



**DEPARTMENT OF MEDICAL AND MOLECULAR SCIENCES  
APPLIED MOLECULAR BIOLOGY & BIOTECHNOLOGY  
STUDENT HANDBOOK**

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In order to facilitate the success and ensure the welfare of students in the Applied Molecular Biology and Biotechnology (AMBB) major and in their future careers, the policies stated herein have been adopted. Feel free to contact the Program Director if you have any questions concerning department policies.

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**DEPARTMENT OF MEDICAL and MOLECULAR SCIENCES**  
**MISSION STATEMENT**

**The Department of Medical and Molecular Sciences is committed to providing skilled, critically-thinking practitioners equipped to be future leaders in health sciences. In this pursuit, the Department is committed to active engagement of undergraduate and graduate students in experiential learning, to forming collaborative partnerships with educational, clinical, industrial and research experts locally and globally, to discovering innovative breakthroughs in research that contribute to the health and basic sciences body of knowledge, and to functioning as an expert resource regarding all issues related to Medical and Molecular Sciences.**

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## I. GOALS AND COMPETENCIES REQUIRED OF STUDENTS

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It is the goal of the University of Delaware to encourage students to achieve their highest standard of scholarship and to help them assume responsibility for developing and achieving their own goals and objectives. In accordance with this, the primary educational goals of the Department of Medical and Molecular Sciences are to provide students with an excellent comprehensive education in Applied Molecular Biology and Biotechnology leading to a baccalaureate degree, to prepare students to function in professional positions as practitioners for the bioscience environment of the 21<sup>st</sup> century, and to prepare students to be life-long learners so as to remain current with advances in biomedical science.

The curriculum design assures student-oriented instruction in the theory and practice of competencies important in the Biotechnology sector. The capstone experience of your curriculum will be the practical internships which comprise a significant part of your senior year coursework. This experience offers students an opportunity to refine their skills, while at the same time gain a better sense of what area of biotechnology they are most interested in. Our approach enables students to graduate from the University well prepared to enter the workforce or professional and graduate schools.

Students complete extensive hands on laboratory course work designed to give them proficiency in current molecular techniques utilized in a wide range of biotechnology fields; and includes in addition to the “standard molecular biology techniques”, cell and tissue culture; protein expression, purification and characterization; molecular diagnostics; and mutation detection. Laboratory class sizes are kept small to ensure adequate guidance in developing hands-on skills. In addition, the curriculum includes theoretical basic science course work, such as: systems biology/bioinformatics, cell biology, biochemistry, immunology, histology, flow cytometry, and microbial and human genetics. Course work in regulatory issues and ethics are also included. Students utilize state of the art equipment and are taught by experts in their respective fields, from both academia and industry. The curriculum provides preparation for those seeking to sit for the MB(ASCP) exam and conforms to the curriculum standards set forth for programs in biochemistry and molecular biology by the NSF (National Science Foundation) & ASBM (American Society for Biochemistry and Molecular Biology).

In the final phase of their training, students engage in practical rotations in various laboratory settings to gain first hand day-to-day experience in the laboratory environment. Students are required to work full-time over of period of 4-5 months, during which time they will be evaluated on their technical competency.

Our goal is that students completing their degree will be able to hit the ground running and be prepared to begin graduate studies or independent careers as BS level scientists. Graduates of our program will be well suited for employment in the bio-pharmaceutical industry (for example, Glaxo Smith-Kline, Merck, Johnson and Johnson, W-Xi Apptech, Centacore, Imugen, Sanofi Pasteur, Bristol-Meyers Squibb), in molecular diagnostics, forensics, core facilities, academic labs, state/government laboratories and in teaching. Alternatively, graduates will be well prepared to join doctoral and/or a variety of professional programs.

To accomplish the educational goals of the program and some of the general education goals of the University, the curriculum incorporates cognitive competencies. After successfully attending lectures and completing assignments, the student will be able to:

- Utilize scientific principles (e.g., molecular biology, bioinformatics, immunology, biochemistry, genetics, microbiology, etc.), laboratory principles, and methodologies as they apply to the biotechnology sector.
- Interpret accurately laboratory data and determine their significance.
- Utilize principles of quality assurance and quality improvement.
- Communicate, through oral and written skills, effectively and professionally to enable consultative and educational interactions with scientific personnel, the public, and clients in order to function successfully as a member of the professional team.
- Demonstrate ethical behavior and professionalism, maintain confidentiality of laboratory or patient information, and participate in continuing education for one's own professional career development.
- Develop skills and knowledge to become life-long learners.
- Evaluate published scientific studies utilizing knowledge of research design.
- Apply principles and concepts of laboratory operations to critical pathways and scientific decision making, performance improvement, dynamics of the biotech sector in relationship to laboratory operations.

## General Education Goals of the University

After successfully attending lectures and completing assignments in the liberal arts courses, the student will be able to:

- Read critically, analyze arguments and information, & engage in constructive ideation.
- Communicate effectively in writing, orally, and through creative expression.
- Work collaboratively and independently within and across a variety of cultural contexts and a spectrum of differences.
- Critically evaluate the ethical implications of what they say and do.
- Reason quantitatively, computationally, and scientifically.

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## II. ESSENTIAL FUNCTIONS REQUIRED OF STUDENTS

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As an AMBB major, you have chosen to pursue a profession, where honesty and integrity are critical personal characteristics required both in academic studies and in the practice of the medical profession. Successful students are self-sufficient, problem-solvers who like the challenge and responsibility that careers in healthcare provide. In order for graduates to maintain their competence, they need to be life-long learners. As a AMBB student, you must develop skills and the know how to find information and to be self-learners. The principles that embody the Essential Functions are applicable to the many career opportunities that exist in healthcare. Physicians, physician assistants, dentists, optometrists, etc. need to possess the same qualities that are detailed in the Essential Functions including but not limited to manual dexterity, good eye-hand coordination, safe utilization of equipment, accuracy, maintaining composure in stressful situations, utilizing independent judgment, exercising good communication skills, demonstrating ability to comprehend scientific and medical information, and maintaining patient confidentiality. The Essential Functions are comprised of emotional and professional/intellectual demands and are the expectations for a student who plans to enter the biotech workforce or to pursue graduate or professional school upon graduation.

The *emotional demands* required of students include the ability to:

1. Maintain composure and professionalism while providing appropriate services under stressful situations, such as time constraints, emergencies, rudeness, etc.
2. Utilize independent judgment and act logically in the performance of one's duties.
3. Organize and accept responsibility for one's work, including acknowledgement of errors or uncertainty and acceptance of constructive criticism.
4. Employ sufficient psychological stability to consistently and dependably utilize critical thinking in order to formulate and implement safe and ethical healthcare decisions in a variety of settings.

The *professional/intellectual demands* required of students include the ability to:

1. Communicate in a professional, positive, tactful manner with patients, physicians, nurses, and other healthcare and non-healthcare employees.
2. Communicate understandably, comprehend, and follow directions in English as evidenced by verbal, written, and reading skills.
3. Communicate, through the use of assistive devices (e.g., hearing aids, phone receivers, etc.) if needed, so as to converse understandably in English.
4. Maintain patient confidentiality and exercise ethical judgment, integrity, honesty, dependability, and accountability in the performance of one's responsibilities.
5. Demonstrate the intellectual skills required to comprehend scientific and medical information, perform mathematical calculations, analyze information, evaluate information, and use critical thinking skills to solve problems.
6. Maintain a well-groomed, neat, professional appearance.

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### III. HEALTH AND SAFETY REQUIREMENTS

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- **Health Requirements**

To safeguard the health and safety of self and others when performing educational activities in various laboratory settings, students may be required to have a routine physical examination before the start of practical rotation activities. The physical examination provides verification that the student appears to be free from disease or any impediment which would interfere with normal activity, study, or physical effort.

- **Immunizations**

Before starting rotation activities, students may be required to have specific testing and/or immunization (or documentation thereof) for hepatitis B virus, tetanus, measles (rubeola), mumps, and rubella (MMR), varicella (chicken pox), influenza and tuberculosis (2-step PPD tuberculin skin test or QuantiFERON® test). Students might be required to submit documentation of immunity as evidenced by positive immune titers for several of these diseases. For the safety of coworkers, many institutions have the right to refuse student participation, if the student is unwilling to comply with immunization requirements.

Laboratory personnel are among those at increased risk for acquiring hepatitis B virus infection due to their possible contact with human blood, cell culture media or other body fluids. A student who wishes to be immunized may receive the injections from his or her primary care provider. **Such immunizations should begin at least six months prior to volunteer activities.** Alternatively, the vaccine is available through Student Health Services paid for by the student. The vaccine is administered

as a series of three injections given at appropriate intervals over a six-month period. If a student has been vaccinated previously, most affiliates will require a blood test to determine antibody titer to the hepatitis B virus.

- **Drug Screening, Criminal Background Check, and Other Requirements**

Before starting clinical activities, a student may be required to complete a urine drug screening and a criminal background check. There are some requirements that may be specific to certain healthcare institutions, including but not limited to: child abuse registry investigation and adult abuse registry investigation. For the safety of patients, healthcare institutions reserve the right to request a urine drug screening and such criminal/abusive background checks at the commencement of clinical activities.

- **Important Note**

Students should be aware that results from the criminal background check, urine drug screening, child abuse registry investigation and adult abuse registry investigation could negatively impact the student's ability to participate in internship activities at outside institutions. In addition, candidates applying for employment in biotech sector are typically required to undergo a criminal background check and urine drug screening. Each student should use sound judgment and avoid situations which could result in poor decisions. Failure to do so could jeopardize the student's ability to complete graduate medical education, thus impacting on future career goals.

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## IV. ACADEMIC REQUIREMENTS

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- **Grading**

**Students must obtain a grade of C- or higher in each of the Department of Medical and Molecular Sciences (MEDT) courses to progress in the AMBB major. A grade of C- requires attainment of a minimal grade of 70%. Grades are not curved. Medical and Molecular Sciences courses are offered only once a year.** To avoid problems that may impede progression in the major, a student who finds himself/herself in academic difficulty is encouraged to seek assistance from the Office of Academic Enrichment and the Center for Counseling and Student Development. **NOTE:** In accordance with University policy, courses taken at another institution must be graded C or better to transfer (a grade of C- is not acceptable for transfer).

See <http://www.udel.edu/registrar/transfer/transins.html>.

- **Lecture Attendance**

**Attendance at all AMBB lectures is highly recommended.** Individual faculty might require attendance. The student must abide by the regulations set forth in each Medical and Molecular Sciences course, so the student should consult the policy contained in each course manual. In general, absence from class due to illness, death of a family member, a personal emergency, or observance of a religious

holiday will constitute cause for an excused absence. Examples of unexcused absences include but are not limited to scheduling routine medical and dental appointments, expanding spring break beyond its allotted time, or scheduling other travels for personal reasons.

- **Student Grievances and Disciplinary Action**

Honesty and reliability are essential in the medical profession, and these qualities are emphasized in all of the undergraduate professional courses. Any incidence of personal misconduct, suspected cheating on an examination, plagiarism, or any other form of academic dishonesty by a student will be communicated to the Office of Student Conduct. If warranted, the incidence may be adjudicated by the Undergraduate Student Conduct System. Determination of misconduct may result in an F in the course and automatic dismissal from the AMBB major.

Student grievances are handled according to the policies of the Department of Medical and Molecular Sciences, the College of Health Sciences, and the University at large. Students should refer to the *University of Delaware Student Guide to University Policies* for detailed information on academic and non-academic grievance procedures (available at <http://www.udel.edu/stuguide/current>).

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## V. PROFESSIONAL SCHOOL REQUIREMENTS

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- **Health Profession Evaluation Committee (HPEC)**

A student whose educational goal is to attend a professional school, to include medical, dental, optometry, or podiatry, should become familiar with the Health Professions Evaluation Committee (HPEC) no later than the junior year. *Please note, students pursuing graduate education as a Physician Assistant are not expected to open a file with this Committee.* HPEC is a University committee composed of University faculty and local physicians, who evaluate the credentials of perspective candidates for medical and dental school admission. A junior student must complete their HPEC pre-med file, be interviewed by two HPEC committee members in preparation for the University's evaluation of the student's record, and take the appropriate standardized admission exam, e.g., MCAT, DAT, GRE. A student may open a HPEC file as early as the freshman year, most often during the sophomore year and no later than the junior year.

For additional information about HPEC, students are referred to [http://sites.udel.edu/healthpro/hpec\\_home](http://sites.udel.edu/healthpro/hpec_home)

- **Center for Health Profession Studies**

The Center for Health Profession Studies focuses on assisting students who are interested in careers in the health professions. The Center helps to assist students who want to pursue careers in medicine, dentistry, optometry, podiatry, physician assistant, advanced practice registered nurse, pharmacy, physical/occupational therapy and other health profession programs.



For additional information about the Center for Health Profession Studies, students are referred to <https://sites.udel.edu/healthpro>.

- **Course Completion Requirements** - Programs of the Department of Medical and Molecular Sciences are structured on the premise that students must cumulatively assimilate and master the basic body of knowledge in their discipline and certain theoretical principles before applying these principles and knowledge in laboratory practice. Academic coursework is scheduled in a planned, sequential format which is carefully monitored to ensure that subsequent coursework expands and solidifies prior learning, and that students are sufficiently prepared to enter the practical phase of their programs.

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**STUDENT SIGNATURE**

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**It is the student's responsibility to read and understand the policies in this document.**

**MY SIGNATURE ATTESTS THAT I HAVE READ AND UNDERSTAND ALL OF THE POLICIES AND INFORMATION RELATED IN THIS DOCUMENT FOR PROGRESSION IN AND COMPLETION OF THE APPLIED MOLECULAR BIOLOGY AND BIOTECHNOLOGY MAJOR.**

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**WITNESS to Student's Signature      Date**  
**(Parent or guardian can be a witness.)**

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**Student's Signature                      Date**

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**Print Student's Name**