

**University of Medicine and Dentistry of New Jersey (UMDNJ)**

**Dual-Degree Program between the  
UMDNJ Graduate School of Biomedical Sciences (GSBS)  
And the  
UMDNJ School of Public Health (SPH)  
Leading to the:  
Master of Biomedical Sciences and Master of Public Health**

This program combines the educational and research strengths of the Graduate School of Biomedical Sciences (GSBS) with those of the School of Public Health (SPH) in a program that provides students with a strong knowledge of contemporary research methods and scientific foundations in both the biomedical sciences and public health.

**Goals of the Program**

The proposed program accomplishes several desirable goals for students interested in careers in biomedical science, clinical medicine and dentistry or public health. Many students who follow a program in basic biomedical science find themselves drawn to a career in the pharmaceutical, academic or public policy areas that involve public health issues. Similarly, some students who gain a degree in public health discover that they have inadequate preparation in the basic biomedical sciences. This dual degree program allows students to gain expertise in the fields of biomedical science and public health and thus produces graduates able to solve problems common to both fields and communicate effectively with the respective professional workforces.

Examples of the potential value of this program include public health workers who understand the molecular biology of a pathogen who will be in a better position to analyze effective measures to help control the pathogen. Likewise, basic research scientists, working in an academic, pharmaceutical or biotech environment who understand the epidemiology of a pathogen will be in a better position to design experiments to critically assess ways of immobilizing or destroying the pathogen.

Public health officials trained in this program will be academically grounded in biomedical science and will be better prepared to address the complex problems facing the public health workforce in New Jersey and in the nation. The program also benefits students interested in clinical careers by simultaneously preparing them for professional school while broadening their knowledge in public health, with the desired outcome of producing clinicians who are well trained in public health. It also allows students unsure of their career goals to explore their strengths and interests in basic science research and public health as they plan their professional paths.

**Target Student Population**

This combined degree program is directed towards individuals holding a baccalaureate degree in any discipline of study and who express an interest in public health. Applicants must have a background in biology, chemistry and physics. Undergraduate courses in

biochemistry and molecular biology also would be useful, but will not be required. Some students may use the program as a terminal degree while others may use it as preparation to pursue the MD, DMD, PhD, or DrPH degrees. Positions that would find such a dual degree of benefit include:

- Urban governmental agencies
- State and Federal Departments of Health
- Non-governmental health organizations, such as the American Cancer Society, American Diabetes Association, American Heart Association, etc.
- Pharmaceutical/biotech companies

### **Program Description**

Individually, the Master of Public Health degree program requires 45 credits and the Master of Biomedical Sciences degree program requires 30 credits. With approximately a 20% overlap of courses acceptable to each program, completion of the dual-degree program will require a minimum of 57 credits.

To complete this proposed combined degree, the Master of Public Health portion will require completion of 15 credits of a public health core curriculum and 15 credits of specialization in Quantitative Methods. This program will accept 9 elective credits in biomedical sciences from GSBS, which have direct relevance to public health. The Master of Biomedical Sciences part of the program will require 21 credits in the biomedical sciences, composed of two 3-credit mandatory “Fundamentals” courses Biochemistry and Molecular Biology and Cellular Biology; 1 credit of seminar and 2 credits of laboratory rotation; and 12 credits of elective courses in biomedical sciences, at least one of which has direct public health relevance; and the program will accept 9 credits of coursework from the SPH. An interdisciplinary research/practice fieldwork project of 6 credits will be required of all students in the program. A table is attached that displays the course requirements for the dual degrees.

The program will be offered to students who are enrolled either full-time or part-time. All courses included in this proposed program will be taken from courses currently offered by GSBS and SPH. In general, required courses will be completed in the first two semesters and the remaining coursework will be taken during the subsequent semesters. The anticipated length of the program is five semesters of fulltime study.

The SPH offers core and QM courses in the evening during the spring, fall and summer semesters. Students who are available to take courses during the summer are encouraged to do so if they wish to speed the completion of the program. Those who wish to begin taking SPH courses after acceptance into the dual degree program, but before matriculation in August, may take SPH course by contacting the Newark Campus SPH office and completing a “quick” admit application form.

The specific courses of specialization at GSBS will depend upon individual student’s interests and background. For the Master of Public Health degree program, students will major in Quantitative Methods, emphasizing Biostatistics, Epidemiology, Injury or Infectious Diseases. Other majors leading to the Master of Public Health degree may also be considered.

### **Program Benefits**

The dual-degree program has specific benefits:

- It covers science and public health concepts necessary for those contemplating positions in the pharmaceutical or biotechnology industry.
- The knowledge gained from this program will allow graduates to communicate effectively throughout their organization and with peers in science and public health.
- The program can be completed in 2-1/2 years as opposed to 4 - 5 years for separate programs.
- The program will help prepare students who are interested in pursuing the MD or DMD to achieve a breadth of knowledge in basic science and in public health that will be a valuable asset in establishing their careers.

### **Admission to the Program**

Applicants apply for the dual-degree program to both the Master of Biomedical Sciences (at the GSBS) and Master of Public Health in Quantitative Methods (at the Newark Campus of the SPH) programs. Students will submit separate applications for the dual degree programs to each school; the GSBS and the SPH will share parts of the application (e.g. the student's official transcript and letters of recommendation) whenever possible. Each school will determine the suitability of the application to the dual degree program. Students may apply to each school simultaneously. Alternatively, some students will already be matriculated at one of the schools and then decide to pursue the dual degree. Students in either school may apply to the other school for the dual degree at any time prior to the completion of their penultimate semester in the degree program for which they were originally admitted.

Admission into the dual Master of Biomedical Sciences/Master of Public Health program requires a strong score on the Verbal and Quantitative portions of the Graduate Record Examination (GRE) and a superior undergraduate academic record of achievement. GSBS also requires that applicants have a basic background in biology and chemistry.

### **Requirements:**

The program requires a total of 57 credits with an overall "B" average and a research/public health practice project acceptable to both programs. The research/public health practice advisory committee will usually be composed of three members with representatives from both programs.

The Biomedical Sciences program requires 21 credits (6 credits in two 3-credit mandatory "Fundamental" courses: Biochemistry and Molecular Biology, and Cell Biology; 1 credit in seminar and 2 credits in a lab rotation; and (12 credits of) elective courses in biomedical sciences). The Public Health program requires 30 credits including 15 for core courses and 15 credits of specialization. Six credits of interdisciplinary fieldwork are also required.

A list of available courses at the GSBS or SPH can be obtained at their respective web sites. The web address for the GSBS is: <http://www.umdnj.edu/gsbnsweb> and the web address of the SPH is <http://sph.umdnj.edu>.

<b>TABLE OF THE PROGRAM</b>	
<p><b>School of Public Health - 30 Credits</b> Required of all Biostatistics and Epidemiology Students Course #, Name (credits)</p>	<p><b>Graduate School of Biomedical Sciences - 21 Credits</b> Course #, Name (credits)</p>
<p>PHCO 0501 - Health Care Systems and Policy (3) PHCO 0502 - Principles of Epidemiology (3) PHCO 0503 - Introduction to Environmental Health (3) PHCO 0504 - Introduction to Biostatistics (3) Students must pass the QSA to take PHCO 0504. PHCO 0505 - Health Education &amp; Behavioral Science in Public Health (3) Note: Students should take PHCO 0502 and 0504 ASAP after entering the program (preferably in the fall) because they are pre-requisites for upper level QM courses.</p>	<p><b>Required Core Courses</b> GSND N500A - Fundamentals of Biomedical Sciences 1 (3) GSND N500 B - Fundamentals 2: Cellular Biology (3) MSBS 5910 - Seminar in Biomedical Sciences (1) MSBS 593A - Research in Biomedical Sciences (2)</p>
<p><b>Public Health Core Credits 15 credits</b></p>	<p><b>Biomedical Sciences Core Credits 9 credits</b></p>
<p><b>Public Health Specialization Courses</b> <b><u>Biostatistics Concentration</u> Required Credits 15 credits</b> QNME 0611 Design of Epidemiologic Studies and Clinical Trials(3) QNME 0612 Linear Models: Regression and ANOVA (3 ) QNME 0584 Computing II: EPI- Info (1)  QNME 0587 Intro to SAS for Data Analysis in Public Health (2 credits) Note: Students are encouraged to take QNEM 0584 Computing II: EPI-Info during the same semester as PHCO 0502 Principles of Epidemiology. QNME 0614 Categorical Data Analysis (3) QNME 0613 Life Tables and Survival Analysis (3) ----- <b>Public Health Specialization Courses</b> <b><u>Epidemiology Concentration</u> Required Credits 15 credits</b> <b>5 Required Courses: (9 credits)</b> QNME 0611 Design of Epidemiologic Studies and Clinical Trials (3) QNME 0612 Linear Models: Regression and ANOVA (3) QNME 0584 Computing II: EPI Info (1) QNME 0587 Intro to SAS for Data Analysis in Public Health</p>	<p><b>Biomedical Sciences Elective Courses 12 credits</b> Students must complete 12 credits from the following list of elective courses. Courses should chosen in consultation with the student's academic advisor. Courses not listed can be substituted only with GSBS permission.  MSBS 5140 Biological Terrorism &amp; Weapons Mass Destruction (2) GSND 5235 Principles of Clinical &amp; Translational Res. Oncology (2) BIOC N5002 Introduction to Genomics, Proteomics and Bioinformatics (3) PATH 5100 Cellular Pathology (3) NEUR 5200 Fundamentals of Neuroscience (3) NEUR N5031 Neural Substrates of Aggressive Behavior (3) CBMM N5001 Basic Histology (3) CBMM 5350 Molecular Medicine of the Heart (3) MSBS 5130 Stem Cell Biology &amp; Applications Molecular Medicine (3) MSBS 520A Advanced Stem Cell Seminar (2) PHPY N5021 Fundamentals of Pharmacology (3) PHPY N5225 Principles of Toxicology (3) PATH N5209 The Business of Science: Drug Development – From Molecules to Medicine (3)</p>

<p>(2 credits)          Note: Students are encouraged to take QNME 0584 Computing II: EPI-Info during the same semester as PHCO 0502 Principles of Epidemiology.</p> <p><b>And students are required to take 1 of these 3 methods courses:</b> (3 credits)          QNME 0621 Survey Research Methods Questionnaire Design(3)          QNME 0614 Categorical Data Analysis (3)          QNME 0613 Life Tables and Survival Analysis (3)</p> <p><b>And Choose 1 Elective Course (preferably within QNME): (3 credits)</b>          Epidemiology students who choose to pursue one of the approved collateral programs (e.g. injury or infectious diseases) would take the approved collateral courses as part of their elective course work. This would increase the number of credits required for the dual degree.*</p>	<p>BIOC 5170 Molecular Methods in Biochemistry (3)          CBMM 5002 Practical Approaches for Studying Protein Function (2)          DENT 5150 Metallic Systems &amp; Dental Biomaterials (2)          DENT 5160 Polymeric Systems in Biomaterial Sciences (2)          DENT 5220 Methods in Microscopic Imaging (2)          DENT 5300 Oral Microbiology (3)          BIOC 5003 Advances Genomics, Proteomics, &amp; Bioinformatics (2)          GSND 5113 Gene Expression (2)          PATH N5211 Immunology (3)          NEUR N5040 Neurobiology of Disease (3)          MICR N5233 Microbes and Infectious Disease (3)          MICR 5231 Molecular Virology (3)          CBMM N594A Regional Gross Anatomy: Thorax &amp; Abdomen (3)          GSND 5225 Cancer Biology          MSBS N5134 Hematopoietic Stem Cell Biology (2)          MSBS N512 Topics in Cancer Stem Cell Biology (2)          GSND 5115 Molecular Basis of Reproduction (2)          BIOC 5100 Molecular Oncology (2)          BIOC 5330 Signaling Mechanisms in Biochemical Systems (2)          PHPY N526 Principles of Toxicology II (3)          GSND 5215 Animal Models in Biomedical Research (2)          MSBS N517 Introduction to Select Agent Biology (2)          MSBS N5010 Seminar in Homeland Security and Domestic Preparedness (2)          MSBS 5100 Current Molecular Techniques (3)          DENT 5310 Oral Immunology (3)          PHPY N5030 Topics in Pharmacology (3)</p>
<p><b>Total Didactic Course Credits</b>  <b>Public Health - 30 credits*</b></p>	<p><b>Total Didactic Course Credits</b>  <b>Biomedical Sciences - 21 credits</b></p>
<p align="center"><b>Public Health Fieldwork and Biomedical Sciences Research –          SPH course numbers FDWC 0600 (1) and FDWC 0601 (5) 6 credits          Fieldwork topics are selected in consultation with the student’s SPH academic advisor.</b></p>	
<p>Public Health - 30 Credits *          Biomedical Sciences - 21 Credits          Fieldwork/Research - 6 Credits          Total 57 Credits</p>	