

Department of Biomedical Sciences
School of Public Health
University at Albany

Graduate Program of Study

September 2009

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DEPARTMENT OF BIOMEDICAL SCIENCES
School of Public Health, University at Albany

PROGRAM OF STUDY

The Department of Biomedical Sciences comprises the following programs:

Immunology and Infectious Diseases (IID)
Biodefense and Emerging Infectious Disease (BD-EID)
Molecular Genetics (MG)
Neuroscience (NEU)
Structural and Cell Biology (SCB)

Applicants to either the M.S. or Ph.D. program are expected to hold a baccalaureate with a combined total of at least 42 credits in biology, chemistry, mathematics, and physics. A minimum of 18 credits in one of these areas will be required, with at least 6 credits in each of the other areas. Applicants are required to submit official scores of the Graduate Record Examination aptitude test; the advanced test in biology, chemistry, or physics is recommended. A minimum score of 600 on the paper based TOEFL (250 on the computerized test; 100 on the internet based test) is required for international students.

DEGREE PROGRAMS

The graduate program in Biomedical Sciences (BMS) is individualized. Courses are selected with the assistance of faculty advisors, in accordance with the requirements of the tracks and taking into account the background and interests of the individual student. Students may be admitted for study toward either the Ph.D. or M.S. degree.

During the first two years students take courses in areas such as cell biology, biochemistry, molecular biology, genetics, immunology, infectious disease, structural biology, and neuroscience. In addition, all students take BMS 601- Introduction to Biomedical Sciences, BMS 590 a,b - Laboratory Rotations in Biomedical Science, BMS 665 - Current Literature in Biomedical Sciences (journal club) and BMS 670 - Responsible Conduct of Scientific Research.

BMS 601 is a multi-disciplinary introduction to fundamental principles of the biomedical sciences focusing on the molecular basis of human disease. The course integrates basic sciences and genomic-scale technology with human health, environmental induced disease and public health. Students will also gain an understanding of how bench science leads to improvements in public health and become familiar with grant writing and scientific paper presentation and review.

The laboratory rotations (BMS 590a,b) are taken in the first year by all students, regardless of their previous laboratory experience. The aims of the laboratory rotations are: (1) to allow the student to interact with faculty from varied disciplines, (2) to introduce the student to laboratory techniques and principles, and (3) to aid the student in selecting a mentor for their graduate research. Ph.D. students do three rotations under different mentors with at least one rotation in a field outside that of the student's expected specialization.

BMS 670 is aimed at promoting a better recognition of the values underlying the ethical performance of science. Case studies on topics such as data management; authorship; peer review; conflict of interest; use of animals in research; human subjects in research; and policies on misconduct will be discussed.

In addition to formal course work, emphasis is placed on informal instruction and interaction between students and faculty in the laboratory, and active participation in seminars, colloquia and journal clubs. It is expected that a student in the Ph.D. program will select a mentor and a track by the end of the first year, and be admitted to candidacy for the doctoral degree by the end of the third year, at the latest.

PROGRAM LEADING TO THE MASTER OF SCIENCE (M.S.) DEGREE

Program of Study and Research (36 credits minimum)

The course of study for the M.S. degree should take 2 years to complete beyond the baccalaureate.

1. Required Courses

- 1) BMS 504a: Biochemistry (4 credits)
- 2) BMS 500: Molecular and Cell Biology (4 credits)
- 3) BMS 504b: Biochemistry (3 credits) **OR**
BMS 500b: Molecular Biology and Genetics (3 credits)
- 4) BMS 590 a **OR** b: Lab rotations (1 or 2 credits) *
- 5) BMS 601 - Introduction to Biomedical Sciences (3 credits)
- 6) BMS 665 - Journal Club (must be taken every semester, 1 or 0 credit/semester, can be taken for credit a total of 2 times)
- 7) BMS 670 - Responsible Conduct of Scientific Research (1 credit)

** 1 rotation is required of masters students; a second rotation is optional, but is strongly encouraged. Each rotation credit will consist of a minimum of 10 hours per week in the laboratory. Satisfactory completion of a rotation will consist of a written report, evaluation of a lab notebook, and an oral presentation.*

2. Additional courses as approved by advisor. Total course credits to equal 22 course credits minimum.

3. Master's thesis research (BMS 699: 14 credits minimum).

4. Satisfactory completion of a Master's **major field examination**. This oral exam will be administered by a three member thesis advisory and examination committee consisting of the student's mentor and two additional faculty members, one in the student's track and one in the department, but outside of the student's track. The subject matter of this exam should be in the area of the student's proposed research. The exam will be taken in the semester prior to the defense of thesis, and may be retaken once.

5. Satisfactory completion of a **written thesis**. The thesis has no page limitation and must present specific aims, background and significance, experimental designs and methods section, results section, discussion, conclusion, and references. The thesis is reviewed by the Masters Thesis committee, who will determine if the student understands the work done, interprets the results objectively, and can communicate the science effectively.

6. Satisfactory **defense of thesis**. The candidate will present an open oral seminar based on thesis research and defend his/her work in a closed meeting of the thesis committee.

7. Candidates must maintain a minimum of a **B average**.

- ▶ *If a student gets a C+ or lower in a departmental or track required course, he/she must retake the course.*

PROGRAM LEADING TO THE DOCTOR OF PHILOSOPHY DEGREE (Ph.D.)

The program of study and research toward the Ph.D. degree requires at least three academic years of full-time study and research beyond the baccalaureate, and typically may involve five years of full-time study.

COURSE REQUIREMENTS (66 credits minimum)

1. Required courses: (14 credits maximum)

- 1) BMS 590 a,b,c - Laboratory rotations (2 or 3 credits)*
- 2) BMS 601 - Introduction to Biomedical Sciences (3 credits)
- 3) BMS 665 - Journal Club (must be taken every semester for 1 or 0 credit/semester; maximum of 5 credits total) **
- 4) BMS 670 - Responsible Conduct of Scientific Research (1 credit)

** 3 rotations are required of doctoral students. Each rotation credit will consist of a minimum of 10 hours per week in the laboratory. Satisfactory completion of a rotation will consist of a written report, evaluation of a lab notebook, and an oral presentation. The third rotation may be waived at the discretion of the Academic Committee.*

*** During the course of the student's career, the student must take 3 different journal club sections. First year students will participate in BMS 665 QEI Journal Club during*

the first semester and then in sections appropriate to their laboratory rotation in following semesters.

2. **Additional courses** as approved by advisor or required by track. Total course credits to equal 38 credits minimum.

3. **Dissertation Research** BMS898 and BMS899: 28 credits minimum combined. BMS 898 is taken by students not yet admitted into candidacy for the degree. BMS 899 is required of all students admitted into candidacy for the degree.

ACADEMIC STANDARDS

All students are expected to remain in good academic standing during the course of their study, i.e. maintain at least a B average and obtain a grade of satisfactory (S) in all credit requirements applicable to the graduate degree. A student whose record falls below these standards will, at the discretion of the Department, either be placed on probation or dismissed. Students on probation are conditionally allowed to continue in the department program for a limited time period* in order to achieve good academic standing and are expected to obtain at least a B or S grade in all of their courses. A student whose record falls below acceptable standards or whose performance otherwise indicates a lack of ability or effort needed to succeed in the graduate program may at any time be denied permission for further study.

*Students do not automatically have at least two semesters to achieve good academic standing.

PROBATION

Students on probation are conditionally allowed to continue in the program for a limited period of time in order to correct a deficiency in their record (eg grade problem, failure to complete qualifying exams or admission to candidacy requirements in a timely manner, etc.). The probationary period usually lasts for at least one semester and, depending upon the student's progress, may be extended for up to a year. All deficiencies must be corrected before probation ends. A student on probation may have their University stipend and/or tuition scholarship withdrawn at any time.

ACADEMIC INTEGRITY

Academic dishonesty (e.g. plagiarism, cheating on examinations, falsification of data, etc) is unacceptable and will not be tolerated. Any student who violates academic integrity standards will automatically be placed on disciplinary probation for at least one semester. For violations associated with a course, the student may be required to retake the course at his/her own expense. Depending on the severity of the violation, the student's stipend and /or tuition may also be revoked, or the student dismissed from the program. A report describing the violation and recommended sanctions imposed will be placed in the student's file, and a copy of the form will be distributed to the student's

mentor and thesis committee members, the Dean of the School of Public Health, and the Office of Graduate Studies.

University policy states the following:

If a faculty member informs the student that he or she will receive a failing grade in the course or other academic exercise as a result of academic dishonesty, the student receiving such penalty will not be permitted to withdraw from the course unless the grievance process or Office of Conflict Resolution and Civic Responsibility rules in favor of the student. Students who feel they have been erroneously penalized for an academic integrity infraction or who think that a penalty is inappropriate may grieve these issues through procedures developed for each college, school, program, or department of the University. Copies of the procedures are maintained in the School and College Deans' Offices or on their respective websites. A copy of the disposition of any grievance arising in matters of academic dishonesty will be attached to the Violation of Academic Integrity Report filed in the Office of the Vice Provost for Undergraduate Education or the Dean of Graduate Studies.

Detailed information on the University's definitions and policies on academic dishonesty can be found in "Community Rights and Responsibilities", a University at Albany publication, found online at <http://www.albany.edu/judicial/>.

ADMISSION TO CANDIDACY

Students must be admitted to candidacy by the end of their third year. A student is admitted to candidacy for the degree of Doctor of Philosophy upon meeting the following standards:

1. A minimum of a B average ***
2. Completion of SUNY and Department course requirements
3. Satisfactory completion of the Research Tool requirement
4. Satisfactory completion of both parts of the Qualifying Exam
5. Completion of University residence requirement
6. Completion of any additional requirements specified in the University's Graduate Bulletin.

**** If a student gets a C+ or lower in a departmental or track required course, he/she must retake the course.*

TUITION POLICY

The Department of Biomedical Sciences will provide tuition scholarships to eligible doctoral students for a maximum of four years. Students must be admitted into candidacy by the end of their third year, and are expected to complete the 66 credits required for the degree by the end of their fourth year. Contingent upon available

funding, tuition scholarships may be provided at the rate of one (1) credit per semester to students in their fifth year of study. Students in their six year of study or beyond are not eligible to receive a tuition scholarship.

RESEARCH TOOL REQUIREMENT

The student must demonstrate proficiency in an approved research tool. This can be accomplished by demonstrating a reading knowledge of one appropriate foreign language or competency in computer science, statistical analysis, or biometrics. Alternatives may include appropriate courses which will not be used toward degree credit.

The Biomedical Sciences Department authorizes, accepts and in some cases may administer the research tool via the Graduate Academic Committee (GAC). The student should submit a written request to the Department as to their choice to satisfy the research tool requirement. This request must be submitted to and approved by the GAC **BEFORE** the start of the proposed tool.

Examples of Research Tools may include:

- Formal approved courses (a minimum of a B grade) selected from the list below:
(*Additional courses may be approved upon review by the GAC*)
STA552 Principles of Statistical Inference
STA572 Introductory Applied Statistics for Environmental
and Biomedical Sciences
MAT565 Applied Statistics
CSI580 Computer Science in Scientific Disciplines
CSI503 Algorithms and Data Structures
- Computer knowledge (satisfied by writing a functional program on an appropriate problem)
- DNA Workshops, Technique Workshops (a minimum of a B grade or verification of satisfactory performance)
- Foreign Language (written translation of a scientific paper)

Ph.D. QUALIFYING EXAM: PARTS I AND II

Part I: The Comprehensive Exam. This is an oral exam taken at the end of May in the first year of study. It is intended to test the candidate's breadth of knowledge in the Biomedical Sciences, to determine if the student can apply that knowledge to experimental hypotheses, and to test his/her ability to critique a scientific paper. The candidate will choose one of four papers selected by the examining committee. The papers will be representative of the four general track areas and will draw upon material covered in the first year courses. Students will be presented with the papers two weeks prior to the exam and will notify the QE1 committee of their choice of paper one week before the exam. In preparing for this exam, students are not permitted to consult with anyone, but may make full use of the library and all electronic resources. The student will be expected to present a 45-50 minute research grade seminar using the scientific paper of choice. The QE1 committee will then test the student's understanding on all aspects of biology relating to the paper. This may include any background necessary for a

truly in-depth understanding of the paper. The oral exam is expected to take 60-90 minutes.

The QE1 committee will consist of four standing members representing each track. In addition, a fifth ad hoc member will attend the exam. The ad hoc member will be selected by the committee and will be an additional representative whose expertise covers the area of the selected paper. This fifth person may vary for each student.

The QE1 committee will provide their recommendation (Pass/Fail/Marginal or Retake) to the Graduate Academic Committee after all students have completed the exam. The GAC will review each candidate's overall progress through the first year in the context of the QE1 result. The results of the recommendation of the GAC will be communicated to the student in an individual meeting with the GAC chair and the QE1 committee chair. Passing the QE1 is necessary but not sufficient for continuation in the Ph.D. program. Students who fail QE1, but have passed each of their first year courses to the satisfaction of the GAC, may be allowed to retake the exam before the start of the second year. A second failure in the QE1 would result in dismissal from the Ph.D. program. Students who fail the QE1 and do not make satisfactory progress in their course work will be dismissed from the Ph.D. program.

Students on academic probation are not permitted to take QE1. Exceptions to this policy will be reviewed on an individual basis by the Graduate Academic Committee. Students seeking an exception must submit a written request to the GAC. Letters of evaluation from all rotation mentors must accompany the petition to the GAC.

MS students will be allowed to take QE1 upon permission of the Graduate Academic Committee. Passing QE1 would be necessary but not sufficient for acceptance into the Ph.D. program, which decision would be made by the Admissions Committee.

Part II: Defense of Proposal

By the end of the third semester, the Ph.D. Dissertation Committee must be formed. The Dissertation Committee is chaired (in the usual case) by the research mentor (a non-voting member) and composed of at least four other members, two BMS Department faculty members from the student's program area (track), one BMS faculty member outside the program area and one member whose primary academic appointment is outside the BMS Department, and who may be from another institution. In the case where the mentor is ineligible to chair the Ph.D. Dissertation Committee, the committee may designate another member as chair, who then serves as a voting member. The composition of the Ph.D. Dissertation Committee will be reviewed by the Graduate Academic Committee for final approval.

Within one year of successfully completing Part I of the qualifying exam, the student should complete Part II, a defense of proposal. This exam will test the student's depth of knowledge in his/her chosen area of specialization as well as the student's ability to write

and defend a research proposal. This examination is to be on a topic intended to serve as the basis for the student's Ph.D. dissertation research.

The student will write the proposal in the format of a mini-grant application, equivalent to a mini NRSA fellowship. The written proposal should be no longer than 10 single-spaced pages (not including references) and should consist of an abstract, background and significance, specific aims and experimental design. **Preliminary data are not required.** If preliminary data have been obtained, then it should be included in the background materials and may be included in the oral presentation. The student may consult with anyone in the course of preparing the proposal, but the written document must represent the student's own work. The mentor may aid in the development of specific aims and construction of a topical outline for the dissertation proposal. The mentor also may direct the student to relevant literature and may edit an initial draft. However, the mentor should not act as co-author. The research proposal will be judged on standard criteria, including, but not limited to, the student's grasp of the field, significance of the proposed work, originality and depth of thought and the feasibility of the experimental approach.

The written proposal will be submitted to the department office **no later than April 1st of the second year.** The student must provide the department office with copies of the proposal for distribution to all members of the dissertation committee. The proposal may also be submitted electronically. The oral defense must be taken **no later than June 1st of the second year.** The department office will provide the dissertation committee chair with course grades, laboratory rotation evaluations, and Qualifying Exam Part I results to review with the committee prior to the Qualifying Exam Part II oral defense. At the oral defense, the student will answer questions on the proposal and on related topics, focusing on (but not restricted to) the student's program area.

The Dissertation Committee will provide a grade of Pass, Conditional Pass, or Fail. The student must pass the exam by a majority vote of the Committee. If the student does not satisfactorily complete this part of the exam, the Dissertation Committee will make appropriate recommendations to the Graduate Academic Committee, which may include modifying the proposal and re-taking the exam, completing remedial course work, or dismissal from the program. The date and results of the exam will be communicated by the Dissertation Committee Chair to the Graduate Academic Committee and the Department Chairperson. If the student receives a Conditional Pass on the exam, the conditions must be met within three months or the student will receive a grade of Fail. If the student receives a grade of Fail, the exam may be re-taken once, and must be completed within three months.

All students are strongly encouraged to submit proposals for pre-doctoral training awards following completion of the Qualifying Exam Part II.

DISSERTATION RESEARCH

ROLE OF THE Ph.D. DISSERTATION COMMITTEE

The student's Dissertation Committee will meet regularly with the student throughout the course of his/her dissertation research to evaluate progress and advise. It is the responsibility of the student with his/her Dissertation Committee Chair to ensure that these periodic reviews are scheduled every 9 to 12 months. A Doctoral Student Annual Progress Review form, including a brief report summarizing each periodic review, should be submitted by the Committee Chair to the Graduate Academic Committee shortly after each meeting. These reports will become part of the student's academic file.

The Dissertation Committee also is responsible for evaluating and accepting the final written dissertation and conducting the student's oral dissertation defense. However, it is the student's responsibility to ensure that the final document submitted to the University is prepared according to department and University guidelines. Part of the evaluative process is determination of whether the student has produced a body of work which is publishable. As a guide, doctoral students in the Department of Biomedical Sciences typically publish three peer-reviewed publications based on their dissertation research, two of which are first-authored, by the end of their tenure in the program. Acceptance of the dissertation will be by majority vote of the Dissertation Committee, and is subject to the approval of the Department Chair and the Graduate Office.

The student must submit the Thesis/Dissertation Seminar and Defense Scheduling Form to the department office **at least three weeks before** the scheduled oral defense, providing the date, time, location, and title of presentation.

PROGRAM OF STUDY

Students in the Department of Biomedical Sciences can choose their course of study from the following areas of research:

Immunology and Infectious Diseases

The study of the basic biology and pathogenesis of viruses, bacteria, fungi, and protozoan pathogens, their interaction with host cells at the cellular and molecular level, and the response of the immune system to these microbes. Scientists in this track utilize structural biology, biochemistry, molecular biology, cell biology, arthropod biology, ecology, evolution, and genetics to investigate the problems of infectious diseases and immune-related pathologies.

Training Program in Biodefense and Emerging Infectious Disease

The BD-EID training program bridges basic biomedical research and public health with emphasis on the fundamentals of infectious disease and immunology. Practical training is offered in epidemiology, emerging infections, and biodefense science in

biocontainment laboratories. Program faculty focus on the areas of pathogen biology and determinants of pathogenesis; animal models of infection and immunity; host response and immunity, epidemiology; natural history and ecology of select agents and diseases; novel therapeutic targets; and development of diagnostic methodologies. Trainees will be broadly trained to address the challenges associated with understanding the causes of infectious disease.

Molecular Genetics

The study of the structure and function of genes and genomes at a molecular level. Faculty in the Molecular Genetics Track focus on the genetics of humans, model organisms from *E. coli* to mice, and viral and bacterial pathogens. Faculty research encompasses genomics, population genetics, quantitative genetics, cancer genetics, developmental genetics, gene expression, gene regulation and genome biology and evolution.

Neuroscience

The study of basic biological principles underlying nervous system functions and their application to disease. Neuroscience faculty members study problems ranging from understanding the molecular basis of neurodegenerative and neuropsychiatric disease to developing effective therapies, including workable computer-brain interfaces. Subspecialization may be pursued in neurogenetics, neurophysiology, neuroimmunology, neuroanatomy, and neurotoxicology. Scientists in this track collaborate extensively with those in other BMS tracks, as well as with researchers and physicians in area hospitals.

Structural and Cell Biology

The study of the macromolecular structures and machines, using advanced 3D light and electron microscopy, X-ray crystallography and NMR spectroscopy. The emphasis is on understanding cellular function from the assembly of integrated molecular machines: how do they work, how are they assembled, and how are they regulated? Topics include cell division, transcription and translation, extracellular molecular recognition complexes, and how defects in the cellular machinery can lead to cancer and metastasis.

CURRICULUM

During the first year all students take integrated courses in Biochemistry and Molecular Cell Biology. In addition, they are required to take a Journal Club and Laboratory Rotations each semester. Courses may be waived if students can demonstrate they have already had the material.

Fall Semester

BMS 504a Comprehensive Biochemistry (4cr)
BMS 500 Molecular Cell Biology (4cr)
BMS 665Q Journal Club (1cr)
BMS 590a Laboratory Rotations (1cr)

Spring Semester

BMS 504b Comprehensive Biochemistry (3cr) – optional for MG students
BMS 500b Molecular Biology and Genetics (3cr)
BMS 665 Journal Club (0cr)
BMS 590b Laboratory Rotations (1cr)
Track requirement or elective (2-3cr)

The Qualifying Exam Part I is taken at the end of May of the first year of study.

All track requirements must be satisfied prior to admission to candidacy.

Immunology and Infectious Diseases students are required to take the following course(s):

BMS 506 Introduction to Immunology (2cr)
Either BMS 514 Molecular and Cellular Immunology (3cr) or BMS 610 Microbial Pathogenesis (3cr)

Biodefense and Emerging Infectious Disease students are required to take the following courses:

BMS 506 Introduction to Immunology (2cr)
BMS 514 Cellular and Molecular Immunology (3cr)
BMS 610 Microbial Pathogenesis (3cr)
BMS 632 Molecular and Cellular Prokaryotes (3cr)
BMS 553 Virology (4cr)
BMS 555 Biodefense Sciences (1cr)
BMS 556 Biodefense Laboratory (1cr)
BMS 557 Emerging Infectious Diseases (1cr)
* EPI 501 Principles and Methods of Epidemiology (3cr)

Two of the following courses must be taken:

BMS 504b Biochemistry; BMS 500b Molecular Biology and Genetics; BMS 552 Medical Entomology; EPI 605 Epidemiology of Infectious Disease

* satisfies the BMS 601 requirement

Molecular Genetics students are required to take **two** of the following four course(s):

BMS 606 Biology of Model Organisms (3cr)

BMS 622 Cancer Biology (3cr)

BMS 632 Molecular and Cellular Biology of Prokaryotes (3cr)

BMS 663 Mammalian Genetics (3cr)

Neuroscience students are required to take the following courses:

BMS 604 Cellular and Molecular Neuroscience (3cr)

BMS 612 Neuroanatomy and Nervous System Disorders (3cr)

Structural and Cell Biology students are required to take **one** the following course(s):

BMS 606 Biology of Model Organisms (3cr)

BMS 622 Cancer Biology (3cr)

BMS 635 Methods in Structural Biology (3cr)

Year 2

In addition to BMS 601: Introduction to Biomedical Sciences, which is taken by all students, individual tracks require various advanced level courses to promote in-depth knowledge in a particular topic. Students also must select a course to satisfy the second semester public health requirement (see list of approved substitutes for BMS 601B). All students should begin their dissertation/thesis research in the laboratory of their selected mentor.

Fall Semester

BMS 601 Introduction to Biomedical Sciences (3cr)

Elective or track requirement (3cr)

BMS 665 Journal Club (1cr)

BMS 670 Responsible Conduct of Scientific Research (1cr) - may be taken in either the fall or spring semester

BMS 510 Communication in Science (2cr)

All students are required to take BMS 510 Communication in Science. Students will be given the opportunity to test out of this course during the summer.

Spring Semester

Elective or track requirement (3cr)

BMS 665 Journal Club (0 or 1cr)

BMS 670 Responsible Conduct of Scientific Research (1cr) - may be taken in either the fall or spring semester

BMS 898 Laboratory Research

One course from the list of recommended replacements for BMS601B.

The Qualifying Exam Part II must be completed by June 1 of the second year of study.

Years 3-5

During years 3-5 the principal focus is on dissertation research. However, individual tracks may require their students to take additional courses to gain more in-depth knowledge in certain areas. The research tool requirement must be completed by the end of the third year of study, and students must be admitted into candidacy.

Fall Semester

BMS 665 Journal Club

Electives

BMS 898 Laboratory Research or BMS 899 Dissertation Research

Spring Semester

BMS 665 Journal Club

Electives

BMS 898 Laboratory Research or BMS 899 Dissertation Research

Approved substitutions for BMS 601B: BMS 601B Introduction to Biomedical was eliminated from the curriculum, effective Fall 2007. Individual tracks have identified a list of courses from which students may select to satisfy the second semester public health requirement.

Immunology and Infectious Diseases

EPI 501: Principles and Methods of Epidemiology (3cr) OR

BMS 555: Biodefense Sciences (1cr), BMS 556: Biodefense Laboratory Sciences (1cr), and BMS 557: Biodefense Sciences: Emerging Infectious Diseases (1cr)

Molecular Genetics

EPI 501: Principles and Methods of Epidemiology (3cr)

BMS 555: Biodefense Sciences (1cr), BMS 556: Biodefense Laboratory Sciences (1cr), and BMS 557: Biodefense Sciences: Emerging Infectious Diseases (1cr)

BMS 552: Medical Entomology (3cr)

BMS 553: Virology (4cr)

BMS 610: Microbial Pathogenesis (3cr)
 BMS 612: Neuroanatomy and Nervous System Disorders
 BMS 622: Cancer Biology (3cr)
 BMS 663: Mammalian Genetics (3cr)
 EPI 552: Principles of Statistical Inferences (3cr)
 EPI 604: Cancer Epidemiology (3cr)
 EHT 530: Principles of Toxicology (3cr)

Neuroscience

BMS 612: Neuroanatomy and Nervous System Disorders (3cr)

Structural and Cell Biology

BMS 622: Cancer Biology (3cr)
 EPI 604: Cancer Epidemiology (3cr)
 Other courses with approval of mentor and track director

Electives

The following courses are offered as electives and may be taken upon consultation with the academic mentor by students from any track.

BMS 506 Introduction to Immunology	2cr
BMS 514 Cellular and Molecular Immunology	3cr
BMS 552 Medical Entomology	3cr
BMS 553 Virology	4cr
BMS 555 Biodefense Sciences	1cr
BMS 556 Biodefense Laboratory	1cr
BMS 557 Emerging Infectious Diseases	1cr
BMS 606 Biology of Model Organisms	3cr
BMS 610 Microbial Pathogenesis	3cr
BMS 612 Neuroanatomy and Nervous System Disorders	3cr
BMS 622 Cancer Biology	3cr
BMS 632 Molecular and Cellular Biology of Prokaryotes	3cr
BMS 635 Methods in Structural Biology	3cr
BMS 650 Readings in Neuroscience	1-3cr
BMS 652 Neuroimmunology Colloquium	2cr
BMS 655 NanoBioTechnology	3cr
BMS 660 Readings in Molecular Endocrinology	3cr
BMS 663 Mammalian Molecular Genetics	3cr
BMS 666 Contemporary Topics in Immunology	0-1cr
BMS 851 Advanced Techniques in Structural Analysis	1-4cr
STA 572 Introduction to Applied Statistics in Environmental Biomedical Sciences	2cr

Students may also take classes offered in other departments at the School of Public Health, Albany Medical College, Rensselaer Polytechnic Institute, and in the Biological Sciences Department, University at Albany.