

University of Maryland, Baltimore

Graduate School

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

*Designer and Editor: Tanya F. Tucker
Editors: Keith Brooks, Joe Giffels and Erin Golembewski*

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GENERAL INFORMATION

Graduate School

Graduate studies began at the Baltimore campus of the University of Maryland in 1917. The University of Maryland Graduate School, Baltimore (UMGSB) offers 27 master's and doctoral degree programs in health, physical, biomedical, medical, and social sciences. The Graduate School offers dual degrees with the University's professional schools including PhD/MD, PhD/PharmD and PhD/DDS degree programs, and coordinates interinstitutional studies in biochemistry, gerontology, and toxicology with other University System of Maryland graduate programs.

All doctoral students are actively engaged in research with faculty members to address some of society's most pressing problems and biomedical research's most challenging questions in basic and translational research. These efforts, supported by over \$380 million in research grants and contracts in fiscal year 2006 are undertaken collaboratively with the National Institutes of Health, the National Science Foundation, the University of Maryland Medical Center, the Veterans Affairs Medical Center, the Institute for Human Virology, the University of Maryland Biotechnology Institute, and others.

Degrees Offered Through the Graduate School

PhD
MS

Web Site

Our Web site (graduate.umaryland.edu) includes the Graduate School catalog, program information, links to program and school Web pages and e-mail addresses, and the online application for admission.

Physical address:

Graduate School
University of Maryland, Baltimore
110 S. Paca Street, 4th Floor
Baltimore, MD 21201

Mailing address:

660 West Redwood Street
Room 021
Baltimore, Maryland 21201

Phone: 410-706-7131

Fax: 410-706-3473

E-mail: gradinfo@umaryland.edu

University of Maryland, Baltimore

Situated in the heart of downtown Baltimore, the University of Maryland, Baltimore is among the nation's leaders in education, research, public service, and patient care. As the founding campus of the University System of Maryland, UMB has a nearly 200-year tradition of excellence.

Our graduate and professional schools not only educate the majority of the state's health care and human service providers, but also train them to be leaders in the community. In addition, the schools of dentistry, law, medicine, nursing, pharmacy, and social work are ranked among the country's top institutions.

Generating more than \$380 million in annual research funding in Fiscal Year 2006, the faculty has contributed to important advances in basic science and applied research. The University's growth has been dramatic, with facilities that add to its stature as a Baltimore landmark; it attracts the nation's top educators, researchers, and students.

With 5,600 students and 2,000 faculty members and staff, the University is an economic engine that yields \$16.54 in financial activity for every \$1 invested by the state. In addition to the University's mandates of teaching and research, members of the University community donate more than two million hours a year in service to the public.

The Dental School's new \$153 million, 360,000-square-foot building opened in the summer of 2006. The building features technological advances such as electronic patient records, digital imaging, and online curricula. The Dental School ranks third among the nation's dental schools in funding from the National Institutes of Health (NIH).

The School of Medicine is among the top public medical schools in NIH research funding. In 2006, the University will open a School of Public Health.

Among the University's distinguished organized research centers, the Center for Vaccine Development, led by Myron Levine, MD, DTPH, is the only university vaccine center in the world engaged in the full range of vaccinology--from basic science to clinical evaluation.

In 2005, the University opened its first fully leased building in the UMB BioPark in West Baltimore. The 10-building biopark complex brings much needed laboratory and office space to the area. It also encourages collaboration among biotechnology companies and faculty and helps UMB professors and researchers with burgeoning companies remain close to their teaching obligations.

Baltimore

Beyond offering outstanding professional opportunities, Baltimore is a great place to live. In addition to a diversity of affordable housing, Baltimore's world renowned Inner Harbor area, lively entertainment, world-class museums, fine music, and professional theater make city living exciting and culturally rewarding. For sports lovers, Orioles baseball and Ravens football are within walking distance of campus. The city also offers access to the Chesapeake Bay and Atlantic Ocean beaches, ski resorts in Western Maryland and Pennsylvania, and the nation's capitol, Washington, DC.

Directions

From the South Via I-95: From I-95, take I-395 (downtown Baltimore) and exit onto Martin Luther King Jr. Boulevard, staying in the right lane. At fourth traffic light, turn right onto Baltimore Street. Turn left at second traffic light onto Paca Street (get into right lane) and enter the Baltimore Grand Garage (visitor's parking) on the right.

From the South Via 295: Take 295 (Baltimore-Washington Parkway) to its end. As it enters Baltimore, it becomes Russell Street, then Paca Street. The Baltimore Grand Garage is two blocks beyond Lombard Street on the right.

From the South Via I-97: Take I-97 North to 695 West to 295 North and follow directions from the south via 295.

From the North: Take I-95 South to 695 West to 83 South. Continue on 83 to its end, past exit 1 (Fayette Street). Make a right onto Lombard Street (continue through town for about one mile), turn right onto Paca Street. Visitors' parking is two blocks on the right.

From the East: Take I-95 South or I-895 South to I-395 (downtown Baltimore) and follow directions from the south via I-95.

From the West: Take I-70 East to 695 South to I-95 North. From I-95, take I-395 (downtown Baltimore) and follow directions from the south via I-95.

ADMISSIONS

Determination of Admissibility

Responsibility for admission to graduate study at the University of Maryland, Baltimore resides with the Office of the Vice President for Academic Affairs and Dean, Graduate School. The dean 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 Ph.D. program are generally higher than those for admission to a M.S. program. Applicants must also 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 requirements, which may exceed the minimum.

The Graduate School requires a completed application (online or paper), official transcripts of all prior undergraduate and graduate study (2 sets), three letters of recommendation, and a statement of academic goals and research interests.

The Graduate School normally requires Graduate Record Examinations (GRE) scores for admission to graduate programs and uses GRE scores as part of the data on which it bases its admission decisions. The scores, however, are never the sole criteria for admission. Some programs may recommend or require other standardized tests.

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 examination of the International English Language Testing System (IELTS).

Some programs require additional evidence of ability to succeed. Such evidence may include an interview, documentation of prior work experience, GRE subject test, or other supplementary materials. Applicants should contact the office of the program to which they are applying about additional admission requirements. Failure to comply with all Graduate School and departmental or program requirements for admission may result in the application not being considered.

Admission to graduate programs is highly competitive; for best consideration applicants should submit accurate and complete credentials by the specified deadline.

Application Procedures

Candidates for admission must submit the application form and transcripts to the Graduate School along with the required nonrefundable application fee. The Graduate School will not process or review an application until the application fee is paid. We do not waive or defer the application fee.

Applicants for all Graduate School programs must mail their materials to:
Graduate School
University of Maryland, Baltimore
660 West Redwood Street, Room 021
Baltimore, MD 21201

The Graduate School is physically located at:
110 S. Paca Street, 4th Floor
Baltimore, Maryland 21201

Applicants to master's and non-degree graduate study in Nursing must direct their applications to:

Office of Admissions and Student Affairs
655 W. Lombard Street, Suite 102
University of Maryland School of Nursing
Baltimore, MD 21201

Transcripts of work in progress are required at the time of application; final transcripts certifying degree completion are required upon degree completion. Delays in the receipt of academic credentials could cause delays in the admission review process. It is the applicant's responsibility to ensure that the Graduate School receives all required application materials.

Application Deadline Dates

- U.S. citizens and U.S.-educated permanent residents: July 1 for fall semester and Dec. 1 for spring semester.
- International students and permanent residents who are attending or have attended a foreign school: Jan. 15 for fall semester and May 1 of the prior year for spring semester.
- Nondegree applicants: at least two weeks prior to the start of the respective semester.

Some programs have deadline dates other than those listed above; applicants should consult the "Graduate Programs Directory" section and program descriptions for special deadlines and requirements. Because admissions decisions for many programs are made several months before July 1, it is to the applicant's advantage to apply as early as possible.

Application Form

Candidates for admission must submit a completed application form (online or paper) following the procedures accompanying that form or process. The application must be signed (hand signature or electronic certification) by the candidate for admission to receive consideration.

Applicants must provide the cumulative grade point average (GPA) for each degree pursued or completed. Some programs may require a separate GPA calculation for the undergraduate major. To calculate a cumulative GPA, applicants must convert all grades to a four-point grading system. Pass or fail, satisfactory, incomplete credit, or similar grades are not included in these calculations. All numerical, alphabetical, or equivalent grades, except as already noted, must be calculated as follows:

1. Multiply quarter credit hours by (0.66) to convert to semester credit hours.
2. Multiply the number of semester credit hours for each course by the number of quality or honor points earned, as follows: A=4, B=3, C=2, D=1, F=0.
3. Divide total number quality points by total semester credit hours.

Transcripts

Applicants must submit two official copies of academic transcripts that include all undergraduate and graduate work. Each transcript should bear the signature of the registrar and the seal of the granting institution and should include the years of attendance, courses taken, grades received, class standing, and the degree, diploma, or certificate conferred.

Letters of Recommendation

Applicants must provide three letters of recommendation, preferably from professors or others who can attest to the quality of the applicant's academic performance and scholastic potential. The applicant's full name, the semester or session for which admission is desired, and the program to which s/he is applying must be indicated on the letter or form provided for this purpose. These letters must be sent directly to the program to which s/he is applying.

Statement of Goals and Objectives

Applicants must write and submit a 300- to 500-word statement outlining her or his goals and objectives in pursuing graduate study.

Standardized Test Scores

The Graduate School normally requires the submission of scores earned on the Graduate Record Examinations (verbal, quantitative, and analytical writing scores). Many programs may also require scores earned on the GRE Advanced (subject-specific) test. Information on registering for the GRE's and on having test score results sent to UMB is available from the testing agency:

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

(The Graduate School's GRE institution code number is 5848; department codes are published by GRE)

Applicants whose native language or language of the home is not English must take an English language proficiency exam as described in the International Applicants section below.

Time Limitations of Standardized Tests

General Aptitude (GRE) exams must have been taken within 5 years of start of the desired admission term, and English language proficiency exams must have been taken within 2 years of the start of the desired admission term, to be considered valid scores for admission consideration.

Program-Specific Requirements

Some programs have additional requirements such as a supplemental application or an interview. It is important that applicants contact the office of the program to which they are applying about additional admission requirements. Failure to do so may result in applications not being considered.

Transfer of Credit

No more than 6 credits of graduate course work taken as a non-degree student or from other regionally-accredited institutions may apply toward the master's degree at UMB. Students must take such courses from an accredited institution within the five-year limit for completing the master's degree; the program must agree that the specific credit is appropriate to, and acceptable in, students' programs; and students must earn grades of B or better in such courses (approved courses and related credits are transferred, grades are not).

The Graduate School does not require or accept transfer of credit for courses taken at other institutions for doctoral students. Courses approved by the graduate program are listed on the Graduate Record Form at the time of admission to candidacy. These courses do not appear on the University of Maryland, Baltimore transcript, but if approved by the program or department, may be used as partial fulfillment of the doctoral student's degree program completion requirements.

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 you have a credential evaluation done by an outside agency.

In addition to meeting the requirements for all applicants cited above, 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 3.0 grade point average, 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 and Mark Sheets

International applicants must provide two official transcripts in English and two official native language transcripts or mark sheets from each college or university attended. Each set of documents must list subjects studied, grades or marks received, and rank in class or division.

Language Requirements

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 550 for paper-based tests, 213 for computer-based tests, 80 for the internet-based tests. IELTS test takers must score no less than Band 7 (total). Some graduate programs have higher minimum score requirements.

TOEFL information and applications are available from:

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

(The Graduate School's TOEFL institution code number is 5848; department codes are published by TOEFL)

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

Graduate students whose work suggests English language deficiencies may need to take remedial English courses at their own expense. The Graduate School also has guidelines for use of the Test of Spoken English scores in evaluating applicants. Candidates for teaching assistantships are encouraged to consider submitting TSE scores in addition to their TOEFL or IELTS scores.

Immigration Requirements

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 he or she has 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 international services officer in the Office of the Registrar.

Acceptable sources of and documents for certifying financial support include: a notarized letter with full name, occupation, and address from 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 showing name and address of awarding institution, amount of funds, extent of expenses covered, and number of years the grant runs.

New international students at the University of Maryland must report to the Office of the Registrar upon arrival. This office helps international students with various immigration matters.

Offers of Admission

The Assistant Dean for Admissions and Enrollment Affairs 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 s/he may 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 program, and within that program only for the specified objective, that is, 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 register in only one graduate program at a time unless admitted to an approved dual degree program.

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 completing that degree at or above their academic standing at the time the offer was made. Applicants engaged in graduate study at another institution are also subject to this policy.

Students admitted pending receipt of a bachelor's degree must submit an official transcript reflecting all course work and award of the degree prior to 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) prior to her/his 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.

Full Graduate Status

Students admitted to full graduate status must have submitted official documents showing a completed bachelor's degree from a regionally accredited institution and qualify in the judgment of admissions officials of the individual program and the Graduate School.

Provisional Graduate Status

Students admitted provisionally must meet specific academic stipulations defined by the program and/or the Graduate School – within a defined time period at UMB (typically the first semester of study) – in order to progress in degree studies. Failure to do so normally results in academic dismissal.

Provisional admission may be offered to a student who does not meet regular standards for admission or who does not possess the desired academic preparation, but shows promise for academic success in graduate studies.

The Graduate School grants full or regular status to students who are admitted on a provisional basis when the students satisfy the provisions stated in their admission letters.

Nondegree Student Status

Nondegree status is for students seeking admission to enhance their knowledge by completing one or more graduate courses. Students should not use nondegree status to obtain full-degree status at the university. While the Graduate School may later consider accepting credits earned while in nondegree status, there is no assurance that it will do so. In cases where the Graduate School does grant such a request, however, no more than 6 credits will transfer to a degree program.

Those who may seek nondegree status include people with an advanced degree who wish to take graduate courses for personal or professional enrichment, teachers and other professionals who wish to participate in summer (or other) institutes, visiting students in good standing as graduate students at other institutions, and University of Maryland employees who hold a bachelor's degree and wish to gain greater knowledge.

Applicants for admission to nondegree status must satisfy one of the following criteria:

- hold a bachelor's degree from a regionally-accredited institution with a B or 3.0 grade point average
- hold a master's or doctor's degree from a regionally-accredited institution
- hold a bachelor's degree from a regionally-accredited institution and have at least four years of successful post-baccalaureate work or professional experience

Applicants do not need to submit GRE scores or letters of recommendation. Students applying for nondegree status must, however, obtain the consent of the director of the graduate program offering the course(s) they want to take. Before submitting a nondegree application, applicants should refer to the individual program descriptions in this catalog for information on possible course restrictions.

International applicants in the United States whose immigration status permits them to enroll on a nondegree basis must meet the entrance requirements of the program and the Graduate School, including language proficiency requirements.

Nondegree students must maintain a 3.0 grade point average. 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.

Nondegree students may enroll for up to five years from the first semester or session enrolled. If a student does not register for at least one course in each semester (fall and spring) the student's registration eligibility is interrupted and s/he must request reentry and permission to register.

Other Enrollment Programs

Visiting Students

Degree-seeking graduate students at other universities may be admitted in a nondegree graduate status as visiting students. Besides the application form and 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.

Golden ID Program

The Golden ID program extends enrollment privileges to Maryland's senior citizens. Those who qualify receive a waiver of graduate tuition for up to three courses per semester. Eligible candidates must be at least 60, retired, not employed full-time, and dependent upon retirement income benefits as their chief source of income. Beyond the waiver of tuition, benefits include use of library and other university facilities, based on space availability.

Interinstitutional Enrollment

The University System of Maryland (USM) encourages graduate students enrolled at one institution to avail themselves of course offerings, research facilities, and special faculty competencies 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 the awarding of the graduate degree. The host institution provides access to courses, seminars, and research facilities on a space-available basis. The host institution will decide if library, parking, and medical services privileges will be extended to the interinstitutional student at the time of the student's enrollment. The interinstitutional enrollment process is facilitated by a standard form that is provided by USM; this form is available at all USM campuses.

Applicant Records

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.

Application materials of admitted students become part of the student's official file and the 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 Education Rights and Privacy Act (Buckley Amendment), published in the university's Student Answer Book outlines the terms by which students may review their records once enrolled.

Immunization and Health Policy

Please log onto www.umaryland.edu/health/ for detailed information regarding immunization.

Student Identification Numbers

The Graduate School assigns an identification number to all applicants. 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 arrival on campus.

REGISTRATION, ENROLLMENT and GRADES

Course Numbering System

Courses 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 post-baccalaureate 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

Unit System

The Graduate School uses a unit system when making calculations to determine full- or part-time graduate student status, administer the minimum registration requirements, and respond to student requests for full-time status certification. The unit system helps the Graduate School accurately reflect the involvement of graduate students in their programs of study and research and the use of university resources in the programs. Table for computing graduate units:

Courses	Units Per Credit
001-399	2
400-499	4
500-599	6
600-798, 800-898, and 900-999	6
799	12
899	18

Full- and Part-Time Enrollment

To be certified as full-time, a graduate student must be officially registered for a combination of courses carrying 48 units per semester. A graduate assistant must be registered full-time whether appointed to a full- or half-assistantship. A full-time assistantship is equivalent to 24 units; a half-time assistantship is equivalent to 12 units. Thus, a graduate assistant appointed to a full assistantship must register for a minimum of 24 units in addition to the assistantship, and a half-time graduate assistant must register for a minimum of 36 additional units.

Any student making any demand upon the academic or support services of the university, whether taking regular lecture, seminar, or independent study courses; using university libraries, laboratories, computer facilities, or office space; consulting with faculty advisers; or taking comprehensive or final oral examinations must register for the number of graduate units that, in the judgment of the faculty adviser, accurately reflects the student's involvement in graduate study and use of university resources.

Registration Process

Registration is accomplished through the student's program or department via a paper form or online. The student may need to secure the professor's or department's permission to register for certain courses. 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.

Schedule Adjustment Procedures

Students must file the necessary form(s) for registration changes with the appropriate university officials' signature(s) of approval in the Graduate School and/or other pertinent offices before changes are complete or official.

Add and Drop

Students may add a course only during the first week of instruction. The last day a student may drop a course without penalty of failure (F) is eight weeks after instruction begins. Graduate program administrators must forward all add and drop changes within these times directly to the Graduate School.

Cancellation

Students compelled to leave the university before the beginning of classes must file a letter of cancellation of registration with the Graduate School. Failure to file this letter and to obtain approval by the Graduate School will result in loss of refund.

Withdrawal

Once admitted to a graduate program, students are obligated to continue their course of studies. The Graduate School may grant a change of status, however, in two situations. Students who wish to cease pursuing their degrees after registration 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 which they would otherwise receive. Students seeking to re-enter graduate study following withdrawal must reapply for admission through the Graduate School.

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 adviser and the Graduate School. Students must complete a Leave of Absence Request Form and present it to their program director and to the Graduate School for approval. The Graduate School notifies students of leave approvals and the terms of re-enrollment. While there is no minimum number of times a student may request a leave of absence, leaves do not extend the time required to complete degree requirements.

Reinstatement

Students who 'stop out,' that is, leave their studies for a period of time without formally withdrawing or applying for a 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 (2) years must appeal for reinstatement to the student's program and to 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 length of departure the student may be required to reapply and compete with a new entering class. The department is under no obligation to re-admit 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 her/his 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 then forwarded to the Graduate School for final approval.

Change of Program

An enrolled student who desires to change her/his 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 must also be copied to the departing program director and advisor, and to the Graduate School. In some cases, a new application for admission and supplemental documentation may be required.

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	3.0
B-	2.67
C+	2.33
C	2.00
C-	1.67
D+	1.33
D	1.00
D-	0.67
F	0.00

If no grade is given to a student, the student automatically receives a No Mark (NM) on his or her 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 course work 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 their designated degree program in which they receive a D or F. No student may graduate with an unresolved or unrepeatable F on the record. Students who earn a grade lower than a B may repeat the course. The grade on any repeated course, whether it is higher or lower than the original grade, takes the place of the original grade.

Pass/Fail

Programs may use a pass or fail (P or 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 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 of the drop/add period.

Temporary and Final Grades

Students should complete all the requirements of graduate course work 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. Students failing to meet this requirement may, upon request, receive a temporary grade of Incomplete (I). Faculty needing additional time for the grading process may award a temporary grade of "No Mark" or "NM."

No student may graduate with an Incomplete (I), No Mark (NM) or failing grade (F) in courses taken for their degree program.

Incomplete Grades

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. This policy does not apply to the 799 and 899 research grades, where the graduate faculty may assign letter grades, pass or fail (P or F) grades, or Incomplete grades. Incomplete grades should be replaced by appropriate terminal grades before the examining committee approves the applicable research.

Appeal of Grade

A student who believes 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 advisers. 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.

Undergraduates Taking Graduate Courses for Undergraduate Credit

Subject to requirements decided by the program offering the course, undergraduate students may register in the undergraduate college for graduate-level courses, that is, those numbered from 600 to 898 (except 799) for undergraduate credit. A student seeking this option will normally be in his or her 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 seven 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, the department chair, and the Vice President for Academic Affairs and Dean, Graduate School.

Abidance of Guidelines

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

Academic Record (Transcript)

A graduate student's academic record (transcript) should serve as a complete history of the student's academic progress at the University of Maryland. 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.

ACADEMIC STANDARDS, POLICIES and DEGREE REQUIREMENTS

Advisement

Program faculty coordinate academic advising. Students are encouraged to seek the advice and counsel of graduate advisers and program directors in planning their curriculum. In addition, the Graduate School provides graduate assistants with a manual on policies and guidelines. Other policies related to student enrollment activities are in the university's Student Answer Book.

Responsibility for progress in a graduate degree program is shared by the student, faculty adviser, and the people administering the program. Students are responsible for compliance with the school's rules and procedures and all other graduate program requirements. Students can increase their chance for academic success by actively seeking 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.

Minimum Grade Point Average

The Graduate School requires all graduate students to maintain a minimum, cumulative grade point average of 3.0 on a 4.0 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.

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

Academic Performance and Progress in Master of Science Programs

The Graduate School has established standards and requirements with regard to minimum grade point average, continuous enrollment, time to degree, academic integrity and other elements of satisfactory academic progress and degree completion.

The elements are delineated in the "Policies" section of this *Catalog* under "Policy on Academic Performance and Progress in University of Maryland, Baltimore Master of Science Programs." All master's degree candidates are expected to review and comply with these standards and requirements.

Academic Performance and Satisfactory Progress in PhD Programs

The Graduate School has established standards and requirements with regard to minimum grade point average, continuous enrollment, time to degree, advancement to candidacy, academic integrity and other elements of satisfactory academic progress and degree completion.

These elements are delineated in the "Policies" section of this *Catalog* under "Policy on Academic Performance and Progress in University of Maryland, Baltimore PhD Programs." All doctoral degree candidates are expected to review and comply with these standards and requirements.

Appeal of Academic Dismissal

The procedures for the resolution of controversy between the Graduate School and a student dismissed for poor academic performance are found in the "Appeal of Academic Dismissal" policy. 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 Vice President for Academic Affairs and Dean, Graduate School, and are printed in the "Policies" section of this *Catalog*.

Degree Requirements

Requirements for the Master of Science Degree

The entire course of study undertaken for the Master of Science degree must form a unified, coherent program approved by the student's mentor 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.

Course Requirements

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 of graduate course work taken as a non-degree 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 adviser 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 required for any other degree. The Graduate School does not grant credit for correspondence courses or for "credit by examination" courses taken at other universities. Note that the Graduate School only transfers credit, not grades, from other universities.

Time Required

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.

Thesis Option

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 adviser. 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 adviser. The chair is responsible for nominating the committee members to the Graduate School dean. In the event that a candidate's adviser 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 a final, unbound copy of the master's thesis to the Graduate School. The signature of the student's adviser on the

approval sheet to be bound with the master's thesis 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 "Procedures for Examination of the Master's Thesis." This document is available from the Graduate School and online.

Nonthesis Option

The requirements for Master of Science degree without thesis vary among programs in which this option is available. Standards for admission are, however, identical with those for admission to any master's program. The quality of the work expected of the student is also 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 course work taken; of the total credits required by a program, a total of 18 numbered 600 or above; submission of one or more scholarly papers; and a passing grade in 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.

Requirements for the Doctor of Philosophy Degree

The Doctor of Philosophy degree is the highest degree awarded by the university and is granted only upon sufficient evidence of high attainment of scholarship and the ability to engage in independent research. Beyond the following requirements, the department or program may have special requirements. Consult the program descriptions in this catalog and the program director for more information.

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 Graduate Record Form at the time of admission to candidacy.

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.

Admission to Candidacy

Doctoral students must complete an application for admission to candidacy, in duplicate, when they fulfill all requirements for candidacy. They must submit both copies to the major adviser and program director for signature, and subsequently forward them to the Graduate School for final review. A graduate record form delineating all course work taken by the student in fulfillment of degree requirements must accompany each copy of the application for admission to candidacy.

Preliminary examinations or other substantial tests as the departments may elect are frequently prerequisites for admis-

sion to candidacy.

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 register for a minimum of 12 credit hours of doctoral dissertation research (899) at the University of Maryland, Baltimore.

A Ph.D. student must establish and maintain a professional relationship with a member of the Graduate Faculty with the appropriate knowledge and expertise to serve as his or her research adviser. If no appropriate Graduate Faculty member is available or no appropriate Graduate Faculty member agrees to be the student's research adviser, the student cannot continue in the Ph.D. program.

In most Ph.D. programs, students must also have a doctoral examination committee appointed by the graduate program director. The doctoral examination committee consists of a minimum of five scholars: the adviser, 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. When the dissertation is completed to the satisfaction of this committee and at least 10 days before the defense, the adviser and both readers sign the form saying 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 advisers for publication of all or part of the dissertation before its defense. A manual to help students in the preparation of their doctoral dissertations, "Instructions for Preparing Master's Thesis and Doctoral Dissertations," is available online and from the Graduate School.

Final Examination

The candidate's doctoral examination committee conducts the examination of the doctoral dissertation. The committee comprises a minimum of five and a maximum of seven voting members, all of whom must hold the doctoral degree or its equivalent. The committee must include the candidate's dissertation adviser, two readers, and one member who is external to the candidate's program, department, or discipline. At least three committee members must be regular members of the Graduate Faculty. The Graduate School designates one committee member as the Graduate School representative. The Graduate School representative, who must be a regular member of the Graduate Faculty and not the committee chair, has the responsibility of ensuring that the examination is conducted according to established procedures.

Nomination of the members of the committee must occur six months before the projected date of the doctoral examination using the "Nomination of Members for the Final Doctoral Examining Committee" form. The committee chair must be a regular member of the Graduate Faculty and is normally the candidate's adviser. The chair is responsible for nominating committee members to the dean of the Graduate School. Besides the chair, two members of the committee must be readers. Each of these three individuals must sign the "Certification of Completion of Doctoral Dissertation" form and return it to the Graduate School two weeks before the proposed examination. The readers and chair are responsible for deciding that the dissertation is ready for defense. The examining committee must receive the final doctoral dissertation two weeks before the examination. One committee member must fulfill the criteria for being an external member. This individual must be from a separate program, department, or discipline from that of the candidate, and must hold a doctoral degree. The individual may be from within the university or may be a scholar from another institution. If the external member is a Graduate Faculty member, the individual may also serve as the Graduate School representative.

The Vice President for Academic Affairs and Dean, Graduate School appoints the doctoral examination committee and notifies the adviser of the approval of the nominated committee. The adviser decides the time and place of the examination. The dean is responsible for notifying all members of the Graduate Faculty of each impending doctoral examination at least two weeks before the scheduled date. All doctoral examinations are open to members of the Graduate Faculty. After the examination, the committee deliberates and votes in private. Affirmative votes by four members of a five-member committee or five members of a larger committee constitutes a successful defense.

Any minor typographical corrections or amendments to the dissertation agreed upon by the examining committee at the time of the final doctoral oral examination must be incorporated in the dissertation by the student. The student must then turn in the original and one copy of the dissertation to the Graduate School office. The signature of the mentor on the approval sheet to be bound with the dissertation certifies that the student made all required corrections.

The candidate may take the final oral defense only twice. A failure on the second attempt means the Ph.D. degree is forfeited. Specific rules on the procedures for the final defense are detailed in the document "Procedures for Examination of the Doctoral Dissertation" available online and from the Graduate School.

Degree Certification and Diplomas

The Graduate School issues 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 Office of Graduate Admissions and Enrollment Affairs by the published diploma application deadline date.

The university issues diplomas at the end of each semester or session. Students who have applied for a diploma but are not able to complete degree requirements as planned must inform the Office of Graduate Admissions and Enrollment Affairs as soon as possible. These students must then reapply in the semester or session in which they expect to graduate. Students do not need to pay another diploma fee, but they must register for at least one credit per semester or session until graduation and pay a renewal fee.

FINANCIAL INFORMATION

Graduate Tuition and Fees

The fees below are for the 2006-2007 academic year. As of the printing date of this Catalog, charges for the upcoming academic years have not been established. 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 and the University System of Maryland Board of Regents. Each semester's current charges may be found on the UMB 'Student Accounting' Web site at <http://www.fincsvc.umaryland.edu/sa/>.

University of Maryland Graduate School 2006-2007	Maryland Resident	Non-Maryland Resident
Tuition - Per Credit Hour		
Master's Degree and Non-degree Students	\$429.00	\$767.00
Medical & Reseach Technology Students	419.00	724.00
PhD Students	363.00	646.00
Nursing PhD Students	380.00	677.00
Technology Fee - Per Credit Hour		
All Graduate Students	10.00	10.00
Auxiliary Fees* - Per Semester		
All Grduate Students	240.00	240.00
Student Health Fee** - Per Semester		
All Graduate Students	1027.50	1027.50
Late Registration Fee	40.00	40.00
Late Payment Fee***	100.00	100.00
Graduation/Diploma Fee:		
Master's Degree Students	55.00	55.00
PhD Students	128.50	128.50

* Includes Student Activities, Student Government, Supporting Facilities, and Transportation Fees

** Health insurance coverage is required for all UMB students

*** Or 5% of the balance, whichever is less.

Explanation of Fees

Student Activity – supports activities in the Graduate School

Student Government – supports activities in the Student Government Association

Supporting Facilities – supports expansion of student facilities on campus.

Transportation – supports student campus transportation system

Technology – supports computer labs

Graduation – helps defray costs involved with graduation and commencement

Tuition

Tuition is charged to students and is applied to instructional programs of the University of Maryland. Students admitted to the Graduate School must pay graduate tuition fees whether the credits satisfy program requirements or not. 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 and the University System of Maryland Board of Regents.

Refund of Fees

According to the regulation of the University of Maryland, graduate students dropping courses receive a full refund of tuition if they drop courses before the first day of the semester. The Graduate School publishes the complete refund schedule in each Course Offerings Schedule.

Indebtedness to the University

Students must pay debts before registration can be completed for the following semester or session. Students may not receive transcripts or diplomas until they pay their debts. The university applies refunds due to students against their outstanding debts to the university. Uncollected debts are forward to the State Central Collection Unit and debts are subject to a 17% collection fee and all costs incurred in collection the delinquent account.

Obligation

Every registration incurs a debt to the university and registration is not complete or official until the student satisfies all financial obligations. Returning students may not register until they pay all financial obligations in full.

Payment of Tuition and Fees

Credit card payments – Visa, Master Card, Discover and American Express are accepted via the Internet by using the link at www.simsweb.umaryland.edu. Credit card payment may only be used for those charges not covered by financial aid. Payments from any financial proceeds that create a credit balance because of prior credit card payments will be credited to the cardholder's account to the extent of the original amount paid by that credit card.

Installment Payment Plan – An installment plan is available for the fall or spring semesters as provided by the “University Policy for Payment of Tuition and Fees.” Details and access to the plan can be obtained in the Student Accounting Office. The fee for setting up an installment plan is \$10.00 per semester.

Due Date

If payment is postmarked, paid in person or via the Internet after the due you will be subject to a late payment fee of \$100.00 or 5% of the balance, whichever is less. Any amount referred to SCCU for collection will be subject to an additional 17% collection fee.

Return Check Policy

A service charge of \$25.00 is assessed for each check that is return unpaid by the bank for any reason.

Hospitalization Coverage

Full time students are required to have health insurance coverage. Students are billed each fall and spring semester for the student health insurance. If a student has comparable coverage and does not want the UMB health insurance policy, it is her/his responsibility to provide proof of coverage to the Student and Employee Health Office (29 S. Paca St.) and obtain a waiver that authorizes removal of the charge from the bill. Waivers are valid for one academic year. Waiver dates for new and transfer students are September 15 for fall semester and February 15 for spring semester. Continuing students have a waiver deadline of August 25 for fall semester and February 15 for spring semester.

Up-to-date Account Information

Students may view current information at www.simsweb.umaryland.edu by choosing ‘Student Services,’ ‘Student Records’ and finally ‘Account Summary by Term.’

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 Registrar's Web site <http://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 success-

fully 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 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 the students shall be given retroactively.

A determination of in-state status is valid only if a student actually enrolls in the semester for which he or she applied. Determinations made in cases where students do not actually enroll are not valid for a subsequent semester (all requirements must be satisfied independently and a new and timely petition submitted).

Financial Assistance

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 shall be consistent with the teaching and research missions of the university. The majority of assistantships are awarded by the program or department in which the student is enrolled. The particular assignment depends on the department'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 appointments 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 by 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. As employees of the university, graduate assistants are eligible for the in-state tuition rate during the performance of the assistantship.

Graduate assistantships are awarded with the intent of both 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 his or her studies and research and that 100 percent of his or her 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 his or her research will be expected to end his or her graduate assistantship. These principles will also 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 Web site.

Graduate Merit Awards

The Graduate Merit Award program supports efforts to recruit, retain, or reward promising or outstanding graduate students. These awards, which are available to any degree-seeking graduate student, carry a stipend of \$2,000 and a remission of tuition for up to 10 credits each semester, fall and spring. Students should contact their program director to request nomination for a Graduate Merit Award.

Need-Based Financial Assistance

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 Work-Study, Federal Stafford loans, and alternative loans. 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 www.fafsa.ed.gov.

More information is available from the Financial Aid Office which may be reached by calling 410-706-7347 or via email at aidtalk@umaryland.edu

Other Funding Opportunities

Funding opportunities are also available to graduate students through National Science Foundation and National Institutes of Health programs and through many other public and private foundations. Students must apply directly to these programs or foundations.

STUDENT SERVICES and CAMPUS RESOURCES

Office of Student Services

The Office of Student Services coordinates campus-wide activities, programs, and services that foster students' academic, personal, and professional development. Offerings are designed to enrich the UMB experience for each student, both in and out of the classroom.

The office advises the University Student Government Association and USGA-affiliated organizations, and helps students organize educational, cultural, and social activities. Student Services is located in the Student Center at Pine Street, suite 202. Call 410-706-7117/7714 (voice/TTD) for more information.

Support Services for Students with Disabilities

Student Services also provides academic and nonacademic support services for students with disabilities. Staff members work with students and their schools to obtain interpreters, notetakers, parking, and other support related to classroom activities. Services depend on an individual's needs and support required for successful learning. The office is equipped with a TTD device to communicate via telephone with hearing-impaired students. The TTD is also available for use by students with hearing impairments while they are on campus. For information, call 410-706-7117/7714 (voice/TTD).

Student Health

Student Health provides comprehensive healthcare to students. Routine physical examinations, sick visits, and gynecological services, including health maintenance and family planning, are among the free services provided to students. Certain birth-control pills are available at a reduced cost for students receiving their gynecological care through Student Health.

Students' families can receive care at the same office through University Family Medicine, the clinical practice of the School of Medicine's Department of Family Medicine. Comprehensive care, including pediatrics, gynecology, minor surgery, and routine prenatal care and delivery, is available.

Patients are generally seen by appointment, but walk-in appointments are also available. A doctor can be reached after hours and on weekends at 410-328-8792. Students who need to be seen after hours should call to speak with the doctor on call. A call to Student Health can save money, time, and frustration.

Student Health is dedicated to providing students with the highest quality care in a friendly and expedient manner. The office sees itself as your "doctor away from home." The staff maintains a policy of strict confidentiality and will not release information without the student's written permission.

Hepatitis B is an occupational illness for health care providers. It has serious consequences and can even be fatal. Immunization against hepatitis B is required for students in the following schools or programs: medical, dental, dental hygiene, undergraduate nursing, medical technology, physical therapy, genetic counseling, social work, and PharmD. The series of three immunizations may be obtained through Student Health.

Student Health is located in University Family Medicine, 29 S. Paca St. For appointments, call 410-328-6645. For information, call 410-328-6791.

Counseling Center

The Counseling Center provides professional counseling services and medication evaluation and management for all students. Students visit the center for help with various problems, large and small, including stress, relationship problems, anxiety, depression, sleep problems, loss of a loved one, eating disorders, disruptive changes in school or home life, and drugs and alcohol.

All Counseling Center services are confidential; the center will not release information to anyone on or off campus without the student's written permission. There is no out-of-pocket expense to use the Counseling Center; the cost of services is included in tuition and student health fees.

The Counseling Center is not a training site; students are always seen by professional social workers, psychiatrists, or a substance abuse specialist. Students are seen by appointment, and class schedules can be accommodated in scheduling appointments confidentially.

The Counseling Center also offers mindfulness-based stress reduction (MBSR) classes to students in the fall and spring semesters. For more information, call 410-328-8404 or see <http://www.umaryland.edu/counseling>.

University Athletic Center

The University Athletic Center (UAC) provides a comprehensive fitness and wellness program on campus. The center offers a variety of aerobic classes, a total conditioning class, mini-screening, a fitness walking program, fitness assessments, equipment orientations, and personal training.

The facility is equipped with two basketball and volleyball courts; two racquetball courts; a squash court; weight room with free weights and paramount equipment; stationary bikes; stair, treadmill, and rowing machines; and areas for stretching. A limited supply of recreational equipment is available. Men's and women's locker rooms have saunas and showers.

Intramural sports include basketball, volleyball, flag football, racquetball, squash, tennis, soccer, and softball. Activities are organized into the following groups: coed, men, women, and open competition.

The UAC, in conjunction with the University police force, offers Rape Aggression Defense, a self-defense course for women. Sessions are offered year-round and taught by trained and certified instructors.

The UAC also organizes several annual programs. Healthwatch provides health screenings and other programs featuring many of the University's vast health-related resources. The Health Fair is held in spring. For information, call 410-706-PLAY (7529).

Parking

Campus parking is available to students. Commuting students must have a parking permit to park on campus. Parking permits allow for parking on campus but does not guarantee a space, which is on a first-come, first-served basis. Students are assigned to the Lexington Garage (Lexington and Pine streets). If you have a disability and need a parking space close to your school, call Student Health at 410-706-6791. Public transportation also makes the campus accessible by bus, subway, and light rail.

Health Sciences and Human Services Library (HS/HSL)

The Health Sciences and Human Services Library (HS/HSL) opened for business in 1998 at its current location. Six stories tall, the library—with its striking architecture, 900 seats, more than 40 study rooms, and three microcomputer labs—provides the University with a focal point for both traditional and computerized information resources and services.

The HS/HSL is the first library established by a medical school in the United States and is a recognized leader in state-of-the-art information technology. As the library for the Southeastern/Atlantic Region of the National Network of Libraries of Medicine, the HS/HSL serves 10 southeastern states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.

Students have access to 50 Windows-based computers in the library's Research and Information Commons area. Students may use databases, electronic journals, electronic books, electronic resources, e-mail, the Web, word processing, desktop publishing, spreadsheets, and other software. Additional computers are available on each floor. All computers are equipped with sound cards and USB ports. In addition to 1500 data connections, there is wireless network

access in the library.

HS/HSL electronic resources are accessible offsite to students, staff and faculty through the library's Web site by choosing an electronic resource and providing a last name in combination with the barcode on the UMB1One card. Support is available on the library's Web site or by calling the reference desk at 6-7996. Training workshops are available on a variety of information topics in the fall and spring.

Information Technology

Serving all schools on campus and the University of Maryland Medical Center, the HS/HSL holds over 380,000 volumes, including over 3,300 print and digital journal titles. It is consistently ranked among the top 25 health sciences libraries in the country.

The University of Maryland Baltimore has proceeded to build a learning environment that uses technology as the catalyst to enhance both the access and availability of information for students. Today, technologies are widely available, contemporary, and integrated into virtually all aspects of University life. UMB, with its many new and renovated facilities, has state-of-the-art technology classrooms for teaching and learning. Contemporary technologies and design have created rooms where instructors can use voice, video, and data in many different presentation formats. Electronic resources are widely available and accessible through easy-to-use, intuitive web environments. Online resources help faculty and students develop innovative pedagogy and learning techniques, and provide seamless access to information resources across campus and the globe.

The contemporary UMB computing infrastructure and high speed network connects to campus buildings, the commercial Internet, and the super fast Internet2 higher education network. Wireless networks are available in many buildings and areas on campus. The wired and wireless campus network provides access to information services and resources for students. Students have access to hundreds of campus-owned desktops, which are housed in the schools, libraries, and common areas throughout the University.

Center for Information Technology Services (CITS)

CITS is the central information technology organization for the University which develops and maintains mission-critical information systems and technologies, e.g., human resources, payroll, finance, student e-mail, research, teaching and learning, network infrastructure, web, telecommunications, etc. Please see the CITS Web site at <http://www.umaryland.edu/cits> for more information.

Assistance and Service Center (ASC)

The Assistance and Service Center, a part of CITS, is composed of a Help Desk and an Enterprise Training Group. ASC provides training, documentation, and Help Desk support for all UMB Enterprise (campus-wide) applications.

Housing

There are two apartment communities on campus: Pascault Row Apartments and University Suites at Fayette Square.

Pascault Row Apartments

The University owns and operates this apartment community. The Pascault Row Apartments are in eight historic row houses which include a total of 80 apartments. There are studio, one-bedroom and two-bedroom apartments available. Each apartment is furnished, carpeted, and has individually controlled heating and air conditioning. Internet access through the campus computer network, cable television and utility costs are included in the housing rate. Laundry facilities and a vending lounge are located on the lower level. Parking is available in the Lexington Garage located directly across the street from the apartment buildings. Students living in Pascault Row are guaranteed the option of remaining in Pascault Row throughout their enrollment. Housing rates are competitive with those for comparable housing in the area, making Pascault Row a popular choice for University of Maryland students.

University Suites at Fayette Square

This apartment community is located on campus and is privately managed by Capstone Management. The community offers furnished studio, one-bedroom, two-bedroom, three-bedroom, and four-bedroom apartments. Rent rates include

all utilities as well as cable television and high speed internet access through the University's network. On-site amenities include a fitness center, laundry rooms, vending services and free coffee service in the lobby. This community offers monitored, on-site security 24/7. Entrance into the complex and into the apartments is controlled by an access card system. Parking is available on-site and at nearby garages. For more information, visit www.fayettesquare.com or contact the management office by telephone at 410-706-5523.

The Residence Life Office also provides students with other housing information and assistance. For more information, see the "Other Housing Options" section of the Residence Life Web site.

Graduate Student Association

The Graduate Student Association (GSA) is a student-run organization comprising the graduate population of the University of Maryland. Representatives from over 20 participating programs throughout the Baltimore campus attend the GSA's monthly meetings and relay information back to their fellow students. GSA Representatives are a great source of information on graduate programs, graduate student events, and the university. The principal goals of the GSA are to:

- act as a liaison to the Graduate School
- communicate student concerns and ideas
- support graduate student research interests
- provide a platform for discussion on matters that affect graduate student life at the university

The GSA coordinates many services and programs, including awards and grants, orientation, social events, a research conference, and a graduation ceremony for Ph.D. students.

Biomedical Sciences - Dental School

University of Maryland Dental School, Department
of Biomedical Sciences

<http://bms.dental.umaryland.edu>

Degrees Offered

PhD, PhD/DDS, MS

Program Description

The Department of Biomedical Sciences-Dental School is a consolidation of the former departments of anatomy, biochemistry, microbiology, pharmacology, and physiology. This consolidation fosters the integration of basic and clinical sciences and strengthens research and training within the Dental School. Recently we have merged our PhD training program with the Graduate Program in Life Sciences. Our faculty are affiliated with the following GPILS programs:

Biochemistry

Neuroscience

Molecular Medicine

Molecular Microbiology and Immunology

We continue to provide specialized training for individuals with a background in the Oral Health professions and offer the following:

The Doctor of Philosophy degree offered through our program is designed for dental professionals who wish to develop a career in science. The doctoral program includes directed course work, seminars, and research experiences. Scholarly activities within the program prepare students to become independent research investigators and competent teachers. Whenever possible, training in this program is integrated with an appropriate GPILS program.

The DDS/PhD is for students who want to pursue their undergraduate dental education with in-depth research training in specific biological science disciplines. The program is based on a seven-year design. In years one and two, DDS/PhD students complete the dental program's predoctoral requirements with the addition of graduate-level basic science courses, weekly research seminars, biostatistics, and laboratory rotations. In years three through five, students complete elective coursework tailored to a selected research area, progressing through doctoral

degree candidacy and doctoral dissertation. The student's dental preclinical skills are reassessed in the spring semester of year five, followed by appropriate training before returning to the dental program in years six and seven. Upon completion of the dental clinical requirements, students receive the DDS and PhD degrees simultaneously. To be considered for this program, applicants must first be admitted to the Dental School's DDS program.

The Master of Science 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.

Program Admission

Applicants to the combined DDS/PhD program should apply to the DDS program. Outstanding students will be considered for admission to the combined degree program after they have been accepted to the dental program.

Residents who wish to study for the MS degree must make separate application to the Graduate School shortly after beginning the residency program.

Applicants to the PhD program may apply to our program or directly to the Graduate Program in Life Sciences. Beyond the Graduate School's minimum admission requirements, applicants should have had courses in biology, physics, chemistry, and mathematics through calculus. A strong undergraduate background in biological and physical science is helpful.

Degree Requirements

The doctoral degree requires completion of required core courses, seminar (4 credits), rotations (2 credits), required courses and elective courses determined by the programmatic interests of the student, and doctoral dissertation research (12 credits). After completion of the core and track-required courses (usually near the end of the second year), students take preliminary examinations for admission to candidacy. Doctoral students must also show sufficient evidence of high attainment in scholarship and the ability to engage in independent research.

The master's degree requires a minimum of 30 credits with the following distribution: interdisciplinary core course (5 credits), selective and elective courses (19 credits), and master's thesis research (6 credits).

Courses

Course Code and Number, Course Title, Credit(s)

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 (1)

An overview of the department's three research tracks, and the teaching, research focus, and interests of faculty members. Offered fall semester, two one-hour sessions per week.

DBMS 611 Principles of Mammalian Physiology (6)

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. Offered spring semester.

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. Offered spring semester.

Prerequisite: DBMS 611 or MPHY 600, or equivalent.

DBMS 618 Special Topics in BMS (1)

This multisectioned course offers students research and educational opportunities in both the traditional biomedical disciplines and in several emerging areas of the "new biology." Small groups of students and graduate faculty arrange the offerings. Areas of specialization include anatomy, biochemistry, microbiology, pharmacology, physiology, neuroscience, immunology, molecular and cell biology, molecular endocrinology, and mineralized tissues.

DBMS 619 Biomedical Science 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 Biological Aspects of Dental Caries (2)

Presents current evidence-based information about biological aspects of dental caries. Basic microbial ecology of the oral cavity and microbial mechanisms of caries are presented. Other topics include histopathology of enamel, dentin, and root surface caries; chemistry and functions of saliva as they relate to dental caries; and associations between saliva and oral structures.

DBMS 622 Immunology and Oral Disease (3)

Covers basic immunologic principles, clinical immunology, and immunologic studies of oral diseases. Offered spring semester.

DBMS 625 Mammalian Oral Histology and Embryology (2)

Developing and definitive oral and paraoral structures are presented, with special emphasis on recent advances in this field of study.

DBMS 628 Advanced Head and Neck Anatomy (2-4)

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)

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. Offered second semester, alternate years.
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)*

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: GPLS 635.

DBMS 636 Pharmacology of Anesthetic Drugs (3)

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 638 Biostatistics (1-3)

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 641 Introduction to Neuroscience (4)

This required course is for students interested in doing doctoral dissertation research in neurosciences. While the course provides an overview of the field, its emphasis is on mastery of core ideas, assessed through quizzes, problem sets, and examinations. Lectures, taught by a small group of faculty members from several departments, cover a comprehensive textbook of neurosciences.

Prerequisites: basic biology, chemistry, and physics.

Cross-listed: GPLS 641.

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, Pain (2)

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. Offered spring, every other year.

Prerequisite: GPLS 641.

Cross-listed: GPLS 643.

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 get to use some techniques to help solve problems that may require a microscope in individual research projects. Offered fall semester, alternate years.

DBMS 708 Laboratory Rotations (1-3)

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 4th semester in the program. Offered throughout the year.

DBMS 799 Master's Thesis Research (1-12)**DBMS 899 Doctoral Dissertation Research (1-12)**

**A permission slip from the program director or instructor is necessary to enroll in this course.*

Dental Hygiene Program

University of Maryland Dental School, Dental Hygiene Program

<http://www.dental.umaryland.edu/admissions/denhyg/hygieneMS>

Degrees Offered

MS

Program Description

The Master of Science in Dental Hygiene program prepares dental hygienists for positions of responsibility beyond those assumed by holders of the baccalaureate graduate. It also provides a foundation for doctoral-level study. The program is student-centered, individualized, and flexible. Faculty members are committed to facilitating the development of creative, thinking professionals who are competent to pursue careers in teaching, research, administration, management, or public and community health care. Self-evaluation and self-direction are encouraged throughout the program. Students have the opportunity to share their experiences, knowledge and skills, work cooperatively with colleagues, and explore a variety of resources to help them reach their maximum potential as health care professionals. Program concentrations include education and community and institutional health.

Program Admissions

Beyond the Graduate School's minimum admission requirements, applicants must be a graduate from an ADA accredited dental hygiene program and hold a bachelor's degree in dental hygiene or related field. Applicants must also hold a license to practice dental hygiene in at least one State.

Degree Requirements

Full-time students can complete the program in about 18 months. Part-time students usually devote 24 -36 months to the program. Candidates require at least 30 credits to graduate.

Core Requirements	Credits
DHYG 414 Educational Program Development	2
DHYG 601 Seminar: Literature Review and Evaluation for Dental Hygienist	3
Master's Level Research Design, Methodology, and Statistics	6
Area of Concentration Practicum	3
DHYG 799 Master's Thesis Research (Thesis Option)	6
Electives	9 -10
Total	30

Elective Offerings: Students may choose electives from courses offered by the schools and departments at any of the University of Maryland campuses in Baltimore, Baltimore County, and College Park, or other campuses in the University System of Maryland. Students who took Educational Program Development (DHYG 414) as undergraduates in the Department select other courses appropriate for their area of concentration. The graduate program Director must approve all electives prior to student registration.

Courses

Course Code and Number, Course Title, Credit(s)

DHYG 414 Educational Program Development (2)

Students explore effective instructional skills used by dental hygienists in such areas as public school systems, community health programs, higher education, and consumer education.

DHYG 601 Seminar: Literature Review and Evaluation for Dental Hygienists (3)

Through an analysis and critique of literature pertinent to the dental hygienist, students examine biological, clinical, research, political, sociological, and educational trends that influence dental hygiene. Students identify potential research questions.

DHYG 609 Special Topics in Dental Hygiene (1-4)

Through seminar, laboratory, clinical, and research activity, this course enables the student, in cooperation with a faculty adviser, to work on an area of interest in dental hygiene.

DHYG 618 Effective Clinical Teaching (1-6)

Through independent study, seminar, and clinical experience, the beginning dental hygiene clinical teacher identifies, analyzes, and develops the skills and attitudes necessary for successful clinical instruction. Students take this course concurrently with a clinical teaching practicum.

DHYG 619 Teaching Practicum (1-4)

Students, working with faculty advisers, gain experience teaching in didactic and clinical or laboratory settings. Faculty advisers emphasize an analytical approach to teaching effectiveness.

DHYG 639 Advanced Clinical Practice Practicum (2-4)

Students work with faculty advisers to gain knowledge and experience in an advanced clinical area of dental hygiene practice, such as nutritional analysis and counseling, oromyofacial pain, periodontics, or orthodontics.

DHYG 799 Master's Thesis Research (1-6)

Master's Level Research Design, Methodology, and Statistics (6)

A variety of courses is available.

Epidemiology and Preventive Medicine

University of Maryland School of Medicine,
Department of Epidemiology and Preventive
Medicine

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

Degrees Offered

PhD, MS, PhD/MD and MS/MD

Program Description

The Department of Epidemiology and Preventive Medicine offers a Master's of Science degree with an optional track in clinical research. The regular master's degree program provides course work and research experience for people seeking public health careers. These include research or administrative careers in hospitals, health departments, academic institutions, regulatory agencies, international organizations, and corporations. A thesis is optional. The track in clinical research is available to physicians, dentists, pharmacists, and other doctoral-level candidates. This curriculum or track includes courses, seminars, research expertise, and mentors to provide students with the knowledge and skills to select and apply appropriate study design and statistics to their own research. A thesis is optional for the clinical research track.

The Doctor of Philosophy program prepares students for careers in academia and health care institutions. The program has a multidisciplinary faculty of epidemiologists, statisticians, physicians, and social scientists. Formal courses, seminars, journal clubs, and supervised research are elements of the program. There is an optional track in molecular epidemiology.

Program Admission

Degree-seeking students are admitted into the fall semester only and the Graduate School must receive MS application materials by March 1; PhD applications must be received by February 1. All international applications must be received by January 1. The Graduate Record Examinations are mandatory; Medical College Admission Test scores replace GRE scores for physician applicants. 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 preventive medicine.

Degree Requirements

Students may need to take additional course work as background preparation or preparation for an area of specialization. The master's degree requires a total of 36 credits; the degree can be completed in one calendar year. The doctoral degree requires 46 to 50 credits from course work, depending on the specialization or track the student follows. Doctoral students must also pass a comprehensive examination taken after the third, full semester, present an oral defense of the doctoral dissertation proposal, complete 12 credits of doctoral dissertation research, and present an oral defense of the completed doctoral dissertation.

Courses

Course Code and Number, Course Title, Credit(s)

PREV 600 Principles of Epidemiology (3)

Presents a comprehensive treatment of the concepts and methods of chronic disease epidemiology. Topics include the classification of statistical associations and methods of distinguishing between causal and non-causal associations. Case-control, cohort and experimental studies are considered in detail. There are also presentations by students of epidemiological papers, including those linking lung cancer to cigarette smoking.

Prerequisites: PREV 620 previously or concurrently and consent of instructor.

PREV 602 Management of Clinical Trials (3)

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 multi-center 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 multi-center trials are demonstrated. There are presentations and discussions on applied methodology using examples from several recent and on-going clinical studies.

PREV 608 History of Epidemiology (1)

Familiarizes the student with the historical development of the field and shows the inter-relationship between epidemiologic methods and concepts with the intellectual, social, political, and technological developments occurring simultaneously.

Prerequisites: PREV 600 or its equivalent.

PREV 611 Disease Modeling in Epidemiology Mathematical (3)

Models are an important tool for understanding infectious disease epidemics. Each student in the course will develop and analyze a basic mathematical model on a system of their choice. In addition, we will introduce students 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 617 Design and Implementation of Research Studies - Grant Writing (2)

During the semester students will select a research topic, develop a research plan, and write a grant application in appropriate format for submission to a funding agency. Grant sections, as they are written, will be presented to the class by the students for critique and discussion. As part of this process, students will consider research strategy and requirements of funding agencies; gain familiarity with various grant formats; discuss ethical issues in study design; and consider the practical aspects of data management. Student evaluation is based on class presentations and the final grant application.

Prerequisite: Enrollment is limited to MS Clinical Research track students.

PREV 619 Biostatistical Computing (2)

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 previously and PREV 720 concurrently, or consent of the instructor.

PREV 620 Principles of Biostatistics (3)

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 627 Vaccinology (2)

An emerging science that deals with all aspects of the development and implementation of vaccines and vaccination programs. The Center for Vaccine Development 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-licen-

sure field studies. This course is taught by the faculty of the Center for Vaccine Development and experts from other institutions. The full range of issues in vaccinology is covered, including the current status of vaccines and vaccination programs. There is particular emphasis on policy in vaccine implementation.

PREV 629 Current Perspectives in Women's Health Research (3)

This course will examine interdisciplinary research in women's health to elucidate the changes across the life span which affect the interplay of women's psychosocial, behavioral, and psychological health. Models of clinical preventive services, community-based interventions, and the management of common chronic conditions, which address the needs of diverse women, improve functional health outcomes, and extend active life expectancy will be presented. We will go beyond the individual risk factor approach to health and disease, and apply models of health and health behavior change to study the sociocultural context and processes underlying the health of diverse populations.

PREV 631 Molecular Epidemiology of Infectious Diseases: Methodological Approaches and their Practical Applications (1)

This course consists of lectures and laboratory rotations dealing with the theoretical concepts and practical applications of methodologies and approaches commonly used in molecular epidemiology. An historical overview of typing methodologies will be part of the course, and it will be presented in the context of ongoing advancements in biological sciences and technology. The pros and cons of various typing methodologies will be explained, and their comparative suitability for specific epidemiological investigations will be discussed. The students should have a background in the biological sciences, and a basic understanding of the structure and organization of prokaryotic genomes will be particularly helpful. The course will be designed to guide the students in a stepwise, easy-to-understand manner, from basic principles of strain genome organization to more complex issues of how to utilize that knowledge during epidemiological investigations.

Prerequisites: A basic knowledge of microbiology. Knowledge of basic molecular biology techniques will be advantageous, but is not required. Also, the PREV 780 course (taken previously or concurrently) will be helpful.

PREV 633 Legal and Regulatory Issues in Clinical Research (1)

The course will be co-taught by faculty from the School of Medicine and the School of Nursing. The course is required for the Master of Science in Clinical Research in

the School of Medicine and the Master of Science in Clinical Research Management in the School of Nursing. This mixture of students will promote the multidisciplinary interactions integral to successful clinical research. *Prerequisites: Health professional degree and clinical research experience.*

PREV 634 Introduction to 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 637 Ethical Issues in Clinical Research (3)

This course begins with the birth of contemporary bioethics in famous research scandals and ends with some current problems on the cutting edge of scientific research ethics. In between, we shall examine the regulatory structure designed to curb the abuse of patient/subjects; specifically, this will consist of the role and functions of institutional review boards (IRBs). The approach will be primarily philosophical but with attention to history and regulation. Many of the great cases (such as the Nazi Doctors' Trial, the Tuskegee syphilis study, Willowbrook, Milgram's authority experiments, and the recently revealed U.S. government-sponsored radiation studies) will be examined with an eye both to historical detail and to ethical analysis. The course will emphasize controversies concerning the ethical design of research studies (e.g., randomization, placebos, informed consent, coercive inducements, gauging risk and benefit, etc.) as

well as problems posed by specific "subject populations" such as medical students, prisoners, developing-world subjects, and cognitively impaired patients. Throughout the course, we will have practical experiences in the ethical review of research protocols.

PREV 638 Ethical Issues in International Research (3)

This course will examine the ethical and philosophical issues raised by research on human subjects, particularly as such research is conducted in an international setting. The course assumes that the student has had at least some elementary acquaintance with basic concepts in research ethics. (This acquaintance may consist of prior or concurrent study of research ethics or some experience in conducting or assessing human subject research. The student should contact the instructor if further clarification is needed.)

PREV 645/LAW 648B 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.

PREV 648 Health Care Administration and Evaluation Lectures (2)

Seminars, readings, and small group discussions are designed to convey an understanding of health care systems, 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. Available as a two-hour lecture

course with an option to take an additional hour which provides in-depth exposure to a selected topic in health care administration and evaluation resulting in a paper.

PREV 649 Introduction to Preventive Medicine (2)

A seminar course which 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.

Enrollment limited to Preventive Medicine Residents.

Prerequisites: PREV 600 and PREV 620 and consent of instructor.

PREV 650 Principles of Health Education and Health Promotion (3)

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.

PREV 651 Molecular Biology in Public Health Research Reviews (1)

The basics of molecular biology as the basis for a discussion of molecular methods frequently utilized in population based health studies. The course is tailored to students that are 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 659 Observational Studies in Epidemiology (3)

This course provides an in-depth examination of study designs, including case-control and cohort studies. Special emphasis will be placed on possible biases that can occur in epidemiologic research. Some special topics will also be addressed in detail, including screening, misclassification, and questionnaire construction.

Prerequisites: PREV 600.

PREV 664 Critical Issues in Global Health (3)

A series of seminars, lectures and reading assignments 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)

Course surveys the effects of the environment on human health. Topics include occupational exposures; toxicology of environmental pollutants; occupational epidemiology; industrial hygiene; legal and regulatory aspects; role of the physician and nurse in the workplace; control of exposures; and health education relating to the worker.

Instruction by lectures, seminars, and field trips to sites of interest.

PREV 670 Psychiatric Epidemiology Critically (3)

Reviews the methods and major substantive issues in psychiatric epidemiology. Topics include epidemiology of schizophrenia, depression and dementia and possible etiologic significance of socioeconomic status, stressful life events, social supports, crowding and housing. The course covers study designs in conducting psychiatric epidemiological research through lectures, seminars and readings.

Prerequisites: PREV 600 or consent of instructor.

PREV 681 Epidemiology of Aging (3)

Involves students in learning how the principles and methods of epidemiology and preventive medicine can be applied to the study of aging. There is a review of health assessment techniques which are potentially useful for conducting epidemiological studies of older persons; the epidemiology of selected diseases common to old age; primary, secondary and tertiary prevention, as applied to older persons, focusing on psychosocial and environmental aspects of health; differing conceptions of long-term care, and its role in the prevention, intervention, and treatment of illness in older persons. Students learn how to critically evaluate and present research in a specific area of gerontological epidemiology with faculty supervision.

Prerequisites: PREV 600 or consent of instructor.

PREV 700 Cardiovascular Disease: Epidemiology and Prevention (3)

Taught in a seminar format in which each student, with faculty guidance, chooses a current problem in cardiovascular epidemiology and, following a presentation of the problem, outlines an approach to the problem that is discussed in class. After incorporating relevant feedback, the student gives a formal presentation and submits a term paper that represents a comprehensive review of the topic. *Prerequisites:* PREV 600 and PREV 620 or consent of instructor.

PREV 701 Cancer Epidemiology (3)

Taught in a seminar format in which each student, with faculty guidance, chooses a current problem in cancer epidemiology and, following a presentation of the problem, outlines an approach to the problem that is discussed in class. After incorporating relevant feedback, the student gives a formal presentation and submits a term paper that represents a comprehensive review of the topic.

Prerequisites: PREV 600 or consent of instructor.

PREV 702 Advanced Quantitative Methods in Epidemiology (2)

Students will discuss each session one or two papers related to an advanced quantitative method in epidemiology. Discussion will be led by either a student or faculty member. Students will write a 7-15 page paper on the topic that they lead.

Prerequisites: PREV 620 and PREV 720.

PREV 703 Complex Disorders Seminar (2)

This seminar series includes speakers from both inside and outside the University of Maryland, Baltimore. The individual 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 including leukodystrophies, bipolar disorder, prostate cancer, and eye diseases. Outside speaker seminars are followed by discussions led by Dr. Stine.

PREV 704 Molecular Epidemiology Practicum - Lab Rotation (3)

The 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)

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 utilization, effectiveness and safety of marketed drug therapies.

PREV 706 Research Informatics: Data Management in Research (2)

Clinical research frequently requires the efficient collection, storage and manipulation of data sets of varying sizes. Researchers must be adept at selecting and using appropriate computer-based tools to aid in this process. Further, researchers must be able to make use of and

manage computer programmers and technical support staff hired to support research projects.

Prerequisites: PREV 600, PREV 620 previously or concurrently or with permission of the course master.

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 711 Genetic Epidemiology (3)

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 disequilibrium 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 (2)

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. 2 credits *Prerequisites:* PREV 600 or PH600 Principles of Epidemiology.

PREV 720 Statistical Methods in Epidemiology (4)

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)

Covers basic principles and theory of regression techniques. Topics include simple and multiple linear regression, robust regression, regression diagnostics, logistic and poisson regression analysis. The emphasis of this course is on learning the biomedical research application and interpretation of regression techniques.

Prerequisites: PREV 620 or consent of instructor.

PREV 722/PHSR 722 Advanced Topics in Product Safety and FDA Regulation (2-3)

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 723 Survival Analysis (2)

Examines methods of analysis for time to event data, including non-parametric methods, Kaplan-Meier analysis, log-rank and Wilcoxon tests, Cox proportional hazards models, time-dependent covariates, discrete time models; parametric methods.

Prerequisites: PREV 620 or consent of instructor.

PREV 747 and PREV 748 Epidemiology and Preventive Medicine Research Practicum I & II (5)

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.

PREV 749 Infectious Disease Epidemiology (3)

Consists of lectures, seminars and reading assignments designed to promote an understanding of infectious disease epidemiology, with particular emphasis on modes of transmission--contact, contaminated vehicles, vector-associated and airborne; interventions and approaches to disease control--smallpox, measles, typhoid, influenza, hospital infections; infections of public health importance in Maryland and use of the laboratory in infectious disease epidemiology.

Prerequisites: A basic knowledge of medical microbiology.

PREV 758 Health Survey Research Methods (3)

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 769 Neuroepidemiology (3)

A seminar course which covers the epidemiology of the major classes of neurologic diseases including cerebrovascular, Alzheimer's, Parkinson, multiple sclerosis, epilepsy and peripheral neuropathy. Methodologic issues are emphasized, such as gradual onset, lack of definitive tests, and use of surrogate responders. There are student presentations and a written assignment.

Prerequisites: PREV 600 or consent of instructor.

PREV 778 Musculoskeletal Epidemiology (2-3)

Presents the epidemiology of the major musculoskeletal diseases of childhood and the adult years. It emphasizes the interrelationships of the biological with the epidemiologic aspects. Prevention of disease through risk factor modification is stressed wherever possible. Methods of classification and diagnosis, and potential problems introduced by different schemes are presented. Disorders covered are rheumatoid arthritis (both juvenile and adult-onset), osteoarthritis, osteoporosis, Legg-Perthes disease, osteogenesis imperfecta, systemic lupus erythematosus, scleroderma, and the spondyloarthropathies.

Prerequisites: PREV 600 or equivalent with consent of instructor.

PREV 780 Molecular Epidemiology (3)

Covers the theoretical framework of the discipline of molecular epidemiology but focuses on the practical application of a basic knowledge of the field which 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, although those with more advanced training will find the course of interest.

PREV 789 Special Studies and Research in Preventive Medicine (1-6)

This individually-planned and closely-supervised course provides experience in the epidemiology of significant preventive medicine topics.

Prerequisites: PREV 600 and 620 or equivalent.

PREV 801 Longitudinal Data Analysis and Analysis of Longitudinal and Clustered Data (2)

Includes topics in matrix algebra, longitudinal data analysis including the multivariate linear model, 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 (721 may be taken concurrently).

PREV 802 Statistics for Molecular Biology (2)

Three topics are covered in this course: statistical design and analysis of experiments; DNA or protein sequence alignment; and analysis of gene expression data from microarray experiments.

Prerequisites: PREV 720 and 721 or permission of instructor. 2 credits.

PREV 803 Clinical Trials and Experimental Epidemiology (3)

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 Substantive Topics in Epidemiology (3)

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 899 Doctoral Dissertation Research in Epidemiology (12)

Consists of substantial epidemiological investigations undertaken by Ph.D. candidates following departmental approval and leading to doctoral dissertations worthy of publication in appropriate scientific journals. The

research must be designed to test relevant hypotheses and employ the most appropriate epidemiological and biostatistical methods.

Prerequisites: Departmental approval.

CIPP 909 Responsible Conduct of Research (2)

A campus-wide course that prepares students for the ethical responsibilities of research. Topics include scientific integrity; research ethics and the ethical decision-making process; data handling and management; authorship; peer review; conflicts of interest; defining, identifying, and handling fraud and misconduct; animal and human research; genetics and reproduction; ownership of data and intellectual property; and the role of the scientist in society. The course includes lectures, seminar discussions, and class exercises. Grading is based on class participation and a written paper.

Gerontology

**University of Maryland School of Public Health,
Doctoral Program in Gerontology at the University of
Maryland Baltimore and the University of Maryland,
Baltimore County**

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

Degrees Offered

PhD

Program Description

The Doctoral Program in Gerontology at the UMB/UMBC provides an interdisciplinary and integrative perspective on the process of human aging and the experiences of growing old. The approach acknowledges the complex, dynamic and bi-directional relationship between individuals and the historical, political, economic, environmental, psychological, social, cultural and biological contexts in which aging occurs. Program emphases include socio-cultural and behavioral gerontology, the health of older persons and populations, and policy for the elderly. The goal of the program is to 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 seven professional schools (dental, law, medicine, nursing, pharmacy, public health and social work) and UMBC's College of Arts and Sciences departments (economics, emergency health services, geography and environmental systems, public policy, psychology and sociology/anthropology) combine to make this mission possible by offering three concentrations of study: social, cultural, and behavioral sciences, epidemiology of aging, and policy for the elderly.

The program also offers a dual degree program between gerontology and epidemiology and a combined degree program between gerontology and applied sociology. You can earn a PhD in gerontology and an MA in epidemiology or sociology.

Program Admissions

Applications are accepted for fall admission only. All application materials must be received by Feb. 1 of the year in which the student intends to enroll. Three letters of recommendation, GRE scores, transcripts, a written statement and personal interview are required of all appli-

cants. The TOEFL is required for all international students who do not have a bachelor's or master's degree from a U.S. institution.

Degree Requirements

The PhD program consists of a total of 61 credits. Within the first 2 years students will take 5 core courses (15 credits) and a required Theories/Methods sequence (6 credits). Students will take an additional 12 credits of research methods and statistics that relate to their concentration. In addition, students will specialize by taking 9 credits of courses appropriate to their interests and 6 credits of electives. Plus, students will take a one semester ethics course, attend a monthly Aging Forum, and a monthly seminar series.

Comprehensive exams are required to be admitted to doctoral status. These will usually take place at the beginning of the 3rd year for full-time students.

All students will defend a dissertation proposal, complete 12 credits of dissertation research, and successfully defend their dissertation.

Courses

Course Code and Number, Course Title, Credit(s)

GERO 672/POLI 672/SOCY 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 provide the student with a context for understanding the public policy process. The course will provide basic information and knowledge which will be useful to the student in more advanced policy-related studies in aging and health.

GERO 681/PREV 681 Epidemiology of Aging (3)

This core course covers applications of the principle and methods of epidemiology and preventive medicine 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.

GERO 700 Sociocultural Gerontology (3)

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 703 Policy Analysis of Aging Issues (3)

This required core course will help students understand how and why aging policies reflect the political system in which they are enacted and implemented. Further, students will learn how research can inform and possibly transform the policy process.

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 742 Economic Issues in Aging (3)

The main objective of this course is to provide students with the basic tools necessary to understand, critique, and evaluate alternatives to issues in aging that have economics implications. The course is divided into four main sections. The first part of the course familiarizes students with tools used in micro-economic analysis. The section will also provide students with necessary computer related activities to obtain and process data for economic/policy analysis. The second part of the course will focus on understanding issues at the macro level. Accordingly, this part will address the nature and magnitude of current issues, implications of these issues for the future, and issues that need to be addressed to increase income and health security in old age. The third part of the course will examine the circumstances under which current programs such as Social Security, Medicare, Medicaid, and other related Welfare programs that address economic and health security in old age were implemented, their performance under current circumstances, and issues related to their continuation. The final part of the course is designed to view issues discussed in prior units through an aging or life-course perspective that emphasizes the impact of events and issues in younger ages on income and health security in old age.

GERO 750 Gerontology Theory/Methods Seminar I (3)

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 Gerontology Theory/Methods Seminar II (3)

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/PSYC 786 Psychological Aspects of Aging (3)

A core course that examines psychological and biological changes associated with aging. The topics of the course include theories of aging, research methods in aging, learning, memory, intelligence and problem-solving, personality, stress and coping and illness. Emphasis is placed on the contribution of longitudinal studies to understanding the individual aging process.

GERO 801 Independent Study in Gerontology (1-3)

The student selects a topic of professional interest and studies with a graduate faculty member who is competent in that field.

GERO 899 Doctoral Dissertation Research (1-12)

Graduate Program in Life Sciences

Graduate Program in Life Sciences (GPILS)

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

Overview

The Graduate Program in Life Sciences (GPILS) offers cutting edge research training in the biomedical sciences. Our programs in Biochemistry and Molecular Biology, Molecular Medicine, Molecular Microbiology and Immunology and Neuroscience award either the PhD or MS in basic research emphasizing the continuum from bench to bedside. The traditional disciplines of Biochemistry, Genetics, Immunology and Microbiology, Molecular and Cell Biology, Pathology, Pharmacology, Physiology, Rehabilitation Sciences and Toxicology have been incorporated into a revitalized structure. The new administrative structure affords integrative training that will meet the demands of the era that now follows the structural elucidation of the genome so as to prepare students for careers in academe, industry or government. Our ideal location within the nexus of biomedical research on the Middle Atlantic Coast provides students with an unparalleled level of breadth and depth of expertise.

Admission/Application

Applicants may apply to two (2) GPILS programs with one application fee. All supporting documents for applications (letters of recommendation, etc) are shared between programs. While each GPILS' program has its own admissions criteria, the quality of students each aims to enroll is of a high caliber.

A competitive applicant usually has a cumulative Graduate Record Examination (GRE) score above 1204, a cumulative grade point average (GPA) 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 Director. Their contact information can be found at: <http://lifesciences.umaryland.edu/contact>

Courses

Course Code and Number, Course Title, Credit(s)

All first year students participate in a highly innovative,

core curriculum for the majority of the fall semester.

Mechanisms in Biomedical Sciences: From Genes to Disease (GPLS 601, 602, 603)

Mechanisms in Biomedical Science is a comprehensive overview of current knowledge in cellular, molecular, and structural biology. This modular course provides the background necessary for subsequent specialized studies in biomedical research in a concentrated program. The core curriculum is broken into 3 separate modules:

- GPLS 601 Mechanisms in Biomedical Sciences I (2)
- GPLS 602 Mechanisms in Biomedical Sciences II (2)
- GPLS 603 Mechanisms in Biomedical Sciences III (4)

The format of these modules 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
- Optional, supplemental review sessions prior to each topic to strengthen background knowledge

Upon completion of the core curriculum, many students begin a lab rotation and/or participate in program specific course work. Students are guided through the registration process by their advisory committee and program coordinators. Additional courses include:

GPLS 604 Neuropharmacology: Basic to Clinical Approaches (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 605 Pathology for Graduate Students (4)

A study of the basic mechanisms of disease processes.

GPLS 606 Cardiac Cellular Physiology (2)

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 607 Principles of Pharmacology (2)

A half-semester course (through Spring Break) in three sections: 1) Pharmacodynamics, pharmacogenomics and pharmacokinetics, 2) Chemotherapeutics of infectious diseases and immunomodulation, 3) Peripheral nervous system.

GPLS 608 Seminar (1-2)

(Section 1, Biochemistry; section 2, Molecular Medicine; section 3, Microbiology; section 4, Neuroscience)

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.

GPLS 609 Lab Rotations (1-3)

(Section 1, Biochemistry; section 2, Molecular Medicine; section 3, Microbiology; section 4, Neuroscience)

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.

GPLS 610 Principles of 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 612 Physiology of Reproduction (2)

This lecture, discussion, and literature course covers mammalian reproductive physiology at the molecular, cellular, tissue, and organismal levels. Topics include reproductive cycles, ovarian function, testicular function, pregnancy, follicular development, oocyte maturation, ovulation, steroidogenesis, steroid and protein hormone action, Leydig and Sertoli cell function, spermatogenesis, fertiliza-

tion, implantation, placental function, parturition, and growth factors. Students attend lectures, read, and discuss selected papers.

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 614 Pharmacological Biotechnology (3)

This course addresses the theory and application of state-of-the-art technologies used for pharmacologic research and testing in industry, academia, and government. The course introduces cutting-edge technological advances in methodologies used in discovery of new drugs and therapies.

GPLS 615 Biological Signal Analysis (3)

This course covers the origin and analysis of various biological signals, especially those arising from the nervous system. Emphasis is on the measurement and interpretation of these signals by techniques such as spectrum analysis, average evoked responses, single-unit histograms, and pattern recognition. Students establish theoretical background of random processes. Prerequisites: differential and integral calculus.

GPLS 616 Molecular Mechanisms of Signal Transduction (3)

This twice-weekly literature, discussion, and lecture course covers mechanisms of hormone action upon target cells, with emphasis on the molecular mechanisms by which hormones mediate their cellular effects.

Prerequisite: completion of GPILS core curriculum, GPLS 601, 602 and 603.

GPLS 617 Integrative Pharmacology (3)

A comprehensive introduction to the major classes of drug action. This course relates cellular and molecular mechanisms to drug action at the level of organ systems and the intact organism, emphasizing research methods.

GPLS 618 Readings/Special Topics (1-3)

GPLS 619 Current Topics in Vascular and Stem Cell Biology (1)

The purpose of this course is to introduce students to contemporary topics of scientific and clinical importance in vascular and stem cell biology. Lectures and discussions will include topics such as the nature and origin of stem cells and their application to medicine, inflammation, proteolytic mechanisms of thrombosis, atherosclerosis, angiogenesis, and vascular disease.

GPLS 620 Cellular Basis of Synaptic Physiology and Pharmacology (3)

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 621 Biostatistics I (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, and hypothesis tests), t-tests, chi-square tests, power calculations, nonparametric methods, simple and multiple linear regression, ANOVA, logistic regression, and survival analysis.

GPLS 622 Introduction to 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.

GPLS 623 Molecular Toxicology (3)

Mechanistic Toxicology Training Grant faculty will present areas of toxicology where significant advances are being made on molecular mechanisms. Emergent technologies in toxicogenomics, proteomics and metabolomics will be introduced. Emphasis will be placed on enhancing skills in interpreting and critiquing the primary research literature.

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 Fundamentals of Membrane Transport: Ion Channels (3)

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 non-excitable cells such as lymphocytes, transformed cells, and glial cells, and the roles of ion channels in development.

GPLS 626 Fundamentals of Membrane Transport: Carrier Mechanisms (3)

This course provides a foundation for future course work, an understanding of current and past literature, and a background for future laboratory research. The initial phase covers the general methodology, thermodynamics, and kinetics of transcellular and transepithelial ion transport. The final phase deals with the biochemical mechanisms and molecular biology of common membrane transport systems such as active ion pumps, co- and counter-transport, and facilitated diffusion.

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, 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 628 Advances in Molecular Medicine (1)

This course serves as an introduction to new instrumentation and methods, including quantitative analyses, that are becoming increasingly important in modern biology. Classes will consist primarily of alternating lectures and journal club discussions of new technology, its application to studies at the molecular, cellular and systems level, and how it can advance our understanding of basic biological mechanisms in health and disease.

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 Cardiopulmonary Mechanics (2)

This course covers cardiopulmonary mechanics. Students read, discuss, and criticize classical and recent papers.

GPLS 633 Pathways in Neuroscience (1)

This introductory reading course familiarizes students with classical and contemporary experiments and controversies that helped shape the field of neuroscience. Key discoveries in anatomy, embryology, physiology, pharmacology, and psychology are examined in the context of their impact on the understanding of nerve cells, brain, and behavior. Topics include the neuron doctrine, cellular connectionism, animal electricity, electrical vs. chemical synaptic transmission, neurotransmitters and their receptors, neural tropism, synaptic plasticity, biochemistry of memory, and molecular basis of learning. Course includes weekly one-hour lecture with occasional laboratory demonstration.

GPLS 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. Course includes two lectures and two laboratory periods per week that deal with the genetics of bacteria and bacterial viruses.

GPLS 639 Readings in Endocrinology (1)

This course exposes students to endocrinology. Following consultation between student and faculty member, a reading topic is chosen. Topics may include, but are not limited to the synthesis, structure, and function of hormones; molecular and cellular techniques as applied to hormone systems; hormone-receptor interactions; signal transduction pathways; and application of transgenic and knockout technologies to the study of endocrine systems. Offered by prearrangement with faculty members.

GPLS 641 Introduction to Neuroscience (3)

While the course provides an overview of the neuroscience field, its emphasis is on the mastery of core ideas, assessed through quizzes, problem sets, and examinations. The course is taught by a small group of faculty members from several departments.

Prerequisites: GPLS 601, 602, 603.

GPLS 642 Nociception, Pain and Analgesia (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.

GPILS 643 Neurobiology of Nociception and Pain (3)

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 645 Physiologic Basis of Molecular Medicine (3)

This course exposes students to a modern, "Big Picture" view of physiological systems. Core concepts of systems function are covered while introducing students to contemporary research issues. Students develop a foundation of knowledge through interactive lectures. These sessions are followed by discussions that apply the functional concepts to clinical situations or current research problems in molecular medicine. In this way, students learn interesting, relevant, state-of-the-art material while acquiring a foundation of knowledge in physiological systems. Required for all Molecular Cell Biology and Physiology students; open to students in other programs.

Prerequisites: GPLS 601, 602, 603.

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 658 Seminar in Reproductive Endocrinology (1)

This seminar exposes students to advances in endocrinology at molecular, cellular, tissue, and organismal levels through critical examination of the current literature and research progress reports by faculty members, fellows, and students. Students must attend regularly, review relevant papers, participate in discussions, and give one presentation. Participating faculty members advise students on topics and presentations.

GPLS 660 Functional Systems: Cell Function (1)

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 (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 (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 (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 (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, pan-

creas, and small intestine, enzymatic digestion and absorption; motility; gastrointestinal hormones and the enteric nervous system; and colonic function (component of the medical physiology course).

GPLS 701 Advanced Molecular Biology (3)

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 (3)

This core course introduces basic ideas of immunity and the immune system, including evolutionary and comparative studies, specific and nonspecific immunity, the biology of T and B lymphocytes, the genetics of the antigen-receptor and MHC loci, immunochemistry, and the role and action of cytokines. The course includes lectures, student presentations, and term papers.

GPLS 703 Basic Parasitology (3)

This core course combines lectures, student presentations of research and review papers, and group discussions. Topics include parasite life histories, the evolutionary biology of parasitism, parasite genetics, immunoparasitology, and control strategies. Lectures increase students' understanding of state-of-the-art molecular parasitology, vaccine design, and immunomodulation to regulate parasite numbers. Students select and review research articles during lecture and discussion sessions.

GPLS 704 Basic Virology (3)

This core 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. Students must actively participate in and lead discussions based on assigned readings and submit an in-depth term paper on a key research area in virology.

GPLS 705 Basic Human Genetics (3)

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 706 Human Genetics Seminar (1)

Students, faculty members, and guests participate in the presentation and review of current topics in human genetics.

GPLS 708 Clinical Genetics I (1)

Topics include collection and interpretation of pedigree information, determination of modes of inheritance, calculation of recurrence risks, techniques of genetic counseling, and an introduction to genetic nosology. Students gain experience in genetic counseling clinics and on hospital ward consultative rounds, with training in abstracting patient medical histories, writing evaluation reports co-signed by faculty members, and interpreting laboratory results. Includes 3 - 4 embryology lectures.

GPLS 709 Advanced Biochemistry (3)

Topics not normally covered in other biochemical courses may include 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 Bacterial Pathogenesis (3)

This course provides groundwork in basic principles of bacterial pathogenesis. Students should already be familiar with fundamentals of bacterial structure and metabolism. The first part of the course covers basic ideas, while the second part examines selected specific organisms in further detail. Classes consist of lectures and discussion of research papers. There are two exams and student presentations.

GPLS 711 Genetic Epidemiology (2)

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)

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 Special Seminar in Biochemistry (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 & 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 & 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 719 Advanced Parasitology (1-4)

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 720 Fluorescence Spectroscopy (2)

An intensive introduction to the techniques of time- and frequency-domain fluorescence spectroscopy, with emphasis on applications in biochemistry and biophysics. The course lasts four and a half days in January. Topics may include time- and frequency-domain measurement techniques, time-resolved anisotropy, data analysis including global analysis, instrumental design, fluorescence energy transfer, transient effects in quenching, excited state reactions, fluorescence-based sensing including fiber optics, fluorescence lifetime imaging, fluorometry with two-photon excitation, and nearinfrared fluorometry.

GPLS 721 Imaging Methods in Membrane Biology (2)

Examines structure-function relationships as evaluated by a range of morphological methods. One two hour session

per week features readings, presentations by students, and group discussions with selected laboratory demonstration sessions. Topics include freeze fracture and negative stain analysis of membrane structure, localization of antibodies and other probes by fluorescence and electron microscopy, quantitative stereology of membranes, autoradiography, and electron probe analysis.

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.

GPLS 730 Protein-Lipid Interactions (3)

This course covers advances in the interactions of proteins and lipids in biological membranes and the importance of these interactions in normal cellular functions. Emphasis is on proteins involved in signaling. Topics include reconstitution of integral membrane proteins (channels and transporters, adenylyl cyclase), peripheral membrane proteins (G proteins, protein kinase C), annular lipids, channel-forming toxins, fatty acylated proteins (ras, p60src), GPI-linked proteins, macro- and microdomains of membrane lipids, and lipid regulators (diacylglycerol, arachidonate).

GPLS 731 Clinical Genetics II (2-4)

This lecture series, which complements HGEN 728, covers clinical aspects of genetic disease. Topics include genetic disorders and birth defects, organ systems, both metabolic and dysmorphic syndromes, normal prenatal and pediatric development, medical terminology, components of medical charts and physical examinations, and organization and administration of medical centers. The course also introduces other specialties and subspecialties, as most genetic disorders involve coordination of complex medical care.

GPLS 732 Population Aspects of Human Genetics (1)

This course covers basic concepts in genetic epidemiology, including assessment of familial aggregation, and is designed to provide the student with a basic understanding of approaches used in gene mapping, such as linkage and association analysis.

GPLS 740 Molecular Basis of Human Disease (2)

Provides students with a detailed analysis of molecular approaches used to characterize the genetic defects of inherited human disorders. Topics include diversity of

technical approaches, with emphasis on recent developments; general utility and limitations of various approaches; importance of the analysis of mutational spectra; and potentials for gene therapy.

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 760 Advances in Functional Genomics (2)

This course covers current technology in functional genomic research. Twelve topics are changed yearly to reflect the most current advancements in the field. Classes consist of lectures, presentations, and discussions.

GPLS 777 Modern Neuroanatomical Methods (2)

A comprehensive tutorial of the major, state-of-the-art anatomical approaches used in neuroscience, including modern microscopical techniques, methods for protein and RNA localization, neuroanatomical tract-tracing, molecular and electrophysiological approaches to neuroanatomy, and methods for data acquisition and analysis. The course focuses on an understanding of the principles underlying these approaches, and the advantages and potential pitfalls of each approach. Taught by a team of faculty members from the neuroscience program, the course consists of lectures and demonstrations.

GPLS 778 Recording Neural Activity: Modern Methods (2)

A comprehensive tutorial of the major, state-of-the-art electrophysiological and imaging approaches used in neuroscience. The course focuses on an understanding of the principles underlying these approaches, and the advan-

tages and potential pitfalls of each. The course consists of lectures and demonstrations.

GPLS 780 Neurobiology of CNS Diseases (3)

This course covers the clinical and basic science aspects of major central nervous system diseases. Topics include apoptosis and excitotoxicity, genetic analysis of human disease, Alzheimer's, Parkinson's, Huntington's, epilepsy, multiple sclerosis, amyotrophic lateral sclerosis, stroke, Creutzfeldt-Jakob and Prion diseases, pain transplantation and stem cells, AIDS and infections of the CNS, and migraines and headaches. The course includes student presentations and at least one "neurology rounds" style presentation by neurologists.

GPLS 781 Biological Psychiatry (3)

Provides students with a strong background in both the clinical and neurobiological aspects of mental illness, including schizophrenia, depression and bipolar disorder, obsessive-compulsive disorder, attention deficit hyperactivity disorder, autism, and drug abuse. Psychiatrists from the School of Medicine introduce the clinical symptoms and treatments for each disease. The clinical and neuroscience faculty at the Maryland Psychiatric Research Center present current research on the neurobiology behind each illness.

GPLS 790 Introduction to Cancer Biology (3)

This course will introduce 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 types of tumors and ends with topics related to animal models for studying cancer. Lectures will 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 Current Topics in Cancer Biology (3)

This course is designed to act as an advanced follow up of the course "Introduction to Cancer". Most of the lectures and paper discussions in this course are based on current literature and recent advances in cancer cell and molecular biology. The lecture series covers specific topics such as the growth factors, tumor suppressor networks, apoptosis, mechanisms of metastasis, role of angiogenesis in developing tumors, and cancer, senescence and aging. Required for all molecular and cellular cancer biology students.

GPLS 799 Master's Thesis Research (1-12)

(Section 1, Biochemistry; section 2, Molecular Medicine; section 3, Microbiology; section 4, Neuroscience)

GPLS 888 Cerebral Cortex (2)

This seminar examines the roles of the cerebral cortex in perceptual and motor functions. Topics include: Perception and the Cerebral Cortex, Evolution and Development of the Cerebral Cortex, Cells and Local Networks of the Neocortex, Thalamocortical and Corticocortical Interactions, Cytoarchitecture and Columnar Organization and Cortical Areas and the Computations they Perform. Participants read primary source articles as well as reviews and book chapters. Student evaluation is based on participation and presentations. Class size is limited, and permission of the instructor is required. Open to students, postdocs and faculty.

GPLS 899 Doctoral Research (1-12)

Section 1, Biochemistry; section 2, Molecular Medicine; section 3, Microbiology; section 4, Neuroscience

Biochemistry and Molecular Biology

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

Contact Information

David Weber, PhD, Director
dweber@umaryland.edu

Kathleen Reinecke, AA, Program Coordinator
kreinecke@umaryland.edu

Degrees Offered

PhD, PhD/MD, PhD/DDS and MS

Program Description

This intercampus program is comprised of faculty from the University of Maryland, Baltimore and the University of Maryland, Baltimore County. Together, they offer a single program of study leading to the Doctor of Philosophy degree in Biochemistry and Molecular Biology. Students benefit from the extensive facilities and resources of two campuses and interaction among scientists with a wide spectrum of research interests.

The Program in Biochemistry & Molecular Biology offers a wide range of research interests, with particular strengths in molecular biology, protein structure and function (NMR and X-ray crystallography), membrane biochemistry, and physical biochemistry. Specific areas include: molecular genetics of bacterial transformation genes, phage molecular biology, DNA packaging and morphogenesis, enzymology of DNA mismatch repair, fidelity of transcription, gene expression in muscle development, molecular biology of drug resistance, protein tar-

getting and translocation in eukaryotic cells, molecular energy transduction within enzymes, structure of membrane and contractile proteins, membrane signal transduction mechanisms and proteins, receptor-mediated signaling in heart and brain cells, ion pores and enzymatic catalysis, biochemistry of reproduction, intracellular calcium movements during muscle activation, molecular mechanism of muscle contraction, molecular physiology of allosteric systems, structures of complex carbohydrates, molecular modeling, gene regulation, biochemical applications of mass spectrometry, DNA binding of small molecules, and biophysical applications of fluorescence spectroscopy and others. The basic research in this program is applicable to several disease states (i.e. cancer, HIV, heart disease).

Program Admission

In addition to meeting the Graduate School's minimum admission requirements, applicants should have satisfied minimum requirements in organic chemistry and either physical chemistry or introductory biology. For additional information see:

<http://biochemistry.umaryland.edu/graduate/apply.shtml>

Degree Requirements

Program in Biochemistry and Molecular Biology core course requirement: Students have the option to choose from either the 2 semester Biochemistry core course offered at UMBC (CHEM 437 and CHEM 638; 8 credits) or the GPILS core course (Fall) Mechanisms in Biomedical Sciences: From Genes to Disease (GPILS 601, 602 and 603). The decision regarding which core course a student takes is based upon her/his previous biochemistry courses as an undergraduate student and/or her/his score on an ACS Biochemistry placement exam given in late August each year. Should a student score well on the ACS placement exam, he/she will be allowed to place out of the core course requirement (i.e. UMBC Biochemistry Course and the GPILS Biochemistry course). An advanced course is taken in place of the core course for students who pass the ACS Biochemistry exam.

All biochemistry and molecular biology students are required to take the following courses in addition to the core course requirement:

Advanced Molecular Biology (GPILS 703)

Advanced Biochemistry (GPILS 709)

2 semesters of Student Seminars (GPILS 708)

2 advanced courses (at least 1 at UMBC; i.e. with CHEM numbering):

Lab rotations (GPILS 711 or CHEM 602)

3 semesters of Biochemistry Seminar (GPILS 713 or CHEM 713)

Students are required to pass an oral qualifier exam no later than 6 months following the completion of their course requirements. Two weeks prior to the oral qualifier exam, students are required to submit an NIH-style research proposal to their Thesis Committee that is based on their proposed PhD research. The format requirements of this proposal are to follow the page-limits and any other rules and regulations of an actual NIH pre-doctoral fellowship proposal. Students may submit this proposal to the NIH or another appropriate granting agency (i.e. American Cancer Society, American Heart Association, etc), although this submittal is not required. The research proposal is presented orally to the students' thesis committee as part of their oral qualifier exam. During the oral qualifier exam, the students are tested on their general knowledge of biochemistry and molecular biology, including:

- a. Molecular Biology
- b. Enzymology and Bioorganic Chemistry
- c. Physical and Structural Biochemistry
- d. Metabolism and Regulation

Students are given no more than 2 attempts to pass this exam. Failure to pass at the second attempt will result in dismissal from the program by the Graduate Governing Committee.

Students must achieve at least B averages over the first two years of enrollment (i.e. GPA of 3.0 or higher). The program generally dismisses students who have a grade point average below 3.0 at this time. At the discretion of the Graduate Governing Committee, students who do not meet the grade point average requirement may be permitted to take an additional course if doing well in this course 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.

Courses

See GPILS course listing on pages 43-55.

Molecular Medicine

<http://molecularmedicine.umaryland.edu>

Degrees Offered

PhD, PhD/MD, PhD/DDS and MS

Program Description

Molecular Medicine combines traditional areas of biomedical study, including cancer biology, human genetics, molecular and cell biology, pathology, pharmacology and physiology into a unique interdisciplinary research and

graduate training program. Specifically designed to develop scientists for the post-genomic era, students 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. The program is organized into four different tracks: Molecular Cell Biology and Physiology, Molecular and Cellular Cancer Biology, Human Genetics and Genomic Medicine, and Molecular Toxicology and Pharmacology. Having over 140 faculty with interests in a wide range of biological issues relevant to human health and disease, the tracks offer students a vast selection of research opportunities to match their interests and career goals. These include protein structure and function, drug design, membrane biology, muscle biology, animal models, signal transduction mechanisms, gene regulation and the genetic basis for human disease. Students accepted into the PhD program receive graduate fellowships or assistantships that consist of an annual stipend, tuition remission, and health insurance.

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, mathematics, and general physics as well as research experience in the biomedical sciences. Successful applicants have strong letters of recommendation, GRE scores above the 50th percentile, and high cumulative GPAs. Additionally, all international students must meet the Graduate School's requirements for scores from the TOEFL or other exams. Although applications are reviewed for a longer period, students are encouraged to apply by February 1. Admission to the program is highly competitive, and acceptances are made as qualified candidates are identified.

Degree Requirements

In the first year, students participate in an innovative core course, "Mechanisms in Biomedical Sciences: From Genes to Disease" (GPLS 601, 602, 603). Students then complete track course work and three laboratory rotations, tailored to meet each student's research interests and career goals. A Qualifying Examination, consisting of an oral defense of a written research proposal usually on the student's planned dissertation project, is taken no earlier than the beginning of the spring semester of the second academic year. Following successful completion of the qualifying examination, students advance to candidacy for the PhD degree. As a PhD candidate, the student's primary focus is on research with participation in advanced elective courses as recommended by the mentor

and research track, and continued attendance at journal clubs and seminars. Professional development opportunities are available throughout the student's progression to address areas such as public speaking and presentations, critical evaluation of scientific data, grant writing, and development of teaching skills.

Molecular Medicine Track Descriptions

Molecular Cell Biology & Physiology (MCBP)

PhD and PhD/MD students in the Molecular Cell Biology and Physiology Track work with faculty scientists to investigate molecular mechanisms of gene function at all levels of biological organization in higher organisms as well as prokaryotes. They discover how genes and their encoded proteins operate, interact and are regulated within cells, tissues and other complex biological systems. Students study, learn and discover how disease-causing mutations alter the function of single molecules, use animal models and employ functional genomic approaches and gene silencing tools to tease apart how gene products function within molecular pathways and complex biological processes. In doing so, they discover the fundamental basis of life processes including signal transduction mechanisms, tissue development, gene transcription, vesicle trafficking, apoptosis, cell-cell communication, control of the heart beat and regulation of blood pressure, to name a few. Program research seeks to uncover the causes and mechanisms of human diseases, including Alzheimer's, Huntington's, cancer, cystic fibrosis, diabetes, heart failure, hypertension, infertility, osteoporosis, muscular dystrophy and stroke.

The Track is committed to providing students with knowledge and research skills to solve important and timely questions in molecular medicine. The Molecular Cell Biology and Physiology track has strong traditions in cardiovascular biology, membrane biology, muscle, mucosal biology, endocrinology and metabolism, signal transduction and reproductive biology.

Study and Research Focus Areas

Cardiac and Vascular Biology	Molecular Scaffolding Complexes
Cellular Imaging	Metabolism and Endocrinology
Cell and Developmental Biology	Protein and Vesicle Trafficking
Cytoskeleton	Protein Structure, Interaction, and Function
Membrane Biology	Prokaryotic Biology and Infectious Disease
Functional Genomics	Receptors, G-protein coupled and Receptor Tyrosine Kinases
Reproductive Biology	Signal Transduction Mechanisms
G.I. and Mucosal Biology	Stem Cell Biology
Gene Regulation	Synaptic Transmission
Kidney and Epithelial Biology	Systems Biology and Integrative Physiology
Muscle Biology	Transgenic Animals
Physiological Genomics	Ion Channels; Electrophysiology, Structure-function and Regulation
Microscopy & Florescent Imaging	Molecular Physiology & Biophysics

Molecular & Cellular Cancer Biology (MCCB)

Cancer is a complex disease with multiple steps in its pathogenesis and variability depending on the tissue of origin. Our understanding of cancer has reached new heights with the discovery of fundamental aspects of cell and molecular biology combined with advances in the understanding of the process of tumorigenesis. The identification of oncogenes, tumor suppressor genes, pathways of DNA damage and repair, cell cycle regulation, growth factors, angiogenesis, responses to hypoxia, and structural biology have provided exciting new insights into the development and progression of cancer.

Technological advancements in genomics, proteomics, and tissue arrays have refined cancer diagnosis, leading to the development of successful cancer chemotherapies and immunotherapies based on the knowledge of specific molecular targets. The Molecular and Cellular Cancer Biology graduate track offers an exciting and stimulating academic environment to pursue interdisciplinary cancer research focused on utilizing cutting edge technologies to make profound basic science discoveries that will lead to the next generation of sensitive diagnostics and specific therapeutics.

The primary objective of the Molecular and Cellular Cancer Biology track is to provide the students with a strong educational experience combined with modern research training that will enable them to make significant contributions to the understanding of this complex disease. Members of the UM Schools of Medicine, Dentistry and the University of Maryland Greenebaum Cancer Center, its faculty, and state-of-the art research facilities provide opportunities to conduct outstanding fundamental, applied and clinical cancer research.

Study and Research Focus Areas

Gene Transcription	Cancer Genetics
Structural Biology	Apoptosis
Translation	Metastasis
RNA and Protein Instability	Viral and Cellular Oncogenes
Genomic Instabilities	Hormonal Control of Tumor Growth
Mechanisms of Signal Transduction	Angiogenesis
Growth Factor Biology	Cancers of Various Tissue Types
Recombination	Animal and other Surrogate Models for Studying Cancer Development
DNA Damage and Repair	Target Specific Drugs for Cancer Treatment
Carcinogenesis	Mechanisms of Drug Action and Resistance
Cell Cycle	Cancer Diagnosis and Tumor Marker Genes
Cell Differentiation	Tumor Immunology
Tumor Suppressor Genes	Clinical Trials
Genetic Mutations	Cancer Epidemiology

Human Genetics & Genomic Medicine (HGGM)

The unveiling of the complete sequence of the human genome is providing exciting new insights into human biology and disease. Concurrent advances in areas such as high throughput genotyping technologies and computing have provided unprecedented opportunities to uncover the molecular bases of many medical conditions, from rare monogenic diseases to common diseases with complex inheritance—discoveries that will translate into exciting new strategies for prevention and treatment. The Human Genetics and Genomic Medicine track emphasizes a multidisciplinary team approach to research training and gene discovery. The shared goal of the group is to understand how structure, function, and variation in DNA influences human health and disease (perhaps with the joint influence of environmental co-factors). Faculty in the HGGM track have expertise across a wide range of disciplines. Students entering into the Human Genetics and Genomic Medicine track will receive training across multiple areas and may focus on genetics at the level of the cell, organism, or population.

Study and Research Focus Areas

Molecular Genetics	Cardiovascular Disease
Clinical Genetics	Diabetes
Cancer Genetics	Obesity
Cytogenetics	Hypertension
Biochemical Genetics	Cancer
Gene Mapping	Infectious Diseases
Genetic Epidemiology	Osteoporosis
Population Genetics	Psychiatric Disease
Statistical Genetics	Aging
Functional Genomics	

Molecular Toxicology & Pharmacology (MTP)

Molecular Toxicology and Pharmacology studies the effects on cells and their components of acute and chronic exposure to drugs and toxins. Faculty in this track conduct multidisciplinary research that integrates state-of-the-art knowledge and techniques from molecular and cellular biology, biochemistry, chemistry, biophysics, and virology. Current focus is on the mechanism and integration of gene function and the development of drug and molecular therapeutics. Model systems include breast, prostate and skin cancer, chronic and acute neurodegenerative diseases, and viral and toxin-induced disorders. Translational research is emphasized through close collaboration with members of the Marlene & Stewart Greenbaum Cancer Center and the Departments of Dermatology and Neurology, Maryland Psychiatric Research Center and researchers at other institutions including the US Army Medical Research Institute of Chemical Defense and the National Institute on Drug Abuse.

The track is committed to training qualified students to become creative researchers and to prepare them for careers in academics, government and industry. It provides a rich environment in which trainees can acquire cutting-edge knowledge needed to solve important and current problems in oncopharmacology, neuropharmacology, toxipharacology and biotechnology. Students have a broad range of course options in their areas of specialization and are exposed to contemporary research techniques and concepts. Critical evaluation of scientific data and lecturing skills are fostered.

Study and Research Focus Areas

Neuro and oncotoxicology and anti-toxal therapies	Human tumor models (xenografts) for cancer drug development
Cellular senescence and telomerase activation	Cell injury and apoptosis
Protein structure and protein-protein interactions	Ubiquitin-proteasome system
Splicing and post-transcriptional control	Core transcription
Synaptic transmission	Brain development and behavior
Signal transduction mechanisms	Modulation of neuronal plasticity
Biochemistry and pharmacology of ion channels	Electrophysiology
Glial cell function and endocrine disruptors	Stem cell biology and therapy
Viral and non-viral vector construction	Gene therapy
Drug discovery	Genetic vaccine development
X-ray crystallography	Molecular modeling

Courses

See GPILS course listing on pages 43-55.

Master's Degree Studies

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

The graduate program in Molecular Medicine also offers master's level studies with specializations in human genetics, pharmacology & experimental therapeutics, physiology, cancer biology and toxicology.

Molecular Microbiology & Immunology

<http://microbiology.umaryland.edu>

Degrees Offered

PhD, PhD/MD and PhD/DDS

Program Description

The Doctor of Philosophy program in Molecular Microbiology and Immunology provides training opportunities in a variety of the sub-disciplines of microbiology, including molecular and developmental immunology, bacterial pathogenesis, and molecular virology and parasitology. 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 1200 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 January 15 for the fall semester. The program only admits students for the fall semester. International applicants must pass the Test of English as a Foreign Language with a score of 600 or above. For more information see: <http://lifesciences.umaryland.edu/inquire/index.shtml>

Degree Requirements

First year students participate in an innovative core course, "Mechanisms in Biomedical Sciences: From Genes to Disease" (GPLS 601, 602, 603) in the first semester, followed by a period allotted for laboratory rotations. The program selects an advisory committee for each student from the program's basic and clinical science faculty members. Our faculty membership is drawn from the School of Medicine and the Dental School. Students take required, program-specific courses that include: the GPILS core curriculum; immunology; bacteriology, parasitology, and virology; and an introduction to scientific thought and ethics. All students participate in program or school-wide seminars and a series of three laboratory rotations to familiarize them with faculty research. Additional elective courses may be added. To be eligible for a doctoral degree, students must complete at least 38 credits of course work beyond the 12 required credits of doctoral dissertation research for a total of 50 credits. Students take a written and oral qualifying examination at the end of their third semester. Qualified students then choose a doctoral dissertation adviser and begin research.

Courses

See GPILS course listing on pages 43-55.

Neuroscience

<http://neuroscience.umaryland.edu>

Degrees Offered

PhD, PhD/MD, PhD/DDS

Contact Information

Frank Margolis, PhD, Director of Graduate Education
Jennifer Guy, MEd, Program Coordinator

Program Description

Faculty members employ a variety of state-of-the-art approaches to study topics ranging from the single molecule to the human brain. At the cellular and molecular levels investigators study the structure and function of ion channels and neurotransmitter receptors, as well as cellular properties and interactions between neurons. They employ various techniques including electrophysiology, functional imaging of calcium transients and changes in membrane potential, combined with a variety of cell and molecular biology approaches. Neurochemical methods are used to investigate the activation of neurotransmitter receptors, second messenger production and the sequelae of these processes. Sensory (vision, hearing, smell and taste, touch and pain) and motor systems are studied with electrophysiological recordings (from individual neurons and neuronal ensembles), as well as behavioral and neuroanatomical techniques. At complex organizational levels, investigators study hormonal control of gene expression in the regulation of sexually dimorphic behavior, neuronal cell death and the neurobiological basis of psychiatric illnesses. Behavioral and imaging (fMRI) studies in humans address the neurobiology of speech and language disorders, and pain mechanisms.

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. The program is particularly interested in candidates with research experience in the biomedical sciences. 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 1200 or above. The program encourages the application of women and candidates from racial and ethnic minorities under-represented in the sciences.

Although the program reviews applications throughout the year, students are encouraged to apply by February. 1. Admission to the program is highly competitive, and acceptances are made as qualified candidates are identified. Additional information is available from the program coordinator at neurosci@umaryland.edu.

Degree Requirements

First year students participate in an innovative core course, "Mechanisms in Biomedical Sciences: From Genes to Disease" (GPLS 601, 602, 603) followed by "Introduction to Neuroscience" (GPLS 641) in the first semester, and by a wide array of elective courses and at least 3 laboratory rotations. The broad scope of the curriculum is tailored to meet each student's research inter-

ests and career goals. The training program stresses hands-on experience in a variety of state-of-the-art approaches. This experience is gained through a series of rotations in different laboratories to gain familiarity with various techniques and scientific environments. Upon entering the program, each student is assigned an advisory committee composed of three senior faculty members. This committee guides the student through the first two years in the program, helps the student select courses and laboratory rotations, and monitors the student's progress.

By the end of the second year, students complete a course in biostatistics or pass an exam demonstrating competence in this area. Students also choose among a variety of advanced courses, covering all areas of modern neuroscience research. First-year students also attend Professor's Rounds in Neuroscience, an informal series of talks by faculty designed to introduce the faculty and their research interests.

Students usually complete laboratory rotations and course work by the end of the second year in the program, at which point the students will have selected a faculty mentor and dissertation laboratory. Successful completion of a qualifying exam at the end of the second year enables the student to advance to candidacy for the PhD degree. As a PhD candidate, the student's primary focus is on research. A dissertation committee, composed of faculty with expertise in the student's research program, monitors the student's progress and helps the student and their mentor in designing and executing the research program.

Throughout their course of studies, students attend weekly Journal Clubs, a monthly seminar series, and an annual symposium. These are designed to keep students abreast of major developments in various neuroscience related fields, and to provide them with an opportunity to meet with leaders in these fields. At the annual off-campus retreat, all program faculty and students meet at a scenic location for formal and informal scientific and social interactions.

The program also offers a variety of activities designed to advance students' career development, including courses on writing grant applications and scientific papers, communication skills, and instruction on employment opportunities in academia, industry, science policy, and administration.

Courses

See GPILS course listing on pages 43-55.

Physical Rehabilitation Science

<http://pt.umd.edu/phd/prospective/index.asp>

Degree Offered

PhD

Contact Information

Randall Keyser, PhD, Director

Terry Heron, Coordinator

Program Description

The Department of Physical Therapy and Rehabilitation Science offers the Doctor of Philosophy in physical rehabilitation science. Concentrations are available in applied physiology, biomechanics, neuromotor control, and epidemiology of disability.

The nationally- and internationally-recognized faculty includes 15 PhDs, two M.D.s, and nine physical therapists. Major research interests include cardiorespiratory insufficiency and fatigue, stroke rehabilitation, neuroplasticity, and pathomechanics of wheelchair propulsion. Ongoing research projects involve multiple patient populations, including HIV seropositive, children with developmental coordination disorder, children with spina bifida or Down Syndrome, spinal cord injured and other wheelchair users, stroke, and systemic lupus erythematosus.

The program combines faculty, physical, and financial resources from several departments within the School of Medicine 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 impairments.

Individual courses of study serve the interests and educational needs of the student and the principal faculty adviser. The program educates students with the systemic, cellular, 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 degree in a health or rehabilitation related discipline, or related biological science. Experience in rehabilitation is preferred but not essential. Potential candidates are encouraged to

make contact with a potential adviser before applying to the program. The minimum Graduate Record Examinations score is 1000 on the verbal + written combined, or 1100 if either the verbal or written score is below 500. Other selection criteria may be used independently by specific advisers.

Degree Requirements

Students pursuing the doctoral degree in physical rehabilitation science participate in ongoing research as student researchers. Graduate research and teaching assistantships are available to highly-qualified applicants. Those with other support are preferred to be full-time students and must satisfy their advisers' laboratory and research commitment 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. Course work must include 48 credits in the core and cognate areas and 12 credits of doctoral dissertation research. The program may waive some credit requirements if evidence of an accredited graduate school or program verifies academic competency in pertinent course work. Both the adviser and program administration must approve waiving of credit requirements. The doctoral dissertation must be an original scientific and scholarly work of publishable quality, completed according to Graduate School guidelines and program policies.

Courses

Course Code and Number, Course Title, Credit(s)

PTRS 688 Special Topics (1-3)

Special topic listings are graduate-level special interest courses developed by faculty members of the PhD program in physical rehabilitation science. They vary from year to year.

PTRS 702 Graduate Seminar in Teaching I (1) *

Covers learning theories and relevant teaching methods for the adult learner. Laboratory experiences are attached to a physical therapy course being taught concurrently to this course. Students will act as teaching assistants in that course that revolves around a three-hour weekly experience as a laboratory assistant. They will be filmed while teaching a short section of a lab and then self evaluate themselves. The students will keep an ongoing information sheet about their experiences as a laboratory assistant.

PTRS 703 Graduate Seminar in Teaching II (1) *

Covers assessment techniques and curriculum construction. Students will participate in the teaching of labs to

the MPT professional students and be 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 will also construct and justify a curriculum for physical therapy students.

Prerequisite: PTRS 702

PTRS 705 Pathology (2) *

Covers the pathological foundation of human disease processes and how they affect the normal function of human organ systems as related to the physical rehabilitation science curriculum. Students also gain experience discussing and teaching pathological processes with an audience of master's degree students in physical therapy.

PTRS 706 Neuroscience (2) *

Covers neuroscience as applied to rehabilitation. Emphasis is on neuroanatomical and neurophysiological aspects of neuroscience and neuroplasticity.

PTRS 708 Rehabilitation Physiology (2-4) *

Covers fundamental concepts of physiology as related to the physical rehabilitation science curriculum and provides exposure to the research-based subdiscipline of rehabilitation physiology. The focus is on applied aspects of the discipline and exercise physiology for biological perturbation, physiological evaluation, and therapeutic adaptation.

PTRS 709 Rehabilitation Biomechanics (1-3) *

Covers theoretical applications of the principles of biomechanics, Kinematics, Kinetics, and transarticular forces and moments.

PTRS 712 Motor Behavior (2) *

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 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 715 Cellular Mechanisms of Rehabilitation (2) *

Covers cellular aspects of compensatory and rehabilitative adaptations. The course details muscle, bone, and connective tissue aspects.

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 systems of musculoskeletal, nervous, integumentary, cardiovascular, and gastrointesti-

nal. Emphasis is on the applied/functional anatomy. In addition, the student will dissect the human body, submit an anatomical literature review paper on a topic of interest, lecture on one region, and assist in the laboratory.

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 systems of musculoskeletal, nervous, integumentary, cardiovascular and gastrointestinal. Emphasis is on the applied/functional anatomy. In addition, the student will dissect the human body, submit an anatomical literature review paper on a topic of interest, lecture on one region, and assist in the laboratory.

PTRS 720 Applied Human Anatomy, Lower Extremity (3) *

Students attend lectures and laboratory sessions required by the current Human Anatomy course PTAB 400 and concerning the lower extremity. This course covers the body from head to toe including the systems of musculoskeletal, nervous, integumentary, cardiovascular and gastrointestinal. Emphasis is on the applied/functional anatomy. In addition, the student will dissect the human body, submit an anatomical literature review paper on a topic of interest, lecture on one region, and assist in the laboratory.

PTRS 780 Plasticity in the Central Nervous System (2) *

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 will 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 faculty and guest speaker presentations occurring biweekly. On alternating weeks, students discuss relevant research articles under the leadership of faculty members who have research interests in the particular area of discussion. Students

present results of projects in which they are involved and lead discussions of journal articles under faculty guidance. Students in the PhD program must register for seminar for at least four terms.

PTRS 798 Independent Study (1-3) *

Under the supervision of a faculty adviser, students pursue independent study of a topic, research involvement, or independent project development related to the practice of physical therapy. The student and adviser select the course format with a contractual agreement that they sign before course registration.

PTRS 899 Doctoral Dissertation Research (1-12)

Graduate students take dissertation credits for all aspects of the research work required to complete their dissertation work. Students take a minimum of 12 credits to complete their degree requirements.

**A permission slip from the program director or instructor is necessary to enroll in this course*

Marine-Estuarine- Environmental Sciences

University System of Maryland

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

Degrees Offered

PhD, MS

Program Description

The specific objective of the all-University graduate program in Marine-Estuarine-Environmental Sciences (MEES) is the training of qualified graduate students, working toward the M.S. or Ph.D. degree, who have research interests in fields of study that involve interactions between biological systems and physical or chemical systems in the marine, estuarine, or terrestrial environments. The program comprises six Areas of Specialization (AOS): Oceanography, Environmental Chemistry (and toxicology), Ecology, Environmental Molecular Biology/Biotechnology, Fisheries Science, and Environmental Science. Students work with their advisory committee to develop a customized course of study based on research interests and previous experience.

All students must demonstrate competence in statistics. 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 adviser and advisory committee.

Students may conduct their research either in the laboratories and facilities of the College Park (UMCP), Baltimore (UMB), Baltimore County (UMBC), or Eastern Shore (UMES) campuses or in one of the laboratories of the University of Maryland Center for Environmental Science (UMCES): Chesapeake Biological Laboratory (CBL) at Solomons, Maryland; the Horn Point Laboratory (HPL) in Cambridge, Maryland; and the Appalachian Laboratory (AL) in Frostburg, Maryland; or at the Center of Marine Biotechnology (COMB) in Baltimore, Maryland. CBL and HPL are located on the Chesapeake Bay. They include excellent facilities for the culture of estuarine organisms. The laboratories are provided with running salt water, which may be heated or cooled and may be filtered. Berthed at CBL are the University's research vessels, which range from the 65-foot *Aquarius* to a variety of smaller vessels for various specialized uses. At HPL, there are extensive marshes, intertidal areas, oys-

ter reefs, tidal creeks, and rock jetties. AL, located in the mountains of western Maryland, specializes in terrestrial and freshwater ecology.

The MEES program is offered on campuses of the University at College Park, Baltimore, Baltimore County, and Eastern Shore and at the UMCES laboratories and COMB. Students normally enroll on the campus where their adviser is located. Of particular relevance for the MEES program is the University's location near Chesapeake Bay, one of the world's most important estuarine systems, which in many aspects serves as the program's principal laboratory resource.

Program Admission

Applications for admission in the fall semester must be filed by February 1; however, to be considered for financial support, it is better to apply by December 1. Some students will be admitted for the semester starting in January, for which the deadline is September 1. Applicants must submit an official application to the University of Maryland Graduate School, 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 adviser is identified in advance can be admitted. Prior communication with individual members of the faculty is encouraged.

Courses

Students plan their courses under the direction of their academic advisers 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 various 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 enroll in one of the following:

MEES 799 Master's Thesis Research (1-6)

MEES 899 Doctoral Dissertation Research (1-12)

Medical and Research Technology

University of Maryland School of Medicine,
Department of Medical and Research Technology
<http://medschool.umaryland.edu/dmrt>

Degrees Offered

M.S.

Program Description

The Department of 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, non-thesis 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 Bachelor's degree in a life science discipline related to laboratory sciences.

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 (11)

- MEDT 687 Quality Control and Regulations in Laboratory Sciences (2)
- MEDT 628 Seminar (1) (two semesters)
- MEDT 630 Scientific and Technical Writing (2)
- MEDT 635 Teaching Practicum Minor (2)
- CIPP 909 Responsible Conduct of Research (1)
- DBMS 638 Biostatistics (2), PREV 620 Principles of Biostatistics (2), or POSI 604 Statistical Analysis* (2)

Required courses (Biomedical Research Track):

- CHEM 437 Comprehensive Biochemistry I (4)*
- MEDT 631 Research Design (2)
- MEDT 799 Master's Thesis Research (6)

Suggested elective courses:

- MEDT 634 Teaching Practicum Major (4)
- MEDT 638 Special Topics (1-4)
- MEDT 671 Molecular and Cell Biology (3)
- CHEM 638 Comprehensive Biochemistry (4)*
- BIOL 614 Genetics and Eukaryotic Molecular Biology (4)*
- PATH 712 Methods in Chemical and Molecular Pathology (3)
- MMIC 702 Basic Immunology (3)
- GPLS 710 Principles of Bacteria Pathogenesis (3)
- GPLS 704 Basic Virology(3)

Required courses (Management Track):

- MEDT 639 Management Practices in Laboratory Sciences (6)
- ACCT 504 Introduction to Accounting (3)** or ACCT Financial Accounting (3) ***
- FIN 504 Financial Management (3)** or MGMT 640 Financial Decision Making for Managers (3) ***
- MGMT 600 Leading with Integrity (3)** or MGMT 640 Research Methods for Managers (3) ***

Suggested elective courses:

- MEDT 634 Teaching Practicum Major (4)
- MEDT 638 Special Topics (1-4)
- PREV 648 Healthcare Administration (3)
- HCAD 640 Financial Management for Healthcare Organizations (3)***
- ECAD 489 Seminar in Administration (3)*
- MGMT 610 The Manager in a Technological 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 Management (3) ***
- EDUC 601 Human Learning and Cognition (3)*

*University of Maryland Baltimore County (UMBC) courses.

** University of Baltimore (UB) courses

*** University of Maryland University College (UMUC) courses

Courses

Course Code and Number, Course Title, Credit(s)

MEDT 628 Seminar (1)

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 twice. All graduate students from the program must attend seminar during their tenures.

MEDT 630 Scientific and Technical Writing (2)

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, articles, reports, presentations, and proposals.

MEDT 631 Research Design (2)

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)*

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 (1-4)*

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 (1-6)*

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 661 Advanced Hematology (2)

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 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. In the laboratory, students carry out a semester-long project in which they amplify a prokaryotic gene, insert it into a plasmid vector, over-express the recombinant protein, and identify the protein on Western blot.

MEDT 680 Laboratory Management (3)

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 pro-

cedures. 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 for Lab Sciences (2)

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 (1-6)

** A permission slip from the Program Director is necessary to enroll in these courses.*

Nursing

University of Maryland School of Nursing,
Department of Graduate Studies
www.nursing.umaryland.edu

Degrees Offered
PhD, MS

Program Description

The Master of Science degree program offers specialization options for nurses who hold a baccalaureate degree in nursing and a generalist option for those who hold a baccalaureate degree in another field.

The specialist option: This option focuses on specialization and a commitment to, and involvement in, the development and refinement of nursing knowledge. The curriculum, including core, specialty, research, and elective components, prepares registered nurses for advanced practice in numerous specialty areas, including:

- Family & Community Health: Community Health Nursing; Family Nurse Practitioner; Nurse Midwifery; Advanced Practice Pediatrics Nursing (A blended Pediatric Nurse Practitioner and Clinical Nurse Specialist Program); Psychiatric Nursing (Nurse Practitioner and Clinical Nurse Specialist Options).
- Organizational Systems and Adult Health: Adult Primary Care Nurse Practitioner; Trauma, Critical Care, and Emergency Nursing (A blended Acute Care Nurse Practitioner and Clinical Nurse Specialist Options); Gerontology Nurse Practitioner; Nurse Anesthesia; Informatics; Clinical Research Management; Health Service Leadership and Management; and Teaching in Nursing and Health Professions (a certificate program)

The generalist option: This option prepares students with previous baccalaureate or higher degrees in a field other than nursing for entry into nursing practice as a clinical nurse leader.

- The Clinical Nurse Leader is a generalist master's option for entry into nursing practice for

applicants who hold a baccalaureate or higher degree in another field of study. The Clinical Nurse Leader is a new nursing role developed by the American Association of Colleges of Nursing in collaboration with leaders from the practice environment. The Clinical Nurse Leader brings a high level of clinical competence and knowledge to the point of care and serves as a resource for the nursing team.

The Doctoral Degree:

Two options are available for nurses who are seeking a terminal doctoral degree: The Doctor of Philosophy and the Doctor of Nursing Practice.

Doctor of Philosophy in Nursing:

- The Doctor of Philosophy program is for nurses who are committed to leadership in the discovery and refinement of nursing knowledge through research. The curriculum includes core courses that address the theoretical and empirical bases for nursing and the techniques of theory building and research. Specialty courses allow students to develop individualized programs of study.
- Doctoral students may study the theoretical and empirical basis for nursing actions in direct service to clients/patients and those nursing actions for education, administration, or health policy. Doctoral emphasis areas include addictions, critical care, family health and development, gerontology, health promotion and illness prevention, maternal and child health, nursing health policy, nursing informatics, nursing services, oncology, and research methodology and evaluation and outcome assessment.

Program Admissions

Beyond the Graduate School's minimum admission requirements:

MS Program

The specialty option: Applicants must be registered nurses who have earned baccalaureate degrees from institutions that offer an upper-division major in nursing equivalent to that offered at the University of Maryland. The institution must be accredited by either the National League for Nursing Accrediting Commission or the Commission on Collegiate Nursing Education. The applicant must also hold current licensure in at least one state. A Maryland license may be required by some clinical

agencies. An exception may be granted to international students who are solely taking online courses and are not involved in clinical experiences. The School of Nursing evaluates students' potential for master's study based on: prior undergraduate and graduate (if applicable) grade point average, a statement of goals and objectives, two professional references, interviews upon request, a professional resume, and Graduate Record Examinations general test scores. An elementary course in statistics is an admission prerequisite and some specialties require prerequisite physiology and physical assessment skills. Depending on the specialty area, applicants may need work experience.

The generalist option: Applicants must hold a Baccalaureate degree from a regionally-accredited college or university, or an equivalent degree from a comparable foreign institution. The School of Nursing evaluates students' potential for master's study based on: prior undergraduate and graduate (if applicable) grade point average, a statement of goals and objectives, two professional references, interviews upon request, a professional resume, and Graduate Record Examinations general test scores.

International students option: 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 examination of the International English Language Testing System; and must submit official transcripts for all prior undergraduate and graduate study.

PhD Program

PhD program applicants have an earned a master's degree in nursing and must hold current licensure in at least one state. Exceptions may be granted pursuant to a review by the Assistant Dean for Doctoral Studies. The School of Nursing evaluates students' potential for doctoral study based on: GRE general test scores, cumulative GPA, statement of goals, professional resume, interviews upon request and three appropriate references. A graduate course (at least 3 credits) in research and inferential statistics is an admission prerequisite. 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 examination of the International English Language Testing System; and must submit official transcripts for all prior undergraduate and graduate study.

Degree Requirements

MS: Credit and course requirements vary from 31 to 53 credits, depending on the course of study. Students complete most programs of study (except primary care) within three semesters plus a summer of full-time study. Part-time study is available. All students must complete specific

core and research courses.

PhD: Post-master's entry students complete a minimum of 60 credits in nursing theory (6 credits), research and statistics (17 credits), research experiences 11-16, electives (15 credits), and doctoral dissertation research (12 credits). Post-baccalaureate entry students complete a minimum of 95 to 115 graduate credits that include nursing theory (13 credits), research and statistics (20 credits), master's specialty electives (22 to 45 credits), doctoral specialty electives (12 credits), and doctoral dissertation research (12 credits). PhD students complete preliminary, comprehensive, and final oral (doctoral defense) examinations and write a doctoral dissertation reporting the results of an original, independent research project.

Courses

Course Code and Number, Course Title, Credit(s)

NURS 501 Pathophysiological and Pharmacological Bases for Nursing Practice (5)

This course focuses on the pathophysiological disruption to system functioning and on the use of therapeutic drugs in the health care setting. This course will provide an understanding of the Therapeutic Experiment and the role of the nurse in managing drug therapy. The student applies previously acquired knowledge in human anatomy and physiology as well as other basic sciences. The course contributes to the scientific basis for nursing practice.

Prerequisite: None

NURS 503 Health Assessment (3)

This course is designed to provide the nursing student with the knowledge and skills necessary to assess individual health as a multi-dimensional expression of bio-psycho-social-cultural well being. Course content will reflect a functional health and systems approach to nursing assessment of humans through all developmental stages.

Prerequisite: None

NURS 505 Introduction to Professional Nursing Practice (4)

This didactic, laboratory, clinical and seminar course introduces students to the concepts of contemporary professional nursing. The student is guided in the application of theory to clinical practice and in the development of cognitive, psychomotor, communication, and therapeutic skills necessary to address common needs and responses of persons experiencing various health states.

Prerequisite: NURS 503

NURS 507 Context of Health Care Delivery I (3)

This course provides an overview of the nature of nursing as an evolving profession and its relationship to the

structure and function of the United States health care delivery system. Major issues and trends in nursing and health care are explored. Consideration is given to the impact of social, political, economic, and technological factors on the health care system and the nursing profession. The development of basic skills and competencies in problem-solving, decision-making, group dynamics, delegation and supervision are addressed.

Prerequisites: None

NURS 508 Community/Public Health Nursing for the Clinical Nurse Leader (5 credits – 3 didactic/2 clinical)

This course provides the foundational principles of community and public health nursing using theory, analytic skills, and related clinical experiences. Global, federal, and state and local public health priorities and policy options are examined to illustrate the nursing process for the care of communities and populations. The sciences providing the evidence base for community and public health assessment, intervention, and evaluation are integrated into the course. These include introductory epidemiology, community based participatory research (including cultural awareness and competence), nursing and social sciences and qualitative methods. Ethical principles and concepts of social justice are incorporated by analyzing the origins of health disparities especially in cases of special (vulnerable) populations. The U.S. public health system is analyzed relative to the Alma Ata Declaration, U.S. health goals, local emergency preparedness, populations' access to care, and cost. The historical, current, and future role of nurses who care for populations by empowering individuals, families, and communities is critically analyzed. Students apply evidence-based interventions in a variety of public and private clinical settings.

Prerequisites: NURS 501, NURS 503, NURS 505, NURS 507, NURS 625 Co-requisite: NURS 509, NURS 511, 736

NURS 509 The Childbearing Family for the Clinical Nurse Leader (5)

This course provides an understanding of prenatal, women and family nursing principles through classroom and seminar experiences. Course content builds on the Association of Women's Health, Obstetric, and Neonatal Nurses' Standards and Guidelines and the American Association of Colleges of Nursing Clinical Nurse Leader (CNL) role delineation. An evidence-based practice approach is used and emphasis is placed on the biological, psychological, social, cultural, and spiritual aspects of the childbearing experience. Course content includes patient-centered care and examination of the societal and technological issues that influence women and childbearing families. Students will apply theory into clinical practice through nursing care experiences with antepartal, intra-

partal, and postpartum families in a variety of inpatient and outpatient settings.

Prerequisites: NURS 503, NURS 505 Co-requisites: NURS 508, NURS 511

NURS 511 Psychiatric Mental Health Nursing for the Clinical Nurse Leader (5)

This course provides an understanding of psychiatric and mental health nursing principles through classroom and related clinical experiences in a variety of settings. Course content builds on the American Nurses Association of Colleges of Nursing Clinical Nurse Leader (CNL) role delineation. Using an integrated Biological, Psychological, sociocultural, environmental, and spiritual approach, students will learn interventions for the care of individuals and groups with psychiatric disorders. Empirical, aesthetic, ethical, and personal ways of knowing are explored as a basis for understanding the holistic needs of persons with psychiatric disorders. Current research, theory, and biological foundations of psychiatric disorders are introduced. Evidence-based interventions, issues of professional and personal involvement in psychiatric mental health nursing, and legal and ethical implications of caring for persons with psychiatric disorders are discussed. The course requires the clinical application of communication, interpersonal, crisis intervention, cognitive behavioral, and motivational interviewing theory and skills. Students apply psychopharmacological principles, critical thinking, patient education skills, support, advocacy and caring in the clinical setting. The therapeutic use of self and the leadership role of the CNL are emphasized. The course provides opportunities for students to learn to function as beginning CNLs in the roles of professional, clinician, outcomes manager, advocate, educator, and life-long learner.

Prerequisites: NURS 501, NURS 503, NURS 505, NURS 507, NURS 625

NURS 514 Adult Health Nursing (6)

This course is designed to introduce Clinical Nurse Leader students to the application of the nursing process for clients in acute care units. Topics fundamental to the provision of client-centered nursing care in the adult acute care environment will be covered. Lectures, discussion, and clinical application will be used to address topics relevant to beginning nursing practice as a clinical nurse leader.

Prerequisites: NURS 501, NURS 503, NURS 505

NURS 517 Nursing Care of Infants and Children: Family Perspective (4)

This course provides an understanding of how family-centered atraumatic care in the pediatric setting facilitates the health and well being of infants, children, adolescents and their families. The biological, psychological, social,

cultural, and spiritual aspects of the child within the context of the family unit are examined. The strength and the competence of the family are enhanced through emphasis on the development of mutuality and partnerships between the pediatric nurse and the parents. Current pediatric health issues related to wellness and illness are examined utilizing an evidence-based practice approach. Clinical experiences will afford the CNL student the opportunity to provide nursing care across the continuum of pediatric health care services meeting the physical and psychological needs of infants, children and adolescents in primary, acute, critical and chronic care settings. Opportunities are provided through a variety of clinical experience for the development and refinement of assessment skills, critical thinking and problem solving skills as well as nursing intervention strategies.

Prerequisites: NURS 501, NURS 503, NURS 505, NURS 507, and NURS 625

NURS 523 Clinical Nurse Leader Emphasis Practicum (8)

This course is the capstone clinical practicum and seminar taken in the final semester of the Clinical Nurse Leadership program of study to facilitate the transition from nursing student to clinical nurse leader. Analysis and synthesis of information from all coursework is applied to the delivery of organized, safe, efficient, outcomes oriented nursing care in a variety of clinical situations. The components of the course are the clinical and leadership preceptorship, critical thinking, and career planning. The course provides the student with opportunities to apply knowledge from nursing courses (they may also apply previous knowledge from other spheres) and critical thinking skills to clinical situations, patient care leadership, and case studies. The student works with a clinical preceptor to develop, implement and evaluate objectives specific to the clinical patient care and leadership in the emphasis area.

Prerequisites: All program courses are prerequisites to NURS 523 except NURS 701 and NURS 622. NURS 525 must be taken concurrently. This course is taken during the last semester of the program of study.

NURS 525 Leadership In Clinical Nursing Practice (3)

This course focuses on the leadership roles and management functions expected of the clinical nurse leader in a contemporary healthcare environment. Organizational, economic, regulatory and interpersonal factors that impact nursing practice are explored. The administrative process is emphasized as a framework for analyzing concepts and principles such as system theory, fiscal principles, quality improvement methodologies, planned change and the principle attributes of professionalism, among others. Stress is placed on the development of critical thinking

skills and the identification of nursing leadership and research implications. The integration of leadership and management theory and the social responsibility of the nursing profession are emphasized.

Prerequisites/Co-requisite NURS 507 and one major clinical course such as, NURS 509, NURS 508, NURS 511, NURS 514 and NURS 517.

NURS 602 Planning Health Care for Populations (3)

Provides selected conceptual and contextual frameworks needed by advanced practice nurses in the delivery of health care services to populations in an evolving health care system. Introduces a variety of theories and models for managing health care of populations from a population perspective. Involves a wide range of learning activities including using quantitative and qualitative epidemiological methods related to health indicators and accessing relevant health databases for health care planning purposes. Planning concepts and quality indicators needed to effect changes in the health status of selected populations provide practice applications. Cultural determinants of care are also addressed.

NURS 604 Pharmacology of Anesthesia Nursing (3)

This course will provide a comprehensive understanding of the pharmacology of the inhalation anesthetics. The principles of uptake and distribution (pharmacokinetics) of inhalation anesthetics will be discussed along with factors (e.g., flow rates, co-administration of N₂O, variations in CO) that can influence the rate of rise of alveolar tension. This course will also cover the pharmacokinetics and pharmacodynamics of intravenous anesthesia drugs.

Prerequisite: NURS 723

NURS 605 Comprehensive Adult Health Assessment (3)

Builds on previously learned skills and knowledge to develop advanced skills in obtaining and completing a comprehensive health history and physical, and develop competence in identifying, describing and communicating normal and abnormal findings in a written and oral format. A major focus of this course is on the assessment process.

Prerequisite: NURS623 Co-requisites: NPHY 612

NURS 606 Systems in Health Care Delivery (3)

Provides a systems-level analysis of health care policy trends and their effects on organizations and delivery systems, as well as provider and consumer roles in health care delivery. Investigates policy and societal trends affecting health care, the nursing profession and nursing practice. Analyzes health care delivery systems responding to rapidly changing financial incentives that influence the industry at the community, state, national and international

al levels. Assesses the dynamics of these changes on the roles of health care providers and consumers from the economic, social, organizational, political, ethical, legal and technological perspectives. Examines nursing roles and leadership strategies for influencing policy decisions. Emphasis is placed on nursing's role in affecting the health care environment and on the effects of external forces on advanced practice roles and the profession.

NURS 608 Special Problems in Nursing (1–6)

Provides for alternative learning experiences: independent study, development of specific clinical competencies, classes focusing on a variety of special interest topics or topics of an interdepartmental nature. Registration requires permission of advisor. Students may register for one to three credits per semester with a maximum of six credits per degree.

NURS 609 Critical Issues in Health Care (3)

Enables an interdisciplinary group of students to examine the policy, legal and ethical components of a variety of critical issues in health care delivery. Several teaching techniques, including case studies, simulations, mock hearings and panel discussions 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, cost containment in the health care system and delivery of health care to the poor and indigent. The course is taught by faculty from a variety of disciplines, including law, philosophy, nursing, medicine, dentistry, pharmacy, social work and economics.

NURS 610 Pharmacology of Anesthesia Nursing II (2)

This course is a continuation of the study of concepts developed in Pharmacology of Anesthesia Nursing I. In this second semester course emphasis is placed on the study of the uptake, distribution, and biotransformation of anesthetic drugs. The course will also provide information on anesthesia drugs used in clinical specialty areas such as obstetric and pediatric anesthesia and local anesthetics.

Prerequisites: NURS 604

NURS 611 Pediatric Assessment in Advanced Practice Nursing (3)

Utilizes a seminar alternating with laboratory and clinical experiences that emphasize the role of the advanced practice pediatric nurse. Provides the opportunity to refine assessment skills as data is collected and analyzed in the clinical area, using a variety of interviewing, examining and recording skills. Role boundaries, role facilitation and barriers to role implementation are analyzed in seminar

sessions.

Prerequisite or co-requisite: NPHY 630

NURS 612 Trends and Issues in Women's Health Care (2)

Focuses on the evolution of women's health as a discipline and the importance of examining gender-related differences. Discussions include cultural, psychological, social, economical, legal and biological determinants of health and well being of adolescents and women throughout the life span.

NURS 613 Principles of Anesthesia Nursing I (3)

This course provides introductory information pertinent to the clinical practice of anesthesia. Students will build on their previous critical care clinical experience to develop advanced and essential information on providing pre-anesthesia, intra-anesthesia, and post-anesthesia patient care. Emphasis is on basic information in nurse anesthesia about the induction, maintenance, and emergence from anesthesia to include monitoring, patient positioning, and anesthesia record keeping. Additionally, students will build on previously learned skills and knowledge to develop advanced skills in obtaining and completing a comprehensive pre-operative health history and physical. This will allow the student to develop competence in identifying, describing and communicating normal and abnormal assessment findings in written and oral format and using this information to develop an anesthesia plan of care. Prerequisite: None

NURS 614 Principles of Anesthesia Nursing II (3)

This course is designed to further explore and develop concepts taught in Principles of Anesthesia Nursing I with an emphasis on the anesthetic management of the pediatric, geriatric and obstetrical patient. The student will review the specific anesthetic needs, unique physiological requirements and specific safety issues for each specialty. Students will learn to modify their standard anesthesia techniques for healthy adult patients to address the safety issues and unique needs of these groups.

Prerequisite: NURS 613

NURS 615 Regional Anesthesia (3)

This course is designed to provide the anesthesia student with knowledge of anatomy, physiology, pharmacology and clinical aspects of the administration and management of regional anesthesia. The course will review neurophysiology and anatomy, pharmacology of local anesthetics, safety requirements and precautions and contraindications to regional anesthesia as well as correct documentation of regional anesthesia administration and maintenance.

Prerequisite: NURS 613 and NURS 614

NURS 616 Chemistry for Anesthesia Nursing I (2)

This first basic science in anesthesia course is designed to present a review of inorganic and organic chemistry followed by the principles of biochemistry as it applies to the practice of anesthesia. Students will build on their previous knowledge to develop an understanding of basic chemistry principles that apply to the physiology and pharmacology related to anesthesia.

Prerequisites: None

NURS 617 Technology and Physics Anesthesia Nursing (1)

This course focuses on physics principles required for understanding the mechanisms and actions of anesthetic agents, anesthesia equipment and metabolic theories as they apply to anesthesia practice. Emphasis is placed on the physics of anesthesia including molecular gas laws, density of gases, and physics principles as they apply to anesthesia equipment. Students will build on their previous clinical monitoring experience and expand it to understanding the role of monitoring in vigilance and patient safety during anesthesia. Emphasis is placed on how to check anesthesia equipment to reveal problems before harm comes to the anesthetized patient.

Prerequisite: None

NURS 618 Special Problems in Primary Care (1–3)

Develops special competencies or facilitates in-depth clinical experience in an independent study format. Students who are not specializing in primary care may elect this experience to study selected concepts relating to primary care nursing. Students may register for varying units of credit, ranging from one to three credits per semester, with a maximum of six credits per degree.

NURS 619 Clinical Practicum in Primary Care I (3–5)

Focuses on refining health assessment skills, interpreting findings, and developing and implementing appropriate plans of care to meet common health maintenance needs of adults and to promote the health of adults with common health problems. Women's Health Nurse Practitioner students register for three credits, and Adult Health Nurse Practitioner students register for five credits. *Prerequisite: NURS 605, NURS 723, NPHY 612*

NURS 620 Diagnosis and Management in Adult Primary Care I (4)

Prepares the student to diagnose and manage the primary health care needs of adults, including health promotion, health maintenance, acute, self-limiting minor illnesses and stable chronic diseases. Teaches the student to develop diagnostic reasoning skills in clinical decision-making. *Prerequisites: NPHY 612, NURS 605, NURS 723*

NURS 621 Technology in Anesthesia Nursing (3)

The course provides a basic integration of the knowledge of clinical anesthesia, physical sciences, and technologies related to the administration of anesthesia. Students will build from their previous clinical experience in monitoring technology and expand to understanding its role in vigilance and patient safety during anesthesia. Emphasis is placed on how to check anesthesia equipment to reveal problems before harm comes to the anesthetized patient. Principles of vaporization, properties of gas molecules, vapors and liquids related to anesthesia practice will also be studied. *Prerequisites: None*

NURS 622 Systems and Population in Health Care (3)

This core course provides an analysis of critical issues in health care delivery and population health. An overview of the design and structure of the U.S. health care system is presented including the policy, regulatory, financial, technological and social dynamics impacting health care organizations, health care professionals, and consumers of health care services. Building on knowledge of the health care system, the epidemiological bases for local and national health care trends are examined. Issues of cultural diversity, health disparities, and social justice in health care are analyzed. Strategies to enable advanced practice nurses to influence policy and resources allocation to improve health and reduce health disparities are covered.

NURS 623 Advanced Assessment of the Critically Ill (3)

Focuses on the assessment of the critically ill patient. Assessment data from invasive monitoring, laboratory tests and diagnostic studies are analyzed. Clinical experiences in intensive care and trauma units are provided.

Prerequisites or co-requisite: NURS 605, NPHY 612

NURS 624 Pain Management (3)

Focuses on current issues and concepts related to pain assessment and management. Utilizes a theoretical and research foundation to explore the affective dimensions of pain, the impact on family or significant others, cost-benefit issues in pain management and the relationship between pain and quality of patient care.

NURS 625 Introduction to Gerontological Nursing (3)

The first level course is designed to provide the student with the opportunity to systematically explore concepts relevant to successful aging. Emphasis is placed on normal psychosocial factors rather than the pathological changes associated with aging. Factors which affect the delivery of health services and gerontological nursing care are critically discussed. The appropriateness of research

findings for clinical practice will be analyzed. Nursing strategies aimed at health promotion and successful aging are developed.

NURS 626 Processes of Aging: Implications for Nursing Care (3)

Provides an in-depth analysis of specific concepts related to alterations in health of the older adult, especially the frail older adult. Emphasis is placed on assessment methodologies and research-based interventions designed to assist the individual to cope with acute and chronic alterations in health. Emphasis is on improving quality of care for the most frail and disabled older adults across the continuum of long-term care.

Prerequisites: NURS 625, NURS 701. *Prerequisite or concurrent:* NPHY 614

NURS 628 Special Problems (1–6)

Provides alternative learning experiences: independent study, development of specific clinical competencies and classes focusing on a variety of special topics. Students may register for varying amounts of credit, ranging from one to three credits per semester, with a maximum of six credits per degree.

NURS 629 Primary and Secondary Prevention of Cancer (2)

Examines patient-centered issues important in the development and detection of cancer. Provides an overview of cancer epidemiology with emphasis on familial, racial and national disparities in cancer incidence and mortality. Explores concepts of primary and secondary prevention, risk factors, relative risk, risk perception, risk calculations and risk reduction strategies. Cancer screening methods are examined with respect to their sensitivity, specificity, cost effectiveness and acceptability to patients. Policy issues regarding availability and utilization of cancer screening and prevention programs are discussed. Cultural issues with respect to patient education, health practices, access to health care and attitudes toward illness and cancer are addressed.

Prerequisites: None

NURS 630 FPI: Health Promotion and Disease Prevention (2)

Focuses on health promotion and disease prevention strategies for patients across the life span. Addresses the health promotion role of the family nurse practitioner in primary care. Emphasizes the multi-dimensionality of health promotion and disease prevention within emergent family systems. Synthesizes data to formulate a comprehensive management plan for patients across the life span.

Prerequisites or concurrent: NURS 605, NURS 610, NURS 660. *Concurrent:* NURS 631.

NURS 631 FPI: Practicum: Health Promotion and Disease Prevention Practicum (2)

Emphasizes the clinical implementation of health promotion and disease intervention strategies for patients across the life span. Concentrates on the health promotion role of the family nurse practitioner in primary care settings. Includes the synthesis of data and the formulation of comprehensive management plans for patients and families.

Prerequisite or concurrent: NURS 605, NURS 610, NURS 660. *Concurrent:* NURS 630

NURS 632 FPII: Clinical Management of Common Health Care Problems (3)

Focuses on developing a knowledge base for effective diagnosis and management of selected acute, commonly occurring health care problems throughout the life span. Integrates pathophysiology, psychopathology and pharmacotherapeutics, with growth and developmental concepts within the context of family theory. *Prerequisites:* NURS 605, NURS 610, NURS 630, NURS 631, NURS 660. *Prerequisite or concurrent:* NURS 723. *Concurrent:* NURS 633.

NURS 633 FPII: Clinical Management of Common Health Care Problems Practicum (5)

Focuses on the clinical application of critical diagnostic reasoning skills in the case management of acute commonly occurring health care problems encountered across the lifespan. Emphasizes clinical integration of pathophysiology, psychopathology, pharmacotherapeutics, family theory, health promotion, growth and developmental processes within family practice settings. Stresses the diagnostic and therapeutic role of the family nurse practitioner in primary care.

Prerequisites: NURS 605, NURS 610, NURS 630, NURS 631, NURS 660. *Prerequisite or concurrent:* NURS 723. *Concurrent:* NURS 632.

NURS 634 Advanced Health Assessment of the Older Adults (2)

Assists in developing the knowledge and skills necessary for the beginning-level gerontological nurse in an advanced practice role. Focus is on the health assessment of the older adult and the clinical reasoning skills needed to differentiate normal from abnormal changes. Exploration of the advanced practice-nursing role in a variety of health care settings facilitates role transition and realistic understanding of these advanced practice roles.

Prerequisite or concurrent: NPHY 600.

NURS 636 Clinical Diagnosis and Management of the Older Adult (6)

Prepares the student to function as a gerontological nurse

practitioner (GNP) in an ambulatory or long-term setting with older adults who present with common acute and chronic health problems. The student applies assessment skills, laboratory/diagnostic methods and clinical diagnostic reasoning skills in caring for older adults. Treatment strategies that include selection of pharmacotherapeutic agents emphasize the total well-being of the older adult (physical, psychosocial, cognitive and environmental components). *Prerequisites:* NPHY 612, NURS 625, NURS 605 and NURS 634. *Prerequisite or co-requisite:* NPHY 614, NURS 723

NURS 637 Anesthesia Nursing Practicum I (3)

This course will build on the previous clinical experiences and lectures to allow the student nurse anesthetist to provide comprehensive anesthesia care through the whole spectrum of the anesthesia process. Students will continue to provide pre-anesthetic assessments, develop anesthesia care plans, provide safe and effective anesthesia pre-operatively, intra-operatively and post-operatively. Students will perform at a basic level under the supervision of a Certified Registered Nurse Anesthetist or anesthesiologist. Student will present and discuss cases, clinical difficulties and solutions with peers and faculty in weekly clinical conference.

Prerequisite: NURS 614, and NURS 615

NURS 638 Special Problems in Perinatal/Neonatal Nursing (1-6)

Provides for alternative learning experiences: independent study, development of specific clinical competencies, classes focusing on a variety of special interest topics or topics of an interdepartmental nature within the broad category of maternity nursing. Students may register for varying amounts of credit, ranging from one to three credits per semester, with a maximum of six credits per degree.

NURS 640 FPIII: Management of Complex Health Problems (2)

Focuses on the disease management of complex chronic health care problems in patients across the life span. Integrates pathophysiology, pharmacotherapeutics, growth and development and health promotion into the context of family practice settings. Emphasizes the ongoing development of critical thinking skills for comprehensive assessment, diagnosis and therapeutic interventions for chronic health care problems in children and adults.

Prerequisites: NURS 605, NURS 610, NURS 630, NURS 631, NURS 632, NURS 633, NURS 660, NURS 723.

Concurrent: NURS 644.

NURS 641 Cancer Management (2)

This is the last of three didactic courses required for com-

pletion of the Masters' specialty track for advanced practice in oncology nursing. Strategies for cure of cancer, treatment of non-curable cancer, and management of commonly encountered symptoms and side effects due to the cancer itself or to the treatment are discussed using relevant clinical research.

Prerequisites: NURS 723, NURS 629 and NPHY 601

NURS 642 Professional Aspects of Anesthesia Nursing (1)

This course is designed to explore various professional issues and national health policy that affects nurse anesthesia practice and the nurse anesthesia profession. Students will review the history and organization of the American Association of Nurse Anesthetists (AANA) and the responsibilities of the nurse anesthesia councils. Emphasis will be placed on the ethics of nurse anesthesia and the legal challenges and responsibilities of a CRNA.

Prerequisite: NURS 614

NURS 643 Advanced Nursing of Children I (3)

This clinical course emphasizes the role of the Advanced Practice Nurse in the management of acutely ill infants, children and adolescents. Clinical experiences are in hospitals, emergency settings, and trauma/emergent care facilities. The focus of this course is implementation of the nursing process, advanced psychophysiological assessment skills, diagnostic skills, and pharmacological management and treatment plans for children with acute health needs. A strong emphasis will be placed on the needs of families when children suffer acute illness/trauma and community resources that can assist them. An additional focus of the course is the blending of the clinical specialist roles with practitioner skills. Critical or clinical pathways will provide the foundation for exploring the needs of children and families. This course is taught during the eight week summer session.

Prerequisites: NURS 611, NURS 710, NURS 713.

NURS 644 FPIII: Practicum: Clinical Management of Complex Health Problems (3)

Focuses on the management of complex chronic health care problems in patients across the life span. Emphasizes effective implementation of critical thinking skills for age-appropriate assessment, diagnosis and treatment of chronic health care problems encountered with patients in a variety of family practice settings.

Prerequisite: NURS 632

NURS 645 Advanced Nursing of Children II (5)

Focuses on the emerging role of the advanced practice pediatric nurse and the delivery of primary care within the reconceptualization of the health care system. Involves the synthesis of all prior coursework, application of criti-

cal thinking to the clinical arena, implementation of the nursing process and advanced physical assessment skills. Emphasizes tertiary care-based services. *Prerequisite: NURS 643*

NURS 646 Advanced Practice Roles Seminar (2)

Focuses on the emerging role of the advanced practice nurse. Emphasizes role realignment, organizational theory, legal and ethical decisions and management issues in the health care system.

Prerequisite: NURS 611, NURS 643, NURS 710, NURS 711, NURS 713, NURS 714

NURS 647 Diagnosis and Management of Common Acute Care Problems (5)

Provides the basic knowledge and skills necessary to practice at the beginning level as an advanced practice nurse with adult populations in acute care settings. Emphasizes the development of a conceptualization of the role of advanced practice nurses, skills in diagnostic reasoning and clinical decision-making, and the examination of theoretical and empirical bases for advanced nursing practice. Direct practice content focuses on health problems commonly encountered in acutely ill and injured individuals. Indirect practice content focuses on the critical analysis of medical and nursing interventions commonly used with acutely ill adults. Clinical experiences in acute care settings provide opportunities for the development of diagnostic reasoning and beginning management of common acute care problems.

Prerequisites: NURS 605 and NPHY 600. Prerequisites or concurrent: NPHY 601 or NPHY 620 and NURS 723.

NURS 648 Special Problems in Nursing of Children (1–6)

Provides alternative learning experiences: independent study, development of specific clinical competencies, classes focusing on a variety of special interest topics or topics of an interdepartmental nature within the broad category of nursing of children. *Prerequisites: NURS 611*

NURS 654 Principles of Anesthesia Nursing III (3)

The course will build on the information presented in previous courses to familiarize the nurse anesthetist student with anesthetic drugs, techniques and surgical issues unique to the cardiothoracic patient and the surgical patient with cardiac disease.

Prerequisite: NURS 613, NURS 614

NURS 655 Conceptual Foundations of Family Therapy (3)

This course offers the student an orientation to family theory and various methods and techniques of family therapy directed toward the delineations of family systems

and the identification of possible directions and methods of affecting changes in such systems. The course includes a seminar in family concepts related to different family therapy theorists and provides an opportunity for the student to begin to identify a personal operating position on family theory and therapy.

Prerequisite or concurrent: NURS 677, Clinical Diagnosis of Psychopathology

NURS 656 Conceptual Foundations of Family Therapy: Practicum (3)

This course provides an opportunity for students to apply concepts of family therapy in a clinical setting.

Assessment of multiple families will be undertaken.

Theoretically grounded techniques will be utilized and evaluated. Students will be expected to critically analyze strengths and barriers to the therapeutic use of self in clinical settings. This course offers a student the opportunity to integrate family therapy theory with practice applications and provides an opportunity for students to begin to identify a personal operating position on family theory and therapy. *Prerequisite or concurrent: NURS 667.*

Concurrent: NURS 655.

NURS 657 Anesthesia Nursing Practicum II (5)

This clinical course provides opportunity for the student anesthetist to continue to develop judgment, insight and knowledge of clinical practice. Students will provide a pre-operative assessment and develop anesthesia care plans for more complex patients under the direct supervision of a Certified Registered Nurse Anesthetist or an anesthesiologist instructor. Students will operate at a more advanced level, begin to develop more complex anesthesia care plans and administer anesthesia care more independently. Student nurse anesthetists will attend a weekly clinical conference to present cases to their peers and faculty. Students will discuss case problems and achievements and discuss solutions based on discussion with other students and faculty.

Prerequisite: NURS 637

NURS 658 Special Problems in Adult Psychiatric Nursing (1–6)

Provides alternative learning experiences: independent study, development of specific clinical competencies, classes focusing on a variety of special interest topics or topics of an interdepartmental nature within the area of adult psychiatric nursing. Students may register for varying amounts of credit, ranging from one to three credits per semester, with a maximum of six credits per degree.

NURS 659 Organizational and Professional Dimensions of Advanced Nursing Practice (3)

This core course provides content related to organization-

al and professional challenges experienced by nurses in advanced practice whether in clinical care, education, management, or research. The course examines professional, social and organizational factors that influence work of advanced practice nurses. Roles that advanced practice nurses assume are examined with a particular emphasis on leadership development. Leadership strategies address fiscal management; interdisciplinary, inter-and-intra-organizational collaboration; professional and business ethics; and quality improvement. The course encompasses advocacy for the profession and for clients, management of innovation and change, as well as the strategies and skills needed for working in groups. The course is intended to be taken concurrently with clinical courses.

NURS 660 Advanced Health Assessment Lifespan (4)

This course focuses on assessment and clinical decision-making in advanced nursing practice within a family context. Students develop and strengthen skills related to health assessment including physical, psychosocial, cultural, and family dimensions of assessment. Clinical decision-making skill development focuses on appropriate interpretation of multidimensional assessment data and individualization of assessment approaches based on client situation. Emphasis will be placed on proper examination and written documentation techniques.

Prerequisite: NPHY 612

NURS 661 Differential Diagnosis of Psychopathology in Children and Adolescents (3)

Provides the knowledge and skill needed to conduct advanced clinical assessments of children and adolescents with mental disorders. Emphasizes a multi-dimensional process of assessment, including interpretation of psychological and behavioral scales and cultural, legal and referral recommendations onto a comprehensive biopsychological diagnostic formulation and treatment plan. Three hours of fieldwork per week provide experience interviewing children and appropriately documenting findings.

NURS 662 Therapeutic Approaches with Children and Adolescents (2)

Provides the opportunity to study evidenced-based therapeutic approaches specifically designed for child and adolescent patients. Topics include assessment considerations for treating vulnerable youth, theoretical bases for nursing interventions and review of psychometric instruments. Interventions analyzed include the use of play therapy, behavioral management, crisis intervention, solution-oriented brief therapy, social-problem skill training, aggression management strategies, strength-based

assessment/treatment and parent-training skills.

Prerequisite: NURS 661

NURS 664 Therapeutic Interventions across the Lifespan in Mental Health Nursing (2)

This graduate seminar course introduces students to selected theoretical constructs and therapy processes related to brief (short term) individual therapy and group therapy frameworks. Students will have the opportunity to analyze and critique relevant research, selected clinical applications to special populations across the lifespan, and identify outcomes associated with use of different frameworks. Legal, cultural and ethical implications of individual and group therapy will be discussed.

Prerequisite or co-requisite: NURS 667

NURS 665 Therapeutic Interventions across the Lifespan in Mental Health Nursing Practicum (3)

This practicum course provides an opportunity for students to apply concepts of brief individual and group psychotherapy across the lifespan. Theoretically grounded brief individual and group therapy strategies form the basis of assessment, intervention and evaluation of treatment outcomes. Students have the opportunity to collaboratively develop therapeutic contracts and work with clients in individual and group therapies (8 hours field work per week +clinical supervision). Clinical supervision will provide students with the opportunity to critique treatment outcomes and therapeutic use of self in brief individual and group psychotherapy.

Prerequisite or co-requisite: NURS 667, Co-requisite NURS 664

NURS 666 Biofeedback

This course will be an entry-level, experiential course in biofeedback, self-regulatory training, and stress-management. The course covers the content areas of the Biofeedback Certification Institute of America (BCIA) biofeedback certification exam. These include basic applied psychophysiology and self-regulation, psychophysiological assessment, biofeedback instrumentation, biofeedback training for various conditions, and issues of professional practice. Students will engage in a wide range of learning activities including lectures, discussions, experiential biofeedback and relaxation training. Students will ultimately be capable of designing brief biofeedback training protocols for patients with selected disorders.

NURS 667 Differential Diagnosis of Mental Disorders Across the Lifespan (4)

This core specialty course provides the student with the knowledge and skill to perform advanced clinical assessment of mental disorders using the DSM-IV. The course emphasizes a multidimensional approach to assessment that integrates behavioral and social data into a compre-

hensive clinical evaluation of behavioral dysfunction and mental disorders, with appropriate recommendations for treatment of individuals across the life span. The course incorporates the use and interpretation of psychological behavioral scales, laboratory tests, observational and interview data integrated with the latest scientific knowledge about the biopsychological and socio-cultural dimensions of mental disorders. Clinical applications, appropriate to the student's population focus of study (adult, geriatric, child and adolescent) allow students to complete comprehensive clinical assessments related to the diagnosis and treatment of major mental disorders. Students are encouraged to select patients for clinical assessments from medically underserved and vulnerable populations.

NURS 668 Special Problems in Child Psychology (1-6)

Provides alternative learning experiences— independent study, development of specific competencies, classes focusing on a variety of special interest topics or topics of an interdepartmental nature within the area of child psychiatric nursing. Students may register for varying amounts of credit, ranging from one to three credits per semester, with a maximum of six credits per degree.

NURS 669 Primary Care of Women (5)

Provides the theoretical and clinical foundation for a nurse practitioner to manage health maintenance and non-life-threatening disruptions specific to women throughout their life span. Collaboration with other health care providers is emphasized. Content includes normal antepartum and postpartum care, contraception, menopause and common gynecological disruptions, including the prevention and treatment of sexually transmitted diseases.

Prerequisites: NURS 611, NURS 619, NURS 620, NPHY 610 *for Women's Health Students: Prerequisite or concurrent:* NPHY 608.

NURS 671 Epidemiological Assessment Strategies (3)

This course focuses on assessment of physical and social indicators of public health. Epidemiologic methodologies will be stressed, with application to public health problems of the student's choice. Assessment strategies and applications will continue the aggregate focus introduced in the core. The course will build on the public health principles and practices introduced in the community/public health nursing specialty curriculum. Students will be ready to design programs and address needs identified from an empirically based assessment process.

Prerequisite or corequisite: NURS 622

NURS 672 Principles of Anesthesia Nursing IV (3)

The course is designed to build on the information and techniques presented in Principles of Anesthesia I, II and III with an emphasis on the anesthetic management of the trauma patient including orthopedic, neurosurgical, thermal injury, and emergency patients. The student will review the specific anesthetic need of the surgical trauma patient and the emergency surgical patient. Relevant pathophysiology, assessment process, clinical management and safety issues will be emphasized.

Prerequisite/Co-requisites: NURS 627, NURS 637 and NURS 657

NURS 673 Anesthesia Nursing Practicum III (5)

This clinical course provides opportunity for the student anesthetist to continue to develop judgment, insight and knowledge of clinical practice. Students will provide a pre-operative assessment and develop anesthesia care plans for more complex patients under the direct supervision of a Certified Registered Nurse Anesthetist or an anesthesiologist preceptor. Students will operate at a more advanced level, begin to develop more complex anesthesia care plans and administer anesthesia care more independently. Student nurse anesthetists will attend a weekly clinical conference to present cases to their peers and faculty. Students will discuss case problems and achievements and discuss solutions based on discussion with other students and faculty.

Prerequisite: NURS 637, NURS 654

NURS 674 Anesthesia Nursing Practicum IV (3)

This course is designed to allow the SRNA to further incorporate previous lectures and clinical experience to provide anesthesia to the entire spectrum of patients at an independent level. Student will provide anesthesia under the supervision of a Certified Registered Nurse Anesthetist or anesthesiologist. Students will provide a pre-operative assessment, develop an appropriate anesthesia care plan and provide a safe anesthetic with minimal input from their supervising anesthesia provider.

Prerequisite: NURS 673

NURS 675 Advanced Anesthesia Nursing Seminar II (4)

This anesthesia course is the second of two designed to integrate the didactic curriculum with several semesters of clinical anesthesia practice. Student Registered Nurse Anesthetists (SRNAs) will review the practice of nurse anesthesia using current information and resources reflecting the standards of practice in the field of nurse anesthesia. Utilizing lecture and discussion students will synthesize and analyze complex didactic and advanced clinical knowledge in a case based approach.

Prerequisite/Corequisites: NRSG 670, NURS 674

NURS 676 Anesthesia Nursing Practicum V (5)

This course is the final clinical practicum of the program. It is designed to provide the student anesthetist a final opportunity to strengthen clinical skills and incorporate current anesthesia practices into their practice. Students will practice under the direct supervision of a Certified Registered Nurse Anesthetist or anesthesiologist at an independent level. Students will assess patients, develop care plans and provide anesthesia for all types of cases with minimal input from the supervising anesthesia provider. The clinical conference is designed to allow the SRNA to meet with their peers and faculty to discuss recent cases, problems and solutions. Students in their final practicum are expected to assist lower level students to find solutions to their clinical problems.

Prerequisite: NRSG 670, NURS 674

NURS 677 Elements of Clinical Research Design and Organization (3)

Introduces students to the field of clinical research. Types and phases of clinical research, consideration of sampling, study goals including primary and secondary endpoints, protocols, design elements, ethical principles, consideration of alternative therapies, biotechnology, social science interventions and regulatory requirements. Students will participate in evaluating study design criteria and critically assessing implications for clinical trial organization, legal and regulatory compliance, and establishment of responsibilities and a collaborative environment for clinical research study personnel.

Prerequisite: NURS 701

NURS 678 Special Problems in Community/Public Health Nursing (1–3)

Provides alternative learning experiences: independent study, development of special clinical competencies, classes focusing on a variety of special interest topics or topics of an interdepartmental nature within the broad category of community/public health nursing. Students may register for varying amounts of credit, ranging from one to three credits per semester, with a maximum of six credits per degree.

NURS 679 Advanced Practice Roles and Health Care Delivery Systems (3)

In this course students analyze the role and influence of the advanced practice nurse/clinical nurse specialist on the health care environment and on the delivery of care. Clinical experiences and seminars focus on the diverse leadership responsibilities of the advanced practice nurse/clinical nurse specialist.

Prerequisite: NURS 726 for Trauma, Critical Care, and Emergency nursing students.

NURS 681 Clinical Research Management (3)

Administrative components of clinical research including legal and regulatory issues, contract negotiation, financial planning, budgeting and management in consideration of study design and organization that involves issues such as cash flow, payment structures, and economic evaluation will be examined. Project planning, data quality, information management and quality control will provide a practical foundation for the management of clinical research. The role of individuals involved in clinical research will be discussed and criteria for establishing successful studies will be identified. *Prerequisites:* *Elements of Clinical Research, Implementation of Clinical Research.*

NURS 683 Practicum for Advanced Clinical Practice (4)

Supervised experience is provided by each clinical program to prepare the graduate student to function in advanced practice roles. Placement may be in community or home settings, chronic and long-term care facilities and critical care areas.

Prerequisites: NURS 621, NURS 622, NPHY 600.

Concurrent: NURS 755.

NURS 684 Implementation of Clinical Research Study Requirements (3)

Standards for the conduct, performance, monitoring, auditing, recording, data collection and analyses and reporting of clinical research that provide the basis for establishing Good Clinical Practice (GCP) will be examined. This includes the management of culturally diverse clinical trials that may involve “intra-national” as well as international studies. Issues involved in informed consent, records maintenance and storage, management of drugs and devices and required investigator file contents provide a focus for study planning and operational procedures. Patient recruitment and retention methodologies will be detailed. Students will gain experience in completing required Case Report Forms, managing data meeting HIPAA requirements and developing a recruitment campaign.

Prerequisites/Corequisites: *Elements of Clinical Research*

NURS 688 Special Problems in Nursing Education (1–6)

Develops further competencies in teaching through independent study. Students may register for one to three credits per semester, with a maximum of six credits per degree.

NURS 689 Special Problems in Clinical Specialization (1–6)

Independent study in any area of clinical specialization. Students may register for varying amounts of credit rang-

ing from one to three credits per semester with a maximum of six credits per degree.

NURS 690 Managerial Health Finance (3)

Focuses on the role and responsibility of the administrator in fiscal management of health care institutions in both the public and private sectors. Training is provided in resource management and accountability. Conceptual and practical issues related to health care economics, financial management and budget preparation are stressed.

Prerequisite: NURS 606

NURS 691 Organization Theories: Application to Health Service Management (3)

Serves as a foundation for other curriculum offerings in administration. The content is based upon social science theories and the administrative elements of planning, organizing, leading and evaluating, especially as these are evident in the organizational setting. Management principles are outlined and issues related to organizational behavior in the health care industry are discussed. A realistic focus is developed through the use of simulation, small group exercises, self-assessment instruments and audio-visual aids.

NURS 692 Administration of Nursing and Health Services (3)

Focuses on professional and organizational dynamics of administration such as strategic planning, resource analysis, quality improvement, grievance and labor relations and prototypic technology that impact future health care systems. Case analysis is used to ensure analytical thinking and relevancy. Business planning is used to stimulate the thoughtful development and analysis of decisions designed to guide organizational futures.

Prerequisite: NURS 691

NURS 693 Clinical Research Practicum (5)

This capstone course prepares students for clinical research management positions. Exposes the student to clinical research management in a live research environment. Students work with a preceptor a minimum of 135 hours during the semester and attend a two-hour weekly seminar to integrate theory into practice. Pre-requisites: Elements of Clinical Research, Clinical Research Management; Co-requisites: Implementation of Clinical Research.

NURS 694 Theory and Practice in Nursing Administration (4)

Emphasizes preparation for first or middle management nursing positions. Provides exposure to administration leadership in a real-world setting through faculty-arranged

precepted administrative experience (minimum of 120 hours) in settings that include hospitals, primary care, long-term care, managed-care organizations and nurse-managed centers. Two-hour weekly seminars integrate theory into practice.

Prerequisites: NURS 690, NURS 691, NURS 692, NURS 736

NURS 695 Practicum in Health Services Leadership and Management (5)

Emphasizes preparation for advanced or executive leadership and management responsibilities in a selected health care delivery system. Professional goals and learning needs are identified and personal and program objectives are negotiated with a preceptor and faculty to prepare for an executive nursing administration position. Students spend a minimum of 120 hours in the field agency and attend a two-hour seminar each week. This capstone course is designed for students with two or more years of formal nursing administration experience.

Prerequisites: NURS 691, NURS 692

NURS 697 Nursing and Health Policy Theory (3)

Focuses on the analysis, formulation and implementation of health policy viewed from a historical perspective with an examination of selected current issues in nursing and health care. Attention is given to the role of nurses in influencing policy decisions and to socializing graduate nursing students to policy roles. The role of the nurse policy analyst is examined in depth, and nurses employed in this role are interviewed to determine how nursing background and experience contribute to their effective functioning in the health policy arena.

Prerequisite: POSI 601

Concurrent: ECON 652 and POSI 603

NURS 698 Special Problems in Nursing Administration (1–6)

Develops further competencies in the area of administration through independent study. Students may register for one to three credits per semester, with a maximum of six credits per degree.

NURS 701 Science and Research for Advanced Nursing Practice (4)

Focuses on the acquisition, evaluation and interpretation of information designed to link nursing theory and science as a foundation for advanced nursing practice. Working from a body of literature related to broad and middle range theoretical frameworks, the course includes active involvement in an ongoing program of research critique with emphasis on applications to and implications for nursing practice, consideration of the usefulness of selected theories and research for relevance to nursing

practice and the development of beginning skills to undertake selected research activities.

Prerequisite: None

NURS 704 Program Evaluation in Nursing (3)

Introduces various models and approaches available for the evaluation of nursing programs in both educational and service settings. Focuses on the components of various models, their relative strengths and weaknesses and their utility for the evaluation of nursing programs. Opportunities to assess program evaluation efforts in nursing are also provided. Prerequisite: permission of instructor.

NURS 706 Primary Care of Women: Introduction to Nurse-Midwifery (3)

Provides theoretical and practical preparation to provide women with safe and effective nurse-midwifery care for common health problems. Applies the nurse-midwifery management process and model, which incorporates current theories, evidence-based research and clinical experiences relevant to nurse-midwifery, to the provision of primary care to women. Focuses on advanced health assessment techniques used by nurse-midwives in the management of common health problems and the role of the nurse-midwife as a provider of primary health care.

Prerequisite: NURS 605

NURS 707 Evidence Based Practice in Mental Health (1)

This course introduces students to the unique challenges of maintaining an evidence-based nursing practice (EBP) in mental health nursing. It provides the student with advanced concepts and skills for developing and maintaining self-directed lifelong learning habits so that current knowledge in the discipline is maintained. During six two-hour sessions and one 3-hour session, students will use independent and collaborative learning techniques to develop these skills.

NURS 708 Special Problems in Nursing Research (1–6)

Develops further research competencies through independent study. Registration upon permission of instructor. Variable amounts of credit, ranging from one to three per semester may be taken, with a maximum of six credits per degree.

NURS 709 Managed Care Services (3)

Provides an analysis of the health care environment relative to managed care. Evaluates patient service models, techniques for resource identification and acquisition, and methods to standardize and evaluate care. Provides a frame of reference for understanding case management

from an organizational and administrative process perspective.

Prerequisite: NURS 691

NURS 710 Health Supervision of the Well Child I (3)

Provides the beginning preparation to assume the role of primary care provider for children 0–10 years of age. Provides an in-depth analysis of theories and behaviors relevant to health promotion and the advanced practice role. Normal growth and development is emphasized. The role of the advanced practice nurse as an educator is highlighted.

Prerequisite: NURS 611

NURS 711 Health Supervision of the Well Child II (3)

Provides the beginning preparation to assume the role of a primary care provider for adolescents. Normal growth and development are emphasized. The role of the advanced practice nurse as a collaborator and researcher is highlighted.

Prerequisite: NURS 710

NURS 713 Common Health Problems of Children I (3)

Focuses on selected health problems of children frequently encountered in ambulatory settings and the underlying alterations in health equilibrium. Emphasis is placed on problem identification, application of appropriate regulatory processes and evaluation of the effectiveness of intervention.

Prerequisite: NURS 611

NURS 714 Common Health Problems of Children II (3)

Focuses on selected health care problems of children and the underlying alterations in health equilibrium. The problems considered are of a more complex nature than those studied in NURS 713 and more prevalent in older children and adolescents. Problem identification, application of appropriate regulatory processes and evaluation of the effectiveness of intervention are emphasized.

Prerequisite: NURS 713

NURS 715 Advanced Primary Care of Children (5)

Designed to integrate and synthesize the material from all previous coursework and new concepts relevant to the pediatric nurse practitioner in primary care. Clinical experiences require the assumption of a more independent role in assessing and managing the health care of children from birth to adolescence as part of a multidisciplinary health care team.

Prerequisites: NURS 711, NURS 714

NURS 716 Diagnosis and Management in Adult Primary Care II (4)

Focuses on the skills necessary to diagnose and manage the complex health care needs of adults in primary care settings. Diagnostic reasoning skills in clinical decision-making are refined. Specific attention is paid to role issues relative to primary care nurse practitioners.

NURS 717 Clinical Practicum in Primary Care II (3)

Provides the opportunity to function as an adult nurse practitioner in primary care settings with adults who have complex health problems. Synthesizes and integrates previously learned concepts to promote the health of adults and develop more independent diagnosis and management of patients with multisystem problems.

NURS 718 Advanced Primary Care of Women (6)

Provides the opportunity to provide care to women with complex health problems across the life span. Focuses on implementing advanced practice concepts for nursing care, theoretical models and nursing role for the advanced practice women's health nurse practitioner in a variety of settings, including high-risk perinatal centers, ambulatory women's health centers, home care settings or school-based centers.

NURS 719 Clinical Aspects of Drug Abuse (3)

Emphasizes information on commonly misused and abused psychoactive drugs, the genesis of addiction, the clinical expression of addiction and the use of various types of intervention, therapies and supports. A one credit clinical practicum is designed to enhance the care of patients who misuse or are addicted to alcohol, tobacco and other drugs.

NURS 723 Clinical Pharmacology and Therapeutics (3)

Provides advanced knowledge of commonly prescribed pharmacologic agents. Rationales for the use of pharmacologic agents in the treatment of selected health problems are presented. Clinical considerations for drug selection and initiation, maintenance and discontinuation of drug treatment are examined. Legal requirements and implications for pharmacotherapy are reviewed.

NURS 724 Special Problems (3)

Provides the opportunity to study a topic of interest within nursing and includes classes on a variety of special interest topics of an interdepartmental nature.

NURS 726 Diagnosis and Management of Complex Acute Care Problems (4)

Provides the advanced knowledge and skills necessary to function as an acute care practitioner. Promotes refine-

ment of skills in assessment, diagnostic reasoning and clinical decision-making, and development as well as implementation of nursing interventions for critically ill patients. Analyzes the emerging role of the acute care nurse practitioner within the legal constraints of the health care delivery system. Examines the theoretical and empirical basis for diagnosing and managing adult patients with complex acute care problems. Clinical experiences focus on collaborative care of adult patients with complex health problems.

Prerequisite: NURS 647

NURS 727 Advanced Acute Care Management (4)

Emphasizes increased independence in the assessment, diagnosis and management of acutely ill adults with multisystem problems. Clinical experiences and seminar sessions are designed to assist in the integration and synthesis of previously learned concepts in managing acutely ill adults across the continuum of acute care. Emphasis is on increased independence and decision-making in an inter-professional environment. Clinical and professional practice issues are explored.

Prerequisites: NURS 726

NURS 728 Legal and Regulatory Issues in Nursing (2-3)

Presents an overview of the legislative, regulatory and judicial systems of national and state governments as sources of health care law. Selected court decisions that include nursing malpractice, patients' rights, informed consent, termination of treatment and assisted suicide are discussed. Class time will be allocated to research laws affecting health care providers in the Annotated Code of Maryland and the Code of Maryland Regulations. Students meet with representatives to the Maryland General Assembly and attend a legislative hearing. Variable credit: 2 credit seminar, 1 credit special project.

NURS 729 Essentials of Managed Care (3)

Provides an overview of concepts and principles fundamental to understanding a system dominated by managed care. The health care environment, pertinent organizational structures, financing arrangements, disease management strategies and accreditation mechanisms are examined. Emphasizes nursing implications, public policy reform initiatives and ethical dilemmas. Variable credit: 2 credit seminar, 1 credit special project.

NURS 730 Environmental Health (3)

Provides an overview of environmental areas for study, emerging environmental issues, major health hazards and identification of responsibilities for advanced practice nurses and other health professionals. Reviews the history of environmental health legislation and regulatory agen-

cies. Uses a framework for analyzing major environmental health issues to explore how the environment can influence health. Recognition of the need for interdisciplinary teamwork in assessment, diagnosis and community-wide or population-based health promotion/disease prevention interventions is highlighted.

Prerequisite: None

NURS 731 FP IV: Integrative Management of Primary Health Care Problems (2)

Emphasizes the multi-faceted implications of the role of the advanced practice nurse. Provides the forum for addressing role issues encountered in primary care settings, comparing clinical experiences, implementing marketing strategies and clarifying professional licensure/certification/practice requirements. Integrates the management of acute and chronic health care problems.

Prerequisites: NURS 605, NURS 610, NURS 630, NURS 631, NURS 632, NURS 633, NURS 640, NURS 644, NURS 660, NURS 723. Concurrent: NURS 741.

NURS 732 Program Planning and Evaluation in Community/Public Health (3)

Focuses on the systematic inquiry of the foundations of advanced community/public health program planning and evaluation. Emphasis on the assessment, planning and evaluation of population/community focused health promotion/disease prevention programs and projects.

Prerequisites: NURS 622, NURS 701, or Co-requisites: NURS 762, NURS 671 and permission of the faculty.

NURS 733 Leadership in Community/Public Health Nursing (3)

Focuses on integration and application of principles of leadership, management, program planning, implementation and evaluation in population-based efforts to provide affordable quality care. Special emphasis is placed on the practical skills needed for the community/public health nurse to succeed as a leader and manager in the current domestic and international health care environments.

Prerequisites: NURS 671, NURS 732, NURS733, NURS 671, NURS 762, Co-requisite: NURS 753

NURS 734 Advanced Diagnosis and Management of the Older Adult (7)

Develops the ability to assess, diagnose and treat the older adult in a variety of settings. Focuses on more independent diagnosis and management of patients with complex or multiple problems. This course consists of parallel clinical experience and seminar sessions that are designed to assist in integrating and synthesizing previously learned concepts in the care of the older adult in long-term care and ambulatory-care settings.

Prerequisites: NURS 605, NURS 625, NURS 634, NURS

723, NURS 636, NPHY 612 and NPHY 614.

NURS 735 Applied Toxicology (3)

Surveys the principles of toxicology that pertain to human health and the environment. Includes the historical background of toxicology; principles of absorption, distribution, metabolism and elimination; effects of toxic agents, food additives and pollutants with effects on general and susceptible populations; comparative effects on other animal populations; risk communication and the integration of these principles into public health practice. Provides knowledge and working insight into toxic environmental hazards that can affect the diverse human populations that are served by community health nurses and other public health professionals. Uses an interdisciplinary approach to meet course objectives.

NURS 736 Computer Applications in Nursing and Health Care (3)

This introductory course in nursing informatics is designed to foster the attainment of the knowledge, skills and abilities essential for beginning a successful career as a nursing administrator, educator, or expert clinician in an information technology enabled health care environment. The organizing framework develops themes of social context, technology, information, nursing and healthcare. Emphasis is given to the nursing application of information technology. Components of computer technology are identified and defined, and their functions analyzed. Clinical, administrative, and educational computer applications are analyzed. Resources that can assist the nurse and health care professional learn more about computers in health care are discussed. The social, ethical, and legal issues associated with information technology enabled health care delivery systems are analyzed. Learning activities include using word processing, databases management, and spreadsheets are nursing tools; identifying bibliographic resources through on-line computer searching; evaluating computer software; and analyzing principles of automated administrative systems to propose solutions for existing concerns in nursing.

Prerequisites: None

NURS 737 Concepts of Nursing Informatics (3)

Emphasizes the skills of information technology applications and the principles and practices of nursing and health care informatics. Utilizes the organizing framework introduced in NURS 736 and incorporates themes of social context, technology, information and nursing and health care. Explores system selection, implementation, research and evaluation. Considers organizational theories in relation to information system planning, implementation and evaluation. Examines the analysis of health care data and its language, the management of

ongoing information systems for health care and the use of technology standards in system development. Analyzes the impact of information systems on health provider roles and on emerging information technology roles. Learning activities include development of an RFP for an appropriate information system to meet identified health care needs, planning the implementation of an information system and identifying the impact of select trends on the design of health care information systems. *Prerequisites: NURS 691 and NURS 736*

NURS 738 Practicum in Nursing Informatics (3)

Involves precepted practicum experiences in selected agencies/corporations (health care agencies, vendor corporations or consulting firms) that reinforce and enhance the skills needed to analyze, select, develop, implement and evaluate information systems that impact nursing and health care. Emphasizes experience in project management, consultation, user interface, systems design, evaluation of system and role effectiveness and application of research skills. An average of eight hours a week (96 hours total) is spent in the practicum experiences. A two-hour interactive seminar held every other week provides the opportunity to share practicum experiences and receive feedback in analyzing activities. *Prerequisites: NURS 691, NURS 736, NURS 737*

NURS 740 Advanced Practice Psychiatric and Mental Health Nursing Leadership (4)

This capstone course is designed to provide the student with opportunities to synthesize learning experiences in psychiatric nursing. Under the guidance of a qualified preceptor, the student will enact the advanced practice psychiatric clinical specialist or psychiatric nurse practitioner role, applying theoretical and experiential knowledge from all previous course work. The clinical practice requirements are based on the expected competencies for the advanced practice nurse in psychiatric mental health nursing as outlined by the American Nurses Association (2006) and the National Organization of Nurse Practitioner faculties (2003). Clinical conference sessions are designed to assist problem-solving framework, to determine optimal psychiatric mental health care for individuals, families, groups and special populations. *Prerequisites: NURS 605, NURS 667, NURS 751, NURS 752 and at least one psychotherapy course. Students needing to take any of these courses as co-requisites should check with their advisor.*

NURS 741 FP IV: Practicum: Integrative Management of Primary Health Care Problems (7)

Focuses on preparing family nurse practitioner students to function independently at a beginning level of practice in a variety of primary care settings. Individualized practice with designated preceptor(s) provides the integrative clinical

experiences necessary to refine specialized knowledge and skills in family practice and selected primary care settings.

Prerequisites: NURS 605, NURS 610, NURS 630, NURS 631, NURS 632, NURS 633, NURS 640, NURS 644, NURS 660, NURS 723. Concurrent: NURS 731.

NURS 742 Primary Care of the High-Risk Neonate (3)

Provides the skills necessary to provide primary health care to high-risk infants in the home and at follow-up clinics. Course material includes detailed physical assessment skills of the infant through the first year of life. The clinical component includes preparation for discharge, community resources, home visits and experience in the ambulatory setting. Small group clinical seminars focus on critical analysis of primary health care issues for the high-risk infant in the home and follow-up clinic. Through clinical practice, advanced clinical skill in the assessment, intervention and management of the high-risk infant after discharge from the acute care setting through the first year of life is demonstrated.

Prerequisites: NURS 639, NURS 649, NURS 743.

NURS 743 Neonatal and Pediatric Pharmacology (3)

Focuses on providing in-depth knowledge of commonly prescribed pharmacological agents used in the care of healthy and high-risk neonates, children and adolescents. Rationales for the use of the various pharmacological agents in the treatment of selected health problems are also presented. Clinical considerations in drug selection, as well as initiation, maintenance and discontinuation of pharmacotherapy are examined. Legal requirements and implications for pharmacotherapy are reviewed.

NURS 744 Research Seminar in Environmental Health (1)

This interdisciplinary research seminar will focus on the critique of environmental health studies with a special emphasis on understanding the challenges involving exposure assessment, defining and measuring health outcomes, and methods of participatory research. Students will begin to formulate research questions to examine the practice of nursing and other disciplines within the context of environmental health.

NURS 748 Advanced Nursing of the High-Risk Neonate II (1-7)

Continues the development of the role of the advanced practice nurse in the management of normal and high-risk families and infants. Focuses on the continued development of the knowledge, skills and attitudes needed for expert physical and psychosocial assessment of high-risk neonates and their families. Special emphasis is placed on

conditions and situations common to the neonate experiencing complications. Focuses on the acquisition of the psychomotor skills required for the care of high-risk neonates. *Prerequisites: NURS 639, NURS 649, NURS 743.*

NURS 749 Advanced Nursing of the High-Risk Neonate III (1–6)

Focuses on continuing to manage care of the high-risk neonate with an emphasis on developing collaborative relationships with other members of the health care team in a clinical setting. Continuing discussion of the advanced practice role is also completed in this course. With completion of this course and NURS 742, all requirements specified by the National Certification Corporation (NCC) for the certification examination as a neonatal nurse practitioner are met.

Prerequisites: NURS 639, NURS 649, NURS 743.

NURS 750 Interdisciplinary Seminar in Environmental Health (1)

This interdisciplinary course will introduce students to various roles that occupational and environmental medicine physicians, occupational health nurses, environmental health nurses, industrial hygienists, toxicologists, and environmental health epidemiologists, attorneys, and journalists play in promoting environmental health. Students from these various disciplines will work together on case studies in environmental health designed to demonstrate the interdependent activities of all disciplines in effectively promoting the environmental health of a community.

Prerequisites: NURS 730 and NURS 735 or permission of the instructor.

NURS 751 Psychopharmacology (3)

Provides advanced knowledge of commonly prescribed psychopharmacologic agents. Pathophysiologic theories of the etiology of psychiatric disorders are reviewed. Rationales for the use of specific pharmacologic agents in the treatment of selected disorders across the life span are addressed. Examines distinguishing characteristics of various psychotropic medications and clinical considerations in the selection, initiation, maintenance and discontinuation of drug treatment. Legal, ethical and cultural implications of pharmacotherapy are also critically reviewed.

Prerequisite: NURS 667. Concurrent: NURS 752.

NURS 752 Neurophysiology of Mental Disorders (2)

Introduces the neurobiological aspects of psychiatric disorders. Builds from a review of basic neuroscience, including neuroanatomy, neurophysiology and psychoneuroimmunology, to a study of selected functional systems of the brain. Current neurobiological research on selected psychiatric disorders is described. The fundamentals of neuroimaging, EEG and other neurodiagnostic approaches

are discussed.

NURS 753 Practicum in Leadership in Community/Public Health (4)

Provides an opportunity to synthesize and apply knowledge acquired in nursing core and community health courses during this 150-hour capstone clinical course. Provides an opportunity to develop leadership skills. Involves a precepted clinical public health nursing leadership placement, an analysis of leadership experience and the completion of a project. Projects may involve developing a new program initiative, planning for change in an organization's activities, evaluating an activity, analyzing a leadership or policy issue, analyzing and evaluating health promotion/disease prevention outcomes or participating in a community development initiative. Seminars related to clinical experience are held every other week for two hours.

Prerequisites: NURS 671, NURS 701, NURS 732, NURS 761, NURS 762, co-requisite: NURS 733

NURS 754 Seminar in Psychopharmacology for Children and Adolescents (1)

Provides the opportunity for case study discussion on the use of psychopharmacologic agents with children and adolescents, using applied practicum cases at an advanced level. Emphasis is placed on integration of theory and practice and in-depth examination of the modifications in psychotropic drugs required for children and adolescents. Current research, ethical and legal issues surrounding the use of psychopharmacology with children is emphasized.

Prerequisites: NURS 661, NURS 667. Prerequisites or concurrent: NURS 751, NURS 752.

NURS 755 Families in Crisis (2)

Introduces the systems theory orientation for understanding human functioning within a family system, with an application of this orientation to personal, patient/family and health care delivery systems. The family is the unit of study, with systems theory analyzed and applied to clinical issues and situations in various health care settings (acute, chronic, inpatient, outpatient and long-term care facilities). Clinical intervention with families and supervision are components of this course.

NURS 761 Populations at Risk in Community/Public Health (3)

Focuses on the mission of public health and the various organizations that support the responsibilities of public health at the international, national and local levels. Processes and dynamics, such as family systems, support and risk communication, that influence public health and populations at risk are explored. A risk assessment analysis is used to select a population at risk. Factors that influ-

ence the effectiveness of health promotion/disease prevention programs and projects targeted to aggregates, families and populations are analyzed. Responsibilities of community/public health clinical nurse specialists are explored in relation to core public health functions: assessment, policy development and assurance. *Prerequisite or corequisite: NURS 622*

NURS 762 Practicum in Program Planning and Evaluation for Community/Public Health (3)

Focus is on the application of systematic inquiry of the foundations of advanced practice in community/public health program planning and evaluation. Emphasis is on the assessment, planning and evaluation of population/community focused health promotion/disease prevention programs and projects.

Co-requisite: NURS 732 and license to practice nursing in State of selected nursing clinical site.

NURS 766 Managed Care Organizations (5)

Focuses on the synthesis of administrative concepts and principles in managed care environments. Involves working with a preceptor at the administrative/leadership level of a managed care organization to identify, define and conduct an analysis that addresses an organizational opportunity to problem-solve or enhance clinical/administrative objectives. Emphasis is placed on the development of an increased understanding of the complexity of managed care organizations and integral assets such as information systems, marketing, contracts and the formation of integrated delivery systems.

Prerequisites: NURS 691, NURS 709

NURS 767 Leadership for Magnet Status (3)

The Magnet Recognition Program, administered by the American Nurses Credentialing Center (ANCC), is designed to recognize acute care nursing services that have achieved high levels of excellence in the provision of nursing services and demonstrate the ability to attract and retain professional registered nurses. Designation as a Magnet Hospital is the highest level of recognition that ANCC can accord to an organized nursing service. This course critically examines the history, structure, procedures and processes of the Magnet Recognition Program. Particular attention is given to the methodology used to evaluate applicant agencies and the nursing research base related to the Magnet phenomenon is explored.

NURS 769 Society, Health and Social Justice (3)

This course examines social, cultural, and political-economic determinants of health from sociological and social epidemiological perspectives. The concept of social justice is used as a conceptual framework to investigate population health inequities that exist in social class, race, ethnic

and gender groups in the United States. The course addresses the central question: "How does the structure of the society influence the health and illness experience of its population?" The course examines what a society is, how it works, and what the pathways are through which social forces differentially impact class, race, and gender groups. The course will focus on specific mesosocial contexts, such as the workplace, the community and the physical environment, which are particularly important in transmitting macrosocietal forces to the individual. The process of globalization and the role of social movements in shaping public health will also be discussed. The course concludes by examining innovations in health policy and practice that are currently emerging in an effort to address the adverse health impact of inequitable social environments.

Prerequisites: None for masters or doctoral level students, permission of instructor for undergraduate students.

NURS 771 Antepartum Midwifery (4)

Provides theoretical and practical preparation to provide women with safe and effective nurse-midwifery care during an essentially normal pregnancy. Applies the nurse-midwifery management process and model, which incorporates current theories and evidence-based research and clinical experience relevant to nurse-midwifery, to the provision of care to healthy women and women at risk. Focuses on health promotion, addresses risk assessment of deviations from normal in pregnancy and addresses collaboration with other health professionals.

Prerequisites: NPHY 608, NURS 605, NURS 778.

Concurrent: NURS 723, NURS 779.

NURS 778 Gynecological Midwifery (4)

Provides theoretical and practical preparation to provide safe and effective nurse-midwifery care to essentially healthy non-pregnant women throughout the life-span. Applies the nurse-midwifery management process and model, which incorporates current theories, evidenced-based research and clinical experiences relevant to nurse-midwifery, to the provision of care to healthy women and to women at risk who seek gynecologic care including family planning, preconception counseling, late postpartum care, perimenopausal and menopausal care and care for sexually transmitted diseases and reproductive tract infections. Emphasizes health promotion, appropriate screening, cultural sensitivity and family-centered care.

Prerequisite or concurrent: NURS 605

NURS 779 Birth/Newborn Midwifery (7)

Provides theoretical and practical preparation to provide women with safe and effective nurse-midwifery care during an essentially normal labor, birth and postpartum period. Provides theoretical and practical preparation to pro-

vide an essentially healthy newborn with safe and effective nurse-midwifery care during the immediate post-birth period. Applies the nurse-midwifery management process and model, which incorporates current theories, evidence-based research and clinical experience relevant to nurse-midwifery, to the provision of care to healthy women and newborns. Includes risk assessment and collaboration with other health professionals. *Prerequisites: NPHY 608, NURS 605, NURS 778. Concurrent: NURS 723, NURS 771.*

NURS 780 Midwifery Professional Roles (2)

Provides theoretical and practical analyses of the professional role of the certified nurse-midwife. Addresses the history of nurse-midwifery, components of the nurse-midwifery role, the administrative and economic issues of nurse-midwifery practice, legislative and regulatory issues, collaboration with other professions and legal and ethical issues in nurse-midwifery practice.

Prerequisites: NPHY 608, NURS 605, NURS 706, NURS 723, NURS 771, NURS 778, NURS 779. Concurrent: NURS 782.

NURS 781 Advanced Assessment of Computer-Assisted Instruction (3)

Explores the psychological underpinnings of computer-assisted instruction and challenges the participants to apply those theories in the development of working products. Introduces several software authoring products available on the market (e.g., Authorware, Toolbook, HyperCard), and focuses on Hyper Text Markup Language (HTML), the language that forms the basis of the phenomenon known as the World Wide Web. Media-rich interactive programs in HTML are produced and made available on the World Wide Web.

Prerequisite: NURS 685 or permission of instructor.

NURS 782 Complex Midwifery (3)

Provides theoretical and practical preparation to provide safe and effective nurse-midwifery care to women and newborns who are at risk or require complex care. Applies the nurse-midwifery management process and model, which incorporates current theories, evidence-based research and clinical experiences relevant to nurse-midwifery, to the provision of care to women and newborns and to women during pregnancy, childbirth, the postpartum period and throughout the lifespan. Emphasizes an enhanced research-based knowledge of perinatal and gynecological complications, triage, risk assessment and collaborative practice.

Prerequisites: NPHY 608, NURS 605, NURS 706, NURS 723, NURS 771, NURS 778, NURS 779. Concurrent: NURS 780.

NURS 783 Midwifery Integration (7)

Concludes the theoretical and practical preparation to provide safe and effective nurse-midwifery care both to healthy women, with a focus on the childbearing years, and to healthy newborns, as well as to women and newborns who are at risk or in need of complex care. Focuses on the assumption of direct responsibility for the management or co-management, collaboration or referral as appropriate, of the patient's obstetrical and gynecological or neonatal care. Applies the nurse-midwifery management process and model, which incorporates current theories, evidence-based research and clinical experiences relevant to nurse-midwifery, to the provision of care. Applies the knowledge acquired during previous coursework and clinical practice in a collaborative, independent, comprehensive and safe manner with preceptors and faculty who serve primarily as resources to confirm or augment management plans.

Prerequisites: NPHY 608, NURS 602, NURS 606, NURS 701, NURS 706, NURS 723, NURS 771, NURS 778, NURS 779, NURS 780, NURS 782.

NURS 784 Health Care Information Systems Project Management (3)

Provides a managerial perspective to methodologies, procedures and politics for the execution of projects in the health care/information technology marketplace. Examines how projects can be managed from start to finish, including specific emphasis on planning, controlling and risk management to avoid common pitfalls. Topics include essential project management concepts, needs identification requirements planning, project costing, scheduling, resource allocation, project politics, roles, responsibilities and communications, vendor management, work management and what to do when challenges arise. Based on a model for health care informatics practice, and emphasizes learning to plan, organize, direct and control information technology projects.

NURS 785 Health Care Database Systems (3)

Addresses how data are captured, stored, structured, processed and retrieved in automated systems. Relevant examples and practical applications of database design, construction, implementation and maintenance within a health care context are studied. Central topics include database design, data structures and modeling, development of database management systems, manipulation of data within a database using query language, database security and using databases to address problems in health care settings.

Prerequisites: none; IFSM 636 recommended.

NURS 786 Systems Analysis and Design in Health Care (3)

Provides an understanding of the most common tools, techniques and theories currently used in systems design and analysis. Studies the process of information systems development in which technical, organizational and human aspects of systems are analyzed and changed with the goal of creating an improved system. Emphasizes that, in spite of the advanced technology surrounding computer-based information systems, the process of systems analysis and design largely remains an art, dependent on the skills of individual analysts and designers, based on established principles, methods and tools.

NURS 787 Theoretical Foundations of Teaching and Learning in Nursing and Health Professions (2)

This course will provide a foundation in theory and application of essential knowledge for education in a variety of settings. Content includes the teaching/learning process, the learning environment, organizational standards theories of learning and organization of teaching and learning.

NURS 791 Instructional Strategies and Assessment of Learning in Nursing and Health Professions (4)

This course prepares the student to select and gain skill in using instructional strategies appropriate to the learning style of adults and to the topic to be taught, and to make those choices on the basis of an understanding of the behavioral and physiological processes of learning. The course includes both didactic and experiential micro-teaching experiences and provides a strong linkage to techniques for evaluating the impact of various instructional strategies on learning. A full range of educational technology and simulation technology will be employed in learning experiences. Theory and practice of the assessment of learning as applied in diverse settings in health care are addressed. Attention is given to basic measurement principles of reliability and validity, test construction, assessing skill acquisition and competence, and interpreting results from measures.

Prerequisite or Co-requisite: NURS 787

NURS 792 Practicum in Teaching in Nursing and Health Professions (3)

Theoretical knowledge and skills acquired in pre-requisite courses will be applied in a practicum of teaching experiences (average of 9 hours/week) that is precepted by a master teacher. Individual aspects of the practicum will be negotiated between the student and faculty in a learning contract. Synthesis of aspects of role development activities in this course as well as aspects of course/program evaluation will be accomplished in a regularly scheduled seminar.

Prerequisite: NURS 791

NURS 793 Organizational Transformation (3)

Focuses on organizational evaluation and strategic redesign of health care systems. Issues creating an impetus for organizational change are examined. Theories and models of traditional organizational structure and of creative and collaborative redesign are discussed.

Prerequisites: NURS 691 and NURS 692 or permission of instructor.

NURS 808 Special Problems in Nursing Science (1-3)

Provides the opportunity to study a topic of interest within nursing science under a faculty member's guidance. Specific objectives and requirements are determined by contractual agreement prior to registration. Can be repeated up to a maximum of six credits.

NURS 811 Measurement of Nursing Phenomena (3)

Presents the theoretical basis of measurement as a foundation for the development and evaluation of measurement tools used 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.

Prerequisite: NURS 840, NURS 841, NURS 851, NURS 852, NURS 853 and pass preliminary examination and recommend concurrent enrollment in NURS 816.

NURS 815 Qualitative Methods in Nursing Research (2)

Provides an overview to promote understanding of the qualitative paradigm and research methodologies as viable alternatives or supplements to quantitative approaches. Emphases include research design; data collection, analysis, interpretation and evaluation; and ethics and cross-cultural issues. Prepares competent consumers of reports of qualitative studies and promotes awareness of opportunities for and contributions to qualitative inquiry.

NURS 816 Multivariate Analysis in Health Care Research (3)

Introduces multivariate procedures most useful in health care research, including multiple regression, multivariate analysis of variance, principal components analysis, factor analysis and discriminate analysis. Computer programs are used in data analysis from actual research situations.

Prerequisites: completion of NURS 840, NURS 841, NURS 850, NURS 851, NURS 852, NURS 853 and pass preliminary examination.

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.

Prerequisites: NURS 816

NURS 818 Research Practica (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 member's research related to the student's research area, or the student's research area. Six credits of research practica experiences, again using the 3-hours/credit/week formulas, are required with at least three of these being with the student's Research Advisor.

Prerequisite: Completion of 5 credits of NURS 819.

NURS 819 Research Rotation (2-5)

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 researcher's project. Activities include literature review, measurement, data collection, statistical analysis, and manuscript preparation or proposal development.

Prerequisite or Concurrent: NURS 850 or NURS 851 and 852 or NURS 853. Note: Course may be repeated for a total of 10 credits. At the discretion of the Assistant Dean of the Doctoral Program, one repetition after the first 5 credits may consist of one 14-week session of 15 hours per week. Research rotations in each repetition must be different from those previously taken.

NURS 820 Meta-Analysis (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.

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. Prerequisite: NURS 816 or permission of instructor.

NURS 828 Issues in Nursing Scholarship (2-3)

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.

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.

NURS 832 Health Services Research I (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.

NURS 836 Judgment and Decision Making in Nursing Informatics (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

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 multi-dimensional model provides a framework for studying the direct and indirect effects of nursing informatics technology.

Prerequisite: NURS 836.

NURS 840 Philosophy of Science and Development of Theory (3)

Reviews the nature of knowledge and theory in the various scientific disciplines. Describe and analyzes the revolutions or paradigm shifts that have occurred in science. The struggle between many worldviews is discussed including empiricism, positivism, rationalism and the hypoductive model of science. After considering the ways of knowing (epistemology), selected worldviews 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. *Recommended: mas-*

ter's level nursing theory course.

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 the student's area of interest.

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.

Prerequisite or concurrent: NURS 840. Concurrent: NURS 851.

NURS 851 Analysis for Experimental Nursing Research Designs (3)

This course is designed to be taken concurrently with NURS 850 Experimental Nursing Research Designs and provides the theoretical and practical knowledge to conduct analyses of experimental data. 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 experimental and interventional research; and 3) the development of analytical writing and data summary skills. Hypothesis testing with various levels of measurement, and inferential statistics will be examined. The relationships between design and analysis are revealed through the development of an analytical plan. The procedures for compiling data, developing a research file, and documenting the file are specified. Analytic techniques address descriptive statistics, measures of association, ANOVA, and simple regression. *Prerequisite or concurrent: NURS 840. Concurrent: NURS 850.*

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.

Prerequisite or concurrent: NURS 840. Concurrent: NURS 853. Recommended: NURS 850, NURS 851.

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.

Prerequisite or concurrent: NURS 840. Concurrent: NURS 852. Recommended: NURS 850, NURS 851.

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.

NURS 882 Concept Clarification in Nursing: Physiological Basis (2)

Explores clinical nursing problems and related concepts from a physiological perspective. Includes aspects of regulation, transmission and physiological measurement.

Prerequisites: NPHY 600 or equivalent and NURS 840 or permission of instructor.

NURS 883 Research and Theory in Family Health Nursing (3)

Provides an opportunity to explore and evaluate theories used for the study of families within the nursing context. Nursing perspectives of the family over the family life cycle are considered. Emphasis is placed on analyzing theoretical and conceptual issues in nursing related to the family and to the design and implementation of family nursing research studies, measurement of family variables and analysis of family data.

NURS 891 Theory and Research in Educational Administration in Nursing (2)

Addresses current theoretical perspectives and research

regarding the practice of educational administration in nursing. Building upon knowledge of nursing and health care, organizational theory, policy analysis, educational administration and nursing education gained in prerequisite courses, selected issues and problems in higher education administration are explored. An optional practicum is available for additional credit through registration in NURS 898.

Prerequisite: NURS 804 or permission of instructor.

NURS 898 Special Topics in Nursing Science (1-3)

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.

NURS 899 Dissertation Proposal Writing Seminar (1)

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. While the written proposal itself is deferred to each student's committee, most complete a research prospectus. Students may enroll for additional semesters if group support or further group feedback is desired. Once enrolled a commitment to attend all semester sessions is required. *Prerequisites: NURS 840, NURS 841, NURS 850, NURS 851, NURS 852 and NURS 853.*

NURS 899 Doctoral Dissertation Research (1-12)

Variable credit.

NRS 624 Special Problems of Children with Acute, Critical or Chronic Care Needs (1-5)

This course provides complementary learning experiences for the acute/tertiary care Advanced Practice (AP) pediatric nurse practitioner student. These experiences afford the AP student the opportunity to provide advanced nursing care across the continuum of health care services to

meet the specialized physiologic and psychological needs of infants, children and adolescents with complex acute, critical and/or chronic health conditions. Opportunities are provided for the refinement of skills in assessment, diagnostic reasoning and critical thinking. The emerging role of the advanced practice pediatric nurse practitioner in the acute/tertiary care setting is examined within the constraints of the health care delivery system. Concepts regarding managed care from an organizational and administrative perspective are systematically integrated into this clinical course. Clinical settings include newborn nurseries, acute/tertiary care/managed care facilities, PICUs or specialty sites focused on the care of children with special needs and their families.

Prerequisite: NURS 611

NRS 626 Primary Health Care of the Newborn and Neonate (2)

This course provides a theoretical analysis and practical approach to the advanced practice pediatric nurse practitioner's role as a provider of safe and effective care to newborns, neonates and their families. Current theories and evidenced based practice guidelines relevant to the newborn and neonate will be examined. Synthesizing data from a variety of resources, students will be provided opportunities to refine their assessment skills as well as hone decision making and critical thinking abilities. The emerging role of the advanced practice pediatric nurse practitioner in the primary as well as acute/tertiary care setting in the care of this unique population is examined within the constraints of the health care delivery system. Concepts regarding managed care from an organizational and administrative perspective are integrated into this course.

Prerequisite: NURS 611 (for Advanced Practice Pediatric Students only)

NRS 630 Advanced Primary Care Clinical (3) Summer

This course will further stress application of concepts presented in the Diagnosis and Management I (NURS 620) course. The focus is on refining health assessment skills, interpreting findings, developing and implementing appropriate plans of care to meet common health maintenance needs of adults and to promote the health of adults with more complex health problems. The student will gain increased expertise in communication skills, health assessment skills, interpreting findings, epidemiological concepts and developing and implementing plans of care. The emphasis will be placed upon managing an aging population with complex, chronic healthcare needs.

Prerequisites: NURS 619 and NURS 620

NRS 631 Introductory Spanish for Health Care Professional

Students will develop basic Spanish language conversation skills for the health care setting in this small group seminar. This course will emphasize pronunciation, oral comprehension, and vocabulary for patient interviews, health education, and terminology used in the clinical setting. Students will participate in seminars, small group work, case scenarios, and active practice of Spanish conversations. Students will also examine cultural considerations for the Hispanic population and integrate these elements into their developing vocabulary.

Prerequisite: One introductory Spanish course (high school or college) within the past 10 years

NRS 670 Advanced Anesthesia Nursing Seminar I (2)

This anesthesia course is the first of two designed to integrate the didactic curriculum with several semesters of clinical anesthesia practice. Student Registered Nurse Anesthetists (SRNAs) will review the practice of nurse anesthesia using current information and resources reflecting the standards of practice in the field of nurse anesthesia. Emphasis will be placed on a case study approach following body systems for surgical procedures and specific influences of physiology and pathophysiology on anesthetic management.

Pre/Corequisites: All Nurse Anesthesiology courses.

NRS 765 Developmental Psychopathology for Advanced Practice Nurses (2)

This foundational course introduces graduate/advanced practice nursing students to concepts of developmental psychopathology ("the study of the origins and course of individual patterns of behavioral mal-adaptation," [Sroufe & Rutter, 1984, p.18]), vulnerability to stress perspective and particularly highlighting aspects that contribute to resilience and adaptive functioning [Cicchetti & Toth, 1998]. The preventive and intervention applications will be extracted from updated clinical and research literatures. This course will be conducted in a seminar format which will involve the student taking an active participant role in facilitating the synthesis of current literature in developmental psychopathology.

Prerequisite/Corequisite: NURS 752

NPHY 600 Human Physiology and Pathophysiology (3)

Focuses on the study of selected areas in normal human physiology and pathophysiology. Emphasis is placed on the analysis of normal function using a problem-solving process. Major regulating and integrative mechanisms and examples of nonoptimal to pathological function are elaborated to elucidate a conceptual approach to the physio-

logical basis of nursing practice. The course builds upon a basic knowledge of physiology.

NPHY 601 Cancer Genetics, Pathophysiology and Pharmacology (3)

Introduces the principles of cell biology, genetics and pathophysiology and applies those principles to particular cancer sites. Emphasizes understanding the multiple cellular pathways that may lead to malignant transformation and the heterogeneity of cancer as a disease and as a target for therapy. Manipulation of the pathways of malignant transformation for prevention of cancer is reviewed. Site-specific cancers are examined and their particular pathophysiology is discussed.

Prerequisite: NURS 629, NPHY 612

NPHY 608 Reproduction Physiology (2)

Provides more extensive knowledge of human reproduction and the physiologic function of the newborn infant. Selected examples of pathophysiology are presented. Focuses on developing a scientific client assessment of needs and selecting regulatory processes for the care of clients with complex physical needs. Concepts addressed include reproduction, growth, oxygenation, circulation, motion, motility and elimination.

NPHY 610 Methods and Principles of Applied Physiology (3)

Provides the student with a deeper base of scientific knowledge that correlates physiology and corresponding alterations to a process of clinical diagnosis and management. Elaborates upon specific physiological principles and a study of disease entities. Provides exercises in applying epidemiological knowledge in clinical practice and preventive health care settings.

NPHY 612 Advanced Physiology and Pathophysiology (3)

This course provides graduate level content of physiology and pathophysiology that is necessary for understanding the scientific basis of advanced practice nursing and for more advanced clinical courses in a variety of settings. Structural and functional changes in cells, tissues, and organs that underlie selected diseases are discussed. The student will gain an understanding of the mechanisms underlying diseases and their clinical manifestations, thus providing a basis for clinical decisions related to diagnostic tests and initiation of therapeutic regimens. Pathogenesis of disease will be related to principles of health promotion and disease prevention. The course contributes to the scientific basis for advanced practice nursing.

Prerequisites: None

NPHY 614 Physiology of Aging (2)

Emphasizes cell biology, metabolic process and cardiovascular and neurobiological aspects of aging. Presents the pathophysiological basis for health problems of older adults. Alterations at the cell, organ and system levels are discussed to provide the basis for clinical management of common health problems.

NPHY 620 Pathophysiological Alterations in the Critically Ill (2)

This course is designed to provide the student with an opportunity to gain an in-depth knowledge of specific pathophysiological processes often experienced by critically ill patients. Learning is reinforced during scheduled time in critical care areas where the students analyze and evaluate patients demonstrating some of the pathophysiological problems discussed during the didactic portion of the class. Regularly scheduled clinical seminar presentations done by the student permit the student to apply theoretical knowledge to specific situations.

Prerequisite: NPHY 612, NURS 605, NURS 623, NURS 723

NPHY 630 Neonatal and Pediatric Physiology (3)

Focuses on normal physiologic adaptations and developmental physiology that provide the scientific basis and rationale underlying assessment and management of the neonate, infant and child. A systems approach is used to examine the physiological transition to the extrauterine environment and adaptation of the infant at birth, as well as the developmental physiology of the neonate and maturation during infancy and early childhood.

NDNP 802 Methods for Evidence-Based Practice (3)

Focuses on the skills and advanced knowledge necessary for critical analysis of evidence on which to base nursing practice. The students will analyze the framework to transform research into practice through the use of research outcomes, methods and planned change processes. The best practice evidence from systematic research will be applied to current health care delivery. Students will be able to apply analytical methods to develop best practices and practice guidelines and to facilitate the evaluation of systems of care that will improve patient outcomes.

NDNP 804 Theoretical and Philosophical Foundations of Nursing Practice (3)

The philosophical and scientific underpinnings of nursing reflect the complexity of practice at the doctoral level and the rich heritage that is the conceptual foundation of nursing. The practice doctorate in nursing uses science-based theories and concepts to determine the nature and significance of health and health care delivery phenomena.

na. This course integrates nursing science with knowledge from biophysical, social, and organizational sciences as the basis for the highest level of nursing practice. Students analyze selected world-views and theories from a variety of disciplines. Emphasis is placed on the refinement of critical thinking skills.

NDNP 810 Capstone Project Identification (1)

Doctor of Nursing Practice students will have an identified practice area that will provide a guide for their plan of study. In this course, students will explore specific issues related to their practice that will lead them to the completion of a project at program completion. Students will explore literature related to specific practice concerns in their area as well as discuss issues with practice leaders to identify and refine their project goals.

**A permission slip from the program director or instructor is necessary to enroll in this course.*

Oral and Experimental Pathology

University of Maryland Dental School, Department of Diagnostic Sciences and Pathology
<http://www.dental.umaryland.edu>

Program Description

The Department of Diagnostic Sciences and Pathology's graduate program in Oral and Experimental Pathology is for students who already have completed a dental degree. Specialty training and research training is available. Specialties include oral, head and neck cancer research, pathology, epidemiology of oral lesions, immunology, wound healing, and cell structure and function.

Program Admissions

Beyond the Graduate School's minimum admission requirements, applicants should have a DDS, DMD, or equivalent degree.

Degree Requirements

DDS, DMD, or equivalent degree

Courses

(Course Code and Number, Course Title, Credit(s))

DPAT 612 Special Problems in Oral Pathology (2)

Covers pathology of selected oral lesions with emphasis on advances in diagnostic techniques.
Prerequisite: a basic course in pathology

DPAT 613 Special Problems in Oral Pathology II (2)

Covers pathology of selected oral lesions with emphasis on advances in diagnostic techniques.
Prerequisite: DPAT 612

DPAT 614 Methods in Pathology (4)

Covers methods used to prepare pathologic tissues for microscopic examination.
Prerequisite: a basic course in pathology

DPAT 615 Methods in Pathology II (4)

Covers methods used in preparing pathologic tissues for microscopic examination.
Prerequisite: DPAT 614

DPAT 616 Advanced Pathology of Oral Lesions (3)

Covers common and rare lesions of the head and neck.
Prerequisites: DPAT 612 and 613

DPAT 617 Advanced Pathology of Oral Lesions II (3)

Covers common and rare lesions of the head and neck.
Prerequisite: DPAT 616

DPAT 618 Seminar (1)

Covers recent advances in oral pathology.
Prerequisite: a basic course in pathology

DPAT 899 Doctoral Dissertation Research (1-12)

Pathologists' Assistant Program

University of Maryland School of Medicine,
Department of Pathology
<http://medschool.umaryland.edu/pathology/>

Degree(s) Offered
MS

Program Description

The aim of the program is to prepare students for a career as a Pathologists' Assistant in a biomedical environment. The entire curriculum of the Pathologists' Assistant program prepares students for the practice of the profession.

The Pathologists' Assistant is an allied health professional, qualified by academic and practical training to assist in providing service in anatomic pathology under the direction and supervision of an anatomic pathologist.

Pathologists' Assistants function as assistants to anatomic pathologists by participating in the examination, dissection and processing of tissues and by participating in gross autopsy dissection. 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 patient quality care are essential for Pathologists' Assistants. They must demonstrate ethical and moral attitudes and principles which 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 high degree of responsibility assumed by the Pathologists' Assistant requires skills and abilities necessary to provide those services appropriate to an anatomic pathology setting.

Pathologists' Assistants are able to provide the following services under the direct supervision of a licensed and board-certified pathologist but are not limited to:

Surgical Pathology - Assisting in the preparation and

performance of surgical specimen dissection by assuring appropriate specimen accessioning; obtaining pertinent clinical information and studies; dissecting surgical specimens and describing gross anatomic features; selecting and submitting tissue for histologic processing; obtaining and submitting specimens for additional analytic procedures such as immunohistochemical staining, flow cytometry, image analysis, bacterial cultures, toxicology, etc.; assisting in photography of gross and microscopic specimens.

Autopsy Pathology - Assisting in the performance of postmortem examination by ascertaining proper legal authorization; obtaining and reviewing the patient's chart and other pertinent clinical data and studies; notifying involved personnel of all special procedures and techniques required; coordinating special requests for specimens; notifying involved clinicians, appropriate authorities and individuals; assisting in the gross postmortem examination; selecting and preparing tissue for histologic processing and special studies; obtaining specimens for biological and toxicologic analysis; assisting in photography of gross specimens and photomicrography; participating in the completion of the autopsy report; assuming duties as may be assigned relative to teaching, administrative, supervisory and budgetary functions in anatomic pathology.

Program Admission

The department admits for the Fall semester only, with the selection process occurring between February 15 and early May. Completed application packets received after the deadline are held for consideration for the following 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 are scheduled to meet with select faculty, tour the facilities and are given the opportunity to discuss their career goals and research interests. The Pathologists' Assistant Program track is full-time; there is no part-time option available.

Minimum standards for admission to graduate programs at the University of Maryland, Baltimore are specified in the Graduate School Catalog. The Department also requires an undergraduate grade point average (GPA) of at least 3.0 on a scale of 4.0, and prefers grades of A or B in all science courses. Applicants must take the general aptitude Graduate Record Examination (GRE). Strong preference is given to students with a combined verbal and quantitative score of 1200 and an analytical score of >600, or 4.5 in the analytical writing scoring system.

International applicants who meet the application, coursework, grade and GRE requirements as stated above 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 (TOEFL) with a score of 600 or >230 for the new computer based test as proof of their proficiency in English.

Degree Requirements

The required curriculum includes courses in general pathology, systemic pathology, surgical pathology, clinical pathology, autopsy pathology, lab management, physiology, and structure and function (anatomy training). The minimum number of credits required for the master's degree in the Pathologists' Assistant Program Track is 35 credits. The program is structured to comply with both the university standards and those imposed by NAACLS.

Students must maintain a minimum 3.0 cumulative grade point average (GPA) for the duration of the program. Students whose cumulative GPA falls below a 3.0 are placed on Academic Probation, and will not be permitted to graduate without remediation and face possible dismissal from the university.

Beginning with the summer semester, Pathologists' Assistant students fulfill clinical laboratory rotation requirements. Students rotate through area institutions to include University of Maryland Medical Center, St. Agnes Hospital, Johns Hopkins Hospital and the Medical Examiners Office. 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 usually requires 22 months as a full-time student. There is no part-time option available.

Courses

Course code and number, course title, and credits

MANA 601 Structure and Development (gross 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

PATH 602 Systemic Pathology (3)

Detailed in this course, are disease entities and disease processes of the following organ systems: cardiovascular; respiratory; gastrointestinal; renal; male and female reproductive; endocrine; skin; bone; and nervous. Neonatal, forensic, and environmental pathology are also presented. Instruction is by lecture, laboratory and computer.

Offered Spring semesters only.

PATH 603 General Pathology (3)

Lectures and laboratories are used to present the five main subdivisions of general pathology: cellular pathology, injury and inflammation, vascular disturbances, immuno-pathology, and tumors. In addition to the principles of general pathology, this course includes medical terminology and safety.

Offered Fall semesters only.

PATH 608 Autopsy Pathology (5)

Autopsy rotations during the second year of study allow the student to become proficient in all phases of the human post-mortem examination, including evisceration, dissection, description of findings and preparation of postmortem reports. Students receive basic instruction in the function of the autopsy service and the hospital morgue. Specimen photography is also presented in this course. Students are exposed to basic concepts of the medicolegal investigation of death by a rotation at the Office of the Chief Medical Examiner of Maryland.

PATH 609 Surgical Pathology (4)

These rotations during the second year of study provide the student with didactic and practical experience in anatomic pathology as expressed in tissues removed during surgery and examined in the surgical pathology laboratory.

DBMS 618 Special Topics: Physiology (3)

This is a graduate level course emphasizing concepts of human physiology and pathophysiology. Systems covered include cardiovascular, respiratory, gastrointestinal, nervous, renal and endocrine systems. Both the didactic method and seminar method of instruction are used.

MEDT 680 Laboratory Management (3)

This course, taught through the Medical and Research Technology Department, prepares students to be in charge of a laboratory. It provides an overview of laboratory management in 4 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, per-

formance evaluation; the interview process; professional liability; teaching techniques; problem-solving; and professional responsibility and ethics.

PATH 751 Clinical Pathology and Microbiology (2)

This course provides the Pathologists' Assistant student with a working knowledge of clinical chemistry and microbiology tests and procedures used in anatomic pathology. Lectures and seminars on laboratory management and bioethics are also presented in this course.

Pharmaceutical Health Services Research

University of Maryland School of Pharmacy,
Pharmaceutical Health Services Research
<http://www.pharmacy.umaryland.edu/graduate/PHSR/>

Degrees Offered

PhD, PhD/MS

Program Description

The primary mission of the Pharmaceutical Health Services Research program at the University of Maryland is to train strong researchers in a variety of important areas. It provides graduates with the theory, practical experience, and decision-making skills needed to address a wide range of pharmacy related problems.

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. Pharmaceutical services are a vital part of health care, and factors affecting health care inevitably impact on pharmacy, the pharmaceutical industry, and pharmacy practitioners. Some of the factors that are of academic and research interest include:

- the role of the Federal and State governments in health care policy
- third-party programs
- drug utilization
- cost containment
- medication compliance
- provision of pharmaceutical services
- role of health practitioners
- diffusion of new technologies into the medical care setting.

Program Admissions

Applicants to the Doctor of Philosophy in Pharmaceutical Health Services Research 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 but, in general, preference will be given to candidates with previous pharmacy related education and/or experience.

The applicant must satisfy the general requirements of the Graduate School before consideration for admission to the program. For more information of the Graduate School Admission criteria, visit the Web site at <http://graduate.umaryland.edu/admissions.html>. In addition to official transcripts and three letters of recommendation as evidence of academic potential, the student is to submit scores from the Graduate Record Examination and TOEFL, if necessary.

Occasionally a few students who fail to meet these minimum standards may be admitted to graduate study as provisional students on the basis of outstanding performance on the Graduate Record Exam and on the basis of letters of recommendation from competent judges of their performance as students or in a professional capacity. Provisional admissions carry explicit conditions (e.g., minimal grade requirements in stipulated courses) that must be met before the student can be advanced to full graduate status. Specific conditions for admission as a provisional graduate student may be found in the "Admissions" section of this *Catalog*.

Officially, applications must be received by the Graduate School by July 1 (January 15th for International Students) for the Fall Semester, December 1 (May 1 for International Students) for the Spring Semester and by May 15 for admission to the Summer Semester. However, it is preferred that students applying for the Fall semester submit their materials prior to January 1. Applicants interested in receiving a teaching assistantship or research assistantship must apply by March 1. An international student application must be received six months prior to the semester of expected entrance. Specific details of the admission procedures are contained in the "Admission" section of this *Catalog*.

The following forms and/or documents are required for processing of an application by the Graduate School:

- Application for Admission
- Application Fee
- Two official transcripts mailed to the Graduate School at:

Admissions and Enrollment Affairs
660 W. Redwood Street, Room 021
University of Maryland
Baltimore, MD 21201

- Graduate Record Examination (GRE) scores (mailed to the Graduate School). Please use code 5848 for the Graduate School, and 0699 for the Department of Pharmaceutical Health Services Research.
- TOEFL or IELTS scores (for international

applicants), minimum 550, (computer version between 215), (mailed to the Graduate School) please use code 5848 for the Graduate School, and 0699 for the Department of Pharmaceutical Health Services Research.

- Statement of financial status (International Students)
- Immigration documents (form I-20) (International Students)
- 3 Letters of recommendation

Students should indicate on the application a Track or Specialization of interest, if known, from the following list:

- Pharmacoeconomics
- Pharmacoepidemiology
- Pharmaceutical Policy
- Health Behavior

Degree Requirements

Required Core Curriculum (30 credits)

PHSR 610 - Pharmacy, Drugs, and the Health Care System

PHSR 620 - Introduction to Health Behavior Theory

PHSR 650 - Pharmaceutical Economics

PHSR 701 - Research Methods I

PHSR 702 - Research Methods II

PHSR 704 - Pharmacoepidemiology

PREV 600 - Principles of Epidemiology

PREV 619 - Computer-Aided Analysis of Research Data Statistics - Various

Required Seminars

PHSR 709 - Seminar (Various)

Advanced Cognate

12 credits to be determined by student and Curriculum Committee

PHSR899 Dissertation Research (Students need a minimum of 12 credits)

Electives

PHSR 670 - Principles of Health Education, Health Promotion and Disease Prevention

PHSR 722 Product Safety and FDA Regulation

Courses

(Course Code and Number, Course Title, Credit(s))

PHSR 610 Pharmacy, Drugs, and the Health Care System (3)

This course encompasses an examination of the principle components of the US health care system with special emphasis on their relationship to the provision of drugs and pharmacy services.

PHSR 620 Introduction to Health Behavioral Theory (3)

This course covers medical sociology, psychology, social psychology, and interpersonal communication theories and research as they address medicine use and health-related behaviors involving patients, pharmacists, physicians, nurses, and other health care professionals. Students are acquainted with select health behavior theories and learn about research issues specific to the field of behavioral science.

PHSR 650 Pharmaceutical Economics (3)

This course is designed to familiarize the student with economic structure, conduct and performance of the pharmaceutical industry and provide an introduction to pharmacoeconomics. 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 670/PREV 650-Principles of Health Education, Health Promotion and Disease Prevention (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.

PHSR 701 Research Methods I (3)

Health education is a scientific process designed to achieve voluntary behavioral changes to improve health status. Health promotion utilizes health education to pro-

mote 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.

PHSR 702 Research Methods II (3)

This course is designed to introduce the student to the concepts of the 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.

Corequisite: Introduction to Biostatistics

PHSR 704/PREV 705 Pharmacoepidemiology (3)

Gives research tools to design studies assessing 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: Introduction to Biostatistics (multivariate regression) or permission of the instructor.

PHSR 708 Special Problems (1-6)

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 PHSR Graduate Seminar (1-3)

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, post-doctoral 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 Product Safety and FDA Regulation (2-3)

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 discus-

sions with invited guests. Using the FDA'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. This course is cross listed as PREV 722.

Prerequisites: PREV 600, PREV 620, and PHSR 704 or permission of the instructor

PHSR 899 PHSR Doctoral Dissertation Research (1-12)

Pharmaceutical Sciences

University of Maryland, School of Pharmacy,
Department of Pharmaceutical Sciences
<http://www.pharmacy.umaryland.edu/graduate/psc/>

Degrees Offered

PhD

Program Description

The School of Pharmacy's Department of Pharmaceutical Sciences has a rapidly expanding research program in the areas of cellular and molecular biology, chemistry, neuroscience and pharmacology, computer-aided drug design, biopharmaceutics and drug delivery and clinical pharmaceutical sciences. The Department of Pharmaceutical Sciences graduate program fosters individual and collaborative research and a graduate student education which provides a strong, broad background in the drug discovery and development process along with intensive expertise in a focal research area of the pharmaceutical sciences. The mission of the Department of Pharmaceutical Sciences graduate program is to prepare independent, creative scientists to excel in various scientific fields. Our graduates will be educated with the knowledge and skills to direct the discovery of novel biological pathways in human disease and the development and delivery of medications for safe and effective therapy.

Program Admissions

Incoming students typically have a B.A. or B.S. degree in chemistry, biology, biochemistry, psychology, chemical engineering or pharmaceutical science.

Degree Requirements

A. Required curriculum

1. Core Courses

- PHAR600 — Principles of Drug Discovery (3 credits)
- PHAR601 — Principles of Drug Development (3 credits)
- PHAR639 — Molecular Spectroscopy and Imaging (1-3 credits)¹
- PHAR628 — Bioanalytical and Pharmacological Methods (1-3 credits)¹
- Ethics course (minimum 1 credit)
- PHAR899 — Dissertation research (12 credits minimum)

¹ A minimum of 4 credits is required from PHAR628 and PHAR639.

2. Laboratory Research Rotations

PHAR608 (1-2 credits). Students, in most cases, are required to complete at least two rotations.

3. Seminars

PHAR708 — Comprehensive exam seminar (1 credit)

PHAR709 — Departmental seminar (1 credit).

Students are required to present one departmental seminar after their comprehensive exam and before their dissertation defense.

B. Elective courses; three (3) classes, as determined by student and mentor, are required. Below are the elective courses offered by the department, additional elective courses are available from other departments and programs.

- PHAR602 — Biopharmaceutics and Pharmacokinetics (3 credits)
- PHAR610 — Pharmaceutical Formulation and Unit Processes (4 credits)
- PHAR620 — Modern Methods of Drug Delivery (4 credits)
- PHAR638 — Pharmacometrics and Experimental Design (3 credits)
- PHAR653 — Advanced Pharmacology I (4 credits)
- PHAR654 — Advanced Pharmacology II (4 credits)
- PHAR702 — Theoretical Aspects of Solid Dosage Forms (3 credits)
- PHAR707 — Drug Transport and Metabolism (4 credits)
- PHAR747 — Advanced Pharmacokinetics (3 credits)
- PHAR751 — Drug Design (3 credits)

Courses

(Course Code and Number, Course Title, Credit(s))

PHAR 600 Principles of Drug Discovery (3)

PHAR 601 Principles of Drug Development (3)

Describes the interrelationship among disciplines of the pharmaceutical sciences, and establishes the basic theoretical background essential to the drug design and development process. Emphasizes ability development; content progresses, beginning with traditional drug design and optimization of drug structure, continuing with principles of pharmacology, pharmaceutics, biopharmaceutics, phar-

macokinetics, and drug metabolism. Also covers integrative competency in the final module. This is a two-semester course divided into seven integrated modules. These modules relate the various disciplines within the pharmaceutical sciences to the drug design and development process.

PHAR 602 Biopharmaceutics and Pharmacokinetics (3)

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. 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 608 Research Rotations (1)

Students become familiar with research conducted by departmental faculty members. Rotations through the laboratory of a faculty member help students in their selection of a faculty mentor and doctoral dissertation project. The rotation provides an opportunity for participation in the experimental aspects of active research projects. Typically, students participate in two laboratory research rotations.

PHAR 610 Pharmaceutical Formulation and Unit Processes (4)

Addresses the rational design and formulation of dosage forms, and the processes and equipment in their large-scale manufacture. Consideration is on to 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 620 Modern Methods of Drug Delivery (2-4)

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 628 Bioanalytical and Pharmacological Methods (1-3)

Covers theory and applications of separation techniques used for low molecular weight compounds, such as most drugs, larger biopolymers, such as proteins and DNA, and cell sorting analyses. Also covers the separation of chiral compounds, and assay requirements and techniques for the sensitive and accurate measurement of drugs and metabolites in biological matrices, with emphasis on pharmacokinetics and biopharmaceutical applications. In addition, the analysis of cell signaling proteins and their activities is covered.

PHAR 638 Pharmacometrics and Experimental Design (3)

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.

PHAR 639 Molecular Spectroscopy and Imaging (6 modules, 1-3)

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 applications.

PHAR 653 Advanced Pharmacology I (4)

PHAR 654 Advanced Pharmacology II (4)

These courses 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 702 Theoretical 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

PHAR 707 Drug Transport and Metabolism (4)

This course will provide basic knowledge about drug absorption at different sites in the human body (e.g. intestine, blood-brain barrier, kidney, liver) and the physico-chemical and pharmaceutical factors, as well as pathophysiological conditions, that influence drug penetration. This course will allow the students to understand the choice of a particular absorption route and dosage form. Furthermore, the interplay of drug metabolism and drug transport will be discussed.

PHAR 708 Comprehensive Exam Seminar (1)

As part of the students' advancement to candidacy exam, students make an oral presentation based on a research grant proposal prepared by the student, which is based on their proposed dissertation project.

PHAR 709 Departmental Seminar (1)

Students orally present and critically review the progress and findings that are related to their research project.

PHAR 747 Advanced Pharmacokinetics (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.

PHAR 751 Drug Design (3)

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.

Social Work

University of Maryland School of Social Work

<http://www.ssw.umaryland.edu>

Degrees Offered

PhD

Program Description

The School of Social Work's Doctor of Philosophy program is for professional social workers with master's degrees in social work who want to make contributions to the profession through teaching, developing, and testing new knowledge for social work practice.

Program Admissions

Beyond the Graduate School's minimum admission requirements, applicants must have a master's degree in social work from an accredited Council on Social Work Education Master of Social Work program.

Degree Requirements

The 51-credit curriculum begins with 18 credits of core courses: social welfare policy (3 credits); research design and methods, including statistics (12 credits); and social work theory and theory development (3 credits). After completing core courses, students take a qualifying examination. The next phase involves specialization courses of 21 or more credits including a 6-credit research practicum. The final phase of the program is completion of 12 hours of doctoral dissertation credits.

Courses

Course Code and Number, Course Title, Credit(s)

SOWK 800 Social Welfare Policy (3)

Emphasizes methodology of social policy, analytical problems in social policy, and the specific context within which social policy develops. Examines the areas of class structure, political process, ideology and the economic process in terms of their relevance for the development of social policy. Also examined is the institutional context of social policy decision-making as it applies to the organization and development of specific social welfare programs. It also will contain some analysis of comparative social welfare programs.

SOWK 804 Research Methods in Social Work I (3)

Introduction to conceptual understanding, fundamental

research skills, and design and measurement necessary for students to do advanced social work research. The course covers historical trends in social work research problems, hypothesis formulation, selection and testing of measurement strategies, and diverse research designs, including experimental, quasi-experimental, single subject, survey, and quantitative design.

SOWK 805 Statistics I (3)

Focus is on how to select and do the appropriate quantitative data analysis strategies. The course provides conceptual understanding and skills necessary for selection of appropriate statistical procedures, computer computation of procedures, and appropriate interpretation of statistical measures. Content includes basic descriptive statistics through an introduction to the General Linear Model using multiple regression and correlation analysis.

Prerequisites: permission of instructor

SOWK 806 Research Methods in Social Work II (3)

Advanced conceptual understanding of skills used in complex research design and measurement as part of advanced social work research. The course covers advanced hypothesis formulation development, selection and testing of measurement strategies in complex research designs, including experimental, quasi-experimental, single subject, survey, and quantitative design.

Prerequisites: grade of B or better in SOWK 804 and 805

SOWK 807 Statistics II (3)

Provides conceptual understanding of Ordinary Least Squares and logistic regression. Students develop skills to do computer computation and interpret the statistics. The course covers the relationship of these techniques to specific measures, such as ANOVA/ANCOVA, MANOVA/MANCOVA, repeated measures, and principle components analysis. Students become skilled in using these techniques to analyze results of research designs used for social work research. Emphasis is on the relationship of data analysis and research design.

Prerequisites: SOWK 804 and grade of B or better in SOWK 805

SOWK 808 Social Work Knowledge and Theory (3)

Examines the nature of knowledge and the processes of knowledge building within the context of application of scientific methods and development of generalizations from social work practice wisdom and experience. Focus is on knowledge and theory construction, history of ideas, and knowledge-building in social work. Psychological and social science perspectives help students examine theory development in social work.

SOWK 810 Research Practicum I (3)

Enhances students' ability to independently undertake significant and methodologically rigorous social work research in a substantive area. Each student participates as part of a research team to design, carry out, analyze, and distribute a research project. Students select the research topic, design, and measures for the study.

Prerequisites: 804, 805, 806, and 807, and successful completion of qualifying exams in research and statistics.

SOWK 811 Research Practicum II (3)

Expands knowledge learned in SOWK 810 to enhance ability to undertake significant and methodologically rigorous social work research in a substantive area. The student research team will finish collecting data as planned during SOWK 810; enter, organize, and analyze the data collected; and write a journal article that is ready to submit for publication review.

Prerequisite: SOWK 810

SOWK 822 Structure and Content of Social Work Education (3)

Covers the evolution of social work education as part of the American university. Attention is on seminal issues that have been of concern to social work educators and curriculum development and educational structure, rather than teaching methodologies or techniques.

Prerequisite: completion of core courses

SOWK 826 Qualitative Research Methods in Social Work (3)

Introduction to qualitative research and its role in the development of social work knowledge. Covers material on paradigms underlying qualitative inquiry, basic ideas, and major methods. The course fosters students' ability to conduct qualitative research through gathering and analyzing data.

Prerequisites: completion of core courses and successful completion of qualifying exams in research and theory

SOWK 834 Comparative Social Policy (3)

Emphasizes comparative analysis of national approaches to social policy in different societies. Comparative analysis of dimensions of various social welfare systems including social security, social services, and health care policy. Covers methodology of comparative analysis with attention to governmental involvement in social policy, the nature of public and private sector relations, and the assessment of social policy regarding the analytical ideas of adequacy, equity, inclusiveness, comprehensiveness, effectiveness, and efficiency.

Prerequisite: completion of core courses

SOWK 835 Theory and Practice of Social Work Teaching (3)

Focuses on the development of teaching skills used for social work education. Students learn teaching strategies and classroom methodologies. Students develop and deliver sample lectures that include use of audiovisual materials.

Prerequisite: completion of core courses and qualifying examination

SOWK 836 Survey Research in Social Work (3)

Provides the advanced student with hands-on experiences in the design, use, and analysis of survey research. Students learn to write a report interpreting findings from the research.

Prerequisites: completion of core courses and successful completion of qualifying exams in research and statistics.

SOWK 837 Teaching Practicum in Social Work Education (3)

Provides students with a mentored teaching experience in the BSW program at UMBC or MSW program at UMB. Each student serves as a teaching intern and is assigned to work with a professor in a specific course. The student has opportunities to participate in all aspects of teaching, including curriculum development, leading group discussions, preparing AV materials, developing assignments, and evaluating student progress. Students are also exposed to and participate in other academic responsibilities in which the specific faculty member is engaged such as academic advising and field liaison. Active participation in a monthly seminar is a requirement of the course. Students develop a professional paper on some aspect of teaching.

Pre or co-requisite: SOWK 835

SOWK 838 Selected Topics in Social Work (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: completion of core courses and qualifying examination

SOWK 898 Independent Study Doctoral Level (1-3)

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 adviser, instructor, and doctoral program committee must approve the study before registration. Repeatable to a maximum of 6 credits.

Prerequisite: completion of core courses

SOWK 899 Doctoral Dissertation Research (1-12)

Students develop research competence, scientific method and research technology, and analysis of compiled data while completing the doctoral dissertation.

Prerequisites: completion of core courses and successful completion of qualifying exam

Toxicology

University System of Maryland

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

Degrees Offered

PhD, MS, PhD/MD, and JD/MS

Program Description

The Toxicology Program provides educational and professional training in mechanistic and applied fields of toxicology. Students learn to understand and deal with environmental and human health problems arising from the many sources of pollution produced by modern technology. Graduates of the program are prepared for careers in research, teaching, and federal, state, and local government service, as well as careers in industry and non-profit organizations. Research training focuses on developing a better understanding of mechanisms underlying the adverse health impacts of chemical, physical, and biological agents on living organisms. Training in the application of basic scientific knowledge for the protection of environmental and human health protection focuses on risk assessment, exposure assessment and control, and knowledge and use of the regulatory process. To meet these objectives, the program's curriculum includes courses in the basic natural sciences, toxicology, epidemiology, occupational medicine, analytical chemistry and environmental law.

Program Admission

Beyond the Graduate School's minimum admission requirements, applicants should have majored in chemistry, biology, biochemistry, molecular biology, pharmacy, or related fields. The applicant should have had the following courses or equivalents to qualify: molecular and cell biology, organic chemistry, and quantitative analysis. In addition, the applicant should have completed one semester of physiology and one year of biochemistry.

Degree Requirements

Specific requirements for the degrees in toxicology include a minimum of 30 credits with the following distributions: core courses (15 credits), electives in toxicology (6 credits), other electives (9 credits), and master's thesis research (6 credits), or doctoral dissertation research (12 credits). The program encourages students to take advantage of appropriate graduate courses at many University System of Maryland campuses.

Courses

Course Code and Number, Course Title, Credit(s)

TOXI 601 and 602 Advanced Toxicology I and II (3, 3) *

Lectures and discussions cover principles of toxicology. Topics include major classes of toxic agents, principal target organs of toxicity, and mechanisms of toxicity. A two-semester course.

Prerequisites: biochemistry and physiology at the 300 or higher level, or consent of instructor.

TOXI 603 Fundamentals in Pharmacology (2)

This introductory course, required in all tracks, deals with basic principles of drug action. Topics include quantitation of drug-receptor interactions, drug distribution and elimination, and molecular chemotherapeutic mechanisms. A background in biochemistry or physiology is helpful.

Prerequisites: MPHY 644 the first five weeks of the semester.

Nondegree students: consent of the instructor

TOXI 604 Biochemical Pharmacology (3) *

Covers biochemical and molecular mechanisms of drug, xenobiotic, and hormone action on cells and tissues. Emphasis is on methodology in pharmacological research. Topics include mechanisms of drug metabolism, enzymes as targets of drug action, interactions of drugs with channels and carriers, and drugs that interact with nuclear receptors. Offered spring semester, even-numbered years.

Prerequisite: GPLS 607

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.

Prerequisites: organic chemistry, physical chemistry, quantitative analysis, and calculus.

TOXI 608 Research in Toxicology (2-4)

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 will work individually with a faculty mentor to develop and complete a small lab-based or epidemiology research project. A written report will be generated and results of the project presented at the end of the semester seminar.

TOXI 609 Methods in Toxicology (1-3)

Permission and credit arranged individually. Students become familiar with laboratory methods used by staff members to study the effect of toxins and environmental pollutants on living systems. Students may take for credit more than once.

TOXI 615 Toxic Cell Injury (2)

Lectures concerning mechanisms of cell injury from toxic agents attempt to further integrate ideas from TOXI 601 and 602 using a cell biology approach to understanding how organic and inorganic toxicants produce cellular damage.

Prerequisites: TOXI 601 and 602, or consent of instructor.

TOXI 616 Integrative Pharmacology (3)

A comprehensive introduction to the major classes of drug action, required in all tracks. The course relates cellular and molecular mechanisms to drug action at the level of organ systems and the intact organism, emphasizing research methods. Offered spring semester.

Prerequisites: GPLS 607, GPLS 641 or consent of instructor

TOXI 618 Seminar in Toxicology (1)

Students, guests, and faculty members review and discuss original works and recent advances in toxicology. Students may take for credit more than once.

TOXI 620 Joint Environmental Law-Toxicology Seminar Series on Special Topics (2)

Examines real-world problems involving toxic chemicals from both the legal and scientific perspectives. Law and toxicology students work as teams to develop innovative approaches to solving complex problems of regional and national interest. Topics include the effects of toxic chemicals on the Chesapeake Bay and public health problems associated with lead exposure.

TOXI 621 Risk Assessment and Management in a Regulatory Context (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 622: Critical Issues in Law and Science (3)

This course is designed to teach students about how

lawyers, managers and scientists make decisions about controlling the human health effects of environmental pollution. What roles do each of these players have in this process and when are decisions based on science versus policy? Through lectures, class discussions and role play scenarios, students will be taught to understand the underlying assumptions used in making regulatory decisions and will wrestle with difficult issues such as: When should the Precautionary Principle be applied? How well do we handle data gaps? Should human testing be allowed? Is our legal system utilizing science in an appropriate manner?

Crosslisted: ELS *Critical Issues in Law and Science* (School of Law)

TOXI 623 Neurotoxicology (3)

A comprehensive foundation course suitable for graduate students concentrating in neuroscience or toxicology. Following a brief introduction to the normal structure and function of the cellular targets of neurotoxicants, the major classes of environmental neurotoxicants will be discussed in detail. Pesticide, industrial solvents, neurotoxic metals and biological neurotoxins will be studied from a concentration of environmental and occupational sources of exposure to cellular toxic mechanisms.

Prerequisite: Consent of instructor

TOXI 625 Principles of Aquatic Toxicology (3)

Considers the effects and mechanisms by which chemicals produce toxic effects in aquatic organisms. The course covers toxicology testing methods, chemical disposition in aquatic species, metabolism, and biochemical effects at the subcellular level.

Prerequisite: TOXI 601 or equivalent

TOXI 675 Reproductive and Developmental Toxicology (2)

Provides an overview of normal and abnormal male and female reproduction and embryo, fetal, and neonatal development, and covers regulatory toxicology issues, in particular focusing on the risk assessment process.

Prerequisite: TOXI 601 or equivalent

TOXI 799 Master's Thesis Research (1-6)

TOXI 899 Doctoral Dissertation Research (1-12)

*A permission slip from the program director or instructor is necessary to enroll in this course.

UMBC Graduate Programs

UMBC is a selective public research university in the Baltimore-Washington corridor. The university is in the top tier of research universities nationally; the Carnegie Foundation classifies UMBC as a Doctoral/Research-Extensive university.

Graduate programs at UMBC are designed to serve both professional and research-oriented students. The UMBC Graduate School offers 33 masters and Ph.D. programs and 10 certificate programs in the natural and social sciences, engineering, public policy, and arts and humanities.

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Computer Engineering	Molecular and Cell Biology
Computer Science	Molecular Biology, Applied
Economic Policy Analysis	Neurosciences and Cognitive Sciences
Education	Physics, Applied
Electrical Engineering	Physics, Atmospheric
Emergency Health Services	Public Policy
Engineering Management	Psychology, Applied Developmental
Gerontology	Psychology, Human Services
Historical Studies	Statistics
Imaging and Digital Arts	Sociology, Applied
Information Systems	Teaching
Intercultural Communication	Other Graduate Courses

For more information:

Admissions
 Graduate School
 1000 Hilltop Circle
 University of Maryland, Baltimore County
 Baltimore, MD 21250
 (410) 455-2537
 (410) 455-1130 (fax)
umbcgrad@umbc.edu (email)
www.umbc.edu/gradschool/admissions (web)

Administration

Dean's Office

Dr. Malinda B. Orlin, Vice President for Academic Affairs and Dean, Graduate School
 Dr. Erin Golembewski, Academic Coordinator
 Celeste M. Gerhart, Student Funding Specialist
 Tanya F. Tucker, Communications Manager

Admissions and Enrollment Affairs

Keith T. Brooks, Assistant Dean, Graduate School
 Gaycann Day, Enrollment Progression Coordinator
 Vicky Gibson, Administrative Assistant
 Elissha G. Jefferson, Administrative Assistant

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Orlan M. Johnson	Student Regent

Graduate School Faculty

Appointment Status:

Regular (R), Associate (A), Special (S)

Abbott, Patricia, (R), Assistant Professor, Education, Administration, Health Policy, and Informatics, School of Nursing, and Epidemiology and Preventive Medicine, School of Medicine. BS, University of Maryland, 1989; MS, 1992; MS, 1996; PhD, 1999.

Abrams, Ronald, (A), Professor, Pediatrics, Dental School. BS, University of Massachusetts, 1958; DMD, Tufts University, 1962; MS, 1966.

Abrams, Thomas, (R), Associate Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BA, Carleton College, 1972; PhD, University of Washington, 1981.

Acheson, David, (A), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of London, 1977; MD, 1988.

Aichelmann-Reidy, Mary E, (R), Assistant Professor, Biomedical Sciences, Dental School. BS, Georgetown University, 1983; DDS, Stony Brook University, 1987; Certificate of Periodontics, University of Pittsburgh, 1989.

Albrecht, Eugene, (R), Professor, Obstetrics and Gynecology, and Physiology, School of Medicine. BA, University of Vermont, 1965; MS, 1967; PhD, Rutgers University, 1972.

Albuquerque, Edson, (R), Professor and Chair, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Salesiano College, 1953; MD, University Federal of Pernambuco, 1959; PhD, 1962.

Aldrich, Jane, (R), Professor, Pharmaceutical Sciences, School of Pharmacy. BS, Michigan State University, 1976; PhD, University of Michigan, 1983.

Alger, Bradley, (R), Professor, Physiology, and Chair, Neuroscience and Cognitive Sciences, School of Medicine. BA, University of California, 1972; PhD, Harvard University, 1977.

Ali, Afsar, (A), Instructor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Dhaka, 1983; MS, 1985; MS, University of Maryland, 1993; PhD, 1998.

Alkondon, Manickavasagom, (A), Assistant Professor, Pharmacology and Experimental Therapeutics, School of Medicine. MSc, University of Madras, (1976); PhD, University of Delhi.

Allan, Janet, (R), Dean and Professor, School of Nursing. BS, Skidmore College, 1964; MS, University of California, 1968; PhD, 1986.

Alon, Gad, (R), Associate Professor, Physical Therapy, School of Medicine. BS, University of Maryland, 1972; PhD, 1979; M.S., Medical College of Virginia, 1975.

Altstein, Howard, (R), Professor, School of Social Work. BA, Brooklyn College, City University of New York, 1959; MSW, New York University, 1962; PhD, University of Illinois, 1971.

Ambalavanar, Ranjinidevi, (A), Research Assistant Professor, Biomedical Sciences, Dental School. BVSc, University of Peradeniya, 1984; PhD, University of Liverpool, 1992.

Ambrosia, Todd, (A), Assistant Professor, Child, Women's, and Family Health, School of Nursing. BS, American College, 1988; MS, 1990; PhD, 1991; M.S., Vanderbilt University, 1998.

Ambulos Jr., Nicholas, (A), Assistant Professor, Microbiology and Immunology, School of Medicine. BS, University of Rochester, 1982; PhD, University of Maryland, 1987.

Amelung, Pamela, (A), Assistant Professor, Medicine, Organized Research Center for the Genetics of Asthma and Complex Diseases, and Pulmonary and Critical Care Medicine, School of Medicine. BA, University of Maryland, 1982; MD, 1987.

Amr, Sania, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. MS, University Paul Sabatier, 1976; MD, 1977; MS, University of Maryland, 1997.

Anderson, Larry, (R), Professor, Anatomy and Neurobiology, School of Medicine. BS, Oakland University, 1970; MS, Wayne State University, 1973; PhD, 1977.

Anseloni, Vanessa C. Zilli, (A), Research Assistant Professor, Biomedical Science, Dental School. BS, University of Sao Paula, 1994; PhD, 1997.

Antalis, Toni M., (R), Professor, Physiology, School of Medicine. BS, Furman University, 1975; PhD, Rice University, 1981.

Anthony, Bruno, (R), Associate Professor, Psychiatry, School of Medicine. BA, University of Pennsylvania, 1973; MA, MPhil, PhD, Columbia University, 1981.

Arnold, Elizabeth, (R), Associate Professor, Behavioral and Community Health, School of Nursing. BS, Georgetown University, 1961; MS, Catholic University of America, 1964; PhD, University of Maryland, 1984.

Atamas, Sergei, (A), Assistant Professor, Microbiology and Immunology, School of Medicine. MD, Crimea State Medical Institute, 1984; PhD, First Moscow Medical Institute, 1989.

Augsburger, Larry, (R), Professor, Pharmaceutical Sciences, School of Pharmacy. BS, University of Maryland, 1962; MS, 1965; PhD, 1967.

Aurelian, Laure, (R), Professor, Pharmacology and Experimental Therapeutics, School of Medicine. MS, Tel-Aviv University, 1962; PhD, Johns Hopkins University, 1966.

Azad, Abdu, (R), Professor, Microbiology and Immunology, School of Medicine. DPharm., University of Tehran, 1966; MPH., 1970; PhD., Johns Hopkins University, 1976.

Azzam, Hala S., (A), Adjunct Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. MPH., Johns Hopkins University, 2002; PhD, Georgetown University, 1993 BSc, Kings College

Bachman, Kurtis E., (A), Assistant Professor, Molecular and Cell Biology Program, School of Medicine. BS, Millersville University of Pennsylvania, 1996; PhD, Johns Hopkins University School of Medicine, 2000.

Bachur, Nicholas, (R), Professor, Greenebaum Cancer Center, School of Medicine; and Pharmacology and Toxicology, School of Pharmacy. AB, Johns Hopkins University, 1954; PhD; MD, University of Maryland, 1961.

Bai, Guang, (A), Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. MD, Fourth Military Medical College, 1978; MS, 1983; PhD,

University of Ulm, 1988.

Baier-Anderson, Caroline, (A) Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. B.A., George Washington University, 1985; M.S., University of Maine, 1991; Ph.D., University of Maryland Baltimore, 1999.

Balcer-Kubiczek, Elizabeth, (A), Associate Professor, Radiation Oncology, School of Medicine. MS, University of Warsaw, 1967; PhD, University of Maryland, 1981.

Bambrick, Linda, (A), Assistant Professor, Anesthesiology, and Physiology, School of Medicine. BS, University of Toronto, 1981; PhD, University of Alberta, 1986.

Barcak, Gerard, (R), Associate Professor, Biochemistry, and Molecular Biology, School of Medicine. BS, Manhattan College, 1975; MS, University of Maryland, 1982; PhD, 1986.

Barnes, Douglas, (A), Associate Professor, Oral Health Care Delivery, Dental School. BA, Western Maryland College, 1979; DDS, University of Maryland, 1983; MS, 1992.

Barry, Eileen, M. (R), Associate Professor, Microbiology and Immunology, School of Medicine. BA, University of Delaware, 1985; PhD, Medical College of Virginia.

Barth, Richard, (R), Dean, School of Social Work. AB, Brown University; MS; PhD, University of California.

Bartlett, Stephen, (R), Professor, Surgery and Medicine, School of Medicine. BA, Johns Hopkins University, 1975; MD, University of Chicago, 1979.

Bashirelahi, Nasir, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, Tehran University, 1960; PharmD, 1962; MS, University of Louisville, 1965; PhD, 1968.

Bastian, Amy, (S), Assistant Professor, Neurology, Johns Hopkins University and Kennedy Krieger Institute. BS, University of Oklahoma, 1990; PhD, Washington University, 1995.

Batchelor, Adrian, (A), Assistant Professor, Pharmaceutical Sciences, School of Pharmacy. BA, Cambridge University, 1987; PhD, London University, 1992.

Bauer Jr., Kenneth, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. BS, University of Maryland, 1989; PharmD, University of Pittsburgh, 1996; PhD, 1999.

Baumgarten, Mona, (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Concordia University, 1978; MS, McGill University, 1981; PhD, 1990.

Bavoil, Patrik, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. PhD, University of California, 1982.

Beardsley, Robert, (R), Professor, Pharmaceutical Health Services Research, School of Pharmacy. BSP, Oregon State University, 1972; MS, University of Minnesota, 1974; PhD, 1977.

Bechtel, Roy, (A), Assistant Professor, Physical Therapy, School of Medicine. BA, College of Wooster, 1973; BS, University of Maryland, 1979; PhD, 1998; MA, New York University, 1982.

Belcher, John, (R), Professor, School of Social Work. BS, George Mason University, 1976; MSW, University of Kentucky, 1981; PhD, Ohio State University, 1987.

Belkin, Alexey, (A), Assistant Professor, Biochemistry and Molecular Biology, School of Medicine. MS, Moscow State University, 1983; PhD, 1989.

Bellin, Melissa, (A), Assistant Professor, School of Social Work. BA, Stanford University, 1995; MSW, Virginia Commonwealth University, 1998; PhD, 2006.

Benevento, Louis, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, Rensselaer Polytechnic Institute, 1962; MS, 1964; PhD, University of Maryland, 1967.

Bennett, Robert, (A), Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, Carleton College, 1960; MS, University of Nebraska, 1962; PhD, 1967.

Bergey, Gregory, (A), Professor, Neurology, and Physiology, School of Medicine. AB, Princeton University, 1971; MD, University of Pennsylvania, 1975.

Bergman, Stewart, (A), Professor, Oral Surgery, Dental School. BA, Brooklyn College, 1964; DDS, State University of New York, 1968; MS, University of Maryland, 1986.

Berndt, Rita, (R), Professor, Neurology, School of Medicine; and Psychology, University of Maryland, Baltimore County. BA, University of Maryland, 1971; MA, Johns Hopkins University, 1975; PhD, 1977.

Bever Jr., Christopher, (R), Professor, Neurology, School of Medicine. AB, Washington University, 1971; MD, University of Rochester, 1975.

Bingham, Stephen F., (A), Biostatistician, Cooperative Studies Program Coordinating Center, VA Medical Center, Epidemiology and Preventive Medicine, School of Medicine. BS, Gordon College, 1969; PhD, University of Georgia, 1975.

Black, Lindsay, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BS, University of Chicago, 1962; PhD, Stanford University, 1967.

Black, Maureen, (A), Professor, Pediatrics, School of Medicine. BA, Pennsylvania State University, 1967; MA, University of Southern California, 1973; PhD, Emory University, 1977.

Black, Sandra, (R), Associate Professor, Division of Gerontology, Epidemiology and Preventive Medicine, School of Medicine. BS, Towson University, 1977; MS, University of Texas, 1990; PhD, 1994.

Blanpied, Thomas A., (A), Assistant Professor, Physiology, School of Medicine. BA, Yale University, 1987; MS University of Pittsburgh, 1991; PhD 1995.

Blattner, William, (R), Professor, Medicine, and Epidemiology and Preventive Medicine, School of Medicine; and Associate Director, Institute of Human Virology, Medical Biotechnology Center, University of Maryland Biotechnology Institute. AB, Washington University, 1966; MD, 1970.

Blaustein, Mordecai, (R), Professor, Physiology, School of Medicine. BA, Cornell University, 1957; MD, Washington University, 1962.

Blitzer, Miriam, (R), Professor and Interim Program Director, Human Genetics, Pediatrics, and Obstetrics and Gynecology, School of Medicine. BA, University of California, 1974; MS, University of Pittsburgh, 1980; PhD, 1981.

Bloch, Robert, (R), Professor, Physiology, School of Medicine. AB, Columbia University, 1967; PhD, Harvard University, 1972.

Bond, Meredith, (R), Professor and Chair, Physiology, School of Medicine. BA, Macquarie University, 1976; PhD, University of Pennsylvania, 1984.

Born, Catherine, (A), Associate Professor, School of Social Work. BA, University of Maryland, 1972; MSW, 1973; Ph.D., 1982.

Bradham, Douglas, (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, University of North Carolina, 1972; MPH, 1975; DrPh, 1981; MA, 1982.

Brandt, Nicole, (A), Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. BS, State University of New York, 1993; PharmD, University of Maryland, 1997.

Braun, Rita, (R), Assistant Professor, Administration, Health Policy, and Informatics, School of Nursing. BSN, St. Louis University, 1964; MSN, Catholic University of America, 1966; PhD, University of Edinburgh, 1996.

Braver, Elisa R., (A), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Johns Hopkins University, 1975; MHS, Johns Hopkins Bloomberg School of Public Health, 1977; PhD, 1990.

Brindle, Timothy J., (S), Instructor, Physical Therapy and Rehabilitation Science. School of Medicine. BS, SUNY, 1987; MS, Beaver College, 1989; PhD, University of Kentucky, 2001.

Brodie, Angela, (R), Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Sheffield University, 1956; PhD, Manchester University, England, 1961.

Brookes, Neville, (R), Associate Professor, Pharmacology and Experimental Therapeutics, School of Medicine. PharmS, Bath University, 1962; PhD, Leeds University, 1967.

Brown, Clayton, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Oregon, 1981; MS, University of California, 1995; PhD, Johns Hopkins University, 2001.

Brown, Jeanne Geiger, (R), Assistant Professor, Family & Community Health, School of Nursing. BA, Temple University, 1975; BS, Jefferson University, 1980; MS, Columbia University, 1991; PhD, University of Maryland, Baltimore, 2001.

Bucci, Enrico, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. M.C., Liceo-Mamiani, 1950; MD, University of Rome, 1956; PhD, 1965.

Buchanan, Robert, (A), Professor, Psychiatry, School of Medicine. BS, Lehigh University, 1976; MD, New Jersey Medical School, 1980.

Burger, Angelika M., (R), Associate Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BSc, 1988; PhD, Johannes-Gutenberg - University, 1992; MSc, 1993; PhD, University of Bradford, 2004.

Burnett, Joseph, (A), Professor, Dermatology, School of Medicine. BA, Yale University, 1954; MD, Harvard University, 1958.

Burry, Caroline, (R), Assistant Professor, School of Social Work. BA, Furman University, 1978; MSW, University of Georgia, 1980; PhD, University of South Carolina, 1995.

Burt, David, (R), Professor and Co-Program Director, Pharmacology and Experimental Therapeutics, School of Medicine. AB, Amherst College, 1965; PhD, Johns Hopkins University, 1972.

Burton, Martha, (R), Assistant Professor, Department of Physiology, Neuroscience and Cognitive Sciences, School of Medicine. BA, Wellesley College, 1983; AM, Brown University, 1986; PhD, 1989.

Buterbaugh, Gary, (R), Professor, Pharmaceutical Sciences, School of Pharmacy. BS, Iowa State University, 1965; MS, University of Iowa, 1967; PhD, 1969.

Buxbaum, Jerome, (A), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, University of Maryland, 1951; DDS, 1955; FAGD, 1976.

Capra, Norman, (R), Associate Professor and Program Director, Oral and Craniofacial Biological Sciences, Dental School. BS, Birmingham Southern College, 1969; MS, University of Alabama, 1975; PhD, 1976.

Carbonetti, Nicholas, (R), Associate Professor, Microbiology and Immunology, School of Medicine. BS, University of Birmingham, 1981; PhD, University of Leicester, 1985.

Carney, James, (R), Assistant Professor, Radiation Oncology and Molecular and Cell Biology, School of

Medicine. BS, Niagara University, 1989; PhD, Loyola University, 1994.

Carpenter Jr., William, (A), Professor, Psychiatry, and Director, Maryland Psychiatric Research Center, School of Medicine. BS, Wofford College, 1958; MD, Wake Forest University, 1962.

Carrier, France, (A), Assistant Professor, Biochemistry and Molecular Biology, School of Medicine. BS, Quebec University of Trois-Rivières; 1983; PhD, Montreal University, 1988.

Carter-Pokras, Olivia, (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Tulane University, 1979; MHS, Johns Hopkins University, 1982; PhD, 1994.

Casado, Banghwa Lee, (A), Assistant Professor, School of Social Work. BA, Georgia State University, 1998; MSW, University of Houston, 2000; PhD, 2006.

Cascio, Toni, (A), Assistant Professor, School of Social Work. BA, Johns Hopkins University, 1987; MSW, University of Maryland, 1990; PhD, University of Pennsylvania, 1996.

Cerny, Jan, (R), Professor and Chair, Microbiology and Immunology, and Pathology, School of Medicine. MD, Charles University, 1964; PhD, Czechoslovak Academy of Sciences, 1968.

Chaffin, Charles, (A), Associate Professor, Physiology, School of Medicine. AB, Ripon College, 1989; MS, University of Wisconsin; 1992; PhD, 1996.

Chang, Yen-Pei Christy, (A), Human Genetics, School of Medicine. BS, Virginia Polytechnic Institute, 1988; PhD, Johns Hopkins University, 1994.

Chang, Yung-Feng, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, National Taiwan University, 1958; MS, 1960; PhD, University of Pittsburgh, 1966.

Chellaiah, Meena, (R), Assistant Professor, Biomedical Sciences, Dental School. BS, Mudurai Kamaraj University, 1975; MS, 1977; PhD, 1985.

Chen, Hegang, (A), Assistant Professor, School of Medicine. MS, University of Mississippi, 1987; PhD, University of Illinois, 1993.

Christenson, Robert, (R), Professor, Pathology, School of Medicine. BA, University of Massachusetts, 1976; PhD, Florida State University, 1980.

Cohen, Leonard, (R), Professor, Oral Health Care Delivery, Dental School. BA, George Washington University, 1967; DDS, Howard University, 1971; MPH, Harvard University, 1974; MS, 1976.

Cole, Gerald, (R), Professor, Microbiology and Immunology, School of Medicine. BS, Wilson Teachers College, 1952; PhD, University of Maryland, 1966.

Collins, John, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. AB, Northeastern University, 1965; MEd, University of Cincinnati, 1984; PhD, Boston University, 1970.

Collins, Kathryn, (A), Associate Professor, School of Social Work, BA, Mars Hill College, 1993; MSW, Tulane University, 1993; PhD, University of South Carolina, 1999.

Constantine, Niel, (R), Professor, Pathology, School of Medicine. BS, University of Maryland, 1974; PhD, 1981.

Contreras-Vidal, Jose L., (S), Assistant Professor, Physical Therapy & Rehabilitation Science, School of Medicine. Engineer's Degree, Monterrey Institute of Technology (ITESM), 1987; MSEE, University of Boulder, 1990; PhD, Boston University, 1994.

Cooksey, Judith, (A), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. MD, University of Illinois, 1973; MPH, 1986.

Coop, Andrew, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. BA, MA, University of Oxford, 1991; PhD, University of Bristol, 1994.

Cornelius, Llewellyn, (R), Associate Professor, School of Social Work. BA, Syracuse University, 1982; MA, University of Chicago, 1983; MA, 1985; PhD, 1988.

Costello, Leslie, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, University of Maryland, 1952; MS, 1954; PhD, 1957.

Couwenhoven, Ross, (A), Assistant Professor, Oral and Experimental Pathology, Dental School. BA, Calvin College, 1976; DDS, University of Illinois, 1981; PhD, University of Chicago, 1991.

Covington, Barbara, (A), Associate Professor, Education, Administration, Informatics, and Health Policy, School of Nursing. BSN, University of Florida, 1970; MSN, University of Pennsylvania, 1977; PhD, Texas A&M University, 1996.

Cross, Alan, (R), Professor, Medicine, School of Medicine. BA, Harvard University, 1966; MD, University of Pennsylvania, 1970.

Crossley, Harold, (A), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, University of Rhode Island, 1964; MS, 1969; PhD, 1972; DDS, University of Maryland, 1980.

Dalby, Richard, (R), Professor, Pharmaceutical Sciences, School of Pharmacy. BPharm, University of Nottingham, 1983; PhD, University of Kentucky, 1988.

Damcott, Coleen, (A), Associate Professor, Human Genetics, School of Medicine. AAS, State University of New York College of Technology, 1995; BS, Cornell University, 1997; PhD, University of Pittsburgh, 2002.

Darlington, Daniel, (A), Assistant Professor, Surgery, and Physiology, School of Medicine. BS, Pennsylvania State University, 1978; PhD, University of Virginia, 1983.

Dasch, Gregory, (S), Senior Research Microbiologist, Viral and Rickettsial Diseases, Naval Medical Research Center. BA, Oberlin College, 1970; PhD, Yale University, 1975.

Davenport, Joan M., (A), Assistant Professor, Organizational Systems and Adult Health, School of Nursing. BS, Salisbury State University, 1979; MSN, University of Alabama, 1982; PhD, University of Maryland, Baltimore.

Davidson, William, (R), Professor, Orthodontics, Dental School. AB, Dartmouth College, 1960; DMS, Harvard University, 1965; PhD, University of Minnesota, 1969.

DasSarma, Shiladitya, (R), Professor, Molecular and Cell Biology, School of Medicine. BS, Indiana University, 1979; PhD, Massachusetts Institute of Technology, 1984.

Deal, Kathleen, (A), Associate Professor, School of Social Work. BA, Immaculata College, 1968; MSW, Catholic University of America, 1973; PhD, 1997.

Dean, Mary Catherine, (A), Assistant Professor, Dental Hygiene, Dental School. BS, West Virginia University, 1983; MS, University of Missouri, 1985.

DeForge, Bruce, (R), Research Associate Professor, School of Social Work. BA, Central Connecticut State College, 1977; MA, Towson University, 1985; PhD, University of Maryland, 1994.

Delisle, Alan, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, University of California, 1960; MS, 1961; PhD, University of Massachusetts, 1986.

Dennen, June, (A), Genetic Counselor, Human Genetics, School of Medicine. BA, University of Texas, 1982; MSW, New York University, 1986.

DePanfilis, Diane, (R), Associate Professor, School of Social Work. BA, Villa Maria College, 1973; MSW, University of Wisconsin, 1982; PhD, University of Maryland, 1995.

Depaola, Louis, (A), Associate Professor, Oral Medicine, Dental School. BA, University of Maryland, 1971; DDS, 1975; MS, 1981.

Depireux, Didier, (R), Assistant Professor, Anatomy and Neurobiology, School of Medicine. BSc, Universite de Liege, 1986; MSc, University of Maryland, 1988; PhD, 1991.

Dessem, Dean, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, Tulane University, 1976; PhD, University of Illinois, 1985.

DeTolla, Louis, (R), Professor, Comparative Medicine, Pathology, and Medicine, School of Medicine. BA, Temple University, 1970; MS, Rutgers University, 1974; PhD, 1978; VMD, University of Pennsylvania, 1982.

DeVico, Anthony, (A), Associate Professor, Microbiology and Immunology, School of Medicine. BS, Virginia Polytechnic Institute and State University, 1979; PhD, George Washington University, 1992.

DiBlasio, Frederick, (R), Professor, School of Social Work. BA, Western Maryland College, 1975; MSW, University of Maryland, 1978; PhD, Virginia Commonwealth University, 1983.

Dischinger, Patricia, (A), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Wilson College, 1966; MS, University of North Carolina, 1971; PhD, 1974.

Distler, John, (A), Speciality Coordinator, Family Nurse Practitioner Program, School of Nursing. AAS, State

University of New York, 1978; BS, 1981; MS, 2001; DPA, University of Baltimore, 2006.

Dixon, Shannan DeLay, (A), Director, Masters in Genetic Counseling Program, Pediatrics, Division of Human Genetics, School of Medicine. BS, Pennsylvania State University, 1996; MS, Arcadia University, 1998.

Dolgoff, Ralph, (R), Professor, School of Social Work. BA, Oglethorpe University, 1954; MA, Columbia University, 1956; DSW, 1974; M.S.W., Adelphi University, 1961.

Donnenberg, Michael, (R), Associate Professor, Medicine, and Microbiology and Immunology, School of Medicine. BS, State University of New York, 1979; MD, Columbia University, 1983.

Dorsey, Susan, (R), Assistant Professor, Department of Organizational Systems and Adult Health, School of Nursing. BS, West Virginia Wesleyan College, 1986; MS, University of Maryland Baltimore, 1997; PhD, 2001.

Doucette, Lorraine, (A), Assistant Professor, Medical Research and Technology, School of Medicine. AA, Catonsville Community College, 1976; BS, University of Maryland Baltimore, 1978; MS, University of Maryland Baltimore, 1985.

Dowling, Thomas, (R), Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. PharmD, Ferris State University, 1993; PhD, University of Pittsburgh, 1999.

Drohat, Alex, (A), Assistant Professor, Biochemistry and Molecular Biology, School of Medicine. BS, University of Maryland, College Park, 1988; PhD, University of Maryland Baltimore, 1997.

Driscoll, Carl, (A), Assistant Professor, Restorative Dentistry, Dental School. BA, Merrimack College, 1974; DMD, Tufts University, 1977.

Dubner, Ronald, (R), Professor and Chair, Oral and Craniofacial Biological Sciences, Dental School. BS, Columbia University, 1955; D.D.S., 1958; PhD, University of Michigan, 1964.

Duh, Show-Hong, (A), Associate Director, Clinical Chemistry Laboratory, and Assistant Professor, Pathology, School of Medicine. BS, Taipei Medical College, 1971; MS, North Dakota State University, 1981; PhD, 1985.

Dumsha, Thomas, (R), Associate Professor and Chair,

Endodontics, Dental School. BA, University of Maryland, 1973; MS, 1976; DDS, 1979.

Eckert, Richard, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BA, University of Wisconsin-Parkside, 1975; MS, University of Illinois, 1978; PhD, 1981.

Eddington, Natalie, (R), Professor and Chair, Pharmaceutical Sciences, School of Pharmacy. BS, Howard University, 1982; PhD, University of Maryland, 1989.

Edelman, Bennett, (A), Associate Professor and Director, Clinical Laboratories, and Pathology, School of Medicine. BS, Yale University, 1971; MD, Johns Hopkins University, 1975.

Elias, Samia, (A), Clinical Associate Professor, Restorative Dentistry, Dental School. DDS, Alexandria University, 1965; MS, University of Maryland, 1985.

El-Kamary, Samer, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. MB, ChB (MD Equivalent), University of Alexandria (Egypt), 1989; Master of Surgery, 1994; MPH, Johns Hopkins University, 2001.

Elmer, Gregory, (A), Assistant Professor, Psychiatry, School of Medicine. BS, University of Colorado, 1982; PhD, University of Maryland, 1990.

Enwonwu, Cyril, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, University of Ibadan, 1956; BDS, University of Bristol, 1961; PhD, 1976; MDS, 1966; ScD, Massachusetts Institute of Technology, 1968.

Ephross, Paul, (R), Professor, School of Social Work. BS, New York University, 1955; MS, Boston University, 1957; PhD, University of Chicago, 1969.

Esche, Carol, (A), Assistant Professor, Organizational Systems and Adult Health, School of Nursing. BA, Goucher College, 1979; ND, Case Western Reserve University, 1982; MA, Columbia University, 1986; DNP, Case Western Reserve University, 2006.

Fahie, Vanessa, (A), Assistant Professor, Adult Health, School of Nursing. BSN, University of Maryland, 1976; MS, 1983; PhD, 1994.

Falkler, Jr., William, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BA,

Western Maryland College, 1966; MS, University of Maryland, 1969; PhD, 1971.

Fandetti, Donald, (R), Associate Professor, School of Social Work. BA, Providence College, 1958; MS, Boston University, 1963; DSW, Columbia University, 1974.

Fang, Shengyun, (A), Assistant Professor, Molecular and Cell Biology, Graduate School, MD, Anhui Medical University (China), 1985; MSc, 1992; PhD, 1998.

Farber, Donna, (R), Assistant Professor, Microbiology and Immunology, School of Medicine. BS, University of Michigan, 1984; PhD, University of California, 1990.

Farrance, Iain, (R), Assistant Professor, Biochemistry and Molecular Biology, School of Medicine. BS, Virginia Polytechnic Institute and State University, 1982; PhD, University of Georgia, 1988.

Fasano, Alessio, (A), Professor, Physiology, Pediatrics, and Medicine, School of Medicine. MD, University of Naples, 1981.

Fedder, Donald, (R), Professor, Pharmaceutical Health Services Research, School of Pharmacy; and Associate Professor, Epidemiology and Immunology, School of Medicine. BSP, University of Maryland, 1950; MPH, Johns Hopkins University, 1978, DrPH, 1982.

Feldman, Ricardo, (R), Assistant Professor, Microbiology and Immunology, School of Medicine. MS, University of Buenos Aires, 1973; PhD, New York University, 1979.

Feng, Pei, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. MD, Beijing Medical University, 1970; MS, 1981; PhD, University of Umea, 1990.

Finkelstein, Joseph, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. MD, Pirogov State Medical University, 1984 PhD, 1988; MA, Columbia University, 1998.

Finley, Margaret A., (A), Physical Therapy and Rehabilitation Science, School of Medicine. BS, University of Maryland, College Park, 1985; BS, University of Maryland, Baltimore, 1987; MA, 1993; PhD, 2003.

Fishman, Paul, (R), Professor, Neurology, School of Medicine. BA, Johns Hopkins University, 1971; MD, 1978; PhD, Yale University, 1975.

Fiskum, Gary, (R), Professor and Research Director, Anesthesiology, Toxicology, School of Medicine. BA, University of California, 1973; PhD, St. Louis University, 1977.

Fix, Alan, (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Duke University, 1975; MD, University of Florida, 1979; MS, University of Maryland, 1995.

Flajnik, Martin, (R), Professor, Microbiology and Immunology, School of Medicine. BS, Pennsylvania State University, 1978; MS, University of Rochester, 1979; PhD, 1983.

Fleming, Deborah, (A), Assistant Professor, Dental Hygiene, Dental School. BS, University of North Carolina, 1999; MS, 2001.

Forrester, Larry, (A), Assistant Professor, Physical Rehabilitation Science, School of Medicine. BA, Duke University, 1972; MA, Wake Forest University, 1984; PhD, University of Maryland, 1997.

Fouad, Ashraf, (R), Associate Professor and Chairman, Department of Endodontics, Operative Dentistry and Prosthodontics, Dental School. BDS, Cairo University, 1982; MS, University of Iowa, 1990; DDS, 1992.

Franklin, Renty, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, Morehouse College, 1966; MS, Atlanta University, 1967; PhD, Howard University, 1972.

Fried, Jacquelyn, (A), Professor, Dental Hygiene, Dental School. BA, Ohio State University, 1968; MS, Old Dominion University, 1976.

Friedman, Erika, (R), Professor, School of Nursing. BA, University of Pennsylvania, 1973; PhD, 1978.

Froehlich, Jeffrey, (A), Professor, Biochemistry and Molecular Biology, School of Medicine. BS, University of Wisconsin, 1965; MD, University of Chicago, 1969.

Frost, Douglas, (R), Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Massachusetts Institute of Technology, 1971; MS, 1971; PhD, 1975.

Fulton, Amy, (R), Professor, Pathology, and Greenebaum Cancer Center, School of Medicine. BA, University of Kansas, 1972; MS, University of Wisconsin, 1975; PhD, 1977.

Furuno, Jon Paul, (A), Instructor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Rhode Island, 1996; MS, University of Maryland, Baltimore, 2001; PhD, 2004.

Galen, James E., (A), Associate Professor, Center for Vaccine Development, School of Medicine. BA, University of Virginia, 1979; PhD, University of Maryland School of Medicine, 1991.

Gallo, Robert, (R), Professor, Microbiology and Immunology, School of Medicine; and Director, Institute of Human Virology, Medical Biotechnology Center, University of Maryland Biotechnology Institute. BA, Providence College, 1959; MD, Jefferson Medical College, 1963.

Gann, Donald, (R), Professor and Executive Vice Chair, Surgery, and Professor, Physiology, School of Medicine. AB, Dartmouth College, 1952; MD, Johns Hopkins University, 1956.

Gartner, Leslie, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, Rutgers University, 1965; MS, 1968; PhD, 1969.

Garzino-Demo, Alfredo, (A), Assistant Professor, Microbiology and Immunology, School of Medicine; and Basic Sciences, Institute of Human Virology, University of Maryland Biotechnology Institute. PhD, University degli Studi di Torino, 1988.

Gaston, Gerald, (A), Clinical Professor, Oral Surgery, Dental School. BS, Miami University, 1952; DDS, Ohio State University, 1959; PhD, 1972.

Geddes, Chris D., (S), Associate Professor, Biochemistry and Molecular Biology, School of Medicine. BSc, Lancaster University, 1992; PhD, University of Wales Swansea, 1996.

Geiger-Brown, Jeanne, (A), Assistant Professor, Behavioral and Community Health, School of Nursing. BA, Temple University, 1975; BSN, Thomas Jefferson University, 1980; MSN, Columbia University, 1991; PhD, University of Maryland, 2001.

Ghandehari, Hamid, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. BS, University of Utah, 1989; PhD, 1996.

Gill, Donald, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BS, University of Sussex, 1975; PhD, University of London, 1978.

Gioia, Deborah, (A), Assistant Professor, School of Social Work. BA, Northeastern University, 1977; MSSW, Columbia University, 1981; PhD, University of Southern California, 2000.

Glaser, Edmund, (R), Professor, Physiology, School of Medicine. BEE, The Cooper Union, 1949; MSE, Johns Hopkins University, 1954; DEng, 1960.

Gnatt, Averell, (R), Assistant Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Bar-Ilan University, 1984; MS, Weizmann Institute of Science, 1986; PhD, Hebrew University of Jerusalem, 1991.

Gold, Michael, (R), Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, University of California, 1987; PhD, 1994.

Goldblum, Simeon, (R), Professor, Medicine, and Pathology, School of Medicine. BA, University of Michigan, 1969; MD, University of Pittsburgh, 1973.

Goldman, Lawrence, (R), Professor, Physiology, School of Medicine. BS, Tufts University, 1958; PhD, University of California, 1964.

Gonzales, Frank, (S), Chief, Nucleic Acids Section, Laboratory of Molecular Carcinogenesis, National Cancer Institute, National Institutes of Health. BA, University of South Florida, 1975; MA, 1977; PhD, University of Wisconsin, 1981.

Gonzalez-Serratos, Hugo, (R), Professor, Physiology, School of Medicine. BS, Escuela Nacional Preparatoria, 1951; MD, University of Mexico, 1957; MS, Centro de Investigación y de Estudios Avanzados del IPN, 1963; PhD, University of London, 1967.

Goodman, Harold, (A), Associate Professor, Pediatric Dentistry, Dental School. BA, Rutgers University, 1972; DDS, College of Medicine and Dentistry of New Jersey, 1975; MPH, Johns Hopkins University, 1986.

Gordon, Sharon M., (A), Associate Professor, Biomedical Sciences, Dental School. BA, University of North Texas, 1986; DDS, University of Texas Health Science Center, 1991; MPA, Johns Hopkins University, 1996; PhD, Johns Hopkins University 2003.

Gottlieb, Stephen, (A), Associate Professor, Medicine, School of Medicine. AB, Brown University, 1977; MD, 1981.

Grace, Edward, (A), Associate Professor, Oral Health Care Delivery, Dental School. BS, Mt. St. Mary's College, 1960; DDS, University of Maryland, 1964; MA, Loyola College, 1981.

Grattan, Lynn, (A), Associate Professor, Neurology, School of Medicine. BA, Seton Hill College, 1975; MS, American International College, 1977; PhD, University of Connecticut, 1989.

Greenspan, Joel, (R), Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, Rollins College, 1974; MS, Florida State University, 1976; PhD, 1980.

Greif, Geoffrey, (R), Professor, School of Social Work. BA, Ohio Wesleyan University, 1971; MSW, University of Pennsylvania, 1974; DSW, Columbia University, 1983.

Gruber-Baldini, Ann L., (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Bucknell University, 1985; MS, Pennsylvania State University, 1989; PhD, 1991.

Guberski, Thomasine, (A), Associate Professor, Behavioral and Community Health, School of Nursing. BS, American International College, 1964; MS, University of Michigan, 1969; PhD, University of Maryland, 1985.

Gullapalli, Rao, (A), Assistant Professor, Diagnostic Radiology, School of Medicine. BS, Osmania University, 1981; MS, University of Arkansas, 1986; PhD, 1991.

Gunsolley, John, (R), Professor, Periodontics, Dental School. BS, General Motors Institute, 1972; DDS, Indiana University, 1976; MS, Virginia Commonwealth University, 1987.

Gupta, Anandarup, (R), Assistant Professor, Biomedical Sciences, Dental School. BS, University of Calcutta, 1983; MS, University of Connecticut, 1986; PhD, 1990.

Haack, Mary, (R), Associate Professor, Behavioral and Community Health, School of Nursing. BSN, Loyola University, 1974; MS, University of Illinois, 1980; PhD, 1985.

Hack, Gary, (A), Associate Professor, Biomedical Sciences, Dental School. BA, University of Maryland Baltimore County, 1975; DDS, Baltimore College of Dental Surgery Dental School, 1979.

Hadley, Gregg, (R), Associate Professor, Surgery, and Microbiology and Immunology, School of Medicine. BS,

Purdue University, 1975; MS, University of Iowa, 1979; PhD, University of Minnesota, 1986.

Hafer-Macko, Charlene, (A), Assistant Professor, Neuroscience and Cognitive Sciences, School of Medicine. BS, Pennsylvania State University, 1982; MS, Case Western Reserve University, 1984; MD, Ohio State University, 1988.

Haines, Stuart T., (A), Professor, Pharmacy Practice and Science, Pharmaceutical Health Services Research, School of Pharmacy. BA, Massachusetts College of Pharmacy and Allied Health Sciences, 1985; PharmD, University of Texas Health Science Center, 1994.

Hamburger, Anne, (R), Professor and Program Director, Pathology, and Greenebaum Cancer Center, School of Medicine. AB, Brandeis University, 1968; MA, New York University, 1971; PhD, 1975.

Handwerker, Barry, (R), Professor, Medicine, and Microbiology and Immunology, School of Medicine. BA, Johns Hopkins University, 1964; MD, University of Maryland, 1968.

Harrington, Donna, (R), Professor, School of Social Work. BA, University of Maine, 1985; PhD, University of Maryland, 1990.

Harris, Anthony, (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, McGill University, 1989; MD, 1993; MPH, Harvard University, 1999.

Harris, Jesse, (R), Professor, School of Social Work. BS, Morgan State University, 1958; MS, Howard University, 1960; MSW, University of Maryland, 1971; PhD, 1976.

Harris, Ruth, (R), Associate Professor, Behavioral and Community Health, School of Nursing. BSN, University of Maryland, 1974; MS, 1981; PhD, 1986.

Harrison, George, (R), Associate Professor, Radiation Oncology, School of Medicine. BA, Tufts University, 1965; MS, University of Maryland, 1969; PhD, 1972.

Hartley, David M., (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, West Virginia University, 1990; MS, University of Maryland Baltimore County, 1992; PhD, 1996.

Hasday, Jeffrey, (R), Associate Professor, Medicine, and Pathology, School of Medicine. BA, University of

Rochester, 1975; MD, 1979.

Hasler, John, (A), Professor, Oral Diagnosis, and Associate Dean, Clinical Affairs, Dental School. BS, Indiana University, 1958, DDS, 1962; MSD, 1969.

Hassel, Bret, (R), Assistant Professor, Microbiology and Immunology and Greenebaum Cancer Center, School of Medicine. BS, University of Miami, 1981; PhD, Johns Hopkins University, 1989.

Hausman, Kathy, (A), Assistant Professor, Adult Health, School of Nursing. BSN, St. Louis University, 1976; MS, University of Maryland, 1978; PhD, 1995.

Hawkes, William, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Virginia Commonwealth University, 1980; MS, 1984; PhD, 1990.

Hawley, Charles, (R), Professor, Periodontics, and Microbiology, Dental School. DDS, University of Pennsylvania, 1962; MS, University of Illinois; 1970; PhD, University of Maryland, 1976.

Hayashi, Jun, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. BS, Tokyo Metropolitan University, 1976; PhD, University of Connecticut, 1982.

Hebel, J. Richard, (R), Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Virginia Polytechnic Institute, 1962; PhD, 1966.

Heinbockel, Thomas, (A), Assistant Professor, Anatomy and Neurobiology, School of Medicine. MS, Philipps-University, 1990; PhD, University of Arizona, 1997.

Heindel, Louis, (A), Assistant Professor, School of Nursing. BSN, University of Wisconsin, 1980; MA, Webster University, 1992; MS, 1994, Rush University; DNP, 1995.

Hess, John, (A), Associate Professor, Pathology, School of Medicine. BA, Washington State University, 1967; MD, University of Washington, 1972; MPH, University of Hawaii, 1979.

Hicks, Gregory, (A), Assistant Professor, Physical Therapy & Rehabilitation Science, School of Medicine. BA (Biological Sciences), University of Delaware, 1992; BA (English), 1993; MPT, 1995; PhD, University of Pittsburgh, 2002.

Hirshon, Jon Mark, (A), Associate Professor,

Epidemiology and Preventive Medicine, School of Medicine. BA, University of California, 1984; MD, University of Southern California, 1990; MPH, Johns Hopkins Bloomberg School of Public Health, 1994.

Hoag, Stephen, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. BS, University of Wisconsin, 1982; PhD, University of Minnesota, 1990.

Hochberg, Marc C., (R), Professor, Epidemiology and Preventive Medicine, School of Medicine. AB, Franklin & Marshal, 1969; MD, Johns Hopkins University, 1973; MPH, 1979.

Hoffman, Gloria, (R), Professor, Anatomy and Neurobiology, School of Medicine. BS, University of Illinois, 1968; PhD, 1974.

Holcomb, Henry, (A), Assistant Professor, Psychiatry, School of Medicine. BA, Rice University, 1972; MD, University of Texas, 1977.

Hone, David, (A), Assistant Professor, Medical Biotechnology Center, University of Maryland Biotechnology Institute. BS, University of Adelaide, 1984; PhD, 1988.

Hopkins, Karen, (R), Associate Professor, School of Social Work. BS, Pennsylvania State University, 1976; MSW, University of Pittsburgh, 1979; PhD, University of Chicago, 1993.

Horneman, Amy J., (A), Assistant Professor, Medical and Research Technology, School of Medicine. BS, Virginia Polytechnic Institute and State University, 1975; MS, University of Maryland, College Park, 1990, PhD, 2001.

Hsia, Ru-ching, (A), Research Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, National Taiwan University, 1981; PhD, Stanford University, 1992.

Hsu, Ih-Chang, (R), Professor, Pathology, School of Medicine. BS, Kaohsiung Medical College, 1964; MS, National Taiwan University, 1967; PhD, University of Wisconsin, 1972.

Hungerford, Laura, (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Michigan State University, 1978; DVM, 1980; MPH, University of Illinois, 1987; PhD, 1989.

Hussain, Arif, (A), Associate Professor, Medicine,

Greenebaum Cancer Center, and Biological Chemistry, School of Medicine. BS, Howard University, 1976; MD, 1980.

Hybl, Albert, (R), Associate Professor, School of Medicine. BA, Coe College, 1954; PhD, California Institute of Technology, 1961.

Inesi, Giuseppe, (R), Professor and Chair, Biochemistry and Molecular Biology, School of Medicine. LA, Classic Lyseum, 1948; MD, Modena University, 1954; PhD, University of Bologna, 1960.

Jackson, Marian, (R), Associate Professor, Neurology, School of Medicine. BS, Cornell University, 1975; MS, Albert Einstein College, 1978; PhD, 1981.

Jacobson, Jodi M, (A), Assistant Professor, School of Social Work. BS, University of Maryland College Park, 1996; MSW, University of Maryland, Baltimore, 1998; PhD, 2004.

Jennings, Carole, (R), Assistant Professor, Administration, Health Policy, and Informatics, School of Nursing. BSN, Georgetown University, 1969; MA, University of Washington, 1972; PhD, Catholic University of America, 1988.

Jenkins, Louise, (R), Associate Professor, Adult Health, and Program Director, School of Nursing. BS, Northern Illinois University, 1979; MS, University of Maryland, 1982; PhD, 1985.

Jenkins, T. Scott, (A), Research Assistant Professor, Orthodontics, Dental School. BS, Northwestern University, 1988; DDS, University of Maryland, 1992; PhD, 2001.

Johantgen, Meg, (R), Assistant Professor, Administration, Health Policy, and Informatics, School of Nursing. BS, Niagara University, 1974; MS, State University of New York, 1985; PhD, Virginia Commonwealth University, 1994.

Johnson, Jeffrey, (R), Professor, School of Nursing. BA; University of Minnesota, 1980; PhD, Johns Hopkins University, 1986.

Johnson, Judith, (R), Associate Professor, Pathology, and Medicine, School of Medicine. BS, University of Maryland, 1977; PhD, 1990.

Johnson, Karen, (A), Assistant Professor, Adult Health, School of Nursing. BS, Niagara University, 1980; MS,

University of Rochester, 1986; PhD, University of Kentucky, 1999.

Johnson, Kenneth, (R), Professor, Neurology, School of Medicine. BA, Upsala College, 1955; MD, Jefferson College, 1959.

Jones, Deborah, (A), Clinical Assistant Professor, Department of Organized Systems & Adult Health, School of Nursing. BS, University of Alabama, 1990; BSN, 1996; MSN, 2002; PhD, 2005.

Jones, Laundette P., (A), Assistant Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Morgan State University, 1992; PhD, Johns Hopkins University, 2000.

Jones, Raymond, (R), Professor, Pathology, School of Medicine. BS, Old Dominion University, 1968; MS, University of Delaware, 1970; PhD, University of Maryland, 1974.

Josell, Stuart, (A), Associate Professor, Orthodontics, Dental School. DMD, Fairleigh Dickinson University, 1974; MDS, University of Connecticut, 1980.

Kalvakolanu, Dhan, (R), Associate Professor, Microbiology and Immunology, School of Medicine. BS, Osmania University, 1979; MS, 1981; PhD, Indian Institute of Science, 1988.

Kamin-Lewis, Roberta, (A), Assistant Professor, Microbiology and Immunology, School of Medicine. PhD, University of California, 1974.

Kane, Andrew, (R), Assistant Professor, Pathology, and Epidemiology and Preventive Medicine, School of Medicine. BS, Cornell University, 1981; MS, Ohio State University, 1985; PhD, University of Maryland, 1993.

Kao, Joseph, (A), Associate Professor, Physiology, School of Medicine; and Medical Biotechnology Center, University of Maryland Biotechnology Institute. BS, Arizona State University, 1978; PhD, University of California, 1985.

Kaper, James, (R), Professor, Biochemistry, Microbiology and Immunology, and Molecular and Cell Biology, and Chief, Bacterial Genetics Section, Center for Vaccine Development, School of Medicine. BS, University of Maryland, 1973; PhD, 1979.

Kapustin, Jane, (A), Assistant Professor, Department of Organizational Systems and Adult Health, School of

Nursing. BSN, Towson State University, 1981; MS, University of Maryland, Baltimore, 1985; PhD, University of Maryland Baltimore County, 2006.

Karaolis, David, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Technology Sydney, 1990; PhD, University of Sydney, 1994.

Karnup, Sergei, (A), Research Assistant Professor, Anatomy and Neurobiology, School of Medicine. MD, Moscow Medical Institute, 1971; PhD, Moscow University, 1980.

Kauffman, Karen, (R), Associate Professor, School of Nursing. BSN, Allentown College of St. Francis de Sales, 1984; MS, University of Pennsylvania, 1987, PhD, 1992.

Keegan, Achsah D., (R), Professor, Microbiology and Immunology, School of Medicine. BS, Duke University, 1983; PhD, Johns Hopkins University, 1989.

Kelleher, Catherine, (A), Associate Professor, Administration, Health Policy, and Informatics, School of Nursing. BS, Georgetown University, 1969; MS, University of California, 1970; MPH, Harvard University, 1979; ScD, Johns Hopkins University, 1985.

Keller, Asaf, (R), Professor, Anatomy and Neurobiology, School of Medicine. BMedSci, Ben-Gurion University, 1985; MMedSci, 1986; PhD, 1988.

Kessler, Irving, (R), Professor, Epidemiology and Preventive Medicine, School of Medicine. AB, New York University, 1952; MA, Harvard University, 1955; DrPH, 1969; MD, Stanford University, 1960; MPH, Columbia University, 1962.

Keyser, Randall, (R), Assistant Professor, Physical Therapy, School of Medicine. BS, Kent State University, 1979; MA, 1982; PhD, University of Toledo, 1985.

Kittner, Steven, (A), Associate Professor, Neurology, and Epidemiology and Preventive Medicine, School of Medicine. BA, Brown University, 1975; MD, University of Pennsylvania, 1979; PhD, Johns Hopkins University, 1981.

Kjerulff, Kristen, (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, University of California, 1971; MA, University of Illinois, 1975; PhD, 1977.

Klein, Michael, (A), Associate Professor, Biochemistry and Molecular Biology, School of Medicine. BS,

University of Massachusetts, 1980; MS, University of Illinois, 1982; PhD, 1986.

Kleinberg, Michael, (A), Associate Professor, Medicine, Infectious Diseases, School of Medicine; and Affiliate Assistant Professor, Pharmacology and Toxicology, School of Pharmacy. BS, State University of New York, 1977; MS, Albert Einstein College of Medicine, 1982; MD, PhD, 1984.

Knapp, David, (R), Professor and Dean, Pharmaceutical Health Services Research, School of Pharmacy. BSP, Purdue University, 1960; MS, 1962; PhD, 1965.

Knight, Carolyn, (R), Associate Professor, School of Social Work. BA, Goucher College, 1975; MSW, University of Maryland, 1977; PhD, 1985.

Koenig, James, (R), Professor, Psychiatry, School of Medicine. BS, University of Illinois, 1976; PhD, University of Texas, 1983.

Kolenbrander, Paul, (S), Chief of the Oral Infection and Immunity Branch of the National Institutes of Dental and Craniofacial Research at the National Institutes of Health, Biomedical Sciences, Dental School. BA, Central College, 1964; MS, University of Wisconsin, 1967; PhD, 1969.

Koo, Jae Hyung, (A), Assistant Professor, Anatomy and Neurobiology, School of Medicine. BS; Sungkyunkwan University (Korea), 1995; MS, Yonsei University, 1997; PhD, 2000.

Koos, Robert, (R), Professor and Program Director, Physiology, School of Medicine. BS, Purdue University, 1972; MS, 1975; PhD, Cornell University, 1980.

Kotetishvili, Mamuka, (A), Instructor, Epidemiology and Preventive Medicine, School of Medicine. Graduate, Zoo-Veterinarian Institute of Georgia, 1986; PhD, Kanchaveli Research Institute of Plant Protection (Tbilisi, Georgia), 1995.

Kreger, Arnold, (A), Adjunct Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Brooklyn College, 1961; PhD, University of Michigan, 1968.

Krol, William F., (A), Epidemiology and Preventive Medicine, School of Medicine. BS, University of Chicago, 1958; MS, 1964; PhD, Johns Hopkins University, 1969.

Krueger, Bruce, (R), Professor, Physiology, School of Medicine. BS, Yale University, 1970; PhD, 1975.

Krulewicz, Cara, (R), Assistant Professor, Child, Women's, and Family Health, School of Nursing. BA, University of Illinois, 1976; BS, 1982; MS, 1984; PhD, University of Maryland, 1992.

Kunz, James, (A), Assistant Professor, School of Social Work. BA, University of Virginia, 1979; MSW, University of Maryland, 1987; MA, University of Michigan, 1994; PhD, 1997.

Kverno, Karen, (A), Assistant Professor, Behavioral and Community Health, School of Nursing. BSN, University of Colorado, 1978; MA, University of Washington, 1983; PhD, George Washington University, 1994.

Kwon, H. Moo, (A), Professor, Medicine and Physiology, School of Medicine. BS, Seoul National University, 1980; MS, 1982; PhD, State University of New York, 1987.

Lakatta, Edward, (A), Associate Professor, Physiology, School of Medicine. BS, University of Scranton, 1966; MD, Georgetown University, 1970.

Lakowicz, Joseph, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BS, LaSalle College, 1970; MS, University of Illinois, 1971; PhD, 1973.

Lane, Wendy G., (A), Instructor, Epidemiology and Preventive Medicine, School of Medicine. BA, University of Pennsylvania, 1991; MD, University of Pennsylvania School of Medicine, 1995; MPH, University of North Carolina School of Public Health, 1998.

Langenberg, Patricia, (R), Professor and Program Director, Epidemiology and Preventive Medicine, School of Medicine. BS, Iowa State University, 1953; MA, Temple University, 1975; PhD, 1978.

Lederer, W. Jonathan, (R), Professor, Physiology, School of Medicine. BA, Harvard University, 1970; PhD, Yale University, 1975; MD, 1976.

Lee, Insong James, (A), Research Assistant Professor, Pharmaceutical Sciences, School of Pharmacy. BS, State University of New York at Stony Brook, 1982; PhD, University of Pennsylvania, 1990.

Lee, Seok-Woo, (A), Assistant Professor, Periodontics, Dental School. DDS, Seoul National University, 1983; MS, University of Michigan, 1998; PhD, University of Florida, 1995.

Lemaire, Gail, (A), Assistant Professor, Behavioral and Community Health, School of Nursing. BS, Boston University, 1971; MS, University of Texas, 1978; PhD, University of Maryland, 1996.

Levine, Barry, (R), Associate Professor, Pathology, School of Medicine. BS, Loyola College, 1978; PhD, Virginia Commonwealth University, 1982.

Levine, Myron, (R), Professor, Microbiology and Immunology, Epidemiology and Preventive Medicine, and Director, Center for Vaccine Development, School of Medicine; and Head, Infectious Diseases and Tropical Pediatrics Division, Pediatrics, and Head, Geographic Medicine, University of Maryland Medical System. BS, City College of New York, 1963; MD, Medical College of Virginia, 1967; DTPH, London School of Hygiene and Tropical Medicine, 1974.

Levy, Bernard, (R), Associate Professor and Program Director, Oral and Experimental Pathology, Dental School. AB, Ohio University, 1963; DDS, Western Reserve University, 1966; MSD, Indiana University, 1969.

Lewis, George, (R), Professor, Microbiology and Immunology, School of Medicine. BM, University of Hawaii, 1966; MA, University of California, 1969; PhD, 1973.

Lilly, Michael, (A), Associate Professor, Surgery, School of Medicine. BA, College of Holy Cross, 1973; MA, Columbia University, 1974; MD, Georgetown University, 1978.

Lindsey, Michael A., (A), Assistant Professor, School of Social Work. BA, Morehouse College, 1994; MSW, Howard University, 1996; MPH, University of Pittsburgh, 2001; PhD, University of Pittsburgh, 2002.

Lipscomb, Jane, (R), Associate Professor, Behavioral and Community Health, School of Nursing. BSN, Boston College, 1976; MS, Boston University, 1981; PhD, University of California, 1989.

Lipsky Jr., Michael, (R), Professor, Pathology, School of Medicine. BS, Villanova University, 1973; PhD, University of Maryland, 1979.

Litkowski, Leonard, (A), Associate Professor, Restorative Dentistry, Dental School. BS, University of Maryland, 1976; MS, 1983; DDS, 1985.

Litwack, E. David, (A), Assistant Professor, Anatomy and Neurobiology, School of Medicine. BS, University of

Chicago, 1988; PhD, Massachusetts Institute of Technology, 1995.

Livak, Ferenc, (R), Assistant Professor, Microbiology and Immunology, School of Medicine. MD, Semmelweis University School of Medicine Budapest, Hungary, 1988.

Loffredo, Christopher, (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Hartwick College, 1982; MS, University of Maryland, 1985; PhD, 1996.

Lu-Chang, A-Lien, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BS, National Taiwan University, 1971; MS, 1973; PhD, University of North Carolina, 1980.

Lucco, Alfred, (A), Associate Professor, School of Social Work. BA, Brown University, 1959; MA, University of Chicago, 1963; PhD, 1965.

Luther, Paul W., (A), Assistant Professor, Physiology, School of Medicine. BS, University of Idaho, 1977; PhD, University of Illinois at Chicago Health Science Center, 1984.

Macek, Mark D., (A), Assistant Professor, Health Promotion and Policy, Dental School. DDS, University of Nebraska Medical Center College of Dentistry, 1989; MPH, University of Illinois at Chicago School of Public Health, 1994; DrPH, University of Michigan School of Public Health, 1998.

MacKenzie, Colin, (R), Professor, Anesthesiology, and Physiology, School of Medicine. MD, Aberdeen University, 1968.

Mackerell Jr., Alexander, (R), Professor, Pharmaceutical Sciences, School of Pharmacy. BS, University of Hawaii, 1981; PhD, Rutgers University, 1985.

Macko, Richard, (R), Associate Professor, Neurology, Medicine, Gerontology, and Gerontology, School of Medicine. BA, Hiram College, 1979; MD, Ohio State University, 1987.

Macmillian, Kelley R., (A), Assistant Professor, School of Social Work. BA, Indiana University, 1973; MSW, 1984; PhD, University of Kansas, 2005.

MacVittie, Thomas, (R), Professor, Pathology and Greenbaum Cancer Center, School of Medicine. BA, Alfred University, 1964; MS, State University of New York, 1966; PhD, 1970.

Magaziner, Jay, (R), Professor, Epidemiology and Preventive Medicine, and Program Director, Gerontology, School of Medicine. BA, Case Western Reserve University, 1970; PhD, University of Chicago, 1980; MS, University of Pittsburgh, 1982.

Magder, Laurence, (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Michigan State University, 1976; MPH, University of Michigan, 1982; PhD, Johns Hopkins University, 1994.

Maguire, James H., Professor, Epidemiology and Preventive Medicine, School of Medicine. AB, Princeton University, 1970; MD, Harvard University, 1974; MPH, 1978.

Mai, Volker, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Georgia, 1992; PhD, 1999; MPH, Harvard University, 2000.

Mann, Dean, (R), Professor, Pathology, School of Medicine. BA, Goshen College, 1956; MD, St. Louis University, 1963.

Manski, Marian, (A), Assistant Professor, Dental Hygiene, Dental School. BS, University of Maryland, Baltimore, 1988; MS, 2004.

Margolis, Frank, (R), Professor, Anatomy and Neurobiology, and Program Director, Neuroscience, School of Medicine. BS, Antioch College, 1959; PhD, Columbia University, 1964.

Markelonis, George, (R), Associate Professor and Program Director, Anatomy and Neurobiology, School of Medicine. BS, University of Maryland, 1969; PhD, 1976; MS, Villanova University, 1972.

Martin, Stuart S., (A), Assistant Professor, Physiology, School of Medicine. BA, University of Virginia, 1992; PhD, University of California - San Diego, 1998.

Masri, Radi, (A), Research Assistant Professor, Biomedical Sciences, Dental School. BDS, University of Jordan, 1997; MS, University of Maryland Baltimore, 2001; PhD, 2005.

Massey, Ward, (A), Associate Professor, Restorative Dentistry, Dental School. BS, University of Adelaide, 1982; PhD, University of Sydney, 1993.

Matheson, Barbara, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, MA, Hunter College, 1963; PhD, Cornell University, 1968.

Matteson, Donald, (R), Associate Professor, Physiology, School of Medicine. BS, Massachusetts Institute of Technology, 1972; PhD, State University of New York, 1979.

Mazzocco, Gail, (A), Assistant Professor, Administration, Health Policy, and Informatics, School of Nursing. Diplom.A., Massachusetts General Hospital School of Nursing, 1963; BS, University of Maryland, 1972; MS, 1974; EdD, 1988.

McCarthy, Margaret, (R), Professor, Physiology, and Assistant Dean for Graduate Studies, School of Medicine. BA, University of Missouri, 1981; MA, 1984; PhD, Rutgers University, 1989.

McDiarmid, Melissa, (R), Associate Professor, Medicine, and Epidemiology and Preventive Medicine, School of Medicine. BA, University of Maryland, 1975; MD, 1979; MPH, Johns Hopkins University, 1986.

McDonald, Neville, (A), Associate Professor, Endodontics, Dental School. BS, University of Otago, 1975; BDS, 1978; MS, University of Maryland, 1986.

McEntee, Margaret, (R), Associate Professor, Adult Health, School of Nursing. BSN, Seton Hall University, 1968; MS, University of Maryland, 1973; PhD, 1983.

McGuire, Deborah B., (R), Professor, School of Nursing. BSN, University of Pennsylvania, 1974; MS, University of Illinois at the Medical Center, 1981; PhD, 1987.

McLenithan, John C., (A), Assistant Professor, Physiology, School of Medicine. BS, University of Rochester, 1983; PhD, Johns Hopkins University School of Medicine, 1994.

McLeskey, Sandra, (R), Associate Professor, Adult Health, School of Nursing. BS, Duke University, 1963; BSN, George Mason University, 1982; PhD, Georgetown University, 1989.

McPhaul, Kathlee M., (A), Associate Professor, School of Nursing. BSN, University of Virginia, 1979; MPH, Johns Hopkins University, 1987; PhD, University of Maryland Baltimore, 2005.

Mech, Ann, (A), Assistant Professor, Administration, Health Policy, and Informatics, and Coordinator, Legal and Contractual Services, School of Nursing. BSN, University of Maryland, 1976; MS, 1978; JD, George Washington University, 1982.

Medved, Leonid, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. MS, Kiev State University, 1977; PhD, Institute of Biochemistry, 1980; DrSci, 1991.

Meiller, Timothy, (R), Professor, Oral Medicine, Dental School. BA, Johns Hopkins University, 1970; MS, 1979; DDS, University of Maryland, 1975; PhD, 1992.

Meltzer, Stephen, (R), Professor, Medicine, and Pathology, School of Medicine. BA, State University of New York, 1975; MD, 1979; M.Music, University of Colorado, 1983.

Mezler, Richard, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. AB, New York University, 1964; PhD, University of Louisville, 1969.

Meyer, Megan, (A), Associate Professor, School of Social Work. BA, Hamilton College, 1989; MSW, University of California, 1995; PhD, 1999.

Michael, Kathleen, (A), Assistant Professor, Department of Organizational Systems & Adult Health Nursing, School of Nursing. BS, University of Washington, 1975; MSN, Seattle Pacific University, 1996; PhD, Johns Hopkins University, 2005.

Michael, Michele, (A), Assistant Professor, Child, Women's, and Family Health, School of Nursing. BSN, Creighton University, 1968; MS, University of Maryland, 1974; PhD, 1984.

Miller, Ram Ron, (A), Assistant Professor, Epidemiology and Preventive Medicine. School of Medicine. BSc, McGill University, 1991; MD, 1995; MSc, Boston University, 2002.

Minah, Glenn, (R), Professor and Program Director, Oral Biology, and Oral and Craniofacial Biological Sciences, Dental School. BA, Duke University, 1961; DDS, University of North Carolina, 1966; MS, University of Michigan, 1970; PhD, 1976.

Mishra, Shiraz, I., (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. MS, Bombay University, 1975; MBBS(MD),

1982; MA, University of California, 1988; PhD, 1992.

Misono, Hiroaki, (A), Assistant Professor, Biomedical Sciences, Dental School. BA, Sophia University, 1993; MS, 1995; PhD, 1998.

Mitchell, Braxton, (R), Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Princeton University, 1978; MPH, University of Michigan, 1982; PhD, 1987.

Mixson, Archibald, (A), Assistant Professor, Pathology, School of Medicine. BA, Vanderbilt University, 1974; MD, Emory University, 1979.

Moerchen, Victoria, (A), Associate Professor, Physical Therapy & Rehabilitation Sciences, School of Medicine. BA, Lawrence University, 1986; BS, Northwestern University Medical School, 1987; MA, University of Wisconsin-Madison, 1992; PhD, 2002.

Mong, Jessica A., (A), Assistant Professor, Pharmacology & Experimental Therapeutics, School of Medicine. BS, Gettysburg College, 1991; PhD, University of Maryland School of Medicine, 2000.

Monteiro, Mervyn, (R), Associate Professor, Neurology, and Biochemistry and Molecular Biology, School of Medicine. BS, University of London, 1979; PhD, National Institute for Medical Research, 1983.

Montgomery, Kathryn, (A), Associate Professor and Senior Specialist Clinical Management & Leadership, Education, Administration, Health Policy & Informatics, School of Nursing. BS, Barry University, 1973; MS, Catholic University of America, 1979; PhD, University of Maryland, 1997.

Moreton, J. Edward, (R), Professor, Pharmaceutical Sciences, School of Pharmacy. BS, University of Mississippi, 1966; PhD, 1971.

Morgan, William, (R), Professor, Radiation Oncology, School of Medicine. BS, University of Canterbury, 1975; MS, 1977; PhD, 1980.

Morris Jr., J. Glenn, (R), Professor, Medicine, School of Medicine. BA, Rice University, 1973; MD, Tulane University, 1977.

Morton, Patricia, (R), Associate Professor, Adult Health, School of Nursing. BS, Loyola College, 1974; BS, Johns Hopkins University, 1977; MS, University of Maryland, 1979; PhD, 1989.

Morton, Susanne M., (A), Assistant Professor, Physical Therapy and Rehabilitation Science, School of Medicine. BS, University of Illinois, 1994; MS, Washington University, 1998; PhD, 2003.

Moudgil, Kamal, (R), Associate Professor, Microbiology and Immunology, School of Medicine. MD, Medicine Punjabi University, 1979; MD, All India Institute of Medical Sciences, 1983; PhD, 1988.

Mueller, Dawn, (A), Assistant Professor, Family and Community Health, School of Nursing. BSN, Insiane University of Pennsylvania, 1990; MS, University of Maryland Baltimore, 1997; PhD, 2001.

Mullins, C. Daniel, (R), Professor and Chair, Pharmaceutical Health Services Research, School of Pharmacy. BS, Massachusetts Institute of Technology, 1986; MA, Duke University, 1991; PhD, 1994.

Mulroy, Elizabeth A., (R), Associate Professor, School of Social Work. BS, Simmons College, 1964; MSW, University of Southern California, 1972; PhD, 1986.

Munger, Steven, (R), Assistant Professor, Anatomy and Neurobiology, School of Medicine. BA, University of Virginia, 1989; PhD, University of Florida, 1996.

Munson, Carlton, (R), Professor, School of Social Work. BA, Shepherd College, 1964; MSW, University of Maryland, 1969; PhD, 1975.

Murphy, Marilyn, (A), Assistant Professor, Department of Organizational Systems & Adult Health Nursing. BSN, Carlow College, 1985; MS, University of Maryland Baltimore, 2001; MBA, University of Baltimore; PhD, University of Maryland Baltimore County, 2006.

Myslinski, Norbert, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, Canisius College, 1969; PhD, University of Illinois, 1973.

Nahm, Eun-Shim, (R), Assistant Professor, School of Nursing. BSN, Woman's University, 1989; MS, 1995; PhD, University of Maryland School of Nursing, 2003.

Nakashima, Mitsuko, (A), Assistant Professor, School of Social Work. BA, Nanzan University, 1985; MA, University of Kansas, 1988; MSW, 1991; PhD, 2002.

Nataro, James, (R), Professor and Associate Chair for Pediatric Research, Pediatrics, School of Medicine. BS, University of Notre Dame, 1981; MD, PhD, University of Maryland, 1987.

- Nauman, Robert**, (R), Associate Professor and Program Director, Oral and Craniofacial Biological Sciences, Dental School. BS, Pennsylvania State University, 1963; MS, University of Massachusetts, 1965; PhD, 1968.
- Nemoy, Lucia**, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Tufts University, 1991; MSc, University of Oxford 1993 MD, Tufts University School of Medicine, 1997.
- Nikitakis, Nikolaos**, (R), Assistant Professor, Diagnostic Sciences and Pathology, Dental School. DDS, University of Athens, 1996; PhD, University of Maryland Baltimore, 2002.
- Ning, Yi**, (R), Assistant Professor, Pathology, School of Medicine. MD, Shanghai First Medical College, 1984; PhD, Baylor College of Medicine, 1991.
- Njar, Vincent**, (R), Associate Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, University of Ibadan, 1976; PhD, University of London, 1980.
- Noel, Jason**, (A), Assistant Professor, Pharmaceutical Health Services Research, School of Pharmacy, BS, Rutgers University College of Pharmacy; PharmD, 1999.
- Oh, Tae**, (R), Professor, Anatomy and Neurobiology, School of Medicine. BS, Seoul National University, 1966; MS, University of Saskatchewan, 1971; PhD, 1973.
- Oktay, Julianne**, (R), Professor and Program Director, School of Social Work. BA, Antioch College, 1964; MSW, University of Michigan, 1966; PhD, 1974.
- O'Neil, Carol**, (A), Assistant Professor, Behavioral and Community Health, School of Nursing. BS, Cornell University, 1969; MA, Columbia University, 1976; M.Ed., 1978; PhD, University of South Florida, 1988.
- Oram, Daina**, (A), Assistant Professor, Biomedical Sciences, Dental School. BS, Georgia Institute of Technology, 1992; PhD, Emory University, 1999.
- Orlin, Malinda**, (R), Vice President for Academic Affairs and Dean, Graduate School, and Associate Professor, School of Social Work. BA, University of Michigan, 1964; MSW, 1966; PhD, University of Pittsburgh, 1973.
- Orwig, Denise**, (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Pittsburgh, 1989; MS, Johns Hopkins University, 1993; PhD, Pennsylvania State University, 1998.
- Oswald, Lynn M.**, (A), Assistant Professor, Family and Community Health, School of Nursing. BS, University of Wisconsin, 1971; MSN, University of Texas, 1990; PhD, 2001.
- Overholser, C. Daniel**, (R), Professor, Oral Medicine, Dental School. BS, University of Notre Dame, 1966; DDS, Indiana University, 1970; MSD, 1972.
- Ozbolt, Judy**, (R), Professor, Organizational Systems and Adult Health, School of Nursing. BS, Duke University, 1967; MS, University of Michigan, 1974; PhD, 1976.
- Palley, Howard**, (R), Professor, School of Social Work. BA, Brooklyn College, 1957; MS, Yeshiva University, 1950; PhD, Syracuse University, 1963.
- Palumbo, Francis**, (R), Professor, Pharmaceutical Health Services Research, School of Pharmacy. BSP, Medical College of South Carolina, 1968; MS, University of Mississippi, 1973; PhD, 1974.
- Papadimitriou, John**, (A), Associate Professor, Pathology, School of Medicine. MD, University of Athens, 1975; MD, University of Heidelberg, 1978; PhD, University of Maryland, 1991.
- Parente, Frederick**, (A), Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, California State University at San Diego; MS, University of New Mexico, 1974; PhD, 1975.
- Parker, M. Elaine**, (A), Associate Professor and Program Director, Dental Hygiene, Dental School. RDH, University of Detroit, 1964; BS, University of Maryland, 1978; PhD, 1994; MS, Johns Hopkins University, 1982.
- Passaniti, Antonino**, (A), Associate Professor, Pathology, School of Medicine and Greenebaum Cancer Center. BA, Catholic University, 1976; PhD, University of Virginia, 1982.
- Pasetti, Marcela F.**, (A), Assistant Professor, Department of Pediatrics and Chief, Applied Immunology, Center for Vaccine Development. Biochemist. Orientation, University of Buenos Aires, 1990; PhD, 1994.
- Pauza, C. David**, (R), Professor, Microbiology and Immunology, School of Medicine. BA, San José State University, 1975; PhD, University of California, 1981.

Pecukonis, Edward, (R), Associate Professor and Director, Center for Social Work Education in Maternal and Child Health, School of Social Work. BS, Towson University, 1978; MSW, Smith College, 1982; PhD, University of Maryland, 1993.

Peragallo, Nilda, (R), Associate Professor, Behavioral and Community Health, School of Nursing. BSN, University of Chile, 1971; MSN, University of West Virginia, 1979; DrPH, University of Texas, 1991.

Pereira, Edna, (A), Assistant Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Federal Technical School of Chemistry, 1982; PharmD, Federal University of Rio de Janeiro, 1987; MS, 1989; PhD, University of Maryland, 1996.

Perencevich, Eli, (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Michigan, 1990; MD, Case Western Reserve University, 1994; MS, Harvard University, 2001.

Picot, Sandra, (R), Associate Professor, Adult Health, School of Nursing. BSN, University of Virginia, 1977; MSN, 1983; PhD, University of Maryland, 1992.

Pineiro, Silvia, A., (A), Assistant Professor, Medical and Research Technology, School of Medicine. MSc, National South University, 1987; PhD, 1992.

Plaut, S. Michael, (R), Associate Professor, Psychiatry, School of Medicine. BA, Adelphi University, 1965; PhD, University of Rochester, 1969.

Plowden, Keith, (R), Assistant Professor, Adult Health, School of Nursing. BSN, Pace University, 1987; MS, Central Michigan University, 1992; PhD, Walden University, 1996; MSN, La Salle University, 1998.

Plowe, Christopher, (A), Associate Professor, Center for Vaccine Development, Microbiology and Immunology, and Epidemiology and Preventive Medicine, School of Medicine. BA, Cornell University, 1982; MD, 1986; MPH, Columbia University, 1991.

Polli, James, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. BS, Philadelphia College, 1989; PhD, University of Michigan, 1993.

Pollin, Toni, I., (A), Assistant Professor, Human Genetics, School of Medicine. BS, George Washington University, 1993; MS, University of Minnesota, 1997; PhD, University of Maryland, Baltimore, 2004.

Powell, Elizabeth, (R), Assistant Professor, Anatomy and Neurobiology, School of Medicine. BS, Johns Hopkins University, 1990 MS, Rutgers University, 1993; PhD; Rutgers University, 1997.

Powell, Jan, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Otago, 1987; MS, 1988; PhD, 1992.

Pradel, Francoise, (R), Associate Professor and Graduate Program Director, Pharmaceutical Health Services Research, School of Pharmacy. PharmD, University of Paris Sud, 1979; MS, University of North Carolina, 1995; PhD, 1999.

Preis, Frederick, (A), Clinical Professor, Orthodontics, Dental School. BS, Loyola College, 1959; DDS, Georgetown University, 1966.

Proulx, Joseph, (R), Professor, Administration, Health Policy, and Informatics, School of Nursing. BS, University of Bridgeport, 1961; MSN, University of Pennsylvania, 1966; ED, Columbia University, 1972.

Puche, Adam, (R), Assistant Professor, Anatomy and Neurobiology, School of Medicine. BSc, University of Melbourne, 1991 and 1992; PhD, 1996.

Pumplin, David, (R), Professor, Anatomy and Neurobiology, School of Medicine. BS, Michigan State University, 1963; PhD, University of Illinois, 1973.

Quinn, Charlene, C., (A), Assistant Professor, Gerontology, Epidemiology and Preventive Medicine, School of Medicine. BSN, Duke University, 1976; MS, University of Maryland Baltimore, 1981; PhD, Johns Hopkins School of Hygiene and Public Health, 1998.

Qiu, Yun, (A), Associate Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Zhongshan University, 1988; PhD, Rutgers University, 1995.

Radulovic-Balasubramanian, Suzana, (R), Assistant Professor, Microbiology and Immunology, School of Medicine. MD, University of Ljubljana, 1986; MS, 1989; PhD, 1992.

Ramos-Marcuse, Fatima M., (A), Assistant Professor, School of Nursing. BS, University of Maryland Baltimore, 1985; MS, Columbia University, 1992; PhD, Yeshiva University, 2001.

Ramsay, David, (R), Professor, Physiology, School of Medicine, and President, University of Maryland Baltimore. BA, Worcester College, 1960; DPhil and MA, University Laboratory of Physiology, 1963; BM and BCh, Radcliffe Infirmary, 1966; DM, University of Oxford, 1982.

Randall, William, (R), Associate Professor and Co-Program Director, Pharmacology and Experimental Therapeutics, School of Medicine. BS, University of California, 1975; MS, 1978; PhD, 1983.

Rasetto, Flavio, (A), Assistant Professor, Restorative Dentistry, Dental School. D.D.S., National University of Rosario, 1990; MS, University of Maryland, 2000.

Rauch, Julia, (R), Professor, School of Social Work. BA, Swarthmore College, 1957; MSW, University of Pennsylvania, 1962; PhD, Bryn Mawr College, 1974.

Reitz Jr., Marvin, (R), Associate Professor, Microbiology and Immunology, School of Medicine, and Associate Director, Division of Basic Sciences, Institute for Human Virology, Medical Biotechnology Center, University of Maryland Biotechnology Institute. BS, Western Maryland College, 1965; PhD, Purdue University, 1970.

Reece, E. Albert, (R), Vice President for Medical Affairs, and Dean, School of Medicine. BS, Long Island University; MBA, Temple University; PhD, University of the West Indies; MD, New York University.

Rejent, Deborah, (R), Assistant Professor, School of Social Work. BA, University of California, 1973; MA, 1974; MS, Columbia University, 1979; DSW, 1991.

Ren, Ke, (R), Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. MD, Hubei Medical University, 1981; PhD, University of Iowa, 1990.

Resnick, Barbara, (R), Assistant Professor, Adult Health, School of Nursing. BSN, University of Connecticut, 1978; MSN, University of Pennsylvania, 1982; PhD, University of Maryland, 1996.

Reynolds, Mark, (R), Associate Professor, Periodontics, Dental School. BA, University of Maryland, 1978; MA, 1982; DDS, 1986; PhD, 1999.

Rhee, Juong, (R), Associate Professor, Radiation Oncology, School of Medicine. BS, Seoul National University, 1970; MS, 1975; PhD, University of Minnesota, 1983.

Ringel, Shoshana, (A), Assistant Professor, School of Social Work. BA, Hunter College, 1982; MSW, 1984; PhD, Smith College, 2001.

Rizk, Mary Ann, (A), Assistant Professor, Dental School. BS, American University of Beirut, 1986; BS, University of Maryland, 1989; PhD, University of Maryland, 2002.

Ro, Jim, (R), Assistant Professor, Biomedical Sciences, Dental School. BS, Towson University, 1984; MA, 1989; PhD, University of Maryland, 1994.

Roberts, Rosalinda, (A), Professor, Psychiatry, School of Medicine. BS, University of California, 1979; PhD, 1986.

Rodgers, Mary, (R), Professor and Chair, Physical Therapy and Rehabilitation Science, School of Medicine. BS, University of North Carolina, 1976; MS, 1981; PhD, Pennsylvania State University, 1985.

Roerig, Birgit, (R), Assistant Professor, Anatomy and Neurobiology, School of Medicine. Diploma, Ruhr-University Bochum, 1990; PhD, Max-Planck-Institute for Psychiatry, 1993.

Rogers, Terry, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BA, Cornell University, 1970; MS, University of California, 1974; PhD, 1977.

Roghmann, Mary-Claire, (R), Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Rochester, 1986; MD, Johns Hopkins University, 1990; MS, University of Maryland, 1997.

Romani, William, (A), Assistant Professor, Physical Therapy, School of Medicine. BS, University of Delaware, 1990; MS, Cornell University, 1992; PhD, University of Virginia, 1998.

Romberg, Elaine, (A), Professor, Oral Health Care Delivery, Dental School. BA, Vassar College, 1960; PhD, University of Maryland, 1977.

Rosen, Gerald, (R), Professor, Pharmaceutical Sciences, School of Pharmacy. BS, Lowell Technological Institute, 1965; PhD, Clarkson College of Technology, 1969; JD, Duke University, 1979.

Ross, Douglas, (R), Professor, Medicine, Greenbaum Cancer Center, and Pathology, School of Medicine. BS, McGill University, 1968; PhD, Emory University, 1972; MD, 1974.

Royak-Schaler, Renee, (R) Associate Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Washington University, 1968; MEd, University of Maryland; PhD, University of Maryland.

Rubin, Judith, (A), Professor, Epidemiology and Preventive Medicine, and Pediatrics, School of Medicine. AB, Bryn Mawr College, 1964; MD, University of Pennsylvania, 1969; MPH, Johns Hopkins University, 1975.

Rubler, Constance, (A), Assistant Clinical Professor, Orthodontics, Dental School. BS, Rensselaer University, 1973; BS, 1974; MS, 1975; DDS, University of Maryland, 1979.

Rus, Horea, (R), Assistant Professor, Neurology/Toxicology, School of Medicine. MD, University of Medicine and Pharmacy, 1980; PhD, 1992.

Russ, David, (A), Assistant Professor, Physical Therapy & Rehabilitation Sciences, School of Medicine. BA, Stanford University, 1989; MPH; 1993, PhD, University of Delaware, 2001.

Sacci, Jr., John, (R), Assistant Professor, Microbiology and Immunology, School of Medicine. BA, Bates College, 1978; PhD, University of Maryland, 1989.

Salvato, Maria, (R), Professor, Microbiology and Immunology, School of Medicine; and Institute of Human Virology, Medical Biotechnology Center, University of Maryland Biotechnology Institute.

Sarlani, Eleni, (A), Assistant Professor, Biomedical Sciences, Dental School. DDS, University of Athens, Greece, 1996; PhD, University of Maryland, Baltimore, 2003.

Sattler, Barbara, (A), Associate Professor, Behavioral and Community Health, School of Nursing. BS, University of Baltimore, 1980; MPH, Johns Hopkins University, 1982; PhD, 1990.

Satyshur, Rosemarie, (A), Assistant Professor, Child, Women's, and Family Health, School of Nursing. BSN, Thomas Jefferson University, 1982; MSN, Catholic University of America, 1984; DNSc, 1991.

Sauk, John, (R), Professor and Chair, Oral and Experimental Pathology, Dental School. BS, University of Detroit, 1963; DDS, 1967; MS, University of Minnesota, 1971.

Sausville, Edward, A., (R), Adjunct Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Manhattan College, 1973; PhD, Albert Einstein College of Medicine, 1978; MD, 1979.

Scherer, Roberta, (A), Epidemiology and Preventive Medicine, School of Medicine. BA, Thiel College, 1967; MS, George Washington University, 1970; PhD, Johns Hopkins University, 1987.

Schneider, Martin, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BS, Yale University, 1963; PhD, Duke University, 1969.

Schoenbaum, Geoffrey, (A) Assistant Professor, Anatomy and Neurobiology, BS, University of Georgia at Athens, 1989; PhD, University of North Carolina, 1994; MD, University of North Carolina, 1996.

Schulze, Dan, (R), Associate Professor, Microbiology and Immunology, School of Medicine. BS, Indiana University, 1969; MA, Miami University, 1972; PhD, University of Texas, 1978.

Schwarcz, Robert, (R), Professor, Psychiatry, and Deputy Director for Neuroscience, Maryland Psychiatric Research Center, School of Medicine. BS, University of Vienna, 1968; PhD, 1974.

Schweitzer, Julie, (R), Assistant Professor, Neuroscience, School of Medicine. AB, University of Southern California, 1982; MS, University of Massachusetts, 1987; PhD, 1990.

Scott, David W., (R), Professor, Microbiology and Immunology, School of Medicine. MS, University of Chicago, 1964; PhD, Yale University, 1969.

Scott, Doris, (A), Assistant Professor, Behavioral and Community Health, School of Nursing. BSN, Dillard University, 1963; MS, Boston University, 1968; PhD, University of Maryland, 1986.

Scrandis, Debra A., (A), Assistant Professor, School of Nursing. BS Fitchburg State College, (1989); MS, Boston College; PhD, Barry University, 2003.

Seibel, Werner, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, Brooklyn College, 1965; MA, Hofstra University, 1968; PhD, Virginia Commonwealth University, 1972.

Shamoo, Adil, (R), Professor, Biochemistry and Molecular Biology, School of Medicine. BS, University of

Baghdad, 1962; MS, University of Louisville, 1966; PhD, City University of New York, 1969.

Shamsuddin, Abulkalm, (R), Professor, Pathology, School of Medicine. MBBS, University of Dhakar, 1972; PhD, University of Maryland, 1980.

Shapiro, Michael, (A), Associate Professor, Department of Pharmaceutical Sciences, School of Pharmacy. BS, University of Pennsylvania, 1969; PhD, Texas A & M University, 1977.

Shapiro, Paul, (R), Associate Professor and Graduate Program Director, Pharmaceutical Sciences, School of Pharmacy. BS, University of Wisconsin, 1987; PhD, University of Vermont, 1995.

Shardell, Michelle, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Florida, 1998; MS, University of Michigan, 2000; PhD, Johns Hopkins University, 2004.

Shaughnessy, Marianne, (A), Assistant Professor, Adult Health, School of Nursing. BS, University of Pennsylvania, 1984; MS, 1989; PhD, 1996.

Shaya, Fadia, (R), Research Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. BS, American University of Beirut; MPH; PhD, Johns Hopkins University.

Shadaimah, Corey, (A), Assistant Professor, School of Social Work. LLB, Tel Aviv University School of Law 1992; LLM, University of Pennsylvania Law School, 1998; PhD, Bryn Mawr College, 2005.

Shelton, Preston, (A), Associate Professor, Pediatric Dentistry, Dental School. BS, John Carroll University, 1963; DDS, University of Michigan, 1967; MS, University of Nebraska, 1971.

Shepard, Paul, (A), Psychiatry, School of Medicine. BS, Baker University, 1975; MS, North Texas State University, 1978; PhD, University of Texas, 1986.

Shiple, Michael, (R), Professor and Chair, Anatomy and Neurobiology, School of Medicine. BA, University of Missouri, 1967; PhD, Massachusetts Institute of Technology, 1972.

Shirliff, Mark E., (R), Assistant Professor, Biomedical Sciences, Dental School. BS, University of Houston, 1993; PhD, University of Texas Medical Branch, 2001.

Shroff, Bhavna, (R), Associate Professor, Orthodontics, Dental School. BC, University of Paris, 1977; DDS, 1982; M. Human Biology, 1983; MS, University of Connecticut, 1989.

Shuldiner, Alan, (R), Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Lafayette College, 1979; MD, Harvard University, 1984.

Silverberg, Steven, (R), Professor, Pathology, School of Medicine. AB, Brooklyn College, 1958; MD, Johns Hopkins University, 1962.

Silverman, David, (R), Professor, Medicine, Microbiology and Immunology, and Pathology, School of Medicine. BS, Muhlenberg College, 1965; MS, University of Tennessee, 1967; PhD, West Virginia University, 1971.

Silverman, Henry, (A), Professor, Medicine, School of Medicine. BS, Rensselaer Polytechnic Institute, 1974; MS, 1974; MD, Johns Hopkins University, 1978.

Simard, J. Marc, (R), Professor, Neurosurgery, and Pathology, and Associate Professor, Physiology, School of Medicine. BA, St. Anselm College, 1972; MD, PhD, Creighton University, 1981.

Simoni-Wastila, Linda, (R), Research Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. BS, University of North Carolina, 1985; MPH, 1987; PhD, Brandeis University, 1993.

Sjodin, Raymond, (R), Professor Emeritus, School of Medicine. BS, California Institute of Technology, 1951; PhD, University of California, 1955.

Smith, Barbara, (R), Professor and Associate Dean of Research, School of Nursing. BSN, Case Western Reserve University, 1975; MSN, 1978; PhD, Ohio State University, 1986.

Smith, Claudia, (A), Assistant Professor, Behavioral and Community Health, School of Nursing. BS, University of Maryland, 1965; PhD, 2000; MPH, University of North Carolina, 1971.

Smith, Cynthia, (R), Assistant Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BA, University of Colorado, 1970; PhD, University of Michigan, 1975.

Smith, David, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Brigham Young University, 1991; MS, 1993; MA,

Princeton University, 1995; PhD, 1998.

Smith, Gary, (A), Professor, Pharmaceutical Health Services Research, School of Pharmacy. PharmD, University of California, 1966.

Smith, Rachel, (A), Assistant Professor, Behavioral and Community Health, School of Nursing. BSN, University of Virginia, 1975; MSN, Catholic University of America, 1978; PhD, University of Maryland, 1996.

Soeken, Karen, (R), Associate Professor, Administration, Health Policy, and Informatics, School of Nursing. BA, Valparaiso University, 1965; MA, University of Maryland, 1970; PhD, 1979.

Soifer, Steven, (A), Associate Professor, School of Social Work. BS, Denison University, 1976; MSW, Washington University, 1980; PhD, Brandeis University, 1988.

Sorkin, John D., (R), Assistant Professor, Gerontology, School of Medicine. BS, Brooklyn College, 1975; MD, Universidad Autonoma de Guadalajara, 1984; PhD, Johns Hopkins School of Hygiene and Public Health, 1999.

Sowers, Kevin, (A), Assistant Professor, Marine-Estuarine-Environmental Sciences, School of Medicine; and Molecular and Cell Biology, Center of Marine Biotechnology, University of Maryland Biotechnology Institute. BA, State University College of New York, 1976; MA, 1979; PhD, Virginia Polytechnic Institute, 1994.

Spitznagel, John, (A), Assistant Professor, Periodontics, Dental School. BS, University of North Carolina, 1977; DDS, 1982; PhD, University of Texas, 1994.

Squibb, Katherine, (R), Associate Professor and Program Director, Toxicology, School of Medicine. BS, University of Wisconsin, 1971; MS, Rutgers University, 1974; PhD, 1977.

Stanhope, Steven, (S), Director, Physical Disabilities Branch, Warren Grant Magnuson Clinical Center, National Institutes of Health, Department of Physical Therapy & Rehabilitation Science, School of Medicine. BS, Boston University, 1980; MA, University of Maryland, 1982; PhD, 1985.

Stass, Sanford, (R), Professor, Medicine, Chair, Pathology, Program Director, Oncology, and Interim Chair, Medical and Research Technology, School of Medicine. BA, University of California, 1965; MD, University of Missouri, 1971.

Steinberg, Eileen, (A), Instructor, Epidemiology and Preventive Medicine, School of Medicine. BS, University of Michigan, 1975; MD, 1979; MS, University of Maryland, Baltimore, 2001.

Steinberg, Lisa Schwartz, (A), Genetic Counselor, Human Genetics, School of Medicine. BS, Cornell University, 1990; MS, University of Pittsburgh, 1992.

Stine, O. Colin, (R), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Kalamazoo College, 1976; MS, University of Virginia, 1983; PhD, 1986.

Stolley, Paul, (R), Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, Lafayette College, 1957; MD, Cornell University, 1962; MPH, Johns Hopkins University, 1968.

Stone, Maureen, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, City University of New York, 1969; MS, Boston University, 1971; PhD, University of Maryland, 1979.

Stone, Theodore, (A), Assistant Professor, Administration, Health Policy, and Informatics, and Director, Learning Technologies and Media Center, School of Nursing. BA, University of Maryland, 1976; MA, 1988; PhD, 1991.

Strassler, Howard, (A), Professor, Restorative Dentistry, Dental School. BS, State University of New York, 1971; DMD, University of Pennsylvania, 1975.

Strauch, Mark, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, Purdue University, 1977; PhD, University of Michigan, 1983.

Strickland, Dudley, (R), Professor, Department of Physiology, School of Medicine. BS, Bethany Nazarene College, 1973; PhD, University of Kansas, 1978.

Strickland, G. Thomas, (R), Professor, Epidemiology and Preventive Medicine, and Microbiology and Immunology, School of Medicine. BA, University of North Carolina, 1956; MD, 1960; PhD, London School of Hygiene and Tropical Medicine, 1974.

Strieder, Frederick, (A), Clinical Associate Professor, School of Social Work. BS, Gannon University, 1971; MS, Case Western Reserve University, 1977; PhD, University of Maryland, 1990.

Strome, Scott, (A), Chairman, Department of Otorhinolaryngology, Molecular Medicine, School of Medicine. BS, Dartmouth College, 1987; MD, Harvard Medical School, 1991.

Strovel, Erin, (A), Assistant Professor, Human Genetics, School of Medicine. BS, Western Maryland College, 1993; PhD, University of Maryland, Baltimore.

Stuart, Bruce, (R), Professor, Pharmaceutical Health Services Research, School of Pharmacy. BA, Whitman College, 1965; MA, Washington State University, 1968; PhD, 1970.

Stull Jr., Donald, (R), Associate Professor, Adult Health, School of Nursing. BA, University of Washington, 1979; MA, 1981; PhD, 1986.

Sulakvelidze, Alexander, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Tbilisi State University, 1986; PhD, Tbilisi State Medical University, 1993.

Sun, Chen-Chih, (R), Professor, Pathology, School of Medicine. MD, National Taiwan University, 1970.

Swann, Peter W., (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. MS, University of Utrecht, 1989; PhD, 1993.

Sweeting, Linda, (S), Professor, Chemistry, Towson University. BS, University of Toronto, 1964; MA, 1965; PhD, University of California, 1969.

Sydiskis, Robert, (R), Associate Professor, Oral and Craniofacial Biological Sciences, Dental School. BA, University of Bridgeport, 1961; PhD, Northwestern University, 1965.

Syme, Sheryl, (A), Assistant Professor, Dental Hygiene, Dental School. BS, University of Maryland, 1988; MS, 1993.

Sztein, Marcelo, (R), Professor, Pediatrics, and Center for Vaccine Development, School of Medicine. MD, University of Buenos Aires, 1976.

Tagamets, Malle, A., (A), Assistant Professor, Neuroscience, School of Medicine. BS, University of Maryland, 1978; MA, 1984; MS, 1988; PhD, 1994.

Tan, Ming, (A), Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Wuhan University,

1982; MS, Central China Normal University, 1986; PhD, Purdue University, 1990.

Tang, Cha-Min, (A), Assistant Professor, Neurology, Physiology, and Pathology, School of Medicine. BS, Massachusetts Institute of Technology, 1975; MS, 1975; MD, University of Pennsylvania, 1981; PhD, 1982.

Thaker, Gunvant, (A), Associate Professor, Psychiatry, School of Medicine. MD, Baroda University, India, 1978.

Thomas, Sue, (R), Professor, Adult Health, School of Nursing. BS, University of Maryland, 1969; MS, 1972; PhD, 1979.

Thompson, Linda, (R), Associate Professor and Chair, Child, Women's, and Family Health, School of Nursing. BSN, Wayne State University, 1974; MSN, 1978; MPH, Johns Hopkins University, 1985; PhD, 1986.

Thompson, Loren, (A), Adjunct Assistant Professor, Physiology and Associate Professor, Obstetrics, Gynecology, and Reproductive Sciences, School of Medicine. BA, Augustana College, 1977; MS, University of Minnesota, 1979; PhD, Michigan State University, 1984.

Thompson, Richard, (R), Associate Professor, Biochemistry and Molecular Biology, School of Medicine. BA, Northwestern University, 1975; PhD, University of Illinois, 1981.

Thompson, Scott, (R), Associate Professor, Physiology, School of Medicine. BS, Cornell University, 1979; PhD, Stanford University, 1986.

Thompson, Van P., (R), Professor, Restorative Dentistry, Dental School. BS, Rensselaer Polytechnic Institute, 1966; PhD, 1971; DDS, University of Maryland, 1979.

Thrasher, Terry, (R), Professor, Surgery and Physiology, School of Medicine. BS, Eckerd College, 1971; PhD, University of Florida, 1976.

Thut, Paul D., (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. AB, Hamilton College, 1965; MS, University of Rhode Island, 1968; PhD, Dartmouth School of Medicine, 1971.

Tice, Carolyn J., (R), Associate Dean and Chair, Department of Social Work, UMBC. BSW, West Virginia University, 1973; MSW, Temple University, 1976; DSW, University of Pennsylvania, 1987.

Tilbury, Mary, (A), Assistant Professor, Administration,

Health Policy, and Informatics, School of Nursing. BSN, Duke University, 1959; MS, University of Maryland, 1977; EdD, Virginia Polytechnic Institute and State University, 1981.

Tinanoff, Norman, (A), Professor and Chair, Pediatric Dentistry, Dental School. BA, Gettysburg College, 1967; DDS, University of Maryland, 1971; MS, University of Iowa, 1973.

Ting, Laura, (A), Associate Professor, School of Social Work. AB, Columbia University, 1987; MS, 1989, PhD, University of Maryland Baltimore, 2003.

Tomkinson, Alan E. (R), Professor, Molecular and Cell Biology, School of Medicine. BSC, University of New Castle, 1979; PhD, 1983.

Tommasello, Anthony, (A), Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. BS, University of Maryland, 1973; MS, 1981; MS, 1988; PhD, 2000.

Tonelli, Leonardo, (A), Assistant Professor, Department of Psychiatry, School of Medicine. BS/MS, Cordoba University; 1983-1991; PhD, 1997.

Toth, Eric (A), Assistant Professor, Biochemistry and Molecular Biology, School of Medicine. BA, University of Pennsylvania, 1992; PhD, University of California, 1999.

Tracy, J. Kathleen, (A), Instructor, Epidemiology and Preventive Medicine, School of Medicine. BA, University of Kentucky, 1992; MS, University of Maryland Baltimore County, 2001; PhD, University of Maryland Baltimore County, 2003.

Traub, Richard, (R), Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, State University of New York, 1981; PhD, 1986.

Trinkoff, Alison, (R), Associate Professor, Behavioral and Community Health, School of Nursing. BSN, University of Rochester, 1978; MPH, University of North Carolina, 1980; ScD, Johns Hopkins University, 1987.

Trudeau, Matthew C., (A), Assistant Professor, Physiology, School of Medicine. BS, University of Wisconsin-Madison, 1992; PhD, 1998

Tsoukleris, Mona, (A), Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. BS, University of Maryland, 1983; PhD, 1987.

Undie, Ashiwel, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. B.Pharm., University of Nigeria, 1981; M.Pharm., 1983; Ph.D., Medical College of Pennsylvania, 1990.

Vargas, Clemencia, (A), Assistant Professor, Pediatric Dentistry, Dental School. DDS, University of Antioquia, 1982; PhD, Arizona State University, 1994.

Varghese, Raju, (R), Associate Professor, School of Social Work. BS, Kerla University, India, 1958; DSSA, Madras School of Social Work, 1961; MSW, University of Pennsylvania, 1969; EdD, Temple University, 1976; MPH, Johns Hopkins University, 1983.

Varma, Shambhu, (R), Professor, Ophthalmology, School of Medicine. BS, University of Allahabad, 1955; MS, 1957; PhD, University of Rajasthan, 1964.

Venezia, Richard, (R), Professor, Pathology, School of Medicine. BS, LeMoyne College, 1967; MS, University of Dayton, 1972; PhD, University of Rochester, 1977.

Via, Charles, (R), Associate Professor, Medicine, and Microbiology and Immunology, School of Medicine. BA, University of Virginia, 1969; MD, 1973.

Villagra, Federico, (A), Assistant Professor, Physical Therapy & Rehabilitation Sciences, School of Medicine. BS, Universidad Complutense, Spain, 1987; MS; University of Birmingham, United Kingdom, 1989; PhD, 1994.

Virmani, Renu, (A), Adjunct Professor, Pathology, School of Medicine. MD, Delhi University, 1967.

Vogel, Bruce, (A), Assistant Professor, Physiology, School of Medicine. BA, Rutgers College, 1981; PhD, Rutgers University, 1988.

Vogel, Michael, (R), Associate Professor, Psychiatry, Neuroscience Program, School of Medicine. BS, University of Texas, 1979; PhD, Yale University, 1985; MPhil, 1985.

Vogel, Stefanie, (R), Professor, Microbiology and Immunology, School of Medicine. BS, University of Maryland, 1972; PhD, 1977.

Vucenik, Ivana, (R), Associate Professor and Program Director, Medical and Research Technology, School of Medicine. BS, University of Zagreb, 1969; MS, 1975; PhD, 1987.

- Wade, James**, (R), Professor, Physiology, School of Medicine. BA, University of Chicago, 1967; PhD, Princeton University.
- Wagner, Mark**, (A), Professor, Pediatric Dentistry, Dental School. AB, Birmingham Southern College, 1959; DMD, University of Alabama, 1963.
- Walker, Kimberly**, (A), Assistant Professor, Medical and Research Technology, School of Medicine. BS, University of Maryland, 1986; PhD, Virginia Commonwealth University, 1993.
- Waltz, Carolyn**, (R), Professor, Administration, Health Policy, and Informatics, and Associate Dean for Academic Affairs, School of Nursing. BS, University of Maryland, 1963; MS, 1968; PhD, University of Delaware, 1975.
- Wang, Hongbing**, (A), Assistant Professor, Pharmaceutical Sciences, School of Medicine. MB, Shanxi Medical University, 1986; MS, 1989; PhD, 1996.
- Wang, Jia Bei**, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy, and Pathology, School of Medicine. MD, Tong-Ji Medical University, 1982; MS, Institute of Pharmacology and Toxicology, 1985; PhD, University of Maryland, 1991.
- Wang, Jian-Ying**, (R), Associate Professor, Surgery and Pathology, School of Medicine. MD, Sun Yat-Sen Medical University, 1979; MS, 1983; PhD, Beijing Medical University, 1986.
- Wang, Xin Wei**, (A), Adjunct Associate Professor, Pathology, School of Medicine. BS, Shanghai First College, 1982; MS, Chinese Academy of Sciences, 1984; PhD, New York University, 1991.
- Wang, Yibin**, (R), Assistant Professor, Physiology, School of Medicine. BS, State University of New York, 1988; PhD, Baylor College of Medicine, 1993.
- Ward, Christopher**, (A), Assistant Professor, Adult Health, School of Nursing. BS, Virginia Polytechnic Institute and State University, 1989; MS, 1991; PhD, Virginia-Maryland Regional College of Veterinary Medicine, 1996.
- Warnick, Jordon**, (R), Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Massachusetts College, 1963; PhD, Purdue University, 1968.
- Weber, David**, (R), Assistant Professor and Program Director, Biochemistry, and Molecular Biology, School of Medicine. BS, Muhlenberg College, 1984; PhD, University of North Carolina, 1988.
- Wei, Feng**, (A), Research Assistant Professor, Oral and Craniofacial Biological Sciences, Dental School. MD, Hubei Medical University, 1984; MS, Tongji Medical University, 1989; PhD, Chinese Academy of Sciences, 1994.
- Weiner, Myron**, (R), Associate Professor, Pharmaceutical Sciences, School of Pharmacy. BS, University of Maryland, 1966; PD, 1972.
- Weinreich, Daniel**, (R), Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Bethany College, 1964; PhD, University of Utah, 1970.
- Weiss, David, G.**, (A), Medical Statistician, Cooperative Studies Program, VA Maryland Health Care System, Epidemiology and Preventive Medicine, School of Medicine, BS, Duquesne University, 1968; MS, Medical College of Virginia, 1972; PhD, 1974.
- Weiss, Sheila**, (R), Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. BS, University of Maine, 1981; MS, Northeastern University, 1986; PhD, Johns Hopkins University, 1996.
- Weist, Mark**, (R), Professor, Department of Psychiatry, School of Medicine. BA, West Chester University, 1981; MA, West Virginia, 1985; MS, Virginia Polytechnic Institute and State University, 1988; PhD, 1991.
- Welling, Paul**, (R), Professor, Physiology, School of Medicine. BS, University of Kansas, 1983; MD, University of Kansas, 1988.
- Whitall, Jill**, (R), Associate Professor, Physical Therapy, School of Medicine. BEd, Keele University, 1974; MA, University of London, 1982; PhD, University of Maryland, 1988.
- White, Barbara**, (R), Professor, Medicine, and Associate Professor, Microbiology and Immunology, School of Medicine. BA, Wilson College, 1971; MD, University of Pennsylvania, 1975.
- Wier, W. Gil**, (R), Professor, Physiology, School of Medicine. BS, Utah State University, 1971; PhD, University of Utah, 1978.

- Wilks, Angela**, (R), Associate Professor, Associate Dean, Graduate Studies and Research, Pharmaceutical Sciences, School of Pharmacy. BS, University of Lancaster, 1983; PhD, University of Leeds, 1987.
- Williams, Henry**, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, North Carolina State University, 1964; MS, University of Maryland, 1972; PhD, 1979.
- Williams, Mark S.**, (R), Assistant Professor, Microbiology and Immunology, School of Medicine. BS, SUNY, 1984; PhD, University of Michigan, 1991.
- Wilson, Donald**, (R), Professor, Medicine, School of Medicine. AB, Harvard University, 1958; MD, Tufts University, 1962.
- Wilson, Gerald**, (A), Assistant Professor, Biochemistry & Molecular Biology, School of Medicine. BSc, Queen's University, 1991; PhD, 1997.
- Wilson, P. David**, (R), Professor, Epidemiology and Preventive Medicine, School of Medicine. BA, University of Colorado, 1956; MS, University of Minnesota, 1963; PhD, Johns Hopkins University, 1970.
- Wilson, Teresa M.**, (R), Assistant Professor, Radiation Oncology, School of Medicine. BA, Southern Illinois University, 1990; PhD, Loyola University, 1995.
- Winkles, Jeffrey A.**, (R), Professor, Surgery and Physiology, School of Medicine. BA, University of Delaware, 1977; PhD, University of Virginia, 1983.
- Wiseman, Rebecca**, (A), Assistant Professor, Adult Health and Education, Administration, Health Policy, and Informatics, School of Nursing. BSN, University of Tennessee, 1974; MSN, University of Pennsylvania, 1978; PhD, University of Maryland, 1993.
- Wittenberg, George F.**, (A), Assistant Professor, Department of Physical Therapy and Rehabilitation Science, School of Medicine. AB, Harvard College, 1983; PhD, University of California, San Diego; MD, 1993.
- Wozenski, Susan**, (A), Assistant Dean and Assistant Professor, Behavioral and Community Health, School of Nursing. BA, Mount Holyoke College, 1975; MPH, University of Michigan, 1977; JD, University of Connecticut, 1980.
- Wynn, Richard**, (R), Professor, Oral and Craniofacial Biological Sciences, Dental School. BS, University of Maryland, 1964; MS, 1966; PhD, 1970.
- Xiao, Yan**, (A), Assistant Professor, Anesthesiology, School of Medicine. BA, Lanzhou Railway Institute, 1982; MA, Beijing Institute of Technology, 1985; PhD, University of Toronto, 1994.
- Yarowsky, Paul**, (R), Associate Professor, Pharmacology and Experimental Therapeutics, School of Medicine. BS, Washington University, 1969; PhD, George Washington University, 1976.
- Yellowitz, Janet**, (A), Associate Professor, Oral Health Care Delivery, and Director, Geriatric Dentistry, Dental School. BS, Columbia University, 1972; MPH, University of Minnesota, 1979; DMD, University of Pennsylvania, 1987.
- Yocom, Carolyn J.**, (A), Associate Professor and Chair, OSAH, School of Nursing. BSN, University of Pennsylvania, 1970; MSN, Case Western Reserve University, 1975; PhD, University of Illinois at Chicago.
- Zhan, Min**, (A), Assistant Professor, Epidemiology and Preventive Medicine, School of Medicine. BS, Fudan University, 1987; MS, 1991; MS, Simon Fraser University, 1994; PhD, University of Waterloo, 1999.
- Zhang, Li**, (A), Associate Professor, Physiology, School of Medicine. BS, University of Science and Technology, 1984; PhD, University of Notre Dame.
- Zhao, Richard Y.**, (R), Associate Professor, Pathology, School of Medicine. BS, Shandong College of Oceanography, 1981; MS, Oregon State University, 1985; PhD, 1991.
- Zhao, Xianfeng Frank**, (A), Assistant Professor, Pathology, School of Medicine. MD, Shandong Medical College, 1985; MSc, Academy of Military Medical Sciences, 1988; PhD, University of Western Ontario, 1996.
- Zielke, H. Ronald**, (R), Professor, Pediatrics, School of Medicine. BS, University of Illinois, 1964; PhD, Michigan State University, 1968.
- Zito, Julie**, (R), Associate Professor and Program Director, Pharmaceutical Health Services Research, School of Pharmacy; and Associate Professor, Psychiatry, School of Medicine. BS, St. John's University, 1966; MS, University of Connecticut, 1972; PhD, University of Minnesota, 1984.

Zohar, Yonathan, (S), Associate Professor, Biological Sciences, Center of Marine Biotechnology, University of Maryland Biotechnology Institute, and Maryland Agricultural Experiment Station, University of Maryland, College Park. BS, Hebrew University of Jerusalem, 1974; MS, 1976; PhD, University of Pierre and Marie Curie, 1982.

Zuckerman, Ilene, (R), Associate Professor, Pharmaceutical Health Services Research, School of Pharmacy. BS, University of Maryland, 1981; PharmD, 1983.

Zuravin, Susan, (R), Professor, School of Social Work. BS, Hood College, 1967; MSW, University of Maryland, 1976; PhD, 1980.

Graduate School Policies

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) 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 5 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.

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.)

Policy on Arbitrary or Capricious Grading

A. Purpose

These guidelines describe how allegations of arbitrary or capricious grading are handled in course work in the University of Maryland Baltimore 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 course work. 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.

B. 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 should also 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 which 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 either the graduate program director or department chair of the program offering the course prior to filing the allegation. The Dean of the Graduate School or designee shall notify the student, the faculty member, and the 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 and 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 who 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, the faculty member, and the program director within two weeks of receiving the GHC recommendation or within two weeks of the waiver of GHC review.

C. Appeals

1. The student, the faculty member, or the 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 in writing 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, the faculty member, and the 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.)

Student Academic Misconduct

This document sets out the basic University of Maryland Graduate School, Baltimore policy and procedures for dealing with the various forms of student academic misconduct primarily in course work. Such misconduct involves significant breaches of integrity which may take numerous forms such as, but not limited to, those listed below:

- **Fabrication:** The intentional and unauthorized generation 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 UMGSB are subject to the standards of academic integrity required by the UMGSB and to the possible penalties for academic misconduct in course work. Students must also observe any additional standards announced by faculty members for particular courses.

Each faculty member is responsible for maintaining academic integrity in his or her 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, he or she shall initiate the process explained below. 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.

I. 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 has been to assign a zero grade for the exercise and to 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 shall 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.

II. More-Serious Infractions

Infractions that can be considered as 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 recommending 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 shall also make reasonable efforts to preserve any evidence that might be need-

ed by the GCGC in the event of an appeal by the student.

III. 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 shall also obtain any additional information requested by the faculty member, the student, or the 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 shall then 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 his or her case, to offer explanations and interpretations of each item of evidence and testimony, and to 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.

Those members of the GCGC who were present throughout the hearing shall discuss the case in closed session as soon as possible after the conclusion of the hearing. They then vote 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, the 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 his or her 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 shall also send the Dean of the Graduate School the various 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 which 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, University of Maryland Baltimore and 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 with 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 insure 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 will also 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.)

Policy on Academic Performance and Satisfactory Progress in University of Maryland, Baltimore Master of Science Programs

Purpose. Satisfactory academic performance and progress within the University of Maryland Baltimore's (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 non-adherence to program-specific policies and requirements.

Elements of Satisfactory Academic Performance and Progress. 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 Office of Enrollment Affairs (GSOEA) 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, 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 (LOA). Failure to comply with the requirement to register every semester will be taken as evidence that the student has terminated his or her 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 MS degree must form a unified, coherent program approved by the student's advisor and the Graduate School.
- Students must satisfactorily complete course work and the required curriculum in a timely fashion. All requirements for the MS degree must be completed within five years after admission. The period of an approved Leave of Absence is included within the five year time period.
- Students must adhere to the appropriate thesis or non-thesis guidelines outlined by the Graduate School and the program.
- Students in a 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 their doing so. Cheating, plagiarism, fabrication, or abetting the academic dishonesty of another will result in sanction and may lead to academic dismissal.

Procedure. If a student fails to meet Graduate School standards of satisfactory academic performance and progress, the student shall be given written notice of dismissal by the GSOEA. The notice will include the reason for the dismissal. A copy of the notice will be provided to the student's Graduate Program Director (GPD). Notice of dismissal will be mailed to the student's current 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 check for correspondence at his or her address of record in a timely fashion.

Effective July 1, 2005

Policy on Academic Performance and Satisfactory Progress in University of Maryland Baltimore PhD Programs

Purpose: Satisfactory academic performance and progress within the University of Maryland Baltimore's doctor of philosophy (PhD) programs is a shared responsibility of the University of Maryland Baltimore Graduate School (UMBGS), the Doctoral Programs, and graduate students. This policy specifies the elements of satisfactory academic performance and progress for students in

UMBGS PhD programs.

UMBGS Standards

- After admission to a doctoral program, each student must continue a course of study and must register 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 his or her 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 UMBGS and Doctoral Program requirements for non-provisional admission. This determination will be made by the Graduate Program Director and the UMBGS Academic Coordinator.
- Graduate students must maintain a minimum, cumulative grade point average (GPA) of 3.0 on a 4.0 scale.
- UMBGS does not impose a uniform protocol for preliminary, qualifying, or comprehensive examinations. Admission to candidacy occurs after fulfilling 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[1] with the appropriate knowledge and expertise to serve as 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.[2]
- UMBGS requires that students take and pass a doctoral examination of the dissertation comprised 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 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.[3]

Doctoral Program Standards

Students must meet all Doctoral Program requirements for satisfactory academic performance and progress as well as UMGBS 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 UMGBS standards listed above. 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 UMGBS. Examples of more stringent standards are higher than 3.0 minimum GPA required by the UMGBS, 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 UMGBS or the Doctoral Program.

Failure to meet any of the UMGBS 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 UMGBS and the Doctoral Program's standards of satisfactory academic performance or progress, then the student will automatically be placed on probation or dismissed. Written notice of this action will be provided by the Graduate School Office of Enrollment Affairs, including the reason for the action. A copy of the notice will be provided to the student's Doctoral Program Director. Notice will be mailed to the student's current 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, UMGBS 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 UMGBS policy and procedures for appeal of probation or academic dismissal see http://graduate.umaryland.edu/grad_policies/appeal.html

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Effective March 31, 2006

Also see:

http://graduate.umaryland.edu/graduate_people/list/grad_faculty.html

<http://graduate.umaryland.edu/documents/DSSN%20G UIDE%2004.doc>

http://graduate.umaryland.edu/grad_policies/misconduct.html

Ombuds-Committee

The purpose of the Graduate School Ombuds-Committee is to provide mediation services when disagreements or differences of opinion arise between a graduate student and his or her adviser 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 his or her 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 advisers occur during training. In most cases, such problems can and should be worked out by the student, the adviser, and the 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 Dean or the Dean's Designee, who will, in turn, inform the GSOC. The GSOC will then assist the student, adviser, 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:

1. The student must first inform the director of his or her graduate program that a serious problem exists. It is the director's responsibility to review the situation and to attempt to resolve it according to the rules and guidelines of the program and any Graduate School rules or guidelines that are applicable.
2. In the event that the adviser 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.

3. If efforts at the program level fail to resolve the situation, or if the program fails to act, the student may then contact the Dean or the Dean's Designee. The student should present the problem to the 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.
4. The 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 the efforts that were made to resolve the situation. The adviser may also provide input at this time, but such input must be submitted through the program director.
5. 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 who are involved. Upon completion of its review, the GSOC will make recommendations for resolution of the situation in writing to the student, the adviser, the program, and the Dean or the Dean's Designee.
6. The final decision as to the appropriate resolution of all cases will rest with the Dean of the Graduate School.
7. If a GSOC member has been involved in a matter before it reaches the GSOC, the member will not participate in the deliberations. The 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.

GRADUATE COUNCIL GRIEVANCE COMMITTEE GUIDELINES

Appeal of Academic Dismissal and Academic Misconduct

Process

This is a formal hearing for academic cases that have not been resolved at the department level. Following the hearing, which takes place as set forth under "FORMAT," below, the Graduate Council Grievance Committee (GCGC) will deliberate in closed session and will 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 non-voting Administrative Assistant of the Dean of the Graduate School who will record the hearing for archival purposes only.

Format

- a. Chair's introduction, summary of issues and process overview.
- b. Department representative's presentation of issues (15 minutes maximum).
- c. Student presentation of issues (15 minutes maximum).
- d. Optional: Presentation by witnesses (limited to three per side and a maximum of 15 minutes per side).
- e. Questions by committee members.
- f. All presenters and witnesses are excused.
- g. Deliberations by committee members.
- h. 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) in advance of 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 must also be afforded an opportunity to attend. Accordingly, the student must notify the Graduate School, in writing, at least two weeks (14 days) prior to the hearing if he/she intends to use an attorney. Once a lawyer has contacted the Graduate School on behalf of a student, all contact, both 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.

University Policies

USM/UMB policies and procedures can be viewed in full at <http://cf.umaryland.edu/hrpolicies/>