change, migration, infectious and chronic diseases, and mental health, which requires practitioners to develop cross-sector collaborations and innovative approaches to public policy.

The course will allow students to understand how the social gradient affects populations in urban settings and how to develop health-related interventions that are sensible to the human rights, social and gender disparities in such environments.

Students will have the opportunity to learn from representatives of local governments and non-governmental organizations on how projects to improve urban health indicators are designed, executed and evaluated.

INNO 805 - GLOBAL HEALTH AND SOCIAL INNOVATION PRACTICUM (5)

This course provides students the opportunity to integrate theory and practice to address real world challenges faced by policymakers and communities looking to create lasting change in the global health area. It will provide students the possibility to engage and support public, private and non-governmental organizations to solve complex issues related to global health in Costa Rica, a developing country with unique demographic, epidemiological and urbanization conditions.

After completing their foundational course requirements, students will have their practicum experience either in the southern region of Costa Rica or in San José and its vicinities. Students will be partnered mainly with non-governmental organizations, although opportunities exist for partnerships with other stakeholders, such as government institutions.

Potential partner organizations facilitated by CISG include:

- La Casona's bicultural clinic
- Houses of Joy
- Rio Sereno Border Crossing
- Hands for Health Oral Health Protection Program
- ASCONA National and Environmental Service Association
- Comprehensive development association of Rincon de Osa and Playa Blanca
- Comprehensive development association of Dos Brazos de Rio Tigre
- Las Cruces Biological Station
- Municipality of Curridabat
- Instituto Mixto de Ayuda Social (IMAS)Ca
- Municipalidad de Coto Brus
- Patronato Nacional de la Infancia
- Seprojovent
- Cen-Cinai
- Hogar de Ancianos

The student's practicum will be based on the student's specific interest expressed during the initial didactic portion of the certificate. During the practicum, students will conduct a case study to evaluate the innovative work of the organization (or a specific component/initiative of the organization), the process that led to the innovation, the iteration cycles to reach impact, and the product/initiative's sustainability.

MANA

MANA 601 - STRUCTURE AND DEVELOPMENT (ANATOMY, HISTOLOGY, AND EMBRYOLOGY) (9)

The purpose of this course is to provide the student with a comprehensive understanding of the human body at both the gross anatomical and microanatomical levels. The basic concepts of structure as related to function are described in lectures and small group laboratory sessions. Laboratory facilities are provided for cadaver dissection and the examination of histological slides. The course includes instruction in embryology, which is taught in an integrated fashion. Offered Fall semesters only.

MCST -

MCST 601 - INTRODUCTION TO MEDICAL CANNABIS HISTORY, CULTURE, AND POLICY (3)

In this introductory course, participants will learn about the cultural history of medical cannabis use, explore how federal law and policy relating to medical and non-medical

use of cannabis has evolved in the United States, and discuss ethical issues related to medical cannabis. Additionally, students will learn how to identify credible sources of information related to medical cannabis, and educate patients and other professionals.

MCST 602 - PRINCIPLES OF DRUG ACTION AND CANNABINOID PHARMACOLOGY (3)

This course introduces students to the factors influencing drug action in the body. Students will learn about receptor theory, pharmacokinetics, pharmacodynamics, dose-response relationships, and drug tolerance and dependence. This course will develop participants' skills to evaluate cannabis (and its components) from a mechanistic and pharmacologic perspective with the ultimate goal of providing the most appropriate cannabis regimen for individual patients.

MCST 603 - BASIC CANNABINOID CHEMISTRY AND DRUG DELIVERY (3)

This course introduces students to the chemical characteristics of cannabis components. The course will describe the classification system for cannabinoids, cannabinoid compound ratios in plant materials, cannabis-derived products and their constituents, oils, terpenoids, flavenoids, hydrocarbons and nitrogen containing compounds. This course also introduces students to the science of designing dosage forms. Topics include the formulation, development, evaluation, selection and administration of safe, effective, reliable, drug delivery systems, with a focus on development of medical cannabis products. The wide variety of cannabis delivery systems and routes of delivery and the impact of those delivery systems have on the bioavailability of cannabis will be evaluated in this course.

MCST 604 - THE CLINICAL EFFECTS OF MEDICAL CANNABIS (3)

This introductory course provides an overview of patient care skills, including communication and documentation. The course also introduces students to the most common uses of medical cannabis, including pain, nausea/vomiting, and anxiety disorders. Students will learn how to assess these conditions and determine when medical cannabis could be a therapeutic option. Side effects, drug interactions, and precautions are also discussed.

MCST 605 - ADVANCED CANNABIS THERAPEUTICS I (3)

In this advanced level course, students will learn in-depth about the physiology, pathophysiology, and treatment strategies of selected conditions, including pain, muscle

spasm, nausea/vomiting, and anorexia/cachexia. Students will evaluate available evidence, complete case studies, and explore dosing strategies and formulations. Side effects, drug interactions, and precautions are also discussed. (Pre-requisite: MCST 604 – Clinical Effects of Cannabis).

MCST 606 - ADVANCED CANNABIS THERAPEUTICS II (3)

In this course, students learn about the physiology, pathophysiology, and treatment strategies of selected conditions including epilepsy, sleep disorders, anxiety, post-traumatic stress disorder, and others. Students will evaluate available evidence, complete case studies, and explore dosing strategies and formulations. Side effects, drug interactions, and precautions are also discussed. Pre-requisite: MCST 604.

Offered: 202009.

MCST 607 - NEGATIVE EFFECTS OF CANNABIS (3)

In this course, students explore the consequences of cannabis use including adverse effects and misuse or addiction. Students will evaluate available evidence, analyze case studies, and participate in group discussions. This course explores the effects of cannabis on populations, including effects on the workplace, public spaces, impaired driving, adolescent use, and unintentional poisoning, among others.

Offered: 202009.

MCST 608 - CANNABIS GENOMICS AND PHARMACOGNOSY (3)

This course introduces students to the components of the cannabis plant and the resultant biosynthetic pathways that form active and inactive agents. Students will learn the genetic basis for the differences in components between different strains and the subsequent impact on medicinal efficacy, as well as the role that plant components have on the entourage effect. (Pre-requisite: MCST 602 - Principles of Drug Action and Cannabinoid Pharmacology).

MCST 609 - ADVANCED CANNABINOID CHEMISTRY AND ANALYTIC TESTING METHODOLOGY (3)

This course relates chemical characteristics of cannabis components to their pharmacological activity. The course covers a variety of cannabis targets, methods for improving drug activity, and the principles of rational drug design and characteristics such as solubility, stability and metabolism.

Additionally, this course will explore methodologies for concentration, extraction, and purification of plant constituents, along with scope and limitations of analytical techniques for the identification and quantification of plant and synthetic cannabinoids, contaminants, and adulterants in cannabis products. (Pre-requisite: MCST 603 - Basic Cannabinoid Chemistry and Delivery).

Offered: 202009.

MCST 610 - STATE AND FEDERAL CANNABIS LAWS AND POLICIES (3)

This course introduces students to the constantly evolving field of cannabis regulation that spans federal, state, and local government. To better understand this complex system, students will first learn about key aspects of constitutional law that shape cannabis regulation. Once this foundation is established, the course will explore the federal regulation of cannabis and the Controlled Substances Act; state legalization trends and the policy issues states must address; the regulation of cannabis businesses, health care providers, patients, and cannabis products; social equity initiatives; and the regulation of industrial hemp production and its derivative products. In addition to these substantive areas, student will learn how to track and analyze state legislation to remain current on developments in this legal field. (Pre-requisite: MCST 601 - Introduction to Medical Cannabis History, Culture, and Policy)

MCST 611 - RESEARCH DESIGN AND MEDICAL CANNABIS (3)

In this introductory course, participants will develop the foundational knowledge and skills necessary for designing research related to medical cannabis. Participants will learn how to perform a literature review to identify gaps in knowledge, formulate a research question and hypothesis, select an appropriate corresponding research design, and describe best practices for data collection, management, and analysis. Those enrolled in the course will also learn key ethical principles and laws and regulations pertaining to research, including the role of institutional review boards. By the end of the course, participants will have developed a research protocol that is suitable for submission to an institutional review board.

MCST 613 - (1)

Offered: 202009.

MCST 618 - MEDICAL PSYCHEDELIC SCIENCE AND THERAPEUTICS (3)

This course provides an overview of the science and

therapeutic uses of psychedelic agents, with a focus on hallucinogens, hypnotics, empathogens, and entheogens. The course includes historical use, current laws and policies, pharmacological and chemical properties, and the current state of the evidence for therapeutic use.

MCST 619 - SCIENCE WRITING IN MEDICAL CANNABIS (1)

Research shows that most health information is not presented in a way that most people can understand and use. This course is designed to teach students how to choose accessible and inclusive language to write an effective lay summary of a medical cannabis-focused scientific review article for the non-career scientist audience. Students will identify the components of a review article and learn how to transform complex scientific information into dissectible pieces for noncareer scientist audiences. This course was created with permission and materials from Dr. Isabell May's MHS 603 Science Communication Principles course. This course is required for Medical Cannabis Science, Therapeutics, and Policy Certificate students who are transitioning to the Master's program, and may be taken as an elective by students already enrolled in the Master's program.

MEDT

MEDT 628 - SEMINAR (1)

This seminar exposes students to current topics in biomedical and clinical laboratory science, science education, and laboratory management. Students participate in 15 seminars presented by guest speakers, faculty members, and fellow students. Students taking the course for credit research approved topics and develop their oral presentation skills by presenting seminars. Graduate students must enroll in this course three times. All graduate students from the program must attend seminar during their tenures.

MEDT 630 - SCIENTIFIC AND TECHNICAL WRITING (3)

A systematic approach helps students write clear and concise scientific and technical communications for specific purposes. Designed for people in technical and scientific fields, this course helps those whose increasing specializations require them to communicate in memoranda, letters, journal articles, reports, presentations, proposals and progress reports.

MEDT 631 - RESEARCH DESIGN (2)

This course explores the theory of research design and

requires that students show their understanding through integration of design theory into their theses proposals. The didactic portion of the course is presented during a weekly one hour class where theory is presented and discussed. The class reviews weekly homework assignments on such topics as hypothesis formulation, design of a research study, and critique of the scientific paper. The assignments serve to meld the theory with its laboratory application. At the end of the semester, students present their thesis proposals.

MEDT 634 - TEACHING PRACTICUM MAJOR (4)

This course provides information and experience to graduate students, preparing them to assume the duties of an instructor in their declared majors. Students prepare lectures and display materials, conduct library research, and evaluate and assess instructional techniques. Prerequisite: adequate background in the major subject.

MEDT 635 - TEACHING PRACTICUM MINOR (2)

Graduate students teach in a declared minor subject from a variety of areas in clinical laboratory science education in the undergraduate program. Students help faculty members in preparation of lecture and demonstration materials, library research, and evaluation and assessment of instructional techniques. Special assignments enable students to strengthen their knowledge in selected areas. Prerequisite: competence in minor subject.

MEDT 638 - SPECIAL TOPICS (1 TO 4)

Graduate students work on subjects of interest not offered otherwise as a formal course. The study program consists of special reading assignments, reports, or research projects under the supervision of a faculty member.

MEDT 639 - MANAGEMENT PRACTICES IN LABORATORY SCIENCES (1 TO 6)

Graduate students work on special subjects in the field of management not offered as a formal course. Under the supervision of a faculty member, students learn how to carry out new strategies or to conduct the business of running a clinical or research laboratory daily. Students take part in long-range laboratory planning.

MEDT 654 - ADVANCED TOPICS IN LABORATORY SCIENCES (2)

This course exposes students to emerging technologies in the clinical laboratory. The didactic portion of the course provides them with an in-depth study of the theory and basic mechanisms of function for each of the topics selected. Following the introduction of each topic of study,

the various applications are examined with the use of current research articles. Students are expected to show active participation in the presentation of the journal articles discussed. At the end of the term, students submit a paper outlining the advantages and disadvantages of a selected technology. This course is designed to teach students to develop the skills necessary to maintain up-to-date knowledge on new technologies and to continue to grow as members of an ever-evolving clinical laboratory science.

MEDT 661 - ADVANCED HEMATOLOGY (2)

This course focuses on the theoretical and practical aspects of hematological disorders, including red cell disease, white cell diseases, and disorders of hemostasis. Emphasis is on comprehensive theory and laboratory practices and current treatment modalities. In case-study format and open discussion, the course covers the correlation of laboratory findings and disease processes.

MEDT 671 - MOLECULAR AND CELL BIOLOGY (3)

Lectures cover the principles of molecular and cell biology. Students learn the theories behind basic molecular biology techniques including gel electrophoresis, hybridization techniques, PCR, Southern blot, and site-directed mutagenesis. The second part of the course covers applications of molecular biology, including DNA vaccines, bioremediation, molecular diagnostics, and gene therapy.

MEDT 680 - LABORATORY MANAGEMENT (3)

This course is an overview of laboratory management in four areas: personnel, operations, regulations, and finance. Additional emphasis is on current trends in laboratory services, laboratory accreditation and licensure, and accreditation procedures. Topics include organizing, planning, controlling, and supervisory functions of the management process; leadership styles; performance evaluation; the interview process; professional liability; teaching techniques; problem-solving; and professional responsibility and ethics. The program recommends that laboratory management track students take this course in their second year.

MEDT 687 - QUALITY CONTROL AND REGULATIONS IN LABORATORY SCIENCES (2)

This course focuses on the application of basic statistical principles to the maintenance of quality control in the laboratory. The second part of the course prepares students for the work force. Students gain skills and knowledge to be current, efficient, and compliant with the latest

regulatory issues, whether working in a clinical laboratory, research setting, or the biotechnology industry.

MEDT 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

MEES

MEES 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

MEES 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

MEES 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

MHS

MGMT 640 - TECHNOLOGY TRANSFER

This course introduces the concept of intellectual property in advancing technological innovation and promoting economic development. Students will learn how to safeguard intellectual property and facilitate technology transfer including the legal, licensing, and disclosure. The course will also explore the requirements for issue of a patent including preparation of a patent application. The course explores how research or an invention may be commercialized in the process of technology transfer. Emphasis is placed on the patenting and transfer of technologies pertinent to the biotechnology, pharmaceutical and medical device industries

MHS 600 - INTRODUCTION TO LIBRARY RESOURCES AND SCHOLARLY WRITING (1)

This course is designed to provide learners the opportunity to develop skills in both accessing relevant online library resources and engaging in scholarly writing. The portion of the course focusing on library resources teaches and strengthens lifelong research and information competency skills by introducing students to the nature of research and the role of the library in the research process. Students learn the core concepts of information retrieval and essential techniques for finding, evaluating, analyzing, organizing, and presenting information. The topics covered include: using online catalogs to locate books and other library resources; developing research strategies;

exercising critical thinking to evaluate information; applying critical and search techniques to electronic databases; understanding citation formats; and using the Internet as a research tool. The scholarly writing of the course will place emphasis on organization, effective conveyance of thoughts through written words, and writing for multiple types of audiences. Students will have the opportunity to improve both their academic writing and their research skills as they write a literature review or a proposal. Emphasis is placed on conventions of scholarly writing and organizational strategies as well as grammar, editing, and usage.

MHS 680 - ISSUES AND TRENDS IN HEALTHCARE (3)

This 3-credit course is designed to give students a better understanding of the distinct roles of the various healthcare professions in the interdisciplinary management of patients in contemporary medical practice. The course prepares entry-level PAs and other healthcare professionals to enter the workforce and function as an educator and patient advocate based on critical analysis of research and preventive versus diagnostic approaches to treatment.

MHS 601 - INTRODUCTION TO RESEARCH ADMINISTRATION (3)

Students in this course are provided with an overview of the complex environment that supports the academic research enterprise from a historical and evolutionary perspective, including examples of seminal studies and research controversies. Students consider the partnerships between the federal government, industry, and academic and clinical research institutions. The course explores design and implementation human research studies and explores a variety of topics, including the components, general principles, and issues in academic research.

MHS 602 - LEGAL AND ETHICAL ISSUES FOR HEALTH, HUMAN SERVICES AND CLINICAL PROFESSIONALS (2)

This 8 week, 2 credit online course explores ethical and legal issues that are timely and germane to health professionals. This course is based on the premise that to act in an ethical manner means to engage in conduct according to accepted principles; and to improve moral confidence and moral action we must prepare the next generation of health professionals with the requisite ethical resources, tools and skills. A case-based learning design will be utilized to engage students in ethical discussion, exploration, analysis with the goal of determining ethical and legal action that is sound and logical. This course will prepare students to make ethical health care decisions in

the future.

MHS 603 - SCIENCE WRITING PRINCIPLES (3)

This course provides a rigorous analysis of scientific writing on the sentence and paragraph level. Students will master basic principles of effective science writing, both through analyzing previously published scientific writing and through applying these principles in their own writing. Students will be developing a short research proposal throughout the course on a topic of their choice. The goal is to practice these principles in their own writing, culminating in a small portfolio of their revised work produced in this class. Frequent instructor feedback will give students numerous opportunities to further hone their writing skills.

MHS 605 - PERSPECTIVES ON GLOBAL HEALTH (3)

This course is an overview of the field of global health. The focus is on analyzing and responding to major global health challenges and international policies. Analysis covers national and transnational health trends, including major communicable and noncommunicable disease burdens. The World Health Organization - and other international health interventions that address the determinants of health and disease and current and emerging global health priorities, such as disaster relief and infectious diseases - are assessed. Topics include key legal issues, ethics, and models of reform to global health programming and their applications. Skills are developed in analysis, leadership, teamwork, and communication in a global context. It is the first of two core courses towards the global health certificate, and lays the global health framework for MHS 610's global health applications and challenge at the local or community level.

MHS 607 - WRITING FOR SCHOLARLY JOURNALS (3)

This course provides students with a comprehensive overview of the process of writing for scholarly journals, focusing on the IMRD (Introduction, Methods, Results, Discussion) format commonly used for empirical work. Students will read and analyze articles from a variety of journals, focusing on both form and content of research articles, case studies, meta-analyses, and book reviews. Students will apply the course content to their own writing throughout the course, culminating in a portfolio of their revised work based on extensive instructor feedback. Students can use their existing research to produce the various writing assignments during the course and use this as an opportunity to work on submitting an article for publication.

MHS 608 - RESEARCH SEMINAR I (3)

This 3-credit seminar course is designed to give students the basic information regarding health sciences research discoveries. It also provides students with the tools to approach translational research in their present and future work. The course covers the core competencies in clinical and translational research, and each session addresses a core thematic area.

MHS 609 - RESEARCH SEMINAR II (3)

This course is a continuation from Research Seminar I. Research groups work with a faculty mentor to prepare future clinicians to interpret the relevant literature and to be aware of the social, psychological, economic and cultural determinates of health. The course utilizes strategies to incorporate the principles of health promotion and disease prevention in order to promote optimal health care outcomes and to minimize health disparities. Prerequisites: PREV 600, PREV 621, MHS 608

MHS 610 - NATIONAL AND INTERNATIONAL APPROACHES TO HEALTHCARE AT THE COMMUNITY LEVEL (3)

This course applies the concepts, theories, and principles of the field of global health presented in MHS 605 to the practical challenges facing global health professionals at the community implementation level. Each student selects a specific global health priority for a given national or geographically defined population to examine at the local/community level. Students explore how this local health plan differs from, and interacts with, national and international plans for the same health issue. The student's selected case is then be the primary focus for applying needs assessment methodologies, including epidemiological methods, mapping local, national, and global policy processes (based on students' work in MHS 605), identifying strategies for building local infrastructure and workforce capacity, analyzing financial opportunities and limitations, and assessing the impact of macro changes in the global economy, political environment, and human rights and legal systems on the locally identified health structures and systems. Each student completes a final summary project report that will summarize findings regarding scope, options, outcomes, and a recommended action plan for improving the health status of the local population group each student has studied.

MHS 611 - OBSERVATIONAL EPIDEMIOLOGY (3)

This course expands upon introductory epidemiology to develop the learner's knowledge and skills in the design, conduct, analysis, and interpretation of non-experimental

studies of infectious and non-infectious diseases with special focus on dissemination and implementation research in global health. During this course, we will discuss methods of observational epidemiology relative to empirically supported models (e.g., CFIR, REAIM, PRECEDE/PROCEED, ISF, KTA) and we will explore authoritative research syntheses in the dissemination and implementation of evidence-based interventions. Students will also gain experience with and knowledge in designing and analyzing observational studies that provide evidence for the support of global health interventions. Prerequisite: MHS 630 or equivalent. MHS 615 (or related biostatistics) recommended.

MHS 612 - INTRODUCTION TO INTEGRATIVE HEALTH AND WELLNESS (3)

In this course, students will examine the fundamental concepts of integrative health and wellness (IHW), including the history, philosophies, and methods of prominent integrative therapies. Perceived differences between and limitations of traditional “allopathic” medicine and IHW “nontraditional” medicine will be identified. Patients’ motivations and patterns of use of IHW approaches will be explored. Students will consider multicultural and diversity aspects as they relate to the major concepts of this course and how health is provided and perceived by people of different backgrounds, ethnicities, gender identities, religious and non-religious beliefs.

We will explore major areas of IHW, including functional and lifestyle medicine, nutrition and the gut-immune-brain connection, and models of integrative health (e.g., Ayurveda, Naturopathy, and Chinese Medicine). The state of basic scientific knowledge and data from controlled trials relating to the safety, efficacy, and mechanisms of action of integrative therapies are presented. Theories for how these approaches function to affect health are examined, such as psychoneuroimmunology, the role of inflammation, and the gut microbiome. Key practice, legal, and ethical issues facing CAM researchers and practitioners are reviewed, as well as future directions in IHW.

MHS 613 - RESEARCH IMPLEMENTATION AND DISSEMINATION I (3)

The past several decades have witnessed advances in medical sciences and the discovery of new medications, vaccines, diagnostic tools, and other interventions that have the capacity to lead to large improvements in global health. However, the translation of research findings into practice has been slow and uneven. This has led to a

widening gap between what is known to work and what gets done in practice. There are also limitations in applying research and evaluation approaches to identify and to address barriers in the scale-up of evidence-based interventions in local settings. This course provides an introduction to the emerging field of implementation science by reviewing relevant theoretical frameworks, designs and methods, with special focus on HIV and other infectious diseases as well as emerging non-communicable diseases in resource-limited settings.

MHS 614 - RESEARCH IMPLEMENTATION AND DISSEMINATION II (3)

Dissemination and implementation (DI) science facilitates the translation of evidence-based interventions into practice to improve lives. Translating research into practice is a complex process that involves application of DI research methods and principles. This research seminar builds on the introductory course, MHS 613 Research Implementation and Dissemination I. Students will learn about more advanced DI research methods, and will develop a comprehensive research proposal. Prerequisite: MHS 613

MHS 615 - BIostatISTICS FOR HEALTH PROFESSIONALS (3)

This course is designed to introduce students to a broad range of methods commonly used in biomedical and public health research, and to provide some hands-on data analysis experience. Topics include the role of statistics in science, properties of distributions, exploratory data analysis, inference about means, proportions and survival distributions, and introduction to multivariable methods. MHS 615 is for physician assistant students only; cross-listed with PREV 621.

MHS 618 - REGULATORY & LEGAL ISSUES IN RESEARCH (3)

Research involves many ethical, legal, and regulatory issues related to the treatment of subjects, personal privacy, and institutional compliance. This course examines ethical codes of conduct, regulatory requirements, and existing laws that govern research, recruitment and protection of human subjects; diversity and vulnerable populations in research; informed consent; privacy and confidentiality; the role of independent review committees; and the importance of reporting serious adverse events.

MHS 619 - CLINICAL APPLICATION OF INTEGRATIVE HEALTH AND WELLNESS (3)

This course provide students with an interprofessional

overview of the clinical application of integrative health and wellness approaches. Students learn the skills necessary for developing an effective therapeutic practitioner-patient relationship and the strategies for communicating and educating patients about integrative health and wellness approaches, potential benefits, and possible risks. The factors affecting the utilization, interpretation, and patient understanding of these therapies are also examined. Clinical decision-making and the influence of research on recommendations and evaluation are examined. Students learn how the integrative assessment differs from the conventional assessment process, and they learn how to develop an integrative treatment plan. Numerous case studies demonstrating the application of integrative approaches for the treatment and prevention of common and chronic diseases are analyzed. Finally, the challenges in developing research to adequately examine the integrative approach as it is applied in clinical practice are discussed.

MHS 622 - IMPROVING QUALITY OF CARE IN HEALTH SYSTEMS (3)

This course explores health policy, finance and system issues that are timely and germane to health professionals. The course is based on the premise that - to practice in today's complex healthcare environment - students must understand the economic and theoretical underpinnings of the health system. A case-based learning design is utilized to engage students in discussion, exploration, analysis with the goal of improving the safety and quality of care provided in health systems. This course will prepare students to make informed health care decisions related to practice, health finance, and patient safety in the future.

MHS 627 - SCIENCE COMMUNICATION WITH DIVERSE AUDIENCES (3)

This course is designed to support students in developing basic proficiencies in communicating with cross-disciplinary and diverse public audiences and tell compelling stories about science and research. Students will read and critique various styles and genres of science communication and public engagement for diverse public audiences, including plain language summaries of scientific publications, opinion editorials, magazine and newspaper articles, blog entries, excerpts from popular science books, video content, podcasts, social media, and other digital communication. An emphasis will be placed on learning specific strategies of science communication that leads to accessible and engaging science communication, as well as on how to build a case for why scientific research matters to researchers in other fields and to non-career scientists. In addition, students will learn to

identify and practice effective communication strategies to engage and communicate with diverse public audiences. The course provides students ample opportunities to practice various strategies, revise their communication products and strategies based on feedback, and to provide feedback to their peers. At the end of the course, students will have created communication products for diverse public audiences that are ready to submit for publication.

MHS 628 - INTEGRATIVE HEALTH AND WELLNESS COACHING (3)

In this course, students learn the fundamentals of health coaching; a process of guiding and empowering clients to make and sustain choices to achieve health and wellness. The course provides a review of the frameworks and techniques of health coaching from a holistic perspective, including assessment, identification of goals and barriers, development of action plans, implementation strategies, and monitoring progress. Students will learn and apply health behavior change theories and models, as well as interventions from integrative health and wellness. Learning activities include a review of empirical research, class discussions, peer coaching activities, independent assignments, and a class compilation of personal, social, lifestyle, and medical resources to encourage client wellness. Peer coaching sessions allow students to experience the role of a health and wellness coach and that of a coaching client.

MHS 630 - ESSENTIALS OF CHRONIC INFECTIOUS EPIDEMIOLOGY (3)

In the past 15 years, we have seen a rise in chronic disease impacted by behavior and policy, infectious disease outbreaks and new mechanisms of spread never seen before in the US. Clinicians must consider the biosocial impact of globalization and environmental change upon health and disease. In this course we present fundamental concepts of epidemiology to assist the new clinician in their efforts to critically evaluate the health and medical literature, participate in monitoring and surveillance of disease, and interpret data in their individual practice, community and nation to improve care in their practice and professional sphere.

MHS 631 - GLOBAL NON-COMMUNICABLE (NCD) EPIDEMIOLOGY (3)

MHS 633 - CLINICALLY APPLIED CONCEPTS IN SOCIAL AND BEHAVIORAL HEALTH (3)

This core course focuses on the proposition that health is driven by behaviors of the patient, community, or society,

and by the health professional. The course discusses six different behavior theories that effect health promotion practice whether with a patient or the environment in which the patient lives and works. It integrates these six behavior theories into three levels of activity (individual, community, societal) and defines their outcomes within the Social Determinants of Health. In illustrating these theories and their outcomes, the course also defines and provides an overview of nine health issues common in health care delivery. Pre-requisites: MHS 600 and MHS 602.

MHS 635 - GRANT AND CONTRACT MANAGEMENT IN RESEARCH (3)

This course covers all topics related to grants management and awards. Students learn how to set-up grant proposals and awards, bill and perform cost reimbursement, and distribute indirect costs. Students will examine the various aspects of maintaining grant and contracts awards including increasing or decreasing award funding, adjusting the award budget, updating grant information, updating project status, and closing a grant or contract.

MHS 636 - ADVANCED SKILLS IN INTEGRATIVE MIND-BODY INTERVENTIONS (3)

This course is designed to provide students with an evidence-based and experiential understanding of mind-body approaches to promoting health and healing disease. Students are provided with an overview of the scientific evidence for the efficacy and mechanisms of action of mind-body therapies for health promotion and treatment of disease. Students learn advanced skills in approaches that promote and/or rely on the connection between the mind and body. These include meditation, mindfulness, guided imagery, hypnosis, acupuncture, yoga, Tai chi, Qigong, spirituality and energy therapies, journaling, and creative art therapies. Students participate in experiential learning by practicing mind-body approaches and by interacting with an integrative health provider to increase their self-awareness of the interconnections between the emotional, physical, mental, social, and spiritual aspects of health.

MHS 637 - WRITING PROPOSALS AND GRANTS (3)

This introductory course is designed to help students develop basic competencies in the grant application process for a broad range of funding agencies. Students select a project that needs funding from a pool of already prepared projects. They then research public and private funding agencies and will evaluate the objectives of these agencies. Students describe the potential grantee to highlight past achievements and to demonstrate expertise,

and describe how the proposed project will be executed and what the expected outcomes will be. Students will read and critique examples of effective and flawed grant applications, and will identify key characteristics of a clear and compelling proposal. Students prepare writing products for several crucial components of a grant application. They are also introduced to the technical aspects of grant writing, such as communicating through graphics, and generating and justifying a budget. Students write a complete grant application in this course, and develop the basic skills to assist in grant preparation with their peers or workplace organizations.

MHS 639 - HEALTH IMPLICATIONS OF MASS VIOLENCE AND DISASTER (3)

MHS 640 - TECHNOLOGY TRANSFER (3)

This course introduces the concept of intellectual property in advancing technological innovation and promoting economic development. Students will learn how to safeguard intellectual property and facilitate technology transfer including the legal, licensing, and disclosure. The course will also explore the requirements for issue of a patent including preparation of a patent application. The course explores how research or an invention may be commercialized in the process of technology transfer. Emphasis is placed on the patenting and transfer of technologies pertinent to the biotechnology, pharmaceutical and medical device industries.

MHS 650 - Community Engagement and Partnerships (3)

This course is designed to help students gain insights into economic and social value creation. Specifically, the purpose of this course is to provide students with hands-on exposure to the entrepreneurial pursuit of social and health impact and innovation. Students will learn to recognize and critically assess various forms of social and health enterprise strategies as tools of economic development and social transformation. Students will gain a greater understanding of the challenges of growing and sustaining a social or health enterprise.

MHS 652 - LEADERSHIP AND COMMUNICATION (3)

Students learn effective management and communication skills through case-study analysis, reading, and class discussion. The course covers topics such as effective listening, setting expectations, delegation, coaching, performance, evaluations, conflict management, negotiation with senior management and leading with integrity. Prerequisite: MHS 600.

MHS 660 - ADVANCED APPLIED PHARMACOLOGY (3)

By the end of this course, students will have an advanced knowledge in pharmacology used in the treatment of selected health conditions commonly encountered by healthcare providers. Students will apply principles of clinical pharmacology, therapeutics, pharmacokinetics, and drug metabolism learned in PHA 120 and PHA 123 as they focus on the pathophysiological approach to pharmacology. Course activities and resources will emphasize: the integration of pathophysiology and pharmacologic principles, mechanisms of action of drugs, side effects, adverse effects, drug interactions, and the pharmacologic application in clinical settings. Using case studies provided through electronic medical records, students will achieve competency in the decision-making processes used to safely and effectively prescribe and monitor pharmacotherapeutics appropriate to specific patient needs through realistic, simulated, interprofessional interactions of healthcare providers. Prerequisites: PHA 120 and PHA 123 (AACC PA), and MHS 622.

MHS 698 - SPECIAL TOPICS (1 TO 3)

In this special topics course, participants learn about common sources of stress and burnout in the field of death and dying, what resiliency and self-care is, and why professionals need to diligently practice resiliency-building strategies throughout their careers. Participants learn and practice several strategies to build resiliency and will reflect on their experiential learning. At the end of the course, students will have produced a personalized resiliency-building tool kit for themselves to build resiliency and prevent burnout.

MHS 700 - CAPSTONE PRESENTATION (3)

The capstone is designed to be a supervised health science learning experience and a demonstration of the substantive application of the knowledge and skills that have been acquired in the courses taken as part of the MS in Health Science Program. The capstone functions as both the practice experience and the culminating experience for the program. The MS in Health Science capstone experience includes the following components: ? development of a capstone proposal ? delivery of an oral presentation at UMB and at the field placement site as appropriate ? preparation of a capstone portfolio This course requires that the knowledge and skills gained from the Health Science-MS program core courses be applied and reflected upon. Therefore, successful completion of all other MHS courses is required before students can register for the MHS 700 capstone course.

MLL -

MLL 625 - INTERCULTURAL AND CROSS-CULTURAL COMMUNICATION (3)

The purpose of this course is to study communication within the context of the cultural setting. The three main goals are: to provide students with materials, both cognitive and experiential, with which they can develop an awareness of their own cultural identity; to increase their knowledge of the special communication problems to be expected in a cross-cultural situation; and to offer students the opportunity to apply new insights to cross-cultural encounters.

MP

MP 601 - RADIATION THERAPY PHYSICS (3)

This course will cover the basic physics, technology and clinical application of external beam radiation therapy & brachytherapy.

MP 602 - FUNDAMENTALS OF IMAGING IN MEDICINE (3)

Students learn about different imaging modalities (x-ray, computed tomography, magnetic-resonance imaging, nuclear medicine imaging, ultrasound), their applications in medicine with a focus on radiation oncology, and the physics and mathematics of image formation.

MP 603 - ANATOMY AND PHYSIOLOGY FOR MEDICAL PHYSICISTS (3)

MP 604 - RADIOBIOLOGY FOR MEDICAL PHYSICISTS (3)

This course will provide basics of the biology and overview of radiation interactions and effects with cells. Topics such as cell biology, DNA damage and repair, cell survival curves, carcinogenesis, radiation genetic effects, radiation protection, tumor and normal tissue control probabilities and various other biological topics pertaining to radiation therapy and cancer treatment will be instructed.

MP 605 - RADIOLOGICAL PHYSICS AND DOSIMETRY (3)

This course is designed to give students the basic information regarding basic radiation physics: radioactive decay, radiation producing devices, characteristics of the different types of radiation (photons, charged and uncharged particles) and mechanisms of their interactions with materials.

MP 606 - RADIATION PROTECTION AND RADIATION SAFETY (3)

This course is designed to provide learners with the knowledge and technical background to understand the calculation methodology, compliance with the safety standards, and use of quantitative risk assessment for radiation protection & safety. This course also covers the topics on the fundamental principles and objectives of health physics (radiation protection), dose quantities used to evaluate human radiation risks, effects of radiation exposure and fetal risks, elementary shielding calculations and protection measures for clinical environments, the characterization and proper use of health physics instrumentation, and the regulatory and administrative requirements of health physics programs in general and clinical activities.

MSPA**MSPA 465 - Foundation of PA Practice (5)****MSPA 470 - Applied Medical Sciences (7)****MSPA 510 - CLINICAL DIAGNOSTIC STUDIES (3)**

3 credit hours, 45 hours of lecture-based learning. This course is designed to provide the physician assistant student with introductory didactic instruction on clinical laboratory tests and studies. Familiarization with these diagnostic tests and studies will be used to augment critical thinking in the development of a patient's differential diagnoses. Complementary to courses MSPA 465 and MSPA 470, students will clinically apply their knowledge of human anatomy and physiology to a patient's history and physical examination results to select, utilize and interpret the most appropriate laboratory tests studies to help derive the patient's most likely diagnosis.

MSPA 512 - Clinical Medicine 1 (8)**MSPA 514 - Pediatric Medicine 1 (2)****MSPA 515 - Psychiatric Medicine (3)****MSPA 518 - Clinical Medicine 2 (8)****MSPA 519 - Pediatric Medicine 2 (2)****MSPA 520 - Pathophysiological Approach to Pharmacotherapeutics 1 (3)****MSPA 521 - Emergency Medicine (4)****MSPA 522 - Clinical Correlations (3)**

3 credit hours, 45 hours of lecture-based and hands-on simulated patient case-based learning. This hands-on immersive and small group practicum series is designed to integrate the elements of patient evaluation to sound clinical reasoning. Students will use clinical and technical skills learned over the course of their didactic year to properly diagnose, manage and treat patients during

simulated, real-life scenarios using patient actors and high-fidelity manikins. Based on national guidelines and telehealth competencies, this course will also introduce students to the fundamentals of telemedicine and telehealth for health professionals. Students will earn the American Heart Association's CORE Concepts in Telehealth Certificate.

MSPA 523 - Pathophysiological Approach to Pharmacotherapeutics 2 (3)**MSPA 551 - Transition to Clinical Clerkships (1)****MSPA 671 - Clinical Clerkship 1 (4)****MSPA 672 - Clinical Clerkship 2 (4)****MSPA 673 - Clinical Clerkship 3 (4)****MSPA 674 - Clinical Clerkship 4 (4)****MSPA 675 - Clinical Clerkship 5 (4)****MSPA 676 - Clinical Clerkship 6 (4)****MSPA 677 - Clinical Clerkship 7 (4)****MSPA 678 - Clinical Clerkship 8 (4)****MSPA 679 - Clinical Clerkship 9 (4)****MSPA 680 - Issues and Trends in Health Care (3)****NURS -****NURS 802 - RESEARCH AND SCHOLARSHIP SEMINAR (1)****NURS 810 - EVIDENCE BASED POLICY DEVELOPMENT (3)**

The purpose of this course is to enhance doctoral students' understanding of the role of existing evidence in the development of evidence-based health policy in the private and public policy arenas. Theoretical bases and strategies for evidence-based health policy development will be analyzed. Funding sources for policy-influencing evaluation and research will be explored. Leadership skills in the areas of developing evidence-based policy, garnering grass roots support, and communicating a policy message to the media and policy-makers will be developed. Examples of translation of evidence into health policy decisions at the professional, organizational, state, federal, and international levels will be critiqued, and doctoral students will analyze the policy implications of evidence related to their respective research interests and practice specialties.

Offered: 202009.

NURS 811 - MEASUREMENT OF NURSING PHENOMENA (3)

The theoretical basis of measurement is presented as a foundation for the development and evaluation of measurement instruments for use in nursing research. Types of measures, techniques of construction, the

statistical analysis of reliability and validity, strengths and limitations for use of selected measures in nursing research are presented. Nursing research studies are evaluated relative to measurement theory. Tools and procedures, including those used to measure affective, cognitive, behavioral and physiological aspects of selected concepts, are evaluated.

Offered: 202009.

NURS 812 - (3)

Offered: 202002.

NURS 814 - DESIGN OF NURSING RESEARCH II (3)

The course provides an overview of non-experimental research designs (e.g., cohort, case-control, survey), measures such as incidence and prevalence, and related analytic procedures (e.g., logistic regression) for the study of nursing problems. Sampling theory and strategies for conducting probability sampling are also included.

Offered: 202009.

NURS 815 - QUALITATIVE METHODS IN NURSING RESEARCH (3)

Provides an overview to the qualitative paradigm and major approaches to qualitative research. Topics related to qualitative research design, conduct, reporting and evaluation of qualitative research are addressed. Emphasis is placed on the appropriate use of qualitative methods and differences across qualitative approaches. The course focuses on the development of interview skills, observation skills and data analysis.

Offered: 202009.

NURS 816 - MULTIVARIATE ANALYSIS IN SOCIAL AND HEALTH CARE RESEARCH (4)

Social and health care research deals with complex, multidimensional systems, and any adequate assessment of these systems requires that multiple measures be used. Topics introduced in this course include multiple regression, path analysis, logistic regression, principal components analysis, factor analysis and discriminant function analysis.

Offered: 202009.

NURS 817 - LONGITUDINAL DESIGNS IN HEALTH CARE RESEARCH (3)

Designs in which multiple observations of one or more

variables made on a single person or unit (repeated measures designs) or subjects are followed for a long period of time are of particular importance in nursing and health care research. The course will examine several of the more commonly used longitudinal analyses, including ANOVA, linear mixed models, and survival analysis. Designs involving repeated measures on more than one dependent variable, fixed and random effects, and time to event will be considered. Emphasis will be placed on selecting the appropriate design, statistical procedure, and computer program for addressing a given research problem. Small research exercises requiring both computation and interpretation will be assigned in order to promote desired learning.

Offered: 202009.

NURS 818 - SPECIAL TOPICS IN NURSING RESEARCH (1 TO 6)

Research Practica are designed as independently arranged research experiences in which the student actively engages in research activities under the mentorship of a faculty member. These activities are negotiated between student and faculty and relate to either an aspect of the faculty members research related to the student's research area, or the students research area. Six credits of research practica experiences, using the 3-hours/credit/week formulas are required with at least three of these being with the students Research Advisor.

NURS 819 - RESEARCH ROTATION (1 TO 5)

Introduces the active research programs in the School of Nursing with application of various research methodologies to specific research projects. Applies research principles learned previously in each rotation. In the 2 or 3 credit options, 6 or 9 hours per week are spent in one research program and in the 5-credit option, 15 hours per week are spent in each of two successive seven-week sessions in two research programs. During each session, objectives are defined with the faculty researcher and work is completed on a component of the faculty research project. Activities include literature review, measurement, data collection, statistical analysis, manuscript preparation or proposal development.

NURS 820 - (3)

Introduces the issues in and methodology for the quantitative synthesis of research literature. Includes a practical overview of meta-analysis methods for synthesizing and exploring variations in quantitative indices of study outcomes.

Offered: 202002.

NURS 826 - STRUCTURAL MODELING IN HEALTH CARE RESEARCH (3)

Provides an introduction to the construction and estimation of structural models in the context of health care research. Topics include confirmatory factor analysis, path analysis and causal modeling. Emphasis is on the estimation of models with latent variables, interpretation of causal effects and the application of these models in health care research.

Offered: 202009.

NURS 828 - (2 TO 3)

Identifies and analyzes professional issues confronting the nurse scholar. Issues including research priorities, options in career patterns, ethics and politics of science, protection of human subjects, grants, publishing and presenting research are presented and discussed and appropriate applications to the role of nurse-scholar are made. When appropriate, diverse perspectives will be presented. Students are expected to synthesize the material and identify the principles appropriate for their own career. Prerequisite: NURS 811.

Offered: 202002.

NURS 830 - WORKING WITH LARGE HEALTH CARE DATABASES (2)

This course is designed to bridge the gap between nurses' need for information/data and the reality of finding the data, downloading, extracting, and building an effective personal database. Much of the class work will be conducted in the computer lab where students will explore public and private sources of health data that are available via the internet and on CD_ROM. Students will download data to the personal computer, import data into varied software applications, and build a personal database using software of their choice. Prerequisites: A basic knowledge of personal computers including the Windows environment, the use of a mouse, and basic file handling is expected. Knowledge of spreadsheets and databases is a plus. No knowledge of statistical software is needed, although highly desirable for doctoral students.

Offered: 202009.

NURS 832 - (3)

This course is designed for doctoral students who are interested in examining outcomes research issues. The class content focuses on the conceptual and technical

issues encountered in designing and executing these types of research studies. Assignments allow students to design a study in their area of interest, including the identification of potential problems and approaches to dealing with those problems. Prerequisites: NURS 850, NURS 851 and NURS 840 (Students are required to have had a course in theory development and research design. In addition, a basic knowledge of personal computers, data manipulation, and statistical software is expected.)

Offered: 202002.

NURS 833 - THE EVIDENCE BASED PRACTICE PROCESS (3)

Offered: 202009.

NURS 834 - TRANSLATING EVIDENCE PRACTICE (3)

This course focuses on how to translate, evaluate and disseminate evidence in a contemporary health care environment. Individual, organizational and global barriers to translating evidence into practice are explored. Evidence will be summarized and an action plan will be developed to produce valid and reliable clinical recommendations for dissemination into practice. An evaluation plan that includes the patient, health care providers and system outcome measures will be designed to measure the success of the evidence based practice initiative. The integration of nursing theory and theories from other disciplines to guide practice will be emphasized.

Offered: 202009.

NURS 835 - (3)

This course applies the evidence-based practice theoretical knowledge, skills, and attitudes from pre/co-requisite courses through a precepted experience (135 hours total). In an approved practicum site, the student applies their knowledge and skill under the supervision of an experienced faculty and preceptor. Each student will develop an individualized learning contract defining the activities by which they will demonstrate attainment of the course and personal objectives. Discussion and written assignments will allow students to comparatively analyze theoretical and conceptual principles with those experienced in the field. A seminar will provide a forum for discussion of issues and special relevant topics. Individual aspects of the practicum will be negotiated between the student, preceptor, and faculty facilitator.

Offered: 202002.

NURS 836 - (3)

Reflects the central role of decision science in utilizing nursing informatics to improve patient care. Analyzes selected decision science theories and relevant research that supports and directs the field of nursing informatics. Decision sciences include statistically based models of clinical judgment, information processing theory of clinical judgment and theories for knowledge and skill acquisition. Case simulations, protocol analysis, knowledge engineering, decision analysis models, grounded theory, neural networks and ways of knowing are evaluated for their usefulness to nursing informatics. Prerequisites: NURS 737, NURS 840, NURS 850 and NURS 851

Offered: 202002.

NURS 837 - NURSING INFORMATICS IN QUALITY OF CARE (3)

Addresses aggregate-level data analysis in the application of nursing informatics in describing, improving, measuring and delivering quality care. Employs a broad definition of systems and analyzes selected systems theories and relevant research, which supports and directs the field of nursing informatics and its use of available and emerging technology. Theories are applied to the study of systems to determine how their definitions and boundaries facilitate the application of quality of care models and enhance the access, quality and cost-effectiveness of care. A multidimensional model provides a framework for studying the direct and indirect effects of nursing informatics technology.

Offered: 202009.

NURS 840 - PHILOSOPHY OF SCIENCE AND DEVELOPMENT OF THEORY (3)

Reviews the nature of knowledge and theory in the various scientific disciplines. Describes and analyzes the revolutions or paradigm shifts that have occurred in science. The struggle between many world views is discussed including empiricism, positivism, rationalism and the hypoductive model of science. After considering the ways of knowing (epistemology), selected world views and theories from a variety of disciplines are analyzed. Discusses strategies for developing nursing theories and introduces alternative metatheoretical approaches available for use in theory evaluation in nursing.

Offered: 202009.

NURS 841 - THEORY AND CONCEPTUALIZATION IN NURSING SCIENCE (3)

Focuses on the nature of theory in scientific disciplines, nursing theory within the context of the philosophy of science and the evolution of nursing science and the application of conceptualization to the process and conduct of nursing research. Interrelationships between components, context and structure of modes of systematic inquiry, the conceptual basis of theory development and a variety of mid-range theories and their paradigms are analyzed. Contribution of these modes, concepts and theories (practice, mid-range, grand) to knowledge generation and theory development in nursing is critically evaluated in relation to nursing science and applied to student's area of interest.

Offered: 202009.

NURS 850 - EXPERIMENTAL NURSING RESEARCH DESIGNS (3)

This course focuses on the relationship between theory and design and selected experimental and quasi-experimental research designs. Threats to both the internal validity and the construct validity of research designs are explored as well as ways of minimizing them. Issues of bias, representativeness, and generalizability are discussed in relation to probability and nonprobability sampling.

Offered: 202009.

NURS 851 - INTRODUCTORY ANALYSIS FOR NURSING RESEARCH (3)

This course is designed to provide an introduction to concepts and applied skills that can be used when conducting statistical analyses in nursing research. The course focuses on: 1) the identification and uses of appropriate descriptive and inferential statistics; 2) the acquisition of data manipulation skills necessary to conduct nursing research; 3) the development of understanding of concepts such as scales of measurement, probability, normal distribution, confidence intervals, and hypothesis testing; and (4) applying parametric and non-parametric analysis approaches using examples. The procedures for compiling data, developing a research file, and documenting the file will be addressed and students will exercise analytical writing and data summary skills. Analytic techniques address descriptive statistics, measures of association, ANOVA, t-tests, and non-parametric techniques.

Offered: 202009.

NURS 852 - NON-EXPERIMENTAL NURSING RESEARCH DESIGNS (3)

Focuses on non-experimental research designs, including descriptive, cross-sectional, survey, prospective, retrospective, exploratory and qualitative. Incorporates similar approaches including consideration of the validity of the designs as well as bias, sampling, rigor and application of non-experimental research design approaches to researchable nursing questions.

Offered: 202009.

NURS 853 - ANALYSIS FOR NON-EXPERIMENTAL NURSING RESEARCH (2)

Focuses on analytical approaches used to design and conduct non-experimental research and approaches to data reduction and data summary common to non-experimental studies. Addresses analytical issues related to survey and qualitative research, including coding of open-ended questions, handling of missing data, weighing data and non-parametric testing. Reviews software used for data collection, data reduction and reporting.

Offered: 202009.

NURS 880 - INTERDISCIPLINARY RESEARCH SEMINAR - CENTERS OF EXCELLENCE (1 TO 2)

Offered: 202009.

NURS 881 - THEORETICAL AND METHODOLOGICAL ISSUES ON COPING (2)

Provides the student with an opportunity to develop a conceptual framework for viewing and investigating the process of coping. Through a survey and critical review of both historical and contemporary literature from multiple disciplines, an array of models of coping is examined and a prospectus for individual or group studies on coping with stress in health and disease is developed.

Offered: 202009.

NURS 884 - (2)

Offered: 202002.

NURS 897 - SPECIAL TOPICS IN NURSING SCIENCE (1 TO 6)

Allows a student to study a topic of professional interest within the sphere of indirect nursing with a graduate faculty member who has special competence in the subject area. Specific objectives and requirements are determined by contractual agreement prior to registration. Repeatable

up to a maximum of six credits.

Offered: 202009.

NURS 898 - (1 TO 8)

Allows pre-candidacy students to study a topic of professional interest with a graduate faculty member who has special competence in the subject area. Specific objectives and requirements are determined by contractual agreement prior to registration.

Offered: 202002.

NURS 899 - (1 TO 12)

Dissertation credits are taken after admission to candidacy for the doctoral degree. The credits taken during a given semester should reflect the expenditure of time (student's and advisor's) on dissertation related activity. A No Mark (NM) grade is assigned to NURS 899 credits until after the dissertation defense is completed. This seminar, based upon a student-centered learning approach, provides peer and faculty support to students planning to undertake individual research studies, usually (but not limited to) doctoral dissertations. Students develop course and individual objectives the first day of class. A topical outline for class sessions during the semester is agreed upon during the second class meeting. Course and individual objectives usually include development of individual research designs, instruments, and data analysis plans, literature reviews and a written research prospectus. Didactic presentations include the components of a dissertation proposal; methods for negotiating the system including selecting and working with committees, selecting and securing agency cooperation, and Institutional Review Board approval. The majority of class sessions are devoted to student presentations of their research plans with group feedback to strengthen these plans.

Offered: 202002.

PALC

PALC 601 - PRINCIPLES AND PRACTICE OF HOSPICE AND PALLIATIVE CARE (3)

In this introductory course, participants learn about the patient/family centric model of palliative care, the interdisciplinary team concept, models of care in hospice and palliative care and regulatory aspects of these practice models. Participants also learn about education and self-care for practitioners, operational aspects of hospice and palliative care, the application of analytic inquiry and evidence-based discovery, and implications for community

outreach.

PALC 602 - PRINCIPLES AND PRACTICES OF PALLIATIVE CARE EDUCATION (3)

This course provides participants with a solid grounding in the principles of adult learning, how to assess knowledge and learning differences, principles of instructional design, and barriers to teaching and learning. Participants will be prepared to perform an audience analysis, and will be prepared to deliver learning materials to patients, families, caregivers, health care providers and other stakeholders.

PALC 603 - COMMUNICATION AND HEALTHCARE DECISION MAKING (3)

This course lays the foundation for effective communication with patients, families, and colleagues. Clear and compassionate communication skills are essential when determining patient and family goals, preferences and choices during advanced illness, and developing a plan of care to support these preferences. A significant portion of this course is devoted to communication techniques including delivering serious news, facilitating family conferences, enhancing team communication, and participating in the shared decision-making process. Introductory content on moral principles and ethical decision-making are also explored.

PALC 604 - PSYCHOSOCIAL, CULTURAL AND SPIRITUAL CARE (3)

In this introductory course, participants learn how to identify and address psychological, emotional, social, cultural and spiritual aspects of care in advanced illness, including grief and bereavement. Commonly used screening and assessment tools are reviewed. Roles of various professions in addressing psychosocial and spiritual needs are considered. Development of patient and family centered care plans are addressed, along with communication strategies and interventions, including referrals as needed. The importance of equity in palliative care is introduced.

PALC 605 - SYMPTOM MANAGEMENT IN ADVANCED ILLNESS (3)

Pain management is the most prevalent symptom in advanced illness. Participants learn how to perform a uni- and multi-dimensional pain assessment, and the assessment of the most common non-pain symptoms associated with advanced illness. Management strategies including non-pharmacologic and pharmacologic are examined. A case-based learning model is used in this course to master content, including demonstration of information literacy and quantitative fluency.

PALC 606 - SELF-CARE FOR HEALTH CARE PROFESSIONALS (3)

This course is designed to provide students with an evidence-based and experiential understanding of the benefits of self-care in the practice of health care. Hospice and palliative care professionals are at high risk for burnout. Participants in this course learn about common sources of stress, burnout, and compassion fatigue, as well as practical techniques for self-care. Participants will have opportunities to practice integrative self-care tools and to reflect upon their use. At the end of the course, participants will have developed a comprehensive, individualized self-care plan to achieve greater wellness and resilience to burnout

PALC 607 - CLINICAL MANAGEMENT OF SPECIAL PATIENT POPULATIONS (3)

Participants in this course will develop advanced skills used to manage special populations with advanced illness including pediatrics, geriatrics, palliative care emergencies, and advanced assessment cases; and will develop management skills to facilitate withdrawal of life-sustaining treatments, and to manage the days before death.

PALC 608 - HOSPICE LEADERSHIP AND ADMINISTRATION (3)

This course addresses the development of hospice leadership skills, including: developing a supportive culture, mission and values; promoting team building, quality improvement initiatives, service and performance excellence; and assuring appropriate staffing, operational aspects, financial management, human resources management, quality management, organizational integrity and compliance. Participants will become knowledgeable about the standards and regulations for hospice eligibility and compensation models

PALC 609 - PALLIATIVE CARE LEADERSHIP AND ADMINISTRATION (3)

This course addresses the development of palliative care leadership skills including developing a supportive culture, establishing mission and values, promoting team building, promoting quality improvement initiatives, establishing service and performance excellence, assuring appropriate staffing and operational aspects, and developing financial management, human resources management, quality management, and organizational integrity and compliance. Participants will be intimately knowledgeable about the standards and regulations for palliative care practice and compensation models. Prerequisite: PALC 601

PALC 610 - PRACTICE DEVELOPMENT AND STRATEGIC PLANNING (3)

Participants in this course learn to assess the need for a hospice and/or palliative care program. Additionally, participants learn to develop, implement and maintain an ongoing, data-driven process that reflects the complexity of the organization, and one which focuses on clinical, economic and humanistic outcomes. Learners will assure strategic alignment of program operationalization with the established organizational mission and vision, with consideration for growth.

PALC 611 - ADVANCED NON-PAIN SYMPTOM MANAGEMENT (3)

This course prepares participants to perform advanced assessment of patients with complex non-pain symptoms, to develop advanced skills to identify pathogenesis of the complaint, and to develop advanced non-pharmacologic and pharmacologic management of symptoms. Participants will develop advanced skills in managing these symptoms through the interdisciplinary team.

PALC 612 - ADVANCED DISEASE STATE MANAGEMENT (3)

Using a disease-based approach, participants perform advanced assessment of common advanced illness disease states (e.g., COPD, cancer, neurodegenerative disorders, heart disease, etc.), sophisticated identification of pathogenesis and disease progression, selection of beneficial evidence-based treatments, and skills to discontinue medically futile treatments as disease progresses. Prerequisite: PALC 605

PALC 613 - ADVANCED DECISION-MAKING AND COMMUNICATION SKILLS (3)

This course provides participants with advanced skills and information necessary to elicit patient and/or family values and to delineate goals of care regarding pain and symptom management, advanced life-sustaining therapies, and advanced communication techniques for delivering bad news, establishing goals of care, suspending therapies, and death notification.

PALC 614 - ADVANCED SPIRITUALITY AND PSYCHOSOCIAL SKILLS (3)

Participants develop advanced skills in assessing patients and families to determine psychosocial needs, spiritual and cultural concerns, and in addressing patient and family suffering, coping and healing within the emotional, psychological and social domains with focused developmentally-appropriate assessment followed by

targeted communication, interventions and referrals. Prerequisite: PALC 604

PALC 615 - ADVANCED PAIN MANAGEMENT AND OPIOID DOSING (3)

In this course, participants learn to perform an advanced assessment of a pain complaint (history, physical exam, diagnostics/imaging as necessary) and demonstrate advanced and in-depth knowledge of the pathogenesis of pain. Participants also acquire in-depth knowledge of evidence-based non-pharmacologic management of pain, and evidence-based advanced pharmacology (including drug therapy selection, dosing, monitoring, and titration), designed to meet patient-centric therapeutic goals.

PALC 616 - RESEARCH AND OUTCOMES ASSESSMENT IN HOSPICE AND PALLIATIVE CARE (3)

In this introductory course, participants learn about the development and review of study protocols and institutional review board (IRB) applications in palliative care research. Participants also learn how to develop and assess research questions, hypotheses, study design options, data collection procedures, data management and human subjects protections, and presentation of study results. At the end of the course, participants will be expected to write a research study protocol acceptable for submission to an IRB.

PALC 617 - ADVANCED TEAM-BASED PALLIATIVE CARE (3)

This course is entirely case-based, and uses the interprofessional/interdisciplinary approach to the resolution of complex cases of patients with advanced illnesses. Participants will have to rely on team members to achieve optimal patient outcomes. (Majority of coursework must be completed).

PALC 618 - CRITICAL APPRAISAL OF EVIDENCE (3)

The purpose of this course is to facilitate learners in developing skills to identify, evaluate, and apply palliative care literature per the principles of evidence-based practice. The course will introduce research design and statistical methods to allow students to accurately and effectively interpret study findings. Research designs discussed will include descriptive studies, randomized controlled trials, systematic reviews, clinical practice guidelines, qualitative research, and quality improvement. Learners will be able to appraise literature and apply the evidence to a patient care situation or population of interest.

PALC 620 - DISEASE STATE EVALUATION AND MANAGEMENT IN PEDIATRIC PALLIATIVE CARE (3)

Pediatric palliative care is a holistic approach aimed at addressing the complex issues related to the care of children and families facing chronic life limiting illnesses. The needs of children are unique and often quite different from those of adults receiving palliative care. In this, the first of four courses in a series, participants will learn to identify pediatric patients appropriate for palliative care and/or hospice care, including those with a life-threatening condition, conditions where early death is inevitable, progressive but chronic conditions without curative treatment options, and irreversible but non-progressive conditions with complex healthcare needs. For each of these situations, participants will learn about the presentation, diagnosis, prognosis, and management of common disease states, identify developmental issues that impact pediatric palliative care, and demonstrate age-appropriate comprehensive evaluation and assessment. Special attention will be devoted to the identification and care of perinatal/neonatal patients who would benefit from palliative care. The interdisciplinary approach to managing the needs of the pediatric patient, family and caregivers will be addressed, and best practices for the interprofessional pediatric palliative care team.

PALC 621 - PAIN AND SYMPTOM MANAGEMENT IN PEDIATRIC PALLIATIVE CARE (3)

Management of pain and other physical symptoms is a critical part of palliative care. Participants in this, the second in a series of 4 courses, will learn how to perform a developmentally-appropriate assessment of pain and other physical symptoms. A multimodal approach to managing pain and other symptoms will be addressed, including pharmacologic and non-pharmacologic treatments. Special considerations will be given to the selection of opioids and other controlled substances, and risk mitigation strategies while using these medications. Participants will also learn how to monitor the patient's response to the therapeutic intervention, and how to make adjustments that aim to control pain or reported symptom.

PALC 622 - COMMUNICATION , GRIEF, AND BEREAVEMENT IN PEDIATRIC PALLIATIVE CARE (3)

A critically important part of managing serious illness or the end of life is using appropriate communications skills with patients and their families, and anticipating and respecting grief and bereavement experienced by patients and their families. Participants in this, the third in a series

of 4 courses, will learn how to provide developmentally-appropriate strategies to address grief, bereavement, depression, anticipatory grief, and variations in grief responses throughout and beyond the stages of a serious diagnosis. This will include providing interventions for healthcare professionals who are coping with death, anxiety and loss. Communication skills will include both verbal and written, and will cover developmentally and culturally appropriate strategies for empathetically and effectively communicating serious news and addressing goals of care with patients and families. Developmentally appropriate cultural and spiritual assessment tools for assessing personal, cultural, and spiritual beliefs and practices that impact health care decision making will be covered.

PALC 623 - THE PRACTICE OF PEDIATRIC PALLIATIVE CARE (3)

An important part of pediatric palliative care extends beyond the clinical management of the patient, but also includes the development and management of the practice and practitioners. Participants in this course will learn about the application of laws and principles of ethics in the provision of pediatric palliative care, as well as the role of research and quality improvement initiatives. The development and continued support of pediatric palliative care practitioners is critically important, and strategies for accomplishing both objectives will be addressed in this course. A practical component of pediatric palliative care is recognizing and contending with the financial and social aspects that impact practice, and prospectively addressing transitions in care. Both of these topics will be addressed in this course, with liberal use of practical application practice.

PALC 672 - LEADING CHANGE IN PALLIATIVE CARE (3)

This course in Leading Change requires intellectual curiosity and commitment to learning theoretical foundations of leadership in palliative care. Palliative care leadership includes leadership in various domains: administration of new programs, initiatives related to serious illness, promotion of excellence and evidence-based practice, research to grow and mature the evidence, policy and advocacy in regulatory issues, health care delivery, education, ethics, social justice, and technology. This class will examine leadership theory and principles, differences between management and leadership, followership, influence, and power. A case study-based approach will be used to examine leadership approaches in palliative care settings in the community and acute care settings. The goal of the course is to empower

learners to strategically lead palliative care into the future.

PALC 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

This is pre-candidacy work that may include independent investigations consisting of library or laboratory research, seminars, or other assignments appropriate to the problem investigated. It is a DIDACTIC elective that may include self-study and gathering background information. The focus is learning a body of knowledge rather than building specific pharmacy practice skills, which may be a portion but not the entire focus of this experience.

PALC 899 - PALLIATIVE CARE DISSERTATION RESEARCH (1 TO 6)

This course is designed to provide guidance, support and mentoring to the PhD degree candidate throughout the dissertation process. Learners will make an original contribution to the scholarship of palliative care demonstrating the doctoral student's ability to research an important question in the field and capacity to present and interpret research findings in a clear and logical written form. Learners in this course will complete institutional requirements for engaging in academic research to include at minimum submission of a completed IRB application to the University Institutional Review Board for Human Subjects research (IRB). The dissertation is completed under the supervision of a faculty chair and is formally presented in an oral presentation to the dissertation committee. Dissertation credits are taken after the graduate student has been approved for admission to candidacy (approval from dissertation committee) for the doctoral degree in Palliative Care. A minimum of 12 credits are taken by students to complete the dissertation degree requirement.

PATH

PATH 602 - SYSTEMIC PATHOLOGY (3)

This course covers in-depth, the disease entities and disease processes of the following organ systems: blood vessels, the heart, the lungs, head and neck, the gastrointestinal tract, the liver and biliary tract, the pancreas, the kidneys, the lower urinary tract and male genital system, the female genital tract, the breast, the endocrine system, the skin, bones, joints and soft tissue, the peripheral nerves and skeletal muscles, the central nervous system, and the eye. Neonatal, forensic, and environmental pathology topics are also presented as they relate to the various organ systems. Instruction is by lecture, laboratory, and computer. The course is offered Spring semesters only.

PATH 603 - GENERAL PATHOLOGY (3)

This course covers the major subdivisions of general pathology: cellular adaptations, tissue inflammation and repair, neoplasia, environmental and nutritional pathology, and diseases of infancy and childhood. Laboratory sessions include a brief introduction to the following topics, as they relate to Anatomic Pathology: accessioning, patient identification, protected health information, proper laboratory attire and personal protective equipment, common fixatives, and histologic tissue processing and staining. Instruction is by lecture, laboratory, and computer. The course is offered during Fall semesters only.

PATH 608 - AUTOPSY PATHOLOGY (3)

This course provides didactic and clinical practical autopsy procedure/performance experience during the second year of study of the Pathologists? Assistant Program. The student shall become proficient in all phases of the human post-mortem examination, adult and fetal/pediatric, including review of consent forms and death certifications, review of medical records, decedent identification, evisceration, organ block dissection, description of findings, and preparation of post-mortem reports. Students receive basic instruction in the function of the autopsy service and the hospital morgue. Practical aspects of specimen photography are also presented during the course. Students are exposed to basic concepts of the medico-legal investigation of death in a one-month rotation at Maryland?s Office of the Chief Medical Examiner, where the students receive hands-on instruction in forensic autopsies.

PATH 609 - SURGICAL PATHOLOGY (3)

This course provides didactic and clinical practical experience during the second year of study of the Pathologists? Assistant Program. The student shall become proficient in all phases of anatomic pathology dissection with respect to surgically excised specimens, including specimen identification, tissue triaging for ancillary studies, review and interpretation of clinical data, gross specimen description, sectioning, and sampling, intraoperative consults and frozen sections, specimen photography, and cancer staging by gross pathology.

PATH 751 - CLINICAL PATHOLOGY AND MICROBIOLOGY (3)

This course provides the Pathologists? Assistant Program student with a working knowledge of clinical pathology, including hemodynamic disorders, thromboembolic disease, and shock, genetic disorders, diseases of the

immune system, diseases of white blood cells, lymph nodes, spleen, and thymus, red blood cell and bleeding disorders, and infectious diseases/medical microbiology. Instruction is by lecture, laboratory and computer. The course is offered during Spring semesters only.

PATH 789 - SPECIAL TOPICS: PATHOLOGY (1 TO 3)

This special-topics course for Pathologists? Assistant Program students comprises two separate summer term courses; one at the beginning of the first year and one between the first and second years. In the first year special topics course, the students are given a primer in human anatomy, histology, and embryology, and follow a self-study based introduction to medical terminology. Instruction is by lecture and computer. The special topics course between the first and second year provides an introduction to surgical pathology dissection, intraoperative consult and staining, autopsy procedure, medical photography, medical ethics, more in-depth medical terminology, molecular diagnostics, immunohistochemistry, histology, and additional general Anatomic Pathology topics, including laboratory safety and governing/regulating bodies. Instruction is by lecture, computer, and observation and limited practical applications in surgical pathology, histology, and hospital and forensic autopsy pathology. The courses are offered during Summer semesters only.

PHAR

PHAR 600 - PRINCIPLES OF DRUG DISCOVERY (3)

This interdisciplinary modular based course describes the inter-relationship among the disciplines of the pharmaceutical sciences, and establishes the basic theoretical background essential to the drug design and development process. A progression of pharmaceutical sciences content is presented and considers the drug discovery process, beginning with traditional drug design and optimization of drug structure, continuing with principles of pharmacology, including macromolecular structure, genomics, and proteomics, followed by modern drug discovery methods based on knowledge of the structure and pharmacology of target molecules.

PHAR 601 - PRINCIPLES OF DRUG DEVELOPMENT (1 TO 3)

This interdisciplinary, modular based course describes the inter-relationships among the disciplines of pharmaceutical sciences, and establishes basic theoretical background essential for the drug design and development process.

Built upon subject matter presented in PHAR 600 Principles of Drug Discovery, the course covers the areas of pharmaceuticals, biopharmaceuticals, pharmacokinetics, and drug metabolism. Integrative competency is developed and demonstrated in the final module.

PHAR 602 - APPLIED PHARMACOKINETICS (3)

This course focuses on drug absorption, distribution, metabolism, and excretion coupled with dosage and the parameters of clearance, volume of distribution, and bioavailability. These processes determine the concentration of drug at the site of action in the body. The course covers the quantitative relationship between dose and effect as a framework to interpret measurement of drug concentrations in biological fluids, and pharmacokinetic principles using mathematical processes and descriptive parameters that describe the time course of drugs in the systemic circulation and the relationship of drug concentrations to observed effect.

PHAR 606 - Experimental Success (1)

This course provides the student with the opportunity to rotate through laboratories of faculty that perform pharmaceutical sciences research.

PHAR 607 - Experimental Success 2 (1)

This course provides the student with the opportunity to rotate through laboratories of faculty that perform pharmaceutical sciences research.

PHAR 608 - INTRODUCTION TO LABORATORY RESEARCH (1 TO 2)

This course provides the student with the opportunity to perform mini-research projects in faculty research laboratories.

PHAR 610 - PHARMACEUTICAL FORMULATION AND UNIT PROCESSES (2 OR 4)

This course addresses the rational design and formulation of dosage forms, and the processes and equipment in their large scale manufacture. Consideration is on how the interplay of formulation and process variables affects both the manufacturability of the dosage form and its performance as a drug delivery system.

PHAR 615 - PSC ETHICS AND BIOSTATISTICS (1 TO 2)

Recent decades have seen examples of challenges to ethics in scientific research. With the goal of providing complete and contemporary training in research, this course exposes students to acceptable and unacceptable ethical behaviors.

To help students understand the issues and to aid in discussions, this course is heavily case-based. Students gain training in appropriate experimental design, and in ways of conducting experiments and analyzing data. Students also learn to identify ethical issues in a practical sense by critical review of manuscripts. This course is offered to graduate students (MS and PhD) and to Pharmacy (PharmD) students. Knowledge gained in the course is considered an integral component of students' research training in pharmaceutical sciences.

PHAR 620 - MODERN METHODS OF DRUG DELIVERY (2)

This course focuses on the rationale for existing and future drug delivery systems. Students explore underlying physical, chemical, and biological bases for each system and identify benefits and drawbacks. Examples of delivery systems include inhalation aerosols, transdermal patches, microspheres, implants, and tablets. Emphasis is on the biopharmaceutics, and transport properties and barriers associated with each method of delivery. The course also stresses written and oral presentation skills through student presentations and paper critique sessions.

PHAR 621 - MOLECULAR BIOPHYSICS (1 TO 3)

This course focuses on physical aspects of the structure and function paradigm of biological and pharmaceutical molecules. Designed for both experimentally and theoretically/computationally oriented graduate students in pharmaceutical, chemical, biochemical, and medical sciences, this course offers students exposure to basic theories and computational methods for studying the mechanisms of biological systems at an atomic level of detail.

PHAR 622 - ADVANCED PHARMACOGENOMICS (1)

Interindividual variability in drug effects and the lack of reliable prediction of this variability have been recognized as major barriers to safe and efficient therapeutics. Genetic makeup is one of the intricate factors that has substantial influence on drug efficacy or toxicity. Pharmacogenomics deals with heredity and effects on drug response. It combines traditional pharmaceutical sciences with contemporary knowledge of genes, proteins, and SNPs. The objective of this course is to enable the student to understand basic pharmacogenomic principles and their potential use for developing better and safer drugs.

PHAR 628 - BIOANALYTICAL AND PHARMACOLOGICAL METHODS (1 TO 3)

This course describes current techniques and strategies for

isolating, detecting, and analyzing experimental data. Topics range from methods relevant to small molecules, tissues, and cells to methods relevant to whole animals.

PHAR 638 - PHARMACOMETRIC DECISION-MAKING (3)

This course covers the theoretical and practical application of statistics and experimental design to help students use tools in research problems. The class discusses and uses computer programs to analyze data representing actual experimental situations. Prerequisites: PHAR 602 or PHAR 663.

PHAR 639 - SPECTROMETRIC METHODS (1 TO 3)

This course introduces students to spectrometric techniques for the elucidation of molecular structure and to the analysis of pharmaceutically important materials. The methodologies covered include ultraviolet-visible, infrared, nuclear magnetic resonance, and mass and fluorescence spectrometry. The class includes discussions of physical principles, instrumentation involved, exercises in the interpretation of spectrometric data, and examples of application.

PHAR 641 - TECHNICAL WRITING (1)

This course will provide a platform for developing technical writing skills focused on identifying common components of academic writing and creating best practice guidelines. Students will be exposed to articles, visualizations, and software to prepare them for writing in their careers. Students will be challenged to review and breakdown academic literature. They will also lead discussions on effective methods of communication. Exercises from this course will build the foundational skills necessary to succeed in PHAR 642 Technical Writing "Chapter II".

PHAR 642 - TECHNICAL WRITING II (1)

This course will act as a stage for students to develop their technical writing skills with a focus on academic publication. Students will be exposed to articles, visualizations, and software to prepare them for writing in their careers. Content for class will focus on identifying common components and structure of academic literature, style, writing behavior, and revision. Students will work collaboratively through writing and review sessions to construct quality written works. Exercises from this course will build the advanced skills required to write high level academic documents. Students taking this course will work to create documents that meets the general requirements for publication.

PHAR 643 - PHARMACEUTICAL DATA SCIENCE (1)

This course will provide a platform for developing data analytics and coding skills focused on solving real world data science problems in the pharmaceutical field. Students will be exposed to analytics, visualization, and coding tools to prepare them for creating their own programs and solving unique problems. Students will be challenged to create simple programs to analyze large data sets, organize data, visualize data, and identify trends or outcomes from the data. Knowledge and skills from previous courses throughout the program will be utilized to answer questions brought forth in this course.

PHAR 651 - RECENT ADVANCES IN PHARMACOLOGY (1)

This course provides students with an understanding of the recent progress in basic and clinical pharmacology research, from new concepts in pharmacology to the new techniques and trends in pharmacology.

PHAR 653 - ADVANCED PHARMACOLOGY I (4)

Advanced Pharmacology I and II cover mechanisms by which pharmacological agents interact with the living organism to provide the student with a rational basis for investigations in biomedical research. Topics include the pharmacodynamics and the biochemical and physiological effect of drugs on biological systems, including the central and peripheral nervous system, and the endocrine, renal, respiratory, and cardiovascular systems. Lectures supplement weekly conferences and discussion groups.

PHAR 654 - ADVANCED PHARMACOLOGY II (4)

Advanced Pharmacology I and II cover mechanisms by which pharmacological agents interact with the living organism to provide the student with a rational basis for investigations in biomedical research. Topics include the pharmacodynamics and the biochemical and physiological effect of drugs on biological systems, including the central and peripheral nervous system, and the endocrine, renal, respiratory, and cardiovascular systems. Lectures supplement weekly conferences and discussion groups.

PHAR 662 - CLINICAL PHARMACOKINETICS (2)

After successful completion of this course, students should be able to describe the principles of and most current approaches to therapeutic drug monitoring, describe the mechanism of and predict the effects metabolic drug interactions (induction vs. inhibition), give the rationale for dose adjustments in special populations including elderly, obese, liver and kidney disease patients, apply

pharmacokinetic principles, in a scientific manner, to solve a clinical problem/question, and provide a succinct, well-written pharmacokinetics consult note.

PHAR 663 - STATISTICS FOR PHARMACOMETRICS I (3)

The field of pharmacometrics requires good understanding of statistical concepts. This course provides the basic statistical principles required for a pharmacometrician. This introductory level course also strengthens the student's understanding of pharmacokinetic/pharmacodynamic modeling aspects. The course material is tailored for pharmacometricians. Pre-Requisites: PHMX 601

PHAR 665 - DOSE-RESPONSE TRIALS (3)

Knowledge of designing and analyzing dose-response is an important component of a drug development or regulatory review. Basics of the variety of dose-response designs such as parallel, cross-over, flexible-dose, titration, withdrawal, adaptive and enrichment trials are explained. Students perform clinical trial simulations for supporting the choice of appropriate designs and analyses. Innovative designs and data analysis make characterizing dose-response feasible within the realms of drug development. The information generated from such trials is key for both approval of new drugs as well as for drug product labeling. Pre-Requisites: PHMX 601

PHAR 666 - COMMUNICATIONS AND NEGOTIATIONS (2)

This course improves students' abilities to communicate and negotiate strategically. Students identify their communication styles and learn how to compensate for any weaknesses. Scientists in life sciences work with interdisciplinary scientists with diverse backgrounds. Pharmacometrics has not reached its full potential yet and is breaking new ground. In order to influence key decisions during drug development, during regulatory review or in clinics, pharmacometricians need to communicate in a manner that is simple, persuasive, and effective. Implementation of model-based drug development calls for change from current practice, and such changes are often resisted. Scientists who lack authority to implement solutions need to master effective negotiation amid diverse opinions, thereby leading the team towards consensus.

PHAR 667 - ORGANIC SYNTHESIS IN DRUG DESIGN (1 TO 2)

Students are taught the application of synthetic organic chemistry to drug design. The course includes instruction in a range of standard functional group transformations and

chemical mechanisms. Discussion then shifts to apply this synthetic chemistry knowledge to the synthesis of peptides, peptoids, small-molecules and natural products. Protecting group chemistry as well as solid phase synthesis are also discussed.

PHAR 690 - (2)

Offered: 202009.

PHAR 702 - ASPECTS OF SOLID DOSAGE FORMS (3)

A survey of the performance and processing of solid dosage forms. As most pharmaceuticals are prepared from powders, emphasis is on identifying, measuring, and controlling those properties that decide the processing characteristics of powdered materials. Prerequisite: PHAR 535, physical chemistry (calculus based), or consent of instructor

Offered: 200106.

PHAR 705 - PSC JOURNAL CLUB (1)

This course is designed as a forum for students to present research projects to a peer audience and to help students thoroughly disseminate, analyze, and critique current research related to the pharmaceutical sciences. Students will be introduced to interdisciplinary research topics. Journal discussions will be coordinated with department seminar speakers' research interests.

Offered: 200902.

PHAR 707 - DRUG TRANSPORT AND METABOLISM (2)

This course provides basic knowledge about drug absorption at different sites in the human body (e.g. intestine, blood-brain barrier, kidney, liver) and the physicochemical and pharmaceutical factors, as well as pathophysiologic conditions that influence drug penetration. This course allows students to understand the choice of a particular absorption route and dosage form. Additionally, the interplay of drug metabolism and drug transport are discussed.

Offered: 200409.

PHAR 708 - COMPREHENSIVE EXAM SEMINAR (THIRD YEAR, FALL SEMESTER) (1)

An oral presentation given in the fall of Year 3 as part of the graduate student's advancement to PhD candidacy, this seminar focuses on the student's thesis project.

Offered: 200509.

PHAR 709 - DEPARTMENTAL SEMINAR (1)

This oral presentation, given close to the commencement of a student's PhD research, focuses on the student's thesis research.

Offered: 201402.

PHAR 747 - INTERMEDIATE PKPD MODELING (3)

A detailed study of the principles of drug transport, distribution, biotransformation, binding and excretion, with emphasis on quantitative aspects and measurement of these processes.

Offered: 201209.

PHAR 751 - DRUG DESIGN (3)

This course covers applications of chemical and biological principles to the rational design of drugs. Topics include targets of biologically active molecules, approaches to studying ligand and target interactions, overview of drug discovery, agents acting on specific targets, combinatorial chemistry, computation chemistry, and structure activity relationships.

Offered: 200106.

PHAR 755 - TOPICS IN METALLOBIOCHEMISTRY (2)

This course introduces basic concepts pertaining to metal ions in biological systems. Topics include metal ions in proteins, cofactors and metal clusters, metal ion transport and storage and regulation, and metalloenzymes. There is a series of two-hour lectures on specific topics, followed by student presentations of recent research articles from the literature on said specific topics. Students are graded on their paper selection, presentation, analysis of the paper, and intellectual contribution. Prerequisites: PHAR 600/601

Offered: 201002.

PHAR 758 - SPECIAL TOPICS (PROJECT) (1 TO 7)

Research projects are selected from a set of pre-defined projects provided by the Center for Translational Medicine (CTM). Students also use projects from their organizations towards the research. Projects need to be identified by the end of the first year. CTM staff guide the students on these projects. Pre-Requisites: PHMX 747, 759

Offered: 201402.

PHAR 759 - STATISTICS FOR PHARMACOMETRICS II (3)

Understanding clinical trial data with binary, ordinal, count, and time-to-event outcomes requires specific understanding of statistical concepts. This intermediate level course introduces application of statistical techniques such as logistic regression, Poisson regression, and survival analysis. The course also demonstrates simulation techniques associated with discontinuous outcomes. R software is used to demonstrate the application of statistical aspects. Simulated and real data from experiments and clinical trials are employed for practice and homework. Pre-Requisites: PHMX 638, 663

Offered: 201306.

PHAR 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

Offered: 200109.

PHAR 858 - SPECIAL TOPICS (1 TO 6)

Topics vary from term to term.

Offered: 200106.

PHAR 898 - PRE-CANDIDACY RESEARCH (1 TO 6)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

Offered: 201409.

PHAR 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

Offered: 200109.

PHMX**PHMX 601 - BASIC PHARMACOMETRIC TOOLS (3)**

Pharmacometric projects require mastery of new and advanced tools to conduct modeling and simulation. Students are introduced to Phoenix, NONMEM and R. Basic operations such as importing and restructuring data, performing summary statistical analysis, and plotting are taught. The goal, however, is not to provide the theory to interpret the data or the analysis output; other courses in

Pharmacometrics program are designed to complement the tools training received in this course. This is a mandatory course to be taken in the first semester of the MS program.

PHMX 602 - BASIC PKPD MODELING (3)

Understanding pharmacokinetics (PK) and pharmacodynamics (PD) provide the pivotal basis for dosing and related decision-making during drug development and its use in clinic. This course provides training in the fundamentals of PK and PD modeling and their application to decision-making. Theoretical concepts pertaining to analyzing PKPD data, in an average subject, both from mechanistic and statistical points of view, are taught. The course also includes hands-on training using standard modeling and simulation software. This is a mandatory course to be taken in the first semester of the MS program.

PHMX 638 - INTERMEDIATE PKPD MODELING I (3)

Knowledge of conducting pharmacometrics analysis is an important component of the drug development and regulatory project. However, integrating all the different pieces together is equally important. This course guides students on the process of framing the appropriate questions, engineering the analysis, interpreting the results, and influencing the decision-making process in drug development. This course integrates the essence of all of the coursework in the program, and allows students to appreciate the totality of a typical pharmacometrics project that is essential for decisions regarding new drug development. Pre-Requisites: PHMX 602, 663

PHMX 663 - STATISTICS FOR PHARMACOMETRICIANS I (3)

The field of pharmacometrics requires a sound understanding of statistical concepts. This course provides the basic statistical principles required for a pharmacometrician. This introductory level course strengthens the student's understanding of pharmacokinetic/pharmacodynamic modeling aspects. The course material is tailored for pharmacometricians. Pre-Requisites: PHMX 601

PHMX 665 - DOSE-RESPONSE TRIALS (3)

Knowledge of designing and analyzing dose-response is an important component of a drug development and of regulatory review. Basics of the variety of dose-response designs such as parallel, cross-over, flexible-dose, titration, withdrawal, adaptive and enrichment trials are explained. Students perform clinical trial simulations for supporting the choice of appropriate designs and analyses. Innovative

designs and data analysis make characterizing dose-response feasible within the realms of drug development. The information generated from such trials is key for both approval of new drugs as well as for drug product labeling. Pre-Requisites: PHMX 601

PHMX 666 - STRATEGIC COMMUNICATION AND NEGOTIATIONS (2)

This course improves students' abilities to communicate and negotiate strategically. Students identify their communication styles and learn how to compensate for any weaknesses. Scientists in life sciences work with interdisciplinary scientists with diverse backgrounds. Pharmacometrics has not reached its full potential yet and is breaking new ground. In order to influence key decisions during drug development, during regulatory review, or in clinics, pharmacometricians need to communicate in a manner that is simple, persuasive, and effective. Implementation of model-based drug development calls for change from current practice, and such change is often resisted. Scientists who lack authority to implement solutions need to master effective negotiation amid diverse opinions, thereby leading the team toward consensus.

PHMX 747 - INTERMEDIATE PKPD MODELING II (3)

Conducting population analyses and interpreting complex datasets is pivotal for several decisions, such as "go-no-go" dose selection for various patients. This course presents theoretical concepts pertaining to analyzing PKPD data (collected from several subjects) from the mechanistic and statistical points of view. Because data from several subjects are analyzed simultaneously, the course includes advanced modeling techniques such as nonlinear mixed effects modeling. Further, advanced modeling such as physiologically-based PK modeling and absorption-metabolism simulations are introduced. This course also includes hands-on training in standard modeling and simulation software. Pre-Requisites: PHMX 638, 663

Offered: 201409.

PHMX 759 - STATISTICS FOR PHARMACOMETRICIANS II (3)

Understanding clinical trial data with binary, ordinal, count, and time-to-event outcomes requires specific understanding of statistical concepts. This intermediate level course introduces application of statistical techniques such as logistic regression, Poisson regression, and survival analysis. This course also demonstrates simulation techniques associated with discontinuous outcomes. R software is used to demonstrate the application of

statistical aspects. Simulated and real data from experiments and clinical trials will be employed for practice and homework. Pre-Requisites: PHMX 638, 663

Offered: 201409.

PHSR

PHSR 604 - PHARMACOEPIDEMIOLOGY (3)

This course is an introduction to the field of pharmacoepidemiology that uses quantitative research methods to examine questions of benefit or risk in regard to the use of marketed medications. The course is intended to offer useful techniques to medical and health researchers who wish to assess the utilization, effectiveness, and safety of marketed drug therapies. Prerequisite: Introduction to Biostatistics and Principles of Epidemiology.

PHSR 605 - INTRODUCTION TO CER-PCOR FOR THE HEALTH CARE PROVIDER (3)

This course provides an overview of comparative effectiveness and patient-centered outcomes research (CER-PCOR) geared toward clinicians and covers a wide range of topics including CER-PCOR history, definitions, and evolution of key terms. The course also covers identifying and engaging stakeholders; evidence-based medicine; current policy issues; government and private sector roles and programs; PCORI, AHRQ, NIH, HHS, and FDA programs; CMS and private insurer uses; patient engagement and advocacy; and application to clinical decision-making.

PHSR 610 - PHARMACY, DRUGS, AND THE HEALTH CARE SYSTEM (3)

This course encompasses an examination of the principal components of the U.S. health care system with special emphasis on their relationship to the provision of drugs and pharmacy services.

PHSR 620 - INTRODUCTION TO HEALTH BEHAVIOR THEORY (3)

This course covers medical sociology, psychology, social psychology, and interpersonal communication theories and research as they relate to the pharmacy practice system that involves patients, pharmacists, physicians, nurses, and other health care professionals.

PHSR 631 - COMPUTING AND ANALYTIC METHODS FOR OBSERVATIONAL STUDIES (3)

This course focuses on: 1) programming tools and techniques for analyzing observational data using SAS and

R; 2) best practices for storing, manipulating, and analyzing large datasets used in health outcomes studies; 3) programming statistical regression models for observational, non-randomized studies.

PHSR 650 - CER AND PHARMACOECONOMICS I (3)

This course is designed to familiarize students with economic structure, conduct, and performance of the pharmaceutical industry. The course includes such topics as prices and profits in the industry, productivity, cost, economies of scale, innovation, economic effects of regulation, cost benefit and cost effectiveness of pharmaceuticals, and efficiency of drug delivery systems. Prerequisite: One undergraduate economics course or permission of the instructor.

PHSR 655 - CER AND PHARMACOECONOMICS II (3)

This course focuses on: (1) advanced analytical methods used in comparative effectiveness research (CER) and pharmacoeconomics studies, (2) the identification and assessment of uncertainty in CER and pharmacoeconomic studies, and (3) the development of a statistical analysis plan for CER and pharmacoeconomics studies.

PHSR 665 - INTRODUCTION TO MIXED METHODS APPLICATIONS IN COMMUNITY-BASED ACTION RESEARCH (3)

This course provides students with an introduction to the concepts, frameworks, definitions and descriptions of mixed methods action research (MMAR) and how these methods can be applied in designing and conducting community-based action research studies. Topics include: definitions and descriptions of community-based action research and of mixed methods research; mixed methods frameworks for action research; steps in designing and conducting MMAR studies in community settings; types of MMAR designs, and; sampling, data collection, analysis, validation and evaluation of MMAR projects. Students receive instruction on choosing an appropriate MMAR design, on applying the steps to design an MMAR study, and on visually presenting the procedures employed in the study. And, students learn how to develop an MMAR study proposal with an emphasis on the study methodology.

PHSR 670 - HEALTH EDUCATION PROMOTION PROGRAM PLANNING (3)

Health education is a scientific process designed to achieve voluntary behavioral changes to improve health status. Health promotion utilizes health education to promote

health and prevent disease. The PRECEDE Model is used to demonstrate the analytical process to explore health problems, identify and assess the behavioral and non-behavioral factors associated with them in order to develop and evaluate interventions. This course addresses health education at the level of the individual, the family and the community at large. Because the relationship between practitioner and patient is often a major determinant of outcome, health promotion in the clinical setting is given emphasis. Cross-listed with PREV 650.

PHSR 701 - RESEARCH METHODS I (3)

This course is designed to introduce the student to the concepts of scientific research in pharmacy practice and administrative science. Topics to be discussed include the scientific method and problem-solving processes, social science measurement, and several specific methods of research. Co-requisite: Introduction to Biostatistics

PHSR 702 - RESEARCH METHODS II (3)

This course is designed to give research tools to design studies in the impact of pharmaceutical (or other) interventions or policies in actual practice settings. Unlike clinical trials where subjects are randomized to treatment or placebo arms, health services researchers typically are forced to use non-experimental designs with secondary data. This course will take you through the pitfalls in such designs and show you how to deal with them. Prerequisite: Research Methods I and an upper level graduate course in multiple regression.

PHSR 704 - PHARMACOEPIDEMIOLOGY (3)

This course is an introduction to the field of pharmacoepidemiology that uses quantitative research methods to examine questions of benefit or risk in regard to the use of marketed medications. The course is intended to offer useful techniques to medical and health researchers who wish to assess the utilization, effectiveness, and safety of marketed drug therapies. Prerequisite: Introduction to Biostatistics and Principles of Epidemiology. Cross-listed with PREV 705

PHSR 705 - INTRODUCTION TO CER AND PCOR (3)

This course provides an overview of comparative effectiveness and patient-centered outcomes research (CER/PCOR) covering a wide range of topics including history, definitions, and evolution of key terms. Additional topics include: identifying and engaging stakeholders; evidence-based medicine and health technology assessment; current policy issues; government and private sector roles and programs; PCORI, AHRQ, NIH, HHS,

FDA, programs; CMS and private insurer uses; the role of cost/QALY; patient engagement and advocacy; evolving methods and standards resources; and methods and policy controversies.

PHSR 706 - HEALTHCARE QUALITY AND PERFORMANCE MEASURES (3)

This course provides an informative overview of healthcare quality improvement through an evaluation of quality and quality measures in varying aspects of healthcare and healthcare services.

PHSR 707 - HEALTH OUTCOMES ASSESSMENT (3)

This course provides an understanding of the principles for measurement of health and health outcomes. Students will gain a familiarity of various measurement types (e.g., COA, PRO, ObsRO, ClinRO, PerfO), and measurement instruments used for health status, quality of life, patient satisfaction, function and disability, and will become familiar with compliance/adherence and their related properties. Also presented in this course are data sources used for measure development; methods for assessing strengths and weaknesses; validity and reliability, and a framework for judging the appropriateness of a particular measure.

PHSR 708 - SPECIAL PROJECT (1 TO 6)

Students are given the opportunity to work with a faculty member on individual and specialized projects/research. The project/research provides students direct experience of collection, organization, and analysis of data.

PHSR 709 - GRADUATE SEMINAR (1)

The graduate seminar is conducted weekly to inform students and faculty about new research and current issues. Each week there is a different presenter. The speaker may be a graduate student, postdoctoral fellow, resident, faculty member or guest speaker who presents a current topic in the educational or pharmaceutical field. Seminar attendance is mandatory for all graduate students while in residency.

PHSR 722 - ADVANCED TOPICS IN PHARMACOEPIDEMIOLOGY (3)

The purpose of this course is to engage students in the techniques of pharmacoepidemiology through case studies and by working through an actual drug safety investigation. Drug safety is addressed in the context of science and the law through readings, debates, and discussions with invited guests. Using the FDA's Adverse

Event Reporting System database and the medical literature, students devise the epidemiological characteristics of a drug safety signal. Based on the characteristics of the signal, the team designs a pharmacoepidemiological study to further evaluate the safety signal. This course is cross-listed as PREV 722. Prerequisites: PREV 600, PREV 620, and PHSR 704 or permission of the instructor.

PHSR 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

PHSR 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

PHSR 899 - DOCTORIAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

PREV

PREV 600 - PRINCIPLES OF EPIDEMIOLOGY (3)

This introductory course presents a comprehensive overview of the concepts and methods of modern epidemiology. A major emphasis is placed on understanding the strengths and limitations of the various epidemiologic study designs. Bias, confounding, effect modification, and causal inference are covered in detail, and the students are given the opportunity to apply these concepts in critiques of the published epidemiologic literature. Learning approaches include lectures, readings, discussions, in-class exercises, and workshops.

PREV 601 - APPLIED EPIDEMIOLOGY (1 TO 2)

This introductory course is designed to challenge students to apply epidemiologic concepts and methods to analysis of data on current issues. Students choose a relevant question, develop testable hypotheses, conduct descriptive analyses, report and discuss results, and consider study limitations. Each step in the process is supported by lectures and student presentations of their findings to the class. The primary source of data for student projects is adverse event reports to FDA. Student evaluation is based on class presentations and participation. Student registering for 2 credits are expected to complete a final written paper in manuscript form.

PREV 602 - MANAGEMENT OF CLINICAL TRIALS (3)

This course emphasizes the practical application of organizing, managing, and conducting clinical trials. An overview of clinical trials theory and design characteristics provides the background necessary to conduct single center and multicenter studies. Topics encompass essential management functions and responsibilities by primarily focusing on the role of the research coordinator in enrollment, randomization, follow-up visits, timely reporting of adverse drug reactions and events, and study close-out. The role and function of specialized committee structures in multicenter trials are demonstrated. There are presentations and discussions on applied methodology using examples from several recent and ongoing clinical studies.

PREV 611 - DISEASE MODELS IN EPIDEMIOLOGY (3)

Models are an important tool for understanding infectious disease epidemics. Each student develops and analyzes a basic mathematical model on a system of his/her choice. In addition, students are introduced to the core theory for infectious diseases, teach some basic skills needed to read a theory paper, and cover special topics selected by the students. Prerequisites: PREV 600 and PREV 620.

PREV 613 - NUTRITIONAL EPIDEMIOLOGY (3)

This course is taught through lectures, hands-on class demonstrations and activities, and discussions of assigned readings during 15 three-hour sessions. Following an introduction to basic principles of nutritional epidemiology, the topics to be covered will include dietary assessment and analyses; collecting and analyzing anthropometry and body composition data; physical activity measurement and analyses; principles and applications of biomarkers; relationship between diet and risk of developing diseases (e.g., diabetes, cardiovascular, cancer, infection); international nutritional epidemiologic research; and the global application of methods relevant to nutrition and disease risk across the life span. In addition, the students will critique and discuss papers selected from the literature.

PREV 616 - INTRODUCTION TO CLINICAL AND TRANSLATIONAL RESEARCH AT UMB (2)

This course provides an overview of the basic skills, attitudes and resources needed for developing and implementing a clinical or translational research project. The emphasis is on how to obtain these skills and resources on the UMB campus.

PREV 619 - INTRODUCTION TO SAS (1)

This course provides the student with comprehensive experience in the application of epidemiological and biostatistical methods available in the Statistical Analysis System (SAS). Hands-on experience in weekly workshops is gained by conducting analyses of existing data designed to answer a research question. Prerequisites: PREV 620 (Principles of Biostatistics), or Instructor's permission and knowledge of basic principles of epidemiology.

PREV 620 - PRINCIPLES OF BIOSTATISTICS (3)

This course is designed to develop an understanding of statistical principles and methods as applied to human health and disease. Topics include: research design; descriptive statistics; probability; distribution models; binomial, Poisson, and normal distribution; sampling theory and statistical inference. Prerequisites: Knowledge of college algebra required. Calculus recommended.

PREV 621 - BIOSTATISTICAL METHODS (3)

This course is designed to introduce the students to a broad range of methods commonly used in biomedical and public health research, and to provide some hands-on data analysis experience. Topics to be covered include the role of statistics in science, properties of distributions, exploratory data analysis, inference about means, proportions and survival distributions, and introduction to multivariable methods. Note: PH 621/ PREV 621 does not satisfy the biostatistical requirements for MS or PhD students in Epidemiology but is an appropriate course for other graduate degree programs.

PREV 625 - COMMUNITY-BASED PARTICIPATORY RESEARCH METHODS (3)

This course provides a comprehensive understanding of the ways in which social scientists, health professionals and community members can collaborate to address public health problems through research that leads to improvements in health, quality of life and community change. Students and faculty from multiple scholarly disciplines examine the approaches to community-based participatory research that goes beyond the domain of a single discipline. Students receive training in the skills needed to apply mixed methods (qualitative and quantitative) of approaches to designing, implementing and evaluating public health programs and community-based participatory research. Attention is given to the scholarly debates and practical/logistical issues in conducting community-based participatory research. Ethical principles of social justice are applied to public health program planning and evaluation which uses community-

based participatory methodology. Required for students in the Community and Population Health concentration of the MPH program.

PREV 627 - VACCINOLOGY (2)

Vaccinology is an emerging science that deals with all aspects of the development and use of vaccines and vaccination programs. The Center for Vaccine Development (CVD) at the University of Maryland is a world famous research center that creates vaccines in the laboratory, then tests these vaccines at all levels, including pre- and post-licensure field studies. This course is taught by the CVD faculty and experts from other areas including government and industry. The full range of issues in vaccinology is covered, including the current status of vaccines and vaccination programs and political, economic, and ethical considerations. There is particular emphasis on policy in vaccine implementation.

PREV 633 - APPLICATION OF LEGAL AND REGULATORY ISSUES IN CLINICAL RESEARCH (2)

This is a multidisciplinary course covering application of legal and regulatory topics critical to performing clinical research including the informed consent process, privacy and confidentiality issues; investigational new drug (IND) applications; financial disclosure and conflict of interest; the institutional review board (IRB) process; recruitment and retention strategies; data safety monitoring plans; and quality management and clinical research conduct issues.

PREV 634 - HEALTH INFORMATICS (4)

The course provides a comprehensive introduction to the field of health informatics, combining perspectives to medicine, public health, social science and computer science. Particular attention is given to diverse use of computers and information technology in healthcare and the biomedical sciences, including specific applications and general methods, current issues, capabilities and limitations of health informatics. Health Informatics studies the organization of medical information, the effective management of information using computer technology, and the impact of such technology on medical research, education, and patient care. The field explores techniques for assessing current information practices, determining the information needs of healthcare and biomedical research professionals and other workers and patients, developing systems using computer technology, and evaluating the impact of these systems. The course covers a wide range of health informatics applications relevant to healthcare delivery organizations, government agencies, biomedical researchers and commercial entities.

The course provides an overview of major health informatics techniques aimed at optimizing the use of information to improve the quality of healthcare, reduce cost, provide better education for providers and patients, and to conduct medical research more effectively. Prerequisites: Some experience with computers and a passing familiarity with biology and/or medicine is useful.

PREV 645 - SPECIAL TOPICS IN LAW AND MEDICINE: CRITICAL ISSUES IN HEALTH CARE (3)

This interdisciplinary course is open to students from the Schools of Law, Medicine, Social Work, Nursing, Pharmacy, Dentistry and the graduate schools at UMB and UMBC. The course is designed to: (1) provide students with an opportunity to reflect on the legal, ethical and policy issues surrounding a number of health care delivery problems; (2) expose participants to the basic skills necessary to analyze problems from a legal, ethical and policy perspective; and (3) offer participants from different disciplines an opportunity to interact and share information and perspectives about their professions with one another. A variety of teaching techniques, including case studies, simulations, and panel discussions will be used to explore such topics as medical malpractice, rights of patients to refuse treatment, informed consent and substituted consent in medical decision making, confidentiality v. duty to disclose medical information, regulation of experimental drugs, and health care reform. During the course, students will have an opportunity to work in multidisciplinary teams to analyze a particular health care problem and to develop a position paper on a health care policy issue. This course is Cross-listed with LAW 648B.

PREV 648 - INTRODUCTION TO HEALTH SYSTEM AND HEALTH POLICY MANAGEMENT (3)

Lectures, seminars, readings, and small group discussions in this course are designed to convey an understanding of health care systems and their structure, function, and effectiveness. Topics include: principles of management; municipal, state, national, and foreign organizational systems; HMOs; health care costs; cost containment and quality; regulations; planning and evaluation; health manpower; and applied problem solving.

PREV 649 - INTRODUCTION TO PREVENTIVE MEDICINE (1 TO 3)

This seminar course emphasizes the applications of epidemiology, statistical reasoning, and preventive medicine to clinical practice. The role of the physician and other health professionals in the primary and secondary

prevention of disease is discussed. Topics include relationships among physicians, hospitals, nursing homes, regulatory agencies, third party payers, and the law. Prerequisites: PREV 600, PREV 620, and consent of instructor

PREV 650 - HEALTH EDUCATION AND PROMOTION PROGRAM PLANNING (3)

This course presents a scientific process designed to achieve voluntary behavioral change to improve health status. Health promotion utilizes health education to promote health and prevent disease. The analytical process used to explore health problems, the identification of factors associated with them, and the development and evaluation of interventions are covered. This course is cross-listed with PHSR 670.

PREV 651 - MOLECULAR BIOLOGY IN PUBLIC HEALTH RESEARCH (1)

This course, which uses the basics of molecular biology as the basis for a discussion of molecular methods frequently used in population based health studies, is tailored to students planning to take advanced epidemiology courses such as Molecular Epidemiology, Cancer Epidemiology, and Epidemiology of Infectious Disease, but who may be unfamiliar with recent developments in molecular biology.

PREV 652 - HEALTH ECONOMICS (3)

This course provides an analysis of health as an economic good. Using microeconomic theories the course examines the behavior of health care providers, consumers, markets, and firms. The underlying assumptions applicable to market economics are critically examined within the context of the health economy. Special problems of health economics are considered including assumptions of market competition, the demand and supply of medical care and health insurance, the role of government, and equity.

PREV 659 - OBSERVATIONAL STUDIES IN EPIDEMIOLOGY (3)

This course provides an in-depth examination of study designs, including case control and cohort studies. Special emphasis is placed on possible biases that can occur in epidemiologic research. Some special topics also will be addressed in detail, including screening, misclassification, and questionnaire construction. Prerequisite: PREV 600

PREV 664 - CRITICAL ISSUES IN GLOBAL HEALTH (3)

This series of seminars, lectures and reading assignments is designed to give students an overview of the global health

problems facing the world today and equip them with tools to navigate the world of international health. The course focuses on teaching students about the global burden of disease and pattern of disease variations between and within countries. It addresses cross cutting issues such as poverty, environmental degradation and the impact of globalization on health. Topics include maternal and child health, gender and violence, nutrition, water and sanitation.

PREV 668 - ENVIRONMENTAL AND OCCUPATIONAL HEALTH (3)

The class addresses the different components of the environment, the potential hazardous exposures and their implications, and the best practices to prevent and control them. Environmental exposures play a significant role in disease causation, particularly as risk factors for cancer, asthma, and other chronic diseases; and exposures in occupational settings are an important part of environmental exposures. This course consists of didactic lectures, in-class discussions, student presentations, and visits to environmental and occupational sites.

PREV 681 - EPIDEMIOLOGY OF AGING (3)

This course covers applications of the principle and methods of epidemiology and public health to the study of aging. There is a review of health assessment techniques that are potentially useful for conducting epidemiological studies of older people; the epidemiology of selected disease common to old age; primary, secondary, and tertiary prevention, as applied to older people, focusing on psychosocial and environmental aspects of health; differing ideas of long-term care, and their roles in the prevention, intervention, and treatment of illness in older people. Students learn how to critically evaluate and present research in a specific area of gerontological epidemiology with faculty supervision. Pre-requisite: PREV 600 or consent of the instructor. Cross-listed with GERO 681.

PREV 701 - CANCER EPIDEMIOLOGY (3)

This course combines different strands of knowledge ? molecular biology, pathology, epidemiological methods - and clinical and social sciences into an exploration of modern cancer epidemiology, prevention, and control, both domestically and internationally. Emphasis is placed on cancers of high prevalence or unique biological characteristics that illustrate interesting epidemiological or etiological characteristics. Comparison of cancer rates and evidence for the causes of these differences are explored. The goal is to encourage students to think creatively about the cancer problem and to explore research opportunities that will contribute meaningfully to reduced cancer

morbidity and mortality. A combination of lectures, seminars, and class activities is used.

PREV 702 - ADVANCED QUANTITATIVE METHODS (2)

This course covers issues relating to causal inferences ? that is, the study of methods and models used to understand what causes what in our world. Different causal frameworks are explored and are used to address problems relating to study design, confounding, modeling, validity, and inference. Readings are assigned each week, and students complete one midterm assignment and a final exam. The course is useful to anyone designing and conducting clinical research. A background in foundational epidemiological methods and biostatistics is recommended. Prerequisites: PREV 600 and PREV 720 or consent.

PREV 703 - COMPLEX DISORDERS SEMINAR (1)

This seminar series includes speakers from both inside and outside of the University. The speakers focus on topics including the difficulties of defining phenotypes, the problems involved in identifying genetic variation, and the statistical issues involved in correlating multiplicity of genotype data with that of phenotypic data. Speakers address these topics by discussing their research in areas including leukodystrophies, bipolar disorder, prostate cancer, and eye diseases. Outside speaker seminars are followed by discussions.

PREV 704 - MOLECULAR EPIDEMIOLOGY PRACTICUM (3)

This course involves three, three-month assignments across the nine-month school year and should be taken after completion of the first year of coursework. Prerequisites: Completion of first-year courses.

PREV 705 - PHARMACOEPIDEMIOLOGY (3)

This course provides an introduction to the field of pharmacoepidemiology using quantitative research methods to examine the benefits or risks of marketed medications. The course is intended to offer techniques to medical and health researchers who wish to assess the use, effectiveness, and safety of marketed drug therapies.

PREV 707 - COST EFFECTIVENESS IN PREVENTION AND TREATMENT (3)

A 3-semester hour graduate course for masters and doctoral students in the health sciences. This course is a component in the core methods for public health sciences, especially focusing on the preventive measures in

healthcare. Cost-effectiveness analysis is an integral part of the design and development of interventions, so that optimal decisions can be made in selecting the alternative to be implemented. Additionally, the evaluation of outcomes should include an empirical cost-effectiveness analysis to improve the body of knowledge available to future work. These techniques are also applied in randomized clinical trials. This course examines principles and techniques of Cost-Effectiveness Analysis (CEA) in healthcare from a prevention perspective. Participants learn key elements of the economist's analysis of costs and effect, in order to achieve a comparative and incremental cost-effectiveness analysis. Student projects design and conduct a hypothetical and empirical CEA. Prerequisites: PREV 600, PREV 720 or the equivalent.

PREV 709 - INTRODUCTION TO HEALTH SERVICES RESEARCH (2)

The purpose of this course is to explore health research topics and methods common to health services research (HSR) as it is applied to problems relevant to public policy. The focus is on a core set of methods, used in policy-related research. Course topics, discussion, and materials will be useful to health care students interested in understanding how health services research addresses important population health and social issues. The goal of the course is to develop a basic foundation for understanding of the practice and outcomes of policy-related health services research. The course faculty is interdisciplinary and is experienced in conducting health services research applied to various clinical populations.

PREV 710 - CLINICAL AND TRANSLATIONAL RESEARCH PROJECT DESIGN AND IMPLEMENTATION (1 TO 2)

This course provides hands-on experience in clinical and/or translational research project development and implementation. Students must have an idea for a clinical or translational research question involving human subjects at the beginning of the course, and they will work with a mentor outside of the course with content expertise for the research question. The student's research question will ultimately be developed into a research protocol and CICERO application. Prerequisites: PREV 600, PREV 616, and PREV 633.

PREV 711 - GENETIC EPIDEMIOLOGY (3)

This course provides the student with an overview of basic methods in genetic epidemiology, with application to common complex diseases such as coronary heart disease, type-2 diabetes and obesity. The course will begin with a review of basic human genetics and then proceed to a

description of methods used to dissect the genetic contribution to human disease and to map genes. Topics include: assessment of familial aggregation, heritability analysis, segregation and linkage analysis, genetic association studies, and linkage dis-equilibrium mapping. The course will involve a computer lab, and students are expected to complete a data analysis project using genetic analysis software and to write up their results as a course project. Prerequisites: PREV 600, PREV 619, PREV 620 or their equivalents, or consent of instructor. Background in basic human genetics helpful.

PREV 715 - INJURY EPIDEMIOLOGY AND PREVENTION (3)

This course helps students understand basic models of injury causation, principles of injury prevention and control, how to design epidemiologic studies of risk factors for injury and how to evaluate public health interventions designed to address the problem of injuries. Prerequisites: PREV 600 or PH 600, Principles of Epidemiology.

PREV 716 - CHRONIC DISEASE EPIDEMIOLOGY (3)

The purpose of this course is to provide students with an introduction to chronic disease epidemiology. Students are introduced to the application of epidemiologic methods in the context of major chronic diseases in order to determine: 1) disease risk factors and determinants, 2) disease burden in a population and its sub-populations, 3) efficacy and effectiveness of prevention and treatment interventions, and 4) guidelines for individual treatment and public health disease control. Students acquire the skills to interpret, evaluate, and design basic chronic disease epidemiology research projects; to locate and interpret chronic disease surveillance data; and to design public health programs for chronic disease surveillance and control. Prerequisite: Must have completed an introductory epidemiology course (PREV 600), or have a specific exception from instructor. Recommended: Completion of an introductory biostatistics course

PREV 720 - STATISTICAL METHODS IN EPIDEMIOLOGY (3)

This course provides instruction on the specific statistical techniques used in the analysis of epidemiological data. Topics include: treatment of stratified and matched data, detection of interaction, conditional and unconditional logistic regression, survival analysis, and proportional hazards models. Prerequisites: PREV 600, PREV 620 and consent of instructor.

PREV 721 - REGRESSION ANALYSIS (2)

This course covers basic principles and theory of regression techniques. Topics include simple and multiple linear regression, robust regression, regression diagnostics, and logistic and Poisson regression analysis. The emphasis of this course is on learning the biomedical research application and interpretation of regression techniques. Prerequisites: PREV 619 and PREV 720, or consent of instructor.

PREV 722 - ADVANCED TOPICS IN PHARMACOEPIDEMIOLOGY (1 TO 3)

The purpose of this course is to engage students in the techniques of pharmacoepidemiology through case studies and by working through an actual drug safety investigation. Drug safety will be addressed in the context of science and the law through readings, debates, and discussions with invited guests from the FDA, a pharmaceutical company/consulting agency, and a law firm. Students will work together as an investigative team under the direction of the instructor. Using the Food and Drug Administration's Adverse Event Reporting System database and the medical literature, students will work up the epidemiological characteristics of a drug safety signal. Based on the characteristics of the signal, the team will design a pharmacoepidemiological study to further evaluate the safety signal. Prerequisites: PREV 600, PREV 620, PREV 705/PHSR 704, or permission of the instructor.

PREV 724 - INTRODUCTION TO CAUSAL INFERENCE AND MACHINE LEARNING (2)

The objective of this course is to equip students with a diverse range of data analysis techniques (such as model-free estimation, model-based estimation, time-varying treatments, causal survival models, causal mediation models, machine learning models, etc.) for estimating causal effects under specific assumptions when data is gathered for each individual in a population. Additionally, the course will delve into practical applications of these methods through the analysis of real-world data and the examination of cutting-edge research in causal reasoning. By the conclusion of this course, students will have acquired a comprehensive understanding of causal inference principles, especially within the context of biomedical studies, and will have gained proficiency in using commonly employed R functions for data analysis. Furthermore, this course will lay a solid foundation for students interested in pursuing further research in causal inference and will serve as valuable preparation for more advanced courses in causal inference field.

PREV 730 - INTRO TO R STATISTICAL ANALYSIS

This course introduces R software with an emphasis on using R for descriptive data analysis. Students will primarily use base R to manipulate, describe, and graph data and to assess bivariate relations. They will learn how to use R functions to conduct data analysis as well as how to write their own functions. Concepts will be introduced in lectures followed by lab sessions where students will gain hands-on experience by conducting analyses of existing datasets.

PREV 747 - EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM I (3)

This course provides guided experience in epidemiologic research over two semesters. Students are expected to complete a data-based project that includes analysis of data and preparation of manuscript-to-report findings. Prerequisites: PREV 619, PREV 720 (or concurrent enrollment), and PREV 600 previously. Students must successfully complete PREV 747 in order to register for PREV 748.

PREV 748 - EPIDEMIOLOGY AND PREVENTIVE MEDICINE RESEARCH PRACTICUM II (2)

This course provides guided experience in epidemiologic research over two semesters. Students are expected to complete a data-based project that includes analysis of data and preparation of manuscript-to-report findings. Prerequisites: PREV 619, PREV 720 (or concurrent enrollment), and PREV 600 previously. Students must successfully complete PREV 747 in order to register for PREV 748.

PREV 749 - INFECTIOUS DISEASE EPIDEMIOLOGY - A GLOBAL PERSPECTIVE (3)

This course is taught through lectures and discussions of case examples, including outbreak investigations, and assigned readings. Following an introduction to basic principles of infectious disease epidemiology, the topics will be covered according to mechanisms of transmission: contact and air-, vehicle- and vector-borne. Sessions will cover nosocomial infections and hospital infection control, and vaccines to prevent infectious diseases. Discussions also will address problems based on outbreak investigations. The students will prepare a presentation and a report on an infectious disease, and will take a short written exam and progressive review of an unknown infectious disease outbreak. The students are encouraged to attend other conferences and seminars with infectious disease epidemiology topics during the semester. Prerequisite: A basic knowledge of medical microbiology

PREV 758 - HEALTH SURVEY RESEARCH METHODS (3)

This course leads students through the steps in survey research from developing a survey questionnaire, to administering it and analyzing the data. The final results of the survey are presented in a paper. Prerequisites: PREV 620 or consent of instructor.

PREV 780 - MOLECULAR EPIDEMIOLOGY (3)

This course covers the theoretical framework of the discipline of molecular epidemiology, but focuses on the practical application of a basic knowledge of the field that will enable students to critically read the literature and to incorporate the techniques into epidemiological research. Students should have at least a limited background in biological sciences. Those with more advanced training also will find the course of interest. Prerequisite: A prior course in molecular biology.

PREV 789 - SPECIAL STUDIES AND RESEARCH IN PREVENTIVE MEDICINE (1 TO 6)

This individually-planned and closely-supervised course provides experience in the epidemiology of significant preventive medicine topics.

Prerequisites to PREV 789: PREV 600 and 620 or equivalent.

PREV 794 - CAUSAL INFERENCE (2)

This course covers issues relating to causal inferences? that is, the study of methods and models used to understand what causes what in our world. Different causal frameworks are explored and used to address problems relating to study design, confounding, modeling, validity and inference. Readings are assigned each week, and students complete one midterm assignment and a final exam. The course is useful to all those designing and conducting clinical research. A background in foundational epidemiological methods and biostatistics is recommended.

PREV 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

PREV 801 - LONGITUDINAL DATA ANALYSIS (3)

Analysis of longitudinal and clustered data includes topics in matrix algebra, longitudinal data analysis, marginal and mixed effects general linear models, residual analysis and diagnostics, generalized linear models, including marginal

(GEE methods) and mixed effects models for repeated measures and other clustered data. Prerequisites: PREV 620 and PREV 721 (PREV 721 may be taken concurrently).

PREV 803 - CLINICAL TRIALS AND EXPERIMENTAL EPIDEMIOLOGY (3)

This course presents a rigorous overview of the experimental method as applied in therapeutic evaluations, and demonstrates causal associations between risk factors and clinical outcomes. The history of the experimental method and its clinical applications are studied in detail. Guest speakers of unique expertise and experience in clinical trials also are drawn upon. Prerequisites: PREV 600 or equivalent and at least one semester of biostatistics.

PREV 808 - TOPICS IN EPIDEMIOLOGY (1 TO 3)

This is an individual program of study undertaken with faculty supervision in one or more substantive areas of epidemiology. Through assigned reading and critical discussion, the student becomes knowledgeable in a specialized area of epidemiology, with particular emphasis on recent advances. Preparation of a critical review of the literature suitable for publication is required. Prerequisites: Instructor consent.

PREV 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

PREV 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

PTRS

PTRS 688 - SPECIAL TOPICS IN PHYSICAL REHABILITATION SCIENCE (1 TO 3)

Special topic listings are graduate level special interest courses developed by faculty members of the PhD program in physical rehabilitation science. Topics regularly include Foundations of Rehabilitation Science (FRS) I and II, which cover literature on contemporary issues and research methods pertaining to key topics in the field of movement and rehabilitation science. Theoretical, biological, physical, behavioral, and computational approaches to understanding the control of movement in the context of rehabilitation are explored. Applications are made to the analysis of common disorders of movement control that impair function and to contemporary therapeutic

approaches used in rehabilitation. Topics include stroke, spinal cord injury, Parkinson's disease and movement

PTRS 702 - GRADUATE SEMINAR IN TEACHING I (1)

This course covers learning theories and relevant teaching methods for the adult learner. Laboratory experiences are attached to a physical therapy course taught concurrently to this course. Students act as teaching assistants in that course, which revolves around a three-hour weekly experience as a laboratory assistant. They are filmed while teaching a short section of a lab, then evaluate themselves. The students keep an ongoing information sheet about their experiences as a laboratory assistant. Permission from the program director or instructor is necessary to enroll in this course.

PTRS 703 - GRADUATE SEMINAR IN TEACHING II (1)

This course covers assessment techniques and curriculum construction. Students participate in the teaching of labs to the MPT professional students and are involved in creating assessment tools for these students. In addition, they must give one or two lectures to these students and lead some laboratory sessions. They also construct and justify a curriculum for physical therapy students. Prerequisite: PTRS 702

PTRS 709 - REHABILITATION BIOMECHANICS (1 TO 3)

This course covers theoretical applications of the principles of biomechanics, Kinematics, Kinetics, and transarticular forces and moments.

PTRS 712 - MOTOR BEHAVIOR (2)

This course covers fundamental concepts of motor behavior as related to the physical rehabilitation science curriculum and provides exposure to the research-based subdiscipline of motor behavior. The course also covers the major theories of motor development and control with a description of changes in motor skill behavior across the life-span and the accompanying changes in growth and aging.

PTRS 718 - APPLIED HUMAN ANATOMY, TRUNK (3)

Students attend lectures and laboratory sessions required by the current Human Anatomy course PTAB 400 and concerning the trunk. This course covers the body from head to toe, including the musculoskeletal, nervous, integumentary, cardiovascular, and gastrointestinal

systems. Emphasis is on the applied/ functional anatomy. In addition, students dissect the human body, submit an anatomical literature review paper on a topic of interest, lecture on one region, and assist in the laboratory. Permission from the program director or instructor is necessary to enroll in this course.

PTRS 719 - APPLIED HUMAN ANATOMY, UPPER EXTREMITY (3)

Students attend lectures and laboratory sessions required by the current Human Anatomy course PTAB 400 and concerning the upper extremity. This course covers the body from head to toe, including the musculoskeletal, nervous, integumentary, cardiovascular, and gastrointestinal systems. Emphasis is on the applied/functional anatomy. In addition, students dissect the human body, submit an anatomical literature review paper on a topic of interest, lecture on one region, and assist in the laboratory. Permission from the program director or instructor is necessary to enroll in this course.

PTRS 720 - APPLIED HUMAN ANATOMY, LOWER EXTREMITY (3)

Students attend lectures and laboratory sessions required by the current Human Anatomy course PTAB 400. They cover the body from head to toe, including the musculoskeletal, nervous, integumentary, cardiovascular, and gastrointestinal systems. Emphasis is on the applied/functional anatomy. In addition, students dissect the human body, submit an anatomical literature review paper on a topic of interest, lecture on one region, and assist in the laboratory. Permission from the program director or instructor is necessary to enroll in this course.

PTRS 722 - GRANT WRITING IN REHABILITATION SCIENCE PRACTICUM (2)

Skills in study design and clinical research proposals are critical skills that rehabilitation scientists use daily in their profession. Being able to generate a hypothesis, develop specific aims, and establish an experimental approach is the foundation for establishing research and funding. This course will offer an introduction to the development of clinical research proposals related to rehabilitation science and prepare students for their dissertation proposal defense. Through this course, we will provide information and hands on experience in developing a clinical research question and hypothesis, identifying potential funding sources, the structure and policies of federal granting agencies (e.g. National Institutes of Health, Veterans Health Administration, and National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR)) as well as the fundamentals of

creating a sound experimental approach. It will also allow for experience with peer review and participating in a mock study section. Over the course of the semester students will identify appropriate potential funding sources, develop a NIH F31 NRSA proposal, and participate in a review in a mock study section. Each week will involve reading(s), hands on assignments, and a presentation of the prior week's topic. The summative project will be an oral presentation and written grant that will undergo peer review in a mock study section that will include PhD students and faculty members.

PTRS 780 - CENTRAL NERVOUS SYSTEM PLASTICITY (2)

This course explores published experimental evidence characterizing plasticity during the development of the nervous system, normal neuronal and glial functions, and the mechanisms underlying recovery of neurological function following central or peripheral nerve injuries. Students read and discuss classic original literature and formulate theoretical constructs for the role of physical rehabilitation interventions designed to promote or simplify plasticity within the nervous system. Lecture and discussion topics include a historical overview of regeneration and plasticity research, collateral sprouting, denervation super-sensitivity, synaptic redundancy, axonal regeneration, synaptogenesis, competitive interactions, behavioral substitution, and critical periods. Prerequisites: basic neuroscience course

PTRS 788 - SEMINAR IN REHABILITATION SCIENCE (1)

The seminar meets each week with PhD students, postdoctoral fellows, and guest speakers presenting current research interests and findings. First-year students lead discussions of relevant research articles under the guidance of faculty members who have research interests in the particular area of discussion. Students later present results of projects in which they are involved, again under faculty guidance. Students in the PhD program must register for the seminar for at least four terms.

PTRS 798 - INDEPENDENT STUDY (1 TO 3)

Under the supervision of a faculty advisor, students pursue independent study of a topic, research involvement, or independent project development related to the practice of physical therapy. The student and advisor select the course format with a contractual agreement that they sign before course registration. Topic areas commonly include: Rehabilitation Biomechanics, Motor Behavior, or Plasticity in the Central Nervous System. Permission from the

program director or instructor is necessary to enroll in this course.

PTRS 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

PTRS 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

REGS

REGS 603 - DRUG, BIOLOGIC, AND DEVICE REGULATION (6)

This online course is designed to orient students of diverse professional backgrounds to several practical elements that underpin drug, biologic, and device regulation in the US and around the world. It provides the core for the curriculum and is a pre-requisite for all other courses. Elements that are explored are the legal framework for drug regulation, including events that have shaped today's framework; ethical issues in drug/biologic/device development and drug/biologic/device use; global regulatory guidance approaches; types of communications with Food and Drug Administration (FDA), including Investigational New Drug (IND) application, New Drug Application (NDA), and Abbreviated New Drug Application (ANDA) requirements, and 510(k) clearance and Premarket Approvals / Biologics Licensing Applications (PMA/BLA) approval requirements; chemistry, manufacturing, and control (CMC) issues; and post-marketing topics.

REGS 614 - DRUG DISCOVERY (6)

Pharmaceutical sciences are fundamental to the discovery of new medicines and impact the clinical success in treating disease. This online course is designed to orient students from diverse professional backgrounds on the basics of drug/biologics discovery, drug/biologics chemistry and functional groups, medicinal chemistry approaches to optimizing drug action, principles of pharmacology, biological and target considerations in drug and biologics design, issues of drug resistance, and how drugs and biologics are metabolized and eliminated from the body.

REGS 621 - CLINICAL RESEARCH (6)

Well-designed clinical research is essential in the development process of a medication or device and in

generation of the knowledge base for evidence-based medicine and health policy. This online course is designed to uncover the ingredients of clinical research and to orient students of several important issues with current clinical studies. The students will learn how to design and implement different clinical studies. The role of each clinical phase in drug/device development and their various study designs and regulatory issues will be explored. The course will also discuss the Principles of International Conference on Harmonization (ICH) Good Clinical Practice (GCP) Guidelines and how to successfully manage clinical trials. Additionally, knowledge of personalized medicine and behavioral/social issues in drug use will be taught.

REGS 631 - DRUG AND BIOLOGICS DEVELOPMENT (6)

Drug candidates and active pharmaceutical ingredients (API's) need to be successfully delivered and must exhibit acceptable toxicology. This course follows drug discovery and examines key aspects of drug development, including drug formulation and quality, stability testing, pharmacokinetic characterization, bioequivalence, preclinical toxicology, methods of bioanalysis, and non-clinical and clinical Good Laboratory Practices (GLPs). Aspects of biologics are also discussed.

REGS 641 - REGULATED PRODUCTS IN THE MARKETPLACE (6)

FDA approval for the marketing of the drug or other regulated product (e.g., biologics, vaccines, medical devices, laboratory tests) is a major milestone in a product's lifecycle. But it doesn't stop there. Once on the market, how a drug is used and by whom, entry of competing products into the marketplace, and changes in medical care can change the benefit-risk balance. This course covers the breadth of clinical research and surveillance activities take place in the post-approval phase of a regulated medical product's lifecycle. This includes pharmacovigilance and risk management activities, pharmacoepidemiology, pharmacoconomics, comparative effectiveness, and drug utilization research. The course is designed to prepare students to communicate across the pre-/post-marketing divide, evaluate the need for post-marketing studies, and to be able to critically interpret and apply the results of such studies.

SOWK -

SOWK 600 - (3)

This course provides students with a foundation understanding and appraisal of social welfare policies and

programs in the United States, and the historical and contemporary forces that have shaped their development. It introduces core concepts to provide both an understanding of the political process and the analytic skills needed to further the achievement of social work goals regarding social policies and programs. The course also reviews the development of the social work profession and its influence on social welfare policies through advocacy, social action, research, and social reform.

Offered: 202002.

SOWK 630 - (3)

The values and societal mission of the social work profession guide this course. An ecological systems perspective and generic problem-solving model are taught to provide students with theory, knowledge, and a value base for purposeful, culturally competent, and sequential intervention with individuals of diverse backgrounds. Generalist skills taught in this course are interviewing, problem identification, problem-exploration, formulating the problem-to-be worked, data gathering, differential assessment, planning, intervention, termination, and evaluation. Initial exposure to finding evidence-based practices for our work with individuals, families and groups will be introduced. Self-awareness and conscious use of self are emphasized. Self-care will also be discussed. Classroom learning is enhanced through the systematic use of the students' experiences in work with individuals in their field placements. (Co-requisites: SOWK 631 and SOWK 635)

Offered: 202002.

SOWK 631 - (3)

SOWK 631 is a required foundation year course stressing beginning skills and knowledge for practice within social service organizations, networks, and communities, i.e., the contexts in which all social work practice occurs. Understanding and intervening in the environment are skills consonant with the ecological or social determinants perspective that provides focus for the foundation curriculum. This course stresses that social, economic, and political systems are important sources of individual and familial distress. In order to intervene in this distress, it is essential to craft interventions on the macro-social (communities and organizations) as well as the micro-social (individuals and families) levels. In the course, we will also explore the nature and dynamics of diverse communities and social service networks.(Co-requisites: SOWK 630 and SOWK 635)

Offered: 202002.

SOWK 632 - (3)

This course is designed for foundation students to learn about dynamics and basic procedures for direct practice with groups and families. The course first presents an ecological perspective on groups in clinical and organizational settings, explores group typologies, formation, composition, and development, and teaches concepts of group structure and process. The course then furnishes a foundation on social work practice with families, with emphasis on family structure and dynamics as well as beginning techniques for intervention with families.(Prerequisites: SOWK 630, 631 and SOWK 635; Co-requisite: SOWK 636)

Offered: 202002.

SOWK 635 - (3)

The Field Practicum is the signature pedagogy of the MSW program. It provides the framework for knowledge and skill development through immediate application of theoretical knowledge presented in the classroom to real situations presented by individuals, groups or service delivery systems. The practicum helps students learn to shape human services in ways that respond to broad social welfare needs and issues through various forms of intervention. Attention is directed to what is currently known and practiced, to the preparation of students for change in the knowledge base and organization of services, and for reflection on the practice curriculum. Students should have knowledge of, and an opportunity to develop competence in, service delivery that reflects their understanding of the particular needs of minorities, women, and people of various ethnic backgrounds. The practicum aims to integrate the entire Foundation Curriculum. The practicum teaches a common core of knowledge and principles of social work practice in which students are guided by the values and ethics of the profession. (Co-requisites: SOWK 630 and SOWK 631)

Offered: 202002.

SOWK 636 - (3)

The Field Practicum is the signature pedagogy of the MSW program. It provides the framework for knowledge and skill development through immediate application of theoretical knowledge presented in the classroom to real situations presented by individuals, groups or service delivery systems. The practicum helps students learn to shape human services in ways that respond to broad social welfare needs and issues through various forms of intervention. Attention is directed to what is currently known and practiced, to the preparation of students for

change in the knowledge base and organization of services, and for reflection on the practice curriculum. Students should have knowledge of, and an opportunity to develop competence in, service delivery that reflects their understanding of the particular needs of minorities, women, and people of various ethnic backgrounds. The practicum aims to integrate the entire Foundation Curriculum. The practicum teaches a common core of knowledge and principles of social work practice in which students are guided by the values and ethics of the profession. (Prerequisites: SOWK 630, 631 and SOWK 635; Co-requisite: SOWK 632)

Offered: 202002.

SOWK 645 - (3)

Within the person/environment framework, this course will provide a foundation for social work practice through an understanding of the major theories of individual and family functioning that encompasses biophysical, cognitive, emotional, social and spiritual dimensions. Specific attention will be paid to the roles that culture and cultural identity play in human development and to what constitutes "normal" behavior. Students will master the central concepts of theories that provide the basis for many assessment and intervention tools used in social work practice with individuals, families, groups, communities, and organizations. Students will also master relevant concepts of genetics and neurobiology to facilitate understanding of human functioning at the biological level. The course emphasizes the interrelations among social institutions, social structures, and social processes on the one hand, and the realities of the lives of families, groups, communities, organizations and societies, on the other. Another major emphasis of the course is on human diversity, both in terms of its inherent social value and with respect to discrimination and oppression.

Offered: 202002.

SOWK 670 - (3)

As both consumers and producers of research, social workers need to understand core research concepts. This course provides a solid foundation in social work research, with a special emphasis on evidence-based practice. It will prepare you to evaluate critically the wealth of research and evidence available to inform your practice. Furthermore, you will learn to synthesize empirical research into a systematic review of the literature to address a social work practice of personal interest

Offered: 202002.

SOWK 699 - (1 TO 3)

Offered: 202002.

SOWK 700 - (3)

The purpose of this course is to provide students with a critical understanding of institutional racism and the way concepts such as power and privilege impact institutions, social service agencies, social workers, and clients. During the course of the semester, students will broaden their understanding of racism and racial equity and deepen culturally responsive clinical and management skills. This is a special topics course intended for students willing to engage in a process of self-exploration regarding personal and professional attitudes, biases, and clinical frameworks. Class discussions and assignments will be focused on the individual and structural consequences of racism in the United States.

Offered: 202002.

SOWK 704 - (3)

Social Work and the Law is an introduction to the structure and operations of the legal system as it affects social work practice. The course covers several areas closely related to social work: family and domestic matters, child welfare, juvenile justice, mental health, education, and advocacy. Emphasis is on analyzing legislation and court decisions as social policy. The focus includes legal issues relating especially to minors, women, people of color, and other disempowered groups. The course also provides an overview of legal issues bearing upon professional responsibility (such as malpractice, privileged communications, and confidentiality) and offers an introduction to the development of skills used in courtroom testimony. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 705 - (1 TO 3)

Comparative studies of social work practice provide instruments for better understanding the general laws of social life and opportunities for examining practice trends and issues in a clearer perspective. This course focuses on the study of the social work profession and practice in specified developed and developing nations. This course is taken in conjunction with travel to various destinations, which have included India, Central America and Israel. Required pre-departure classes and post-trip debriefings, presentations, and subsequent planning are also included in the course.

Offered: 202002.

SOWK 706 - (3)

This course examines the growth of community mental health in the United States and its relationship to sociological and psychological approaches to various communities and cultural groups. Approaches to mental health, mental illness, problems of service delivery, professional roles, and the possibilities and problems of community mental health are discussed. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 708 - (3)

This course is an introduction to U.S. health and behavioral health care policies and programs. This course is designed to prepare students to analyze, develop, and implement health and behavioral health policies across a range of settings, including prevention/promotion services, primary care, acute care, chronic care, and long-term care. It examines the financing and organization of health and behavioral health systems, including the historical and contemporary forces that have shaped their development. We will pay particular attention to evidence-based models that aim to integrate physical and behavioral health services. The role of social workers in health care will be addressed throughout the semester, including the need to work effectively with cross-disciplinary teams of providers. A major focus will be the impact of policies on excluded, marginalized, and vulnerable populations, and the evaluation of policies based on the social work profession's ethical criteria such as fairness, social justice, anti-oppression, self-determination, and human dignity. The course will also examine diversity dimensions, including ability, age, class, culture, ethnicity, family structure, gender, gender identity and expression, relationship status, national origin, race, religion, sexual orientation, and socioeconomic status. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 710 - (3)

This course has two basic purposes. The first is to provide students with an understanding of American legislative processes with particular reference to the social welfare policy formulation system. The federal system of policy and legislative process also will be examined. The second aim is to develop an appreciation and understanding of the range of social work involvement in the policy/legislative process. Throughout the course, attention is given to the role of human service advocacy organizations active in influencing social welfare legislation and the role of social

workers in social action. The course is also offered as SWOA 710 for those wanting an advanced macro methods course. The major assignment for the course will vary according to the designation chosen (Advanced Policy or Macro methods). (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 712 - (3)

Offered: 202002.

SOWK 713 - (3)

This course is designed to prepare students to assess and understand the impact of American medical and health service programs and policies on human well-being. It has several purposes: (1) to understand the political process through which health service delivery policy evolves; (2) to provide students with background on the organization of health care services so that they have some understanding of the origins and current directions of health care programs; (3) to understand the relationship of medical care and health care programs to other community programs and their impact on various communities; and (4) to enable students, as future social workers, to assess and evaluate program directions and proposals for change. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 715 - (3)

This course identifies challenges contemporary American families are experiencing and presents strategies for developing policies and services to meet these challenges. It not only examines specific policies and services that most affect families but also considers broader questions concerning power and its distribution, allocation of resources, and the role of government in promoting individual and family well-being. The theme of advocacy on behalf of children and families at all levels is stressed throughout the course. This course will help students build on the knowledge of the evaluative concepts of social policy analysis developed in prior research and policy courses. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 717 - (3)

Offered: 202002.

SOWK 718 - (3)

This course examines concepts of equality and inequality, justice (or equity), and injustice, and how they have been

or could be applied to the development and implementation of social policy, with a particular focus on the U.S. The course will address (1) the effects of diverse ideologies, values, cultural perspectives, and historical contexts on the evolution of these concepts; (2) the implications of contemporary definitions of equality and social justice for social policy; and (3) the relationship between social justice, equality, and human rights. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 720 - (3)

The course provides an overview of global social welfare policies and programs, and the historical and contemporary forces that have shaped their development. The course introduces core concepts relating to global human rights and social justice to provide both an understanding of the political process and the analytic skills which will further the achievement of social work goals regarding social work programs and policies. The course also reviews the contemporaneous progress of international social work organizations in responding to global initiatives. The course frames policies by examining the social determinants of health. It pays specific attention to the commitment of social workers to underserved populations, based on the profession's ethical criteria such as fairness, equity, anti-oppression, self-determination, and human dignity. The course will apply these frameworks to the assessment of specific policies in the areas of health care, civil rights, immigrant and refugee rights, employment, criminal justice, education and the environment. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 721 - (3)

This course is designed to prepare students to assess and understand the dialectic between social policies and human well being, with a focus on shelter in its many manifestations. It has several purposes: (a) to reflect upon the concepts of social justice and social change and their relationship to housing, social policy, and participation; (b) to understand the processes through which housing and homelessness services are financed, constructed, maintained, and evolve; (c) to reflect upon the relationships among housing, health, human growth and development, neighborhoods, and communities; (d) to develop a sufficient knowledge of the background and context of housing and homelessness services in the U.S. so that they might predict and influence future directions of these goods; (e) to understand the relationships between housing markets on the one hand, and policies and

programs serving the poor and the disadvantaged on the other hand; (f) to enable students to evaluate program changes and proposals for reform in the institutions providing housing, related services, and financing; (g) to become familiar with the context of housing provisions/financing and homelessness services in other nations; and (g) to understand the role of social workers. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 725 - (3)

This course provides a theoretical framework for delivering social work services in the workplace. It also explores the possible value conflicts faced by the occupational social worker. It will include a history of social services in the work arena and a comprehensive picture of the delivery points for human services, including, but not limited to Employee Assistance Programs (EAPs), human resources and occupational health/medicine. Specific subjects such as mental health and substance abuse, work/life, workplace violence and crisis, diversity, globalization and more will be explored with their respective policy implications. Discrimination and equality in the workplace based on gender, sexual orientation, race, religion, disability, age, employee work status and any other protected categories will be discussed with their appropriate policy questions. This is a required course for students pursuing the Employee Assistance Program (EAP) Sub-specialization. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 726 - (3)

This course examines a variety of social welfare policies that affect the rights and interests of older adults. These include policies related to economic security, health, long term care, and elder justice. Building on the foundation policy curriculum, the course reviews the policy-making process with a discussion of the influence of legislative sanctions and case law in establishing aging policy in the U.S. The focus of the course is on critical analysis of the key assumptions driving policy and policy change, as well as enhancing skills in policy messaging and advocacy. Finally, the course includes a critical examination of the intersection between policy and practice, that is, the influence that policy has on the design of interventions and service delivery practices at the federal, state and local level and the impact of changing policies on communities, providers and older adults. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 729 - (3)

Increasingly, social workers and lawyers are asked to collaborate within the legal system—from the inception of a case to after a case is resolved through court and extrajudicial processes. This advanced policy course provides an opportunity for law and social work students to explore together the promises and challenges of work that draws on the expertise of both professions. The class will meet alternately at the School of Social Work and the School of Law. It will critically explore the professional ethics and training for each profession and their workplace and institutional responsibilities in a variety of settings. It will also examine the different professional conceptions of justice, and how these may be illustrated across settings. Students will work independently and in teams to explore these issues. (Prerequisite: SOWK 600)

Offered: 202002.

SOWK 764 - (3)

Offered: 202002.

SOWK 765 - (3)

A bio-psychosocial model of health and illness is developed in this course, where biological, psychological, social, cultural, and environmental factors and their interactions are explored. A framework of individual and family development is used to study common diseases throughout the life span. (Prerequisite: SOWK 645)

Offered: 202002.

SOWK 766 - (3)

This advanced human behavior course prepares students for international social work globally and / or for transnational work in the United States or abroad. International social work is a discrete field of practice within social work that seeks to improve the social and material well-being of people everywhere. It is practiced across geopolitical borders and at all levels of social and economic organizations. International social work is also development-focused, and so practice is most often at the local, state, and provincial levels within countries. Increased global communication strengthens our awareness of social challenges faced throughout the world, including human rights violations, rapid and unplanned urbanization, poverty, housing access, gender inequality, inability to care for the complex needs of children, poverty and indebtedness, racial and/or ethnic discrimination, and cultural conflicts. To respond to these challenges, social work models used in the United States represent only a subset of possible intervention strategies to meet the

diverse needs of communities and societies globally. Expanding the knowledge of models of intervention strategies and their relevance to specific situations is a key element of this course. (Prerequisite: SOWK 645)

Offered: 202002.

SOWK 767 - (3)

Intimate partner violence (IPV) is a significant societal problem, which has persisted despite determined efforts to eradicate it through legal and therapeutic methods. In this course, the student will be introduced to the basics of IPV, as well as a number of different theories which have been used to explain it. Issues related to victims, offenders, and the effects of exposure to IPV on children will also be examined. Against this backdrop, we will explore various strategies for ending and preventing IPV. Both clinical and policy options will be addressed. This course will help students think critically about what it means to end intimate partner violence on both individual and macro levels of intervention and change. (Prerequisite: SOWK 645)

Offered: 202002.

SOWK 772 - (3)

This is an advanced research class that introduces students to the issues and methods of evaluation in social work practice. In this course students will consider concepts and approaches for evaluating social interventions, including social work practice, programs, and policies. SOWK 670?Social Work Research?serves as a prerequisite for this class. Previously acquired research knowledge is built upon for elaborating on the conceptual, methodological, and administrative aspects of evaluation research. The course focuses on use of empirically based methods to enhance social work practice. Students will consider the theoretical and ethical aspects of an evaluative approach to treatment and examine the policy implications of professional participation (or lack thereof) in evaluation processes. (Prerequisite: SOWK 670)

Offered: 202002.

SOWK 775 - (3)

Offered: 202002.

SOWK 777 - (3)

The purpose of this advanced research course is to provide the student with an opportunity to explore critical research questions, methods, and results that are related to the child welfare service delivery system. Under federal

requirements to report on outcomes of child welfare programs, social workers face a persistent challenge to improve the scientific knowledge that guides practice and policy in this field. This course focuses on the evaluation of interventions in child welfare, by measuring outcomes of child welfare programs. A goal of this course is to draw the logic between research findings and the development and evaluation of child welfare programs, practice, and policy. As such, the course is intended for students who are interested in discovering ways to use research to answer critical child welfare questions and to integrate empirical findings in their practice. This course fulfills the advanced research requirement for the families and children specialization. (Prerequisite: SOWK 670)

Offered: 202002.

SOWK 781 - (3)

SOWK 781 is an advanced research course on Results-Based Accountability (RBA) and complementary Empowerment Evaluation (for working with stakeholders). This course is primarily designed for students in or planning to be in macro practice roles (such as human service or nonprofit administrators, program managers, supervisors, evaluators, community planners, developers, and organizers, and policy practitioners). The RBA framework, currently used at the national, state, local and community levels in the United States and abroad, is used to improve results among whole populations and to improve results among the consumers of specific programs, agencies and service-delivery systems. The goals of this course are for students to know how to use a results and performance framework, identify indicators of success and performance measures to track progress towards a result over time, and engage organizational members and community partners in efforts to collect and analyze data, measure outcomes, and interpret and utilize findings to enhance program, organizational, and community effectiveness. The course requires a "hands-on" team-based project in partnership with designated organizations or community initiatives. (Prerequisite: SOWK 670)

Offered: 202002.

SOWK 783 - (3)

The course purposes are: (1) To provide students with beginning level of skill in planning, implementing, and evaluating ethno-cultural research projects that utilize qualitative methods. (2) To enable students to develop confidence in their ability to independently conduct ethnocultural class project within constraints of time, energy, and resources. (3) To aid students to enhance their

awareness of a role of an ethnographic researcher as one who learns from members of different cultural backgrounds in order to develop an ability to learn from insider perspectives. (Prerequisite: SOWK 670)

Offered: 202002.

SOWK 789 - (1 TO 6)

The instructor-initiated advanced research course involves student participation in research activities under the instructor's direction and supervision. Opportunities are provided for students to engage in hands-on research activities which contribute to a faculty member's program of research. See specific course descriptions offered each semester in the course schedule. (Prerequisite: SOWK 670)

Offered: 202002.

SOWK 790 - (1 TO 6)

The student-initiated independent research course provides an opportunity for students with advanced research abilities to pursue a research topic of personal interest that cannot be addressed in the existing MSW curriculum. This course requires a faculty mentor and a written proposal that is approved by the research sequence as methodically sound. It must also be approved by the chair of the student's concentration and specialization. To be eligible to propose an independent research course, the student must have earned a grade of "A" in SOWK 670, and must have some hands-on research experience. Approval submission deadlines are: March 1st for fall semester; October 1st for spring semester. (Prerequisite: SOWK 670)

Offered: 202002.

SOWK 798 - (1 TO 3)

A student-selected topic is studied under the guidance of a faculty member.

Offered: 202002.

SOWK 799 - (1 TO 6)

Offered: 202002.

SOWK 804 - RESEARCH METHODS IN SOCIAL WORK I (3)

The goals of this course are to teach students (1) to implement the most appropriate research strategies in the pursuit of knowledge pertinent to social work- relevant topics, (2) to understand and critically assess reports of experiment and observational-type research studies, (3) to develop thorough literature reviews, (4) to develop

methodological strategies for testing important hypotheses and answering salient questions, and (5) to become proficient in the use of the American Psychological Association publication standards. The course examines (1) the underlying theory guiding research ? i.e., the four types of experimental validity [statistical conclusion, internal, construct, and external] and how to minimize threats to each; (2) issues regarding the selection and evaluation of measures including the various types of reliability and validity; (3) sampling strategies; (4) experimental and quasi-experimental designs (both group and time-series) including their underlying assumptions; and (5) observational (case-control and cohort designs). These courses are taught at an advanced level; as such they will expose students to the complexities and difficulties of formulating significant social work research. Prerequisite: Permission of instructor

Offered: 202002.

SOWK 805 - DATA ANALYSIS I (3)

The primary aims of this course are to provide students with a firm foundation in descriptive statistics, bivariate inferential statistics, and multivariate ordinary least squares regression including applications and assumptions. This course is designed as an applied statistics course, in which the class will move beyond abstract theoretical discussions and focus on the applications of statistical theory and practice to realworld analysis using appropriate statistical software, and the reporting of findings to audiences of researchers and laypersons. Conducting research ethically, from question and hypothesis formation to analysis and reporting, is emphasized. The course assumes students have a baseline (or greater) understanding of introductory statistics. Prerequisite: Permission of instructor

Offered: 202002.

SOWK 806 - RESEARCH METHODS IN SOCIAL WORK II (3)

The goals of this course are to teach students (1) to implement the most appropriate research strategies in the pursuit of knowledge directly or indirectly relevant to social work practice and interventions, (2) to understand and critically assess reports on applied (interventions) as well as basic research (epidemiologic or observational) and (3) to develop sound proposals ? including both an integrative research review and a well-justified methodology for answering a research question(s) or testing a hypothesis(es). Prerequisites: Grade of B or better in SOWK 804 and SOWK 805

SOWK 807 - DATA ANALYSIS II (3)

The primary aim of this course is to provide students with a foundation in multivariate data analytic techniques, including advanced linear regression, logistic regression, survival analysis, and analysis of variance. This course is designed as an applied statistics course that moves beyond abstract theoretical discussions and focuses on the applications of statistical theory and knowledge to real-world data. The course assumes a baseline (or greater) understanding of introductory statistics and multiple regression. Whereas SOWK 805 delves deeply into a single analytic strategy, SOWK 807 explores many analyses more broadly. Prerequisites: SOWK 804 and a grade of B or better in SOWK 805, or permission of instructor

SOWK 809 - MULTILEVEL MODELING (3)

This course is intended to introduce multilevel modeling for analyzing nested or multiple level data. Students identify situations where multilevel modeling should be used, compare and contrast multilevel modeling with other data analysis techniques, and conduct multilevel data analyses. Finally, students will write a journal article based on a multilevel analysis using a dataset of their choice. Prerequisite: SOWK 804, SOWK 805, SOWK 806, SOWK 807 or permission of the instructor

Offered: 202002.

SOWK 810 - RESEARCH PRACTICUM I (3)

This is the first semester of a two semester course. The primary goals of this course are: to prepare students for dissertations and other original research projects; and to provide students with an opportunity to collect, manage, analyze, and interpret data. Students are expected to work together as a research team to carry out all the steps of a research project. Students are expected to use what they learn in this class to help them in the design of future studies; however, the product(s) of this class are not to be used for their dissertation. This course is primarily conducted in a workshop format, which combines some discussion of conceptual issues relating to research with in-class activities relating to the research project. The actual research project varies from year to year and is based on the interest of the class. The research project must include primary data collection, rather than simply being a secondary data analysis of an existing data set. For example, the project could involve a mail, phone, Internet, or in-person survey; a record abstraction of administrative data; an observational study; or a study in which one codes behavior. Prerequisites: SOWK 804 and SOWK 805

SOWK 811 - RESEARCH PRACTICUM II (3)

The primary aims of this course are to: 1) prepare students for dissertation work and other original research projects; 2) implement a research project; 3) manage, analyze, and interpret data; and 4) generate research articles appropriate for publication. In the first semester of Research Practicum, students will work together as a research team to carry out all the steps of a research project. In the second semester (Research Practicum II), students will pursue independent research questions using data collected as a group. Prerequisite: SOWK 810

SOWK 812 - INTEGRATIVE SEMINAR (3)

This seminar focuses on the relationship between theory and research methods in the development of research questions and a research design. It discusses the meaning of theory and theoretical frameworks; the difference between theoretical and conceptual frameworks; the difference between theories and logic models; different approaches to theory and research within different disciplines and in inter-disciplinary work; the connections between research and context (history, policy, practice); the role of researcher passions and values in the construction and implementation of research projects; and the role of ethics in both theoretical development and research design. At the conclusion of the seminar, students will have a clearer understanding of what to expect in the dissertation process and a rough outline of the structure of a dissertation proposal. Prerequisites: SOWK 804, SOWK 805, SOWK 806, SOWK 807, SOWK 810, SOWK 811, SOWK 826

SOWK 814 - INTERVENTION RESEARCH (3)

Social work requires implementing systematic methods for developing and testing interventions. Social work scholars must integrate their practice expertise with existing theories to conceptualize interventions designed to prevent and respond to social problems. Furthermore, social work scholars must undertake deliberate strategies for documenting and evaluating such interventions. This course will provide a broad introduction to the field of intervention research and hands-on intervention research exercises centered on students' individual practice and research interests. By the end of the semester, students will create or adapt a social work intervention and develop a research proposal to test the efficacy of the intervention. PREREQUISITES SOWK 804, SOWK 805, SOWK 806, SOWK 807, SOWK 810, SOWK 811, SOWK 826

SOWK 815 - STRUCTURAL EQUATION MODELING (3)

This course is intended to introduce students to structural equation modeling. Students identify situations where structural equation modeling should be used, compare and contrast structural equation modeling with other data analysis techniques, and conduct structural equation data analyses. Finally, students write a journal article based on a structural equation analysis using a dataset of their choice. Prerequisites: SOWK 804, SOWK 805, SOWK 806, and SOWK 807; or permission of the instructor.

SOWK 816 - PHILOSOPHY OF SOCIALLY JUST RESEARCH SEMINAR (1)

This seminar is a two-semester sequence on the philosophy of science and socially just research, and is intended to promote critical thinking about the foundations of knowledge and their applications to social work research. The course covers epistemology, ethics, and evidence, with attention to how information is shared, valued, and legitimized. The course draws on traditions and applications of social justice in research, emphasizing the value base of social work as a profession and the contributions of multiple disciplines to socially just research. To that end, discussions about difference, disproportionality, and disparity, as well as power dynamics in research endeavors, will be a central focus of the course. The course adopts an anti-racist, anti-oppressive, critical lens.

SOWK 817 - PHILOSOPHY OF SOCIALLY JUST RESEARCH SEMINAR (1)

This seminar is the second of a two-semester sequence on the philosophy of science and socially just research, and is intended to promote critical thinking about the foundations of knowledge and their applications to social work research. The second semester draws attention to applied examples of epistemology, ethics, and evidence in research. Students are encouraged to consider the "ideal" and the "real" in social work (and multidisciplinary) research and to develop a plan for their own work based on the content of the class.

SOWK 826 - QUALITATIVE RESEARCH METHODS (3)

This doctoral course is designed to introduce students to the history, principles and methods of qualitative research. The course will cover the theoretical and multi-disciplinary origins of the methods as well as application of qualitative methods germane to social work practice, programs and policy. It is an experiential course embedded with the core

qualitative methods of observation, interviews and document analysis. We will examine the family of research strategies that fall under the rubric of qualitative inquiry (such as ethnography, narrative analysis, text or discourse analysis, visual analysis, case-study, grounded theory, oral/life history, focus groups, phenomenology, community-based participatory action research).

PREREQUISITES Permission of Instructor

Offered: 202002.

SOWK 827 - EPIDEMIOLOGY AND BEHAVIORAL RESEARCH (3)

This course provides advanced research training to complete significant studies on behavioral/mental health problems utilizing existing datasets, along with a comprehensive review of some of the most important issues related to drug use and mental health problems in the US. This is a graduate course specifically designed to provide doctoral students with an opportunity to generate new research-based insights and review solutions to health disparities and hazards associated with behavioral/mental health issues, with particular emphasis on Social Work and public health. Prerequisites: SOWK 804, 805, 806, 807; or instructor permission.

Offered: Spring of each odd year (i.e Spring 2023, 2025, etc.).

SOWK 828 - CASUAL INFERENCE (3)

The primary aims of this course are to provide a foundation in the use of statistics for causal inference in the context of observation (non-experimental) research design, including the use of causal frameworks for describing assumptions and hypotheses to test, and advanced statistical methods for estimating and testing associations and making causal inferences from these associations. This course is designed to provide both conceptual and applied material, including practice at using several frameworks and methods for causal inference. This course assumes that students have taken a doctoral level sequence of statistics courses and research design, and have experience with multivariate linear regression, logistic regression, and randomized controlled trials and quasi-experimental studies in field (non-laboratory) settings. Prerequisite: Permission of instructor

Offered: Spring of each even year (i.e. Spring 2022, 2024, etc.).

SOWK 835 - THEORIES AND PRACTICE OF SOCIAL WORK TEACHING (3)

The aim of this course is to provide students with the basic

foundation and advanced knowledge of the theory and practice of social work teaching. The course focuses on the theoretical and technical aspects of delivering social work education. The main focus of the course is to create, to the extent possible, the simulation of realworld teaching situations designed to help students develop their teaching practice through a process of critical reflection, integration, and application. The development of teaching skills is a critical focus of the course. The course covers social work teaching at both the BSW and MSW levels. The course includes basic information related to understanding trends and issues in social work education generally as well as social work teaching. Content includes theories of andragogy and reflective practice, curriculum development, teaching methodologies and techniques, general classroom activity, assessment and evaluation of students, testing methodology, ethical considerations, sensitivity to diversity-related issues, and professional academic development at BSW and MSW levels of social work education. Readings are drawn from the social work education literature as well as from interdisciplinary perspectives, including teaching and learning in higher education. Prerequisite: Permission of instructor

Offered: 202002.

SOWK 838 - SELECTED TOPICS IN SOCIAL WORK (1 TO 3)

Faculty members design and carry out a course devoted to a special topic area. To monitor content and quality, faculty members submit a detailed course outline to the program director before the course is added to the semester course schedule. Prerequisite: Permission of instructor

Offered: 202002.

SOWK 897 - INDEPENDENT STUDY (1 TO 3)

Students select topics of professional interest and study with a graduate faculty member who has competence in the subject. Study plan must include provision for tutorial conferences and a formal paper or report. The student's advisor, instructor, and doctoral program committee must approve the study before registration. Repeatable to a maximum of 6 credits. Prerequisite: completion of core courses.

Offered: 202002.

SOWK 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

Offered: 202002.

SOWK 899 - DOCTORIAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

Offered: 202002.

THAN

THAN 604 - DEATH AND DYING: ETHICAL AND LEGAL CONSIDERATIONS (3)

This course provides participants with the information and skills needed to address ethical and legal concerns related to palliative and end-of-life care. Participants will learn the theoretical foundations of health care ethics, including the Hippocratic Oath, ethical principles, virtue ethics, deontology, utilitarianism, and care-based ethics. The relationship between law and ethics will be clarified. The focus of society and medicine in delaying death and addressing human suffering will be discussed. Emphasis will be placed on developing a knowledge base of key concepts and strategies that can be used to prevent and resolve problems that are specific to palliative and end-of-life care, including advance directives, cardiopulmonary resuscitation, suffering, withholding and withdrawing life-sustaining treatments, organ donation, and assisted suicide.

THAN 605 - PALLIATIVE CARE (3)

In this course on end-of-life care, participants will learn practical skills to assist people who are facing incurable illnesses, such as cancer, severe cardiovascular disease, and progressive neurodegenerative diseases. Palliative care focuses on symptom control and amelioration of suffering, which are often underemphasized in conventional healthcare training. Topics will include pain and symptom management strategies, both conventional and complementary, determination of terminal prognosis, hospice care, palliative care emergencies, and discussion of advance directives. Participants will enjoy creative and thoughtful reflection activities that allow them to deeply engage in the topics covered in this course.

THAN 606 - CARING FOR THE BEREAVED (3)

In this second Fall course, participants will learn the prominent theories of grieving and the grief reaction, as well as the empirically-based therapeutic interventions available to support and care for the bereaved. Participants will learn to distinguish between anticipatory grief, normal grief, and complicated grief and to identify factors that

affect the grieving process. This course also explores reflective practice and self-care for the end-of-life care professional while learning to support those who are dying and those who are grieving.

THAN 609 - PERSPECTIVES IN AGING (3)

This course explores the psychological and social aspects of adult development within the context of the ongoing process of aging. Upon completion of this course, students will be able to describe the major psychological and sociological theories of aging and adult development; understand the physical, psychological, social, and health changes that occur during aging; evaluate the biological, psychological, intellectual, and social dimensions along which developmental changes occur in adult aging and their implications for the aging individual, family, and society; understand the importance of an individual's cultural context while progressing through the life course; and identify current research trends and theories regarding several aspects of the aging process (e.g. death and dying, mental health, positive affect, personality, chronic disease, and social roles).

TOXI

TOXI 601 - ADVANCED TOXICOLOGY I (3)

The first semester of a two-semester course that includes lectures and discussions covering basic principles of toxicology and mechanisms by which chemicals cause diseases and environmental damage. Topics include target organ toxicity, major classes of toxic agents, and mechanisms of cell injury and cell death. Offered in sequence in fall and spring semesters.

TOXI 602 - ADVANCED TOXICOLOGY II (3)

The second semester of a two-semester course that includes lectures and discussions covering basic principles of toxicology and mechanisms by which chemicals cause diseases and environmental damage. Topics include target organ toxicity, major classes of toxic agents, and mechanisms of cell injury and cell death. Offered in sequence in fall and spring semesters.

TOXI 607 - FORENSIC TOXICOLOGY (3)

Lectures include discussion of principles underlying forensic and clinical toxicology, mechanism of action of drugs and other poisons, methods of detection and quantitation of drugs and poisons in tissues and body fluids, and interpretation of analytical procedures for the detection and estimation of drugs and chemicals in biological samples. Offered fall semester in even-

numbered years.

TOXI 608 - RESEARCH IN TOXICOLOGY (2 TO 4)

Designed for students without previous research experience, this course provides training in how to design and conduct research studies, beginning with a two-week classroom based introduction to hypothesis-driven research and experimental approaches used in mechanistic studies in toxicology. For the remainder of the semester, each student works individually with a faculty mentor to develop and complete a small lab-based or epidemiology research project. A written report is generated and results of the project presented at the end of the semester seminar.

TOXI 609 - METHODS IN TOXICOLOGY (1 TO 3)

Permission and credit arranged individually. Students become familiar with laboratory methods used by faculty members to study the effect of toxins and environmental pollutants on living systems. May be taken for credit more than once.

TOXI 611 - EXPOSURE, RISK AND PUBLIC HEALTH (2)

This course focuses on the challenges in determining human health risks related to complex environmental problems. Beginning with a discussion of the principles of chemical risk assessment, this course examines how risk analysis is used in the development and implementation of regulatory policies to protect public health. Lectures address how to evaluate strengths and weaknesses of the risk assessment process, with an emphasis on characterizing exposure and evaluating toxicological data within the public health context. Case studies are used to demonstrate different approaches to these problems.

TOXI 618 - SEMINAR IN TOXICOLOGY (1)

Students, guests, and faculty members review and discuss original research and recent advances in toxicology.

TOXI 621 - RISK ASSESSMENT AND MANAGEMENT (3)

This course is designed to teach students the basic principles that apply to risk assessment of the environmental and human health effects of hazardous chemicals. The course features both lectures and case studies to introduce students to environmental regulations that impact the use, environmental release and clean up of chemical contaminants. Student will learn how to evaluate relationships between exposure to chemicals and health outcomes and how regulations are developed to protect human health. Crosslisted: ELS Risk Assessment and

Management in a Regulatory Context (School of Law)

TOXI 625 - AQUATIC TOXICOLOGY (3)

This course is designed to provide students with a broad perspective on the subject of aquatic toxicology. It is a comprehensive course in which a definitive description of basic concepts and principles, laboratory testing, and field situations, as well as examples of typical data and their interpretation and use by industry and water resource managers, are discussed. The toxicological action and fate of environmental pollutants are examined in aquatic ecosystems, whole organisms and at the cellular, biochemical, and molecular levels. Attention is given to the impact of specific chemical pollutants (e.g. trace metals, nutrients, pesticides, and PCB's and PAH's). The field of biomonitoring, including the detailed description of a range of commonly employed biomarkers, is discussed. Classes consist of lectures by the instructor together with some guest speakers in addition to group discussions. Crosslisted: MEES 743 Aquatic Toxicology

TOXI 799 - MASTER'S THESIS RESEARCH (1 TO 6)

Required enrollment for students engaged in master's thesis studies.

TOXI 898 - PRE-CANDIDACY RESEARCH (1 TO 8)

Required enrollment for students engaged in doctoral dissertation studies prior to their admission to candidacy.

TOXI 899 - DOCTORAL DISSERTATION RESEARCH (1 TO 12)

Required enrollment for students engaged in doctoral dissertation studies.

Administration

Graduate School

Roger J. Ward, EdD, JD, MSL, MPA, Provost,
Executive Vice President

Kenneth Wong, PhD, Dean & Vice Provost, Academic
and Student Affairs

Erin Golembewski, PhD, Senior Associate Dean &
Chief Student Affairs Officer

James N. Reynolds, MBA, Assistant Vice President and
Dean, Fiscal and Academic Affairs

Niya Werts, Interim Associate Dean of Academic Affairs

**Cherilyn (Cheri) Hendrix, DHEd, PA-C,
DFAAPA**, Assistant Dean of PA Education

Christina Cestone, PhD, Executive Director Faculty
Center for Teaching and Learning

Diane Martin, PhD, MA, Director, Geriatrics and
Gerontology Education and Research Program

Gerald Kayingo, PhD, MMSC, PA-C, Assistant Dean of
Research & Executive Director, Physician Assistant
Leadership and Learning Academy

Nick Kouwenhoven, MBA, Executive Director, Academy
of Lifelong Learning

Megan Bruce-Bojo, MSW, Director, Academic
Administration

Stephanie White, Assistant to the Dean

Kyle Locke, MS, Chief Development Officer

Megan Bruce-Bojo, MSW, Program Manager

Ryan Hodgson, MLA, Grants and Contracts Specialist

Jade Grant, Senior Marketing and Recruitment Specialist

Sean Brooks, Student Recruiter

Amanda Hosking, MBA, Director of Graduate
Admissions, Enrollment, and Communications

Theresa Murray, Associate Director of Graduate
Admissions

Jamila Savage, Assistant Director of Graduate Records &

Registration

Arielle Faulkner, Admissions Counselor

Nina Jackson, Admissions Counselor

Jay Domagala, Academic Program Specialist

Joann A. Boughman, Dean Emeritus

Malinda B. Orlin, Dean Emeritus

Faculty

Graduate Faculty

Graduate Faculty are selected by the Graduate School to be the teachers and advisors of Graduate Students.

Members are selected on the basis of academic training, experience, demonstrated potential for creative work and scholarly research, and evidence of the ability and competency essential to directing and supervising graduate students in their pursuit of advanced knowledge.

Specifically, the duties of the Graduate Faculty are to:

- Teach Graduate Courses
- Direct non-thesis students
- Serve on graduate student committees
- Direct master's theses
- Direct doctoral theses

In general, it is expected that new faculty will be first appointed as Associate members. To qualify for Regular status, the faculty member should be fully engaged in multiple aspects of graduate education, mentoring of graduate students, and research. This includes such experiences at former institutions offering graduate education.

For more about Graduate Faculty and to view the directory, please [click here](#) to visit our UMB Graduate School Faculty page.

Policies

The following are the major policies related to graduate students at the University of Maryland, Baltimore (UMB). This citation is not all-inclusive. A general index of University System of Maryland (USM) and UMB policies and procedures governing the University community is available on the University's website: www.umaryland.edu/policies/#student.

Appeal of Academic Dismissal

An appeal of academic dismissal must be submitted to the office of the dean of the Graduate School in writing within 10 working days of the student's receipt of the notice of dismissal. The letter of appeal should include: (a) the basis for the appeal; (b) a summary of discussions, if any, between the student and representatives of the student's program, such as the student's mentor and the student's graduate program director (GPD); and (c) the outcome or remedy proposed by the student. The letter may include additional relevant evidence or information.

The dean of the Graduate School will inform the GPD of the appeal by transmitting the student's letter of appeal within five working days of receipt of the appeal.

Grounds. The following are grounds for appeal: (1) incorrect calculation of grade-point average; (2) misapplication of standards for academic performance and satisfactory progress by the graduate program of the Graduate School; (3) differential application of standards for academic performance and satisfactory progress for the student appealing compared to other similar students; or (4) circumstances that had not been known and that might be relevant to the dismissal.

Disposition. The dean of the Graduate School may: (1) act on the appeal; (2) appoint a designee to collect additional information for the dean of the Graduate School; or (3) constitute a three-person ad hoc review committee from the Graduate Council Grievance Committee (GCGC). The purpose of the ad hoc committee is to provide an opinion and recommendation to the dean of the Graduate School regarding the appeal.

The dean of the Graduate School will inform the student and the GPD in writing of the method of disposition of the appeal. If a dean's designee is appointed, the student and the GPD will be informed of the name and contact information for the dean's designee. If a GCGC ad hoc committee is constituted, the approved guidelines will be followed.

The dean of the Graduate School's decision with respect to a student's appeal shall be final. The student and the GPD will be informed in writing of the dean's decision.

(Approved and adopted by the Graduate Council, Oct. 19, 1995; revised Nov. 25, 2003; revised May 31, 2005; revised January 2008)

Policy on Arbitrary or Capricious Grading

Purpose

These guidelines describe how allegations of arbitrary or capricious grading are handled in coursework at the Graduate School. Arbitrary or capricious means: (a) the assignment of a course grade to a student on some basis other than performance in the course; (b) the assignment of a course grade to a student by unreasonable application of standards different from the standards that were applied to other students in that course; or (c) the assignment of a course grade by a substantial and unreasonable departure from the instructor's initially articulated standards.

These procedures apply only to grades assigned in coursework. Qualifying and comprehensive examinations and defense of theses or dissertations during the progression toward the master's or doctor's degree are to be handled under the Academic Progression* policy.

Procedure

1. If a student alleges that a grade has been given in an arbitrary or capricious manner, the student must first discuss the situation with the faculty member responsible for the course within 10 business days of receiving the grade. The student also should contact the department chair or graduate program director if the issue is not resolved within 20 business days of receiving the grade.
2. If a student remains dissatisfied after the discussions required by paragraph 1, the student may file an allegation of arbitrary and capricious grading with the dean of the Graduate School. Allegations should be made in writing in the form of a letter to the dean of the Graduate School within 30 calendar days of the student's receipt of the grade. An allegation should include: (a) the course, program, and semester in which the grade was awarded; (b) the basis for the allegation; (c) the date the student was advised of the grade challenged; and (d) a summary and the dates of

any conversations held pursuant to these procedures.

3. Upon receiving an allegation, the Graduate School dean's designee shall forward a copy of it to the faculty member who assigned the grade in question and to the chair or graduate program director.
4. The dean of the Graduate School or designee shall review each allegation of arbitrary and capricious grading and shall dismiss the allegation if: (a) the student has submitted the same, or substantially the same, complaint through any other formal grievance procedure; (b) the allegation does not allege actions that would constitute arbitrary and capricious grading as defined in these procedural guidelines; (c) the allegation was not filed with the dean of the Graduate School within 30 calendar days of the student's notice of the grade; or (d) the student has not conferred with the instructor and the graduate program director or department chair of the program offering the course before filing the allegation. The dean of the Graduate School or designee shall notify the student, faculty member, and chair or graduate program director in writing within one week of receiving the allegation of the disposition of the allegation.
5. If an allegation is not dismissed, the faculty member involved will have two weeks from receipt of the allegation to submit a written response to the dean of the Graduate School.
6. The dean of the Graduate School or designee shall submit the allegation of the student and the response of the faculty member to a grade hearing committee (GHC) consisting of three members (two faculty, one student) appointed by the dean of the Graduate School. The GHC may decide to hear statements from the student and the faculty member, or it may deliberate on the basis of written materials. GHC review may be waived with the consent of the student and the faculty member, in which case the dean of the Graduate School or designee will review the matter and make a determination. If the matter is considered by the GHC, following deliberations, the committee will give its recommendations in writing to the dean of the Graduate School or designee. If the GHC finds arbitrary or capricious grading did occur, its report should include recommendations for action, specifying whom they recommend be responsible for those remedy actions.
7. The dean of the Graduate School or designee will receive the GHC recommendation and make a decision. The decision will be forwarded in writing to

the student, faculty member, and program director within two weeks of receiving the GHC recommendation or within two weeks of the waiver of GHC review.

Appeals

1. The student, faculty member, or program director may appeal to the dean of the Graduate School for reconsideration of the decision by submitting an appeal in writing to the dean of the Graduate School within 10 days of receipt of a decision.
2. The dean of the Graduate School's decision with respect to an appeal shall be final. The dean will endeavor to make a decision on the appeal within 10 days after its receipt. The dean's decision will be communicated in writing to the student, faculty member, and program director.

(Approved by the Graduate Council, Jan. 18, 1995; revised by a University of Maryland, Baltimore committee, February 1995; approved in revised form by the Graduate Council, April 20, 1995; revised July 2003)

*Policies, guidelines, and standards related to academic progression are outlined in the Academic Standards and Degree Requirements section of this catalog.

Student Academic Misconduct

This document sets out the basic University of Maryland Graduate School, Baltimore (UMGSB) policy and procedures for dealing with various forms of student academic misconduct primarily in coursework. Such misconduct involves significant breaches of integrity that may take numerous forms such as, but not limited to, those listed below:

- Fabrication: The intentional and unauthorized generation or altering of data, information, citation, or result in an academic exercise.
- Falsification: The intentional and unauthorized altering of any information, citation, or result in an academic exercise.
- Plagiarism: The intentional or knowing representation of the words, ideas, or work of others as one's own in an academic exercise — the appropriation of the language, ideas, or thoughts of another and representation of them as one's own original work.
- Cheating: The intentional or attempted use of unauthorized material in an academic exercise.

- **Improprieties of authorship:** Improper assignment of credit or misrepresentation of material as original without proper referencing of the original authors.
- **Facilitating academic dishonesty:** The intentional or knowing assistance or attempted assistance of another student to commit an act of academic misconduct.

Student misconduct in research and scholarly work falls under the purview of the University of Maryland, Baltimore County document *Policy and Procedures Concerning Misconduct in Scientific Work* or the University of Maryland, Baltimore document *Policy and Procedures Concerning Misconduct in Scholarly Work*.

All graduate students of the University of Maryland Graduate School, Baltimore (UMGSB) are subject to the standards of academic integrity required by the UMGSB and standards of academic integrity specific to a graduate program approved by the Graduate School. For example, the master's in science nursing programs have additional standards. Students also are subject to the possible penalties for academic misconduct described in this document. Students also must observe any additional standards announced by faculty members for particular courses.

Each faculty member is responsible for maintaining academic integrity in their courses and has the authority, using proper procedures and reasonable judgment, to determine whether a student has engaged in academic misconduct. The faculty member must decide whether the misconduct involves a less serious infraction susceptible to resolution by informal methods or a more serious infraction requiring severe and stigmatizing penalty, such as suspension or expulsion. Once the faculty member has made an initial determination of academic misconduct, they shall initiate the process explained as follows. The faculty member should make initial determination of academic misconduct within two weeks of the infraction, if possible, and the entire process should be completed within 90 days, if feasible.

1. Less Serious Infractions

Examples of infractions that can be considered less serious are:

- Minor instances of plagiarism or cheating on examinations or papers required for a course.
- Minor fabrication or falsification of data for a laboratory report for a course.
- Facilitating academic dishonesty by students in an

academic exercise.

After identifying academic misconduct and providing written notification and obtaining written authorization from the associate dean or the dean's designee, the faculty member has authority to resolve less serious cases of academic misconduct by means of informal methods such as warning, counseling, additional assignments, or grading. A typical penalty that has been exacted is to assign a zero grade for the exercise and compute the course grade including the zero grade for the exercise. The student may be reprimanded by the instructors, and the Graduate School can send letters of reprimand with the threat of dismissal should there be further occurrence. Such informal methods shall not be considered to be severe or stigmatizing. Confidential records of authorized informal actions shall be kept by the associate dean or the dean's designee for use of the Graduate Council Grievance Committee*. The GCGC may release only general statistical summaries of such information and may not release identifying information.

Having made an initial determination of academic misconduct involving a less serious infraction and having consulted the associate dean or the dean's designee for authorization, the faculty member shall observe certain rights of the student. The faculty member shall notify the student in writing within five days, if feasible, of the initial determination of academic misconduct and provide the student an opportunity within five days of notification to give explanation. Should the student fail to offer an explanation within the time frame, seek an extension for a good faith reason, or make a written request to the associate dean or the dean's designee for a full hearing before the GCGC, the informal action shall become final.

The faculty member's informal action shall be final and conclusive and not subject to appeal within the University System of Maryland on grounds related to academic misconduct.

2. More Serious Infractions

Infractions that can be considered more serious include:

- Major instances of plagiarism or cheating on examinations or papers for a course.
- Fabrication or falsification of data for publication, thesis, or dissertation.
- A pattern of, or repeated occurrences of, less serious infractions.

Having made a final determination of more serious

academic misconduct, the faculty member shall notify the student in writing within five days, if feasible. The student shall have an opportunity within 10 days to respond and give an explanation to the faculty member before the determination of more serious academic misconduct can be made final by the faculty member.

After making an initial determination of an instance of more serious academic misconduct requiring severe and stigmatizing penalty, the faculty member shall within five days send a letter to the associate dean or the dean's designee. The faculty member's letter shall describe the academic misconduct and recommend suspension, probation, expulsion, or other action commensurate with the seriousness and circumstances of the misconduct. The faculty member shall send a copy of the letter to the student, to the graduate program director, and to the department chair. The associate dean or the dean's designee will notify the registrar, if appropriate, to prevent the student from dropping the course, thereby evading a penalty. The letter to the student shall include a copy of this policy. The faculty member also shall make reasonable efforts to preserve any evidence that might be needed by the GCGC in the event of an appeal by the student.

3. Appeals and Hearings

When the faculty member has filed with the associate dean or the dean's designee a letter establishing academic misconduct requiring severe or stigmatizing penalty, the student shall have the right to a hearing before the GCGC. The student must file a written request for a hearing with the associate dean or the dean's designee within 10 days of notification. When a student requests a hearing in a case involving severe or stigmatizing penalty, the UMGSB administration shall provide facilities and personnel requested by the chair of the GCGC for the purpose of providing due process. If the faculty member recommends suspension or expulsion, the GCGC shall (unless the student waives the right to a hearing) automatically conduct a hearing to determine if there is enough evidence of misconduct, or history of misconduct, to justify suspension or expulsion.

Upon its notification of a hearing request, the dean of the Graduate School will appoint a three-person committee from among members of the GCGC. The GCGC should conduct an investigation, gather evidence, and interview witnesses to determine the facts. The investigation shall include a statement from the faculty member describing the situation and action, a statement from the student including reason for the hearing request, and all statements by witnesses. The associate dean or the dean's designee shall circulate the statements to GCGC members, noting that

confidential items must be kept in a secure location. The GCGC also shall obtain any additional information requested by the faculty member, student, or committee members. If requested by the chair of the GCGC, the associate dean or the dean's designee shall provide the GCGC the record of academic misconduct of any student requesting a hearing. The GCGC should, if necessary, hold a pre-hearing meeting of committee members to discuss the investigation. Copies of all items of evidence should be sent to the faculty member and the student or, if the evidence cannot be copied, the associate dean or the dean's designee should arrange for the evidence to be inspected by these parties at a convenient time.

The GCGC then shall schedule a hearing, conducted by the chair of the GCGC, allowing sufficient time — including continuations if necessary — for the committee to be satisfied that further inquiry would turn up no new material. If feasible, the hearing should be scheduled within 30 days of the GCGC's notice of a hearing request. At least three members of the GCGC must attend a hearing to form a quorum. Hearings will be held in closed session and will be tape recorded. Accidental erasure of the tapes, failure of the recording equipment, or poor quality of the recording will not be grounds for appeal. The faculty member and the student shall attend the hearing. Witnesses may be present at the hearing only during their own testimonies except with the permission of both the student and the chair of the GCGC. Legal counsel for the student or the University may be present at the hearing in an advisory role. Legal counsel shall not function as an advocate. The student shall have the right to state their case, offer explanations and interpretations of each item of evidence and testimony, and ask questions of the faculty member and witnesses. The faculty member may offer interpretations of the evidence and testimony and ask questions as necessary. Each committee member may ask questions. The proceedings of the hearing are to be confidential and are not to be discussed outside the hearing.

Members of the GCGC who are present throughout the hearing shall discuss the case in closed session as soon as possible after the hearing. They then vote on whether to uphold the faculty member's initial determination of academic misconduct. When a faculty member's recommendation of suspension or expulsion is involved, the GCGC also votes whether to uphold the recommendation. No votes in absentia shall be counted.

The GCGC shall send its findings and recommendations in writing to the associate dean or the dean's designee within 10 days of the hearing, if possible. (A dissenting opinion

may be submitted and filed by any GCGC member.) The associate dean or the dean's designee will act upon the recommendations of the report and notify the student, faculty member, and other necessary parties of the results of the determination. If the GCGC determines that the faculty member acted improperly or mistakenly in their initial determination of more serious academic misconduct, it may recommend that the associate dean or the dean's designee expunge the notice of academic misconduct or attach a letter of explanation to the notice. The GCGC may, in its report to the associate dean or the dean's designee, include other penalties. While the GCGC may not impose grade alterations based on the content of the student's work, it has the authority to uphold the grade sanctions recommended by the faculty member if the student is found to have engaged in academic misconduct. The associate dean or the dean's designee's notification letter shall direct the student to the dean of the Graduate School should he or she want to appeal the decision. The GCGC also shall send the dean of the Graduate School the documents and records used as evidence in the case.

The student has the right to appeal to the dean of the Graduate School. The appeal must be in writing and must be filed within 10 days of receiving the GCGC report. The dean will review the GCGC report and may uphold the decision, reverse the decision, modify the decision or penalties, or refer the case back to the GCGC. In any case, the decision of the dean of the Graduate School is final.

The dean of the Graduate School shall maintain a confidential file of academic misconduct communications that shall constitute the student's record of academic conduct. The dean of the Graduate School may place appropriate notations on the student's transcript and provide the academic misconduct record of any student to outside institutions making inquiry appropriate under the federal Buckley Amendment laws.

*The GCGC is composed of three graduate faculty members from each campus — the University of Maryland, Baltimore and the University of Maryland, Baltimore County. GCGC members may be members of the Graduate Council and are appointed by the respective deans of the Graduate School to a term of two years. The initial appointment of one year for two members assures continuity of membership on the committee. Monthly meeting times will be set for the GCGC and any grievances that are filed will be heard at these times. Additional meeting times may be scheduled as needed. When a grievance is filed, all parties of the grievance and the members of the GCGC will be asked if there would be a conflict of interest with members of the committee or any

party filing the grievance. The dean of the Graduate School will select three members of the GCGC who have no conflict of interest with any party affected by the grievance to serve on a panel to hear the case. Two members of the panel will be from the campus of the person filing the grievance. A panel may be augmented by two Graduate Student Association members of the Graduate Council (or other selected students) for the deliberation of academic misconduct grievances. The GCGC panel will serve as an informal fact-finding body, taking written statements from all participants and interviewing witnesses. The investigation may take the form of a hearing in which statements from all participants may be reviewed and the participants questioned. Legal counsel may be present at the hearing in an advisory role but shall not function as an advocate. Every consideration will be taken to ensure the confidentiality of witnesses. The GCGC panel will deliberate in closed session and make its recommendations to the associate dean or the dean's designee. Original documents of the proceedings and records of the hearing also will be submitted to the associate dean or the dean's designee.

(Approved and adopted by the Graduate Council, September 1993; revised July 23, 1998; revised Nov. 25, 2002)

Ombuds-Committee

The purpose of the Graduate School Ombuds-Committee (GSOC) is to provide mediation services when disagreements or differences of opinion arise between a graduate student and their advisor or graduate program that: (a) cannot be successfully resolved at the program level; (b) are serious enough in nature to jeopardize the student's ability to complete their training; and (c) do not relate to issues that fall under other policies.* The GSOC will consist of three experienced faculty members appointed by the dean of the Graduate School for a period of two years.**

Rationale: It is recognized that disagreements between students and their advisors occur during training. In most cases, such problems can and should be worked out by the student, advisor, and program, possibly with the assistance of the student's dissertation committee. If this is not possible, however, the situation should be brought to the attention of the associate dean or the dean's designee, who will, in turn, inform the GSOC. The GSOC will assist the student, advisor, and program to develop a strategy to resolve the situation. The GSOC will provide all parties an opportunity for full consideration of their positions and ensure that all relevant Graduate School rules and guidelines are followed.

Procedures:

- The student must first inform the director of their graduate program that a serious problem exists. It is the director's responsibility to review the situation and attempt to resolve it according to the rules and guidelines of the program and any Graduate School rules or guidelines that are applicable.
- In the event that the advisor is also the program director, the program should select another faculty member or form a committee of faculty members from within the program to mediate the problem.
- If efforts at the program level fail to resolve the situation, or if the program fails to act, the student may contact the associate dean or the dean's designee. The student should present the problem to the associate dean or the dean's designee in writing, describing the situation in detail and outlining what was done at the program level to attempt to resolve it.
- The associate dean or the dean's designee will provide the student's information to the GSOC. The GSOC will request information, also to be submitted in writing, from the program director, stating the program's position and describing efforts that were made to resolve the situation. The advisor also may provide input at this time, but such input must be submitted through the program director.
- The GSOC will review all relevant material provided by the student and program director. The GSOC may request additional information and meet with the parties involved. Upon completion of its review, the GSOC will make recommendations for resolution of the situation in writing to the student, advisor, program, and associate dean or the dean's designee.
- The final decision as to the appropriate resolution of all cases will rest with the dean of the Graduate School.
- If a GSOC member has been involved in a matter before it reaches the GSOC, the member will not participate in the deliberations. The associate dean or the dean's designee will name one alternate member to the GSOC for the matter.

*Note, for example, that instances of alleged arbitrary and capricious grading, sexual harassment, student academic misconduct, and other misconduct are dealt with under other Graduate School policies or University policies.

**Initially, the three faculty members will be appointed to

staggered terms, as follows: one to a term of one year and two to a term of two years. This will provide for overlapping terms in subsequent years.

FERPA Notice

Pursuant to the Family Educational Rights and Privacy Act (FERPA) and the UMB Confidentiality and Disclosure of Student Records Policy, this notice is given to students to advise them that the following information about a student is directory information subject to disclosure by the University upon request: name; address; telephone listing; date and place of birth; photograph; major field of study; dates of attendance; degrees and awards received; and most recent previous educational institution attended. The directory information concerning a student may be disclosed even in the absence of consent unless the student, within three weeks of the first day of the semester in which the student begins each school year, files written notice informing the University not to disclose information in any or all of the categories. Notice not to disclose may be filed with the office of student affairs at the student's school.

The complete Family Educational Rights and Privacy Act policy — including terms and guidelines of student rights of access to educational records — is published in UMB's *Student Answer Book* and is available at www.umaryland.edu/policies/#student.

Graduate Council Grievance Committee Guidelines**Appeal of Academic Dismissal and Academic Misconduct**

This is a formal hearing for academic cases that have not been resolved at the department level. After the hearing, which takes place as set forth under "Format," which follows, the GCGC will deliberate in closed session and recommend a decision and action to the dean of the Graduate School. The hearing is chaired by a member of the GCGC. The committee is staffed by the nonvoting administrative assistant of the dean of the Graduate School who will record the hearing for archival purposes only.

Format

1. Chair's introduction and summary of issues and process overview.
2. Department representative's presentation of issues (15 minutes maximum).
3. Student presentation of issues (15 minutes maximum).

4. Optional: Presentation by witnesses (limited to three per side and a maximum of 15 minutes per side)
5. Questions by committee members.
6. All presenters and witnesses are excused.
7. Deliberations by committee members.
8. Written recommendation to the associate dean or dean of the Graduate School (within 15 calendar days, unless extended by the associate dean or dean of the Graduate School, with notice of the extension given to all parties — the grievant(s) and the department — in writing.

Preparation

All materials that the grievance committee are to review must be submitted to the Graduate School at least two weeks (14 days) in advance of the hearing, at which time such materials will be distributed to all parties to the grievance and to the members of the GCGC. Thereafter, to the extent that any of the parties wish to have additional materials considered by members of the committee, such materials must be received by the Graduate School no later than one week (seven days) in advance of the scheduled date of the hearing, at which time all such additional written materials will be distributed to the parties as well as to the members of the GCGC. The Graduate School will pay for reasonable reproduction costs, but the cost of reproducing voluminous packets (i.e., those exceeding 50 pages) will be charged to the submitting party (the student or the department).

The proceedings will be recorded for archival purposes only.

If witnesses are to be called by either side, their names must be received by the Graduate School, in writing, at least one week (seven days) before the hearing.

Presentation of the issues should be concise and relevant. Obviously, the case is complex, or it would not have reached this stage. The points of dispute or ambiguity may be summarized or illustrated by anecdote. Experience suggests that the best approach is to minimize formalized presentations and allow the committee members maximum time for questions.

Attorneys

An attorney is neither necessary nor recommended. The GCGC described herein operates as part of an academic hearing, not a judicial proceeding. However, if the student

elects to have counsel present, the University's attorney also must be afforded an opportunity to attend. Accordingly, the student must notify the Graduate School, in writing, at least two weeks (14 days) before the hearing if the student intends to use an attorney. Once a lawyer has contacted the Graduate School on behalf of a student, all contact, written and oral, must be with approval of the Office of General Counsel. The lawyer(s)' presence at the hearing does not change the proceedings. The lawyer(s) will not be able to examine witnesses, ask questions, or otherwise take part in the proceedings, except in an unobtrusive manner, in an advisory capacity to their clients.

ADA Policy

The University of Maryland, Baltimore (UMB) is committed to the principles of equal access and opportunity for persons with disabilities, in compliance with the Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973. UMB will not discriminate on the basis of disability against a qualified person with a disability in regard to application, acceptance, grading, advancement, training, discipline, graduation, or other aspects related to a student's participation in an academic program of the University of Maryland, Baltimore. This applies to all University students, postdocs, and applicants for admission to the University.

The UMB Accommodation Process is an interactive process between the student, the Office of Educational Support and Disability Services, and the school. UMB will make a reasonable accommodation for a qualified person with a disability to allow the performance of the essential requirements of an academic program. UMB will not make an accommodation if the accommodation alters the academic nature of the program or if it would result in undue hardship to the University or threaten health or safety. For more information, please see www.umaryland.edu/disabilityservices.

Technical Standards

The Graduate School does not have uniform technical standards and guidelines for admission and progression. Each school — and in some cases each program — may have its own standards and guidelines. A prospective or enrolled graduate student must consult the appropriate school/program student handbook or website for information about the standards students must satisfy, with or without reasonable accommodation, to be qualified.

Nondiscrimination

The University of Maryland, Baltimore does not discriminate on the basis of race, color, religion, national origin or ancestry, sex, sexual orientation, gender identity or expression, physical or mental disability, marital status, veteran's status, or age in its programs and activities. For more information, please see <http://umaryland.edu/academicaffairs/policies>.

Download and Print Catalog

2022-2023 Graduate School Catalog

Site Map

Index

Academic Standards, Policies, and Degree Requirements	18
Administration	179
Admissions	6
Aging and Applied Thanatology	30
AGNG	100
Biochemistry And Molecular Biology	44
Biomedical Sciences-Dental School	31
Cellular and Molecular Biomedical Science	46
CIPP	100
Clinical Aspects of Hospice and Palliative Care	33
Clinical Informatics	34
Course Descriptions	100
DBMS	102
DEIL	105
Diversity Equity and Inclusion Leadership - MS	37
DMSC	105
Download and Print Catalog	189
DPAT	106
Epidemiology and Clinical Research	47
Epidemiology and Human Genetics	48
ETHC	108
Faculty	180
Financial Information	27
FMED	109
Forensic Medicine	38
General Information	5
GERO	110
Gerontology - MS	52
Gerontology - PhD	51
GLBH	112
Global Health	39
Global Health Monitoring and Evaluation	42
Global Health Systems	43
Global Research Ethics	96
GPLS	113
Graduate Catalog	3
Graduate Program in Life Sciences	44
Graduate School Programs	30
Health Professions Education - MS	64
Health Professions Education - PhD	66
Health Science	62
HGEN	122
HPE	124
Human Genetics and Genomic Medicine	55
Implementation and Dissemination Science	67
INCL	126
INFO	127
INNO	128
Integrative Health and Wellness	68
Intercultural Leadership	70
Leadership and Administration in Hospice and Palliative Care	70
MANA	132
Marine Estuarine Environmental Sciences	71
MCST	132
Medical and Research Technology	72
Medical Cannabis Science and Therapeutics	74
Medical Physics	75
Medical Science - DMSc	76
MEDT	134
MEES	136
MHS	136
Mission and Vision Statements, Accreditation, State Authorization, and Disclaimers	4
MLL	141
Molecular Medicine	55
Molecular Microbiology and Immunology	59
MP	141
MSPA	142
Neuroscience	60
NURS	142
Nursing	77
Oral and Experimental Pathology	78
PALC	146
Palliative Care	81
PATH	150
Pathologists' Assistant Program	84
PHAR	151
Pharmaceutical Health Services Research	86
Pharmaceutical Sciences	88
Pharmacometrics	90
PHMX	155
PHSR	156
Physical Rehabilitation Science	61
Physician Assistant	90
Policies	181
PREV	158
Principles and Practice of Hospice and Palliative Care	92
Psychosocial/Spiritual Aspects of Hospice and Palliative Care	93
PTRS	165
Registration, Enrollment, and Grades	13
REGS	167
Regulatory Science	94
Research Administration	95
Science Communication	96
Site Map	190
Social Entrepreneurship	98
Social Work	98
SOWK	167

THAN 177

TOXI 177

