DISCLAIMER

This booklet is not intended as a formal publication of The University of Texas Medical Branch. It should not be relied upon as the sole source of information regarding the Basic Biomedical Science Curriculum. Refer to the Graduate School of Biomedical Sciences at Galveston-Policies and Operations Manual for specific policy details and to the UTMB General Catalog for general information, along with the GSBS Student Handbook.

While every effort has been made to assure accuracy and timeliness of this information, The University of Texas Medical Branch is not responsible for any misrepresentation that might arise through error in its preparation or through failure to give notice of changes in requirements, policies, tuition and fees, course offerings, and other matters affecting students or applicants. The provisions of this booklet do not constitute an irrevocable contract between any student or applicant for admission and The University of Texas Medical Branch.

The University reserves the right to withdraw courses at any time, to change fees and tuition, academic calendars, curricula, degree requirements, graduation procedures, and any other requirement affecting students. Changes will become effective whenever the proper authorities so determine and will apply to both prospective students and those enrolled already.

No person shall be excluded from participation in, denied the benefits of, or be subject to discrimination under any program or activity sponsored or conducted by The University of Texas System or any of its component institutions, on any basis prohibited by applicable law, including, but not limited to race, color, national origin, sex, age, religion, disability or status as a Vietnam era veteran in any of its policies, practices and procedures. Also, The University of Texas does not discriminate on the basis of sexual orientation.
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This booklet provides information pertaining to the First-Year Graduate Studies in Basic Biomedical Sciences offered by the Graduate School of Biomedical Sciences at the University of Texas Medical Branch (UTMB).

Please inform the BBSC Advisor, Dr. Tracy Toliver-Kinsky, or the Program Manager, Jessica Linton, of any discrepancies. It is recommended that this booklet be used in conjunction with the UTMB General Information Bulletin, Graduate School Catalog, and the New Student Information handbook.

I. FIRST-YEAR BASIC BIOMEDICAL SCIENCE CURRICULUM (BBSC)

The Basic Biomedical Science Curriculum (BBSC) is a specially designed first-year integrated curriculum for students wishing to pursue their doctoral research training in any of the six advanced Ph.D. graduate programs at UTMB, listed below.

- Biochemistry and Molecular Biology
- Cell Biology
- Experimental Pathology
- Microbiology and Immunology
- Neuroscience
- Pharmacology and Toxicology

The first-year BBSC provides a multiple disciplinary approach for educating future scientists across several modern biomedical research disciplines. Advanced studies, leading to completion of the Doctor of Philosophy degree, are offered in a wide range of areas of specialization in the Graduate School of Biomedical Sciences. Specific areas of research strength and graduate education are at the University of Texas Medical Branch.

II. FINANCIAL POLICIES AND BENEFITS

All students who are accepted into the BBSC will receive a graduate assistantship. Effective 2017-2018, students selected for graduate assistantship receive a stipend of $29,000, in addition to health insurance coverage. Dental and vision insurance are available for a small charge.

Pursuing a Ph.D. degree is considered a full-time endeavor. Students who receive an assistantship are not eligible to work in other units at UTMB. Employment outside UTMB is strongly discouraged and requires approval from the GSBS Student Affairs Dean. Questions concerning this policy should be discussed with the BBSC Director, Dr. Tracy Toliver-Kinsky.
Time Accrual

Graduate students are paid under the job classification of graduate assistant, as a half-time classified employee. This job title does not allow the accrual of retirement benefits, vacation, or paid holidays. Sick leave is accrued at the rate of four hours a month. Students must inform the BBSC Administrative Office of any leave away from the campus, other than scheduled school holidays, during their first year of coursework.

Health Insurance

A UTMB student appointed as a graduate assistant qualifies for the employee health insurance policy and receives premium sharing from the state and the Graduate School of Biomedical Sciences that pays the full policy premium. Coverage for spouse and/or dependent children is available at cost. Information about the policy is available from the Benefits Division of the Department of Human Resources. Graduate assistants on a stipend, your health insurance is paid.

Tuition and Fees

Tuition and fees for students who are recipients of an assistantship (part of your financial package as an entering BBSC student) will be paid directly to the Office of Financial Services by the BBSC Manager for your first year of graduate studies at UTMB (i.e., Fall 2018, Spring 2019, and Summer 2019).

Chapter 54, Article 54.063 of the Texas Education Code, addresses teaching/research assistants and their ability (includes spouse and children of said student) to "register in a state institution of higher education by paying the tuition fees and other fees or charges required for Texas residents..." if "...the assistant is employed at least one-half time in a teaching or research assistant position which relates to the assistant's degree program under the rules and regulations established by the employer institution."

Retirement Benefits

Graduate assistants do not contribute to a retirement plan, nor do they receive any plan benefits.

FICA

Federal Income Compensation Act (FICA) is also known as social security. Individuals who hold a BBSC graduate assistantship are not subject to FICA withholding. (Note that any income above and beyond the graduate assistantship stipend voids this provision.) All students should check their payment to ensure that FICA is not taken out.
Federal Income Tax

Graduate assistantships are considered taxable income for purposes of the Internal Revenue Service. It is referred to as OASDI on the paycheck. A W-4 form must be on file. Tax information can be found at http://www.irs.gov/.

Paychecks

The University of Texas Medical Branch distributes payroll every other Friday for salary earned the previous two weeks. The first stipend bi-weekly check can be expected the next payroll period following the first day of class (September 14). You can deposit your check in to as many as four different accounts through the Employee Self Service function. If the direct deposit is set up before payroll is processed, it will take effect immediately. If not, any printed paychecks will be mailed to the employment address the following Monday. The "Direct Deposit" form can be downloaded from http://www.utmb.edu/finance/payrollservices/dirdeposit/default.asp or can be picked up from the Bursar's office (2nd floor of the Administration Building). Two forms of identification and a blank deposit slip are required for activation. Employees who arrange to have their paycheck electronically deposited can verify it via the website – click on Employee Paycheck on the UTMB homepage.

The Office of Enrollment Services may be able to assist with short-term loans if funds are needed to meet expenses before the first paycheck is received. Their office is located on campus (2.210 Ashbel Smith Building “Old Red”) and can be reached by phone at 409-772-1215. Go to (http://www.utmb.edu/enrollmentservices/financialaid.asp) https://www.utmb.edu/enrollmentservices/financialaid.asp for more information about financial aid.

Parking

Pre-tax parking is deducted directly from employees' paychecks. This deduction will not be subjected to Federal Withholding or Social Security/Medicare taxes. If interested in signing up for payroll-parking deduction, contact the Auxiliary Office http://www.utmb.edu/auxiliaryenterprises/ParkingFacilities/. Payment of registration and badge fees is required before students can make any parking arrangements.

Funding Guidelines

An important component to biomedical science careers is the ability to obtain funding for research projects. It is a prestigious accomplishment to include on a curriculum vitae. Students awarded extramural support equal to or greater than half of the current stipend rate during their first year should notify the administrative coordinator. The GSBS provides an incentive to recognize such extraordinary efforts.
Funding Opportunities/Scholarships

There are a variety of scholarships available to graduate students, both open and restricted. The website, http://gsbs.utmb.edu/scholarships/, provides detailed information about these scholarships.

Other excellent sources of funding opportunities can be located at the Office of the Assistant Vice President for Research Funding Library, 4th Floor Rebecca Sealy Building – East End, Room 4.400 (ext. 69400) and the UTMB Yellow Sheet at http://research.utmb.edu/research/yellowsheet/ysonline.htm.

Bookstore Purchases

The UTMB bookstore is located in the Moody Medical Library. In previous years, the bookstore issues rebates for items marked books, merchandise, and scrubs on the cash register receipt, but must be $1.00 or more excluding tax. Save all receipts for a possible rebate whenever items are purchased from our bookstore. The bookstore will send out an email message to all students with directions for turning them in for a rebate check.

III. ADMINISTRATIVE ISSUES

A central structure exists to aid with any administrative issues. The program manager must be kept informed of any changes in enrollment status, both employment and coursework.

Contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Office</th>
<th>Phone</th>
<th>Email</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Tracy Toliver-Kinsky</td>
<td>Director, Basic Biomedical Science Curriculum &amp; Chair, BBSC Curriculum Committee</td>
<td>614 Shriners Burns And 4.429-E Levin Hall</td>
<td>409-770-6610</td>
<td><a href="mailto:ttoliver@utmb.edu">ttoliver@utmb.edu</a></td>
<td>0877</td>
</tr>
<tr>
<td>Jessica E. Linton</td>
<td>Program Manager</td>
<td>4.429-F Levin Hall</td>
<td>409-772-5452; Toll-free within U.S.: 1-877-GAL-GSBS</td>
<td><a href="mailto:jelinton@utmb.edu">jelinton@utmb.edu</a></td>
<td>1050</td>
</tr>
</tbody>
</table>
Badges

Students who receive a graduate assistantship are also considered employees of UTMB with the employment title of Graduate Assistant. One badge is issued that contains a “Smart Card”, which recognizes student and employee status. This badge will be needed to access buildings located on campus, checking out books from the library, parking, field-house privileges, and other identification purposes. All badges must be returned when a student departs from the university.

Your employee badge can also be used around the island. Ask about discounts for UTMB employees. It can be used for free transportation for the island bus any day or time of the week. For more information on the Discount with (UTMB) ID Program, visit the UTMB Human Resources page at http://hr.utmb.edu/did/.

Building Access

Security measures are taken on campus limiting access to certain buildings. Numerous buildings on campus are locked after certain hours, and some remain locked (e.g., Galveston National Laboratory, Truman Blocker, Jr. Medical Research, Libbie Moody Thompson Basic Science Building, and Research Building 17). The security entrance system requires your employee badges to be encoded for entry.

Students will need to extend, or request, access to a research building for laboratory rotations. Those arrangements, upon request, are made directly through the department in which the faculty member resides. Ask the lab manager for their Key Control Officer (KCO) since that individual must submit the work order to Campus Police. Be sure that they are aware that you are already given access, but need it to be extended for the weekends or additional hours.

BBSC students will be given 8am-5pm access to the following buildings through the Summer 2023 term: Medical Research Building, Basic Science Building; and unlimited access (24 hrs/day, 7days/wk) to the following: Ashbel Smith Building, Jamail Student Center (through Summer 2021), Research Building #6 entry, and William C. Levin Hall.

There are four small break-out rooms on the 3rd floor of Levin Hall which may be used for studying, group projects, etc. These rooms are 3.330, 3.332, 3.336, and 3.338. They are exclusive to the BBSC class and as long as classes are not being held in them, no reservation is needed. If you would like to book any, contact Jessica Linton. But for fire safety and among other reasons, electrical appliances (coffee pot or otherwise) are not permitted in any of those rooms. Rotations begin in the 2nd 8-week block of the first term and labs will have designated areas for such amenities.
Mail

Campus mail is located in the main BBSC office, Room 4.429 Levin Hall. Students are encouraged to check it on a regular basis. Personal mail should be sent to your home residence. In completing forms or other campus business, the route number is 1050.

Telephones

The main telephone number for the BBSC Office is 409-772-5452 (extension 25452 from a campus phone). Another extension is 22665 which is to the main Graduate School office. Notification of any phone messages received for students in the main office will be sent via the student’s UTMB email account.

The campus is on a five-digit phone system. To reach numbers outside of the UTMB campus, the caller must first dial "9", and then the seven-digit telephone number. Long-distance dialing can only be done with a UTMB telephone access code. These access codes are issued to individuals and control the billing for the telephone call charges. Graduate students are not normally issued telephone access codes during their first year.

Weather Emergency Policy

Galveston Island is a geographical area subject to hurricane threats. UTMB has developed Disaster Plans to implement appropriate procedures in the event of a hurricane. If the need for emergency transportation occurs, it is the student’s obligation to obtain such transportation. UTMB is unable to provide shelter for students as all non-hospital buildings are closed in the hurricane preparation phase. The Academic Executive Council will formally dismiss students from all schools in the event of a hurricane threat – normally when a hurricane “warning” is announced. Please refer to the information posted on the web at http://www.utmb.edu/emergency_plan/.

Students are appointed with an employee title of Graduate Assistant which is classified as a non-essential employee. This is defined as “employees whose presence is not essential during a declared emergency status, but cannot leave until released by supervisor and must return to work as usual under routine operations after emergency status has ended.” In the event of an evacuation, students are responsible for making transportation arrangements off the island.

Our university also has a service, called “UTMB Alerts”, whereby instant messages would be sent to the email/and/or telephone on record should an emergency situation arise. Refer to the UTMB Directory How-To Guide for updating your directory information.

Some other useful urls concerning weather emergency are as follows: UTMB Weather Advisories – https://galen.utmb.edu/weather/index.shtml
Weather-related services are available by dialing 409-74STORM (409-747-8676) or tuning campus television to channel 37. Reports are also provided on radio stations, KGBC 1504 AM and KTRH 740 AM, and on area television stations.

IV. ACADEMIC REGULATIONS

Information provided here is only a brief overview of academic policies and procedures. Students are encouraged to review thoroughly the complete policies for academic matters, especially as described in section 4 of the GSBS Academic Policies. This document can be accessed at http://gsbs.utmb.edu/_pdf/BylawsandPolicies.pdf.

Professionalism and Compliance

Professionalism should always be exercised, regardless of media used. This includes chat boards or in verbal conversations. There are rules and regulations to address inappropriate conduct violation. As you progress through your graduate career, appropriate conduct is expected. More information can be found at http://www.utmb.edu/compliance/ (and click on ‘Standards of Conduct Guide’). Also see Appendix for Classroom Etiquette, along with Student Rights and Responsibilities.

Every student (and employee) is mandated to complete certain training to be compliant with the university. This is regulated by the federal government and no exceptions are made. You can find out what courses you are required to do and its deadline by logging to the Annual Online Training Compliance area at http://hr.utmb.edu/tod/elm.aspx. Information about compliance can be found at http://www.utmb.edu/compliance/.

Students, on the other hand, must complete their annual training within 60 days of the semester, not by the end of the fiscal year. The site will indicate an August 31 due date which is for employees. Unfortunately the system is limited to indicate one due date. Although the systems indicates the due date of 8/31, all students (even students who are also employees) are required to complete this training at a much earlier deadline.

Grades

For continuation in good standing from one semester to the next, the standards imposed by the Graduate School of Biomedical Sciences must be met. These are as follows: 1) achieving in each term a 3.0 average or above for all letter-graded courses and 2)
satisfactory performance in all other courses each term. If these conditions are not met, students are placed on probation for the next semester.

**Probation**

If during the term in which the student is on probation he/she achieves a 3.0 average or above for all letter-graded courses and satisfactory performance in all other courses, the Dean will remove the student from academic probation. Only with permission of the Dean will a student be permitted to drop a course during any term that he/she is on probation.

**Dismissal**

Conditions for academic dismissal from the graduate school exist when a student (a) on probation fails to achieve a 3.0 GPA or above for all letter-graded courses and satisfactory performance in all other courses; (b) receives a second F, WF, or U grade; (c) a student receives a second grading symbol of "W" for the same course or more than two grades of "W" overall; or (d) fails to meet all requirements for admission to candidacy for a degree in a timely fashion as specified in the GSBS Academic Policies. The Dean informs students in writing when they are dismissed from the graduate school. Students dismissed from the graduate school are not eligible for readmission. However, a student may formally appeal the dismissal decision within two weeks of the issuance of the dismissal.

**Student Advisors**

Students are assigned faculty advisors to assist students in determining the appropriate classes to take each semester, selecting the lab for rotations, and deciding on a graduate program for advanced coursework, as well as any problems students may encounter. Advisors will evaluate the performance of students during their progress during the first year. Students are encouraged to seek their advice at any point during the first-year curriculum. Some of the items that will be discussed are as follows:

- Coursework / Course Schedule
- Research Rotation Choices
- Grades
- Dissertation Advisor
- Progress of Experiments
Drop/Add Policy For GSBS “Short Courses” That Begin After The Census Enrollment Date of a Term

This policy applies to courses in the Graduate School that have a duration of less than the typical 16-week term and that begin after the twelfth class day of a term. Such courses include numerous of the 8-week BBSC “electives” and courses in graduate programs that may be 7-10 weeks in length. State regulations regarding enrollment census dates impose certain limitations on the manner in which dropping or adding such “short courses” can be handled. The following guidelines and policies are designed to assist in understanding and operating under these rules.

I. Students must register for all courses, regardless of duration or start-date, in an upcoming term during the normal period for registration before a term via mySTAR or other approved method of registration. Students may drop or add courses until the end of the twelfth class day of a term and appropriate adjustments will be made in their tuition and fee assessments.

A student must remain enrolled in a minimum of 9 credit hours throughout a term to be considered a full-time student. Loss of full-time status will result in loss of stipend support. Dropping or adding credits to a net of less than 9 hours at any time during a term will result in loss of stipend support. Loss of full-time status can also change the visa status of international students.

It is extremely important that students plan their schedules carefully and with the advice of the BBSC and Program Directors so as to develop the most appropriate and effective curricular plan and to minimize the necessity for dropping and adding courses after a term is underway.

II. After the sixth class day of a term (or fifth if Summer), a student may add or drop an 8-week BBSC elective or a “short course” in a specific graduate program that begins later in the term only under exceptional circumstances and with consent of his/her advisor(s).

A. Such a course may be added before the class begins or within the first six (five for Summer) days after the class starts. Adding the course requires permission of the course co-director or instructor, the BBSC or Graduate Program Director (as appropriate), and the Graduate School of Biomedical Sciences. Students shall pay the additional costs in tuition and fees for each course added.

B. Such a course may be dropped before the course begins provided paperwork is processed by Friday of the week preceding the course start; to drop the course requires permission of the BBSC or Graduate Program Director (as appropriate) and the Graduate School of Biomedical Sciences. In this case, the course will not appear on the student’s transcript. Tuition and fees paid for the course are not charged when the course is
dropped before it begins; appropriate reimbursement will be made if tuition and fees have already been paid. Students are cautioned to be certain that dropping the course does not lower their total credit-hour load to less than 9 hours as this will result in loss of the stipend.

C. Students may withdraw from such courses at any time after the course begins through the final day of class of the course. To withdraw from the course requires (i) a brief written statement by the student explaining the reason for withdrawing from the course and (ii) signatures of the course director/instructor, the BBSC or Graduate Program Director (as appropriate) and the Graduate School of Biomedical Sciences. The GSBS Academic Policies will apply in determining the final grade for the course ("W" or "WF"). Tuition and fees paid for the course are not reimbursable. Students are cautioned to be certain that dropping the course does not lower their total credit-hour load to less than 9 hours, and to note that the "W" option should only be used when absolutely necessary, since this grade cannot be used for the same course more than once and accumulating more than two "W" grades is grounds for dismissal from the Graduate School.

Other Rules and Regulations

Additional information about graduate school requirements can be found in the UTMB General Information Bulletin or on the GSBS web site. Nothing in the present document is meant to conflict with the information found in the Graduate School Catalog.

V. GRADUATE FACULTY MEMBERS

By the end of the Summer term of the first year, all students transition from the BBSC to their graduate program. A form to facilitate that process is provided by the BBSC. The BBSC will prepare the necessary paperwork to make the change official in the Office of Enrollment Services. It is the responsibility of each student to identify a laboratory and mentor willing to provide support for their graduate research. Dissertation supervisors must be members of the GSBS graduate faculty.

There are numerous faculty appointed as members of the Graduate School of Biomedical Sciences. Information concerning their research interests can be found at the program web page.
VI. GENERAL COURSE SCHEDULE  
(Note: Maximum course load is 15 hours/term; 9 minimum)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
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<tr>
<td>YEAR 1 – Fall Term</td>
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</tr>
<tr>
<td>BBSC 6043</td>
<td>Laboratory Rotation [1st block optional]</td>
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<tr>
<td>BBSC 6043</td>
<td>Laboratory Rotation [2nd block required]</td>
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<tr>
<td>XXXX 61xx</td>
<td>Program Seminar</td>
<td>1</td>
</tr>
<tr>
<td>BBSC 6129</td>
<td>Responsible Conduct in Biomedical Research (longitudinal, spanned across 3 terms)</td>
<td>1</td>
</tr>
<tr>
<td>BBSC 6131</td>
<td>General Laboratory Safety</td>
<td>1</td>
</tr>
<tr>
<td>BBSC 6132</td>
<td>Laboratory Biosafety and Biocontainment [optional]</td>
<td>1</td>
</tr>
<tr>
<td>BBSC 6302</td>
<td>Cell Biology</td>
<td>3</td>
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<tr>
<td>BBSC 6401</td>
<td>Biochemistry</td>
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<tr>
<td>Spring Term</td>
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<td>BBSC 6043</td>
<td>Laboratory Rotations (2)</td>
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<td>BBSC 6222</td>
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<td>XXXX 6097</td>
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<td>YEARS 2-5</td>
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<tr>
<td></td>
<td>Graduate Programmatic Requirements, Electives and Dissertation Research through Graduation</td>
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The BBSC Academic Year 1 Calendar is provided in the Appendices, along with “Instructions for Writing Take-Home Assignment Answers”. The course descriptions are in the following section.
VII. BBSC COURSE OFFERINGS

The first-year Basic Biomedical Science Curriculum (BBSC) offers an extraordinary graduate experience that furnishes a breadth of biomedical concepts and a strong foundation for advanced work. The BBSC is composed of foundational courses (Cell Biology, Biochemistry, Molecular Biology & Genetics, Biostatistics, Big Data Sampling, and Responsible Conduct in Biomedical Research), and a series of 8-week laboratory rotations. Additional available activities include regular seminars and specialized courses. The descriptions for each course are detailed on the following pages. BBSC course offerings are dynamic. New courses are added and older courses are not offered every year. The following listings are provided as a general guide. All graduate course offerings are also located online, click on the “GSBS Course Offerings By Program” on the main GSBS webpage.

All full-time students are required to take at least 9 credit hours of coursework in each of the three academic terms [I: Fall, II: Spring, III: Summer]. Listed below in numerical order are the BBSC course offerings. It is not a complete list of all offerings, but reflects courses that are eligible for the first-year requirements. Descriptions for each follow. The second digit in the course number represents credit hours.

<table>
<thead>
<tr>
<th>Name of BBSC Course</th>
<th>Course No.</th>
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<td>Laboratory Rotation (Fall, Spring, Summer)</td>
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<td>Introduction to the Study of Biological Systems (Summer)</td>
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<td>Critical Reading of Scientific Literature (Spring)</td>
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<td>Genes, Environment, and Disease (Summer)</td>
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<td>Neuronal Transmission (Spring)</td>
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<td>Teaching in Biostatistics (Spring)</td>
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<tr>
<td>Small Sampling of Big Data (Summer)</td>
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<tr>
<td>General Laboratory Safety (Summer, Fall)</td>
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<td>Laboratory Biosafety and Biocontainment (Summer, Fall)</td>
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<td>Frontiers of Science (Fall, Spring, Summer)</td>
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<td>Neuronal Excitability (Fall)</td>
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<td>Principles of Drug Action, Pharmacokinetics &amp; Biotransformation (Spring)</td>
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<td>Vaccine Development Pathway: From Discovery to Licensure (Summer)</td>
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<td>Animal Models of Human Diseases (Fall)</td>
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<td>Project Proposal Preparation (Spring)</td>
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<tr>
<td>Biostatistics (Spring)</td>
<td>BBSC 6222</td>
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</table>
Required Courses

The Basic Biomedical Science Curriculum (BBSC) provides an integrated, multidisciplinary, first-year curriculum for students. The BBSC is composed of three sixteen-week foundation courses (Cell Biology, Biochemistry, and Molecular Biology & Genetics), a series of seven or eight-week integrative electives, three to six laboratory rotations, and a set of specialized courses and activities.

The following are required foundation courses in the Basic Biomedical Science Curriculum:

BBSC 6302 - 3 credits
CELL BIOLOGY
This is a required foundation course in the Basic Biomedical Science Curriculum (BBSC). It is a sixteen-week course taught throughout the term to acquaint students with the basic principles of modern cell biology. The topics to be covered include regulation of basic cellular activities including functions of cell organelles, signaling, changes in cell numbers, interactions during development, and cellular organization into tissues. Grades will be based on the performance on examinations and small-group discussions.
Prerequisites: At least one-year college-level biology and chemistry; biochemistry recommended
Term offered: I
Year offered: Annually
Hours per week: Lecture 3
Instructor: Oberhauser

BBSC 6401 - 4 credits
BIOCHEMISTRY
This is a required foundation course in the Basic Biomedical Science Curriculum (BBSC). The course deals with the fundamental forces that are the bases for molecular interactions, and the translation of these forces into the structure and function of proteins. Emphasis will be on the principles that give rise to these forces; on applying the principles to biochemical problems; and on the use of the principles in understanding macromolecular structure and function. The course also covers the basics of intermediary metabolism; the application of knowledge as to the fundamental forces that are the basis for molecular interaction; and the integration of these forces into regulation, synthesis and function of different biomolecules as they apply to developing an understanding of
metabolism in homeostasis and disease. The course will have three lectures and two hours of small-group discussion and problem-solving sessions per week. Grades will be determined based on performance on written examinations and performance in small-group discussion sessions.

Prerequisites: College chemistry through organic, college physics and biochemistry recommended or consent of instructor

Term offered: I
Year offered: Annually
Hours per week: Lecture 3; Conference/Discussion 2
Instructors: Pettitt, Smith

BBSC 6403 - 4 credits
MOLECULAR BIOLOGY AND GENETICS
This is a required foundation course in the Basic Biomedical Science Curriculum (BBSC). It will consist of three lectures per week and two-hour discussion sessions every other week for a total of sixteen weeks. Topics include nucleic acid structure, DNA replication, genetic recombination, recombinant DNA technology, mutations and their repair, transcription and its regulation, translation, Mendelian inheritance, the human genome, microbial genetics, transgenic animals and models of human genetic disorders, and human evolution. Grades will be determined based on the performance on four examinations, graded problem sets, and participation in small-group discussion sessions.

Prerequisites: BBSC 6302, BBSC 6401, or consent of instructor

Term offered: II
Year offered: Annually
Hours per week: Lecture 3; Conference/Discussion 2
Instructor: Bouyer, Martinez

The following are also required courses but are considered special activities:

BBSC 6043 – (1-3 credits)
LABORATORY ROTATION
This is a required core course in the Basic Biomedical Science Curriculum (BBSC). It is designed to provide students the opportunity to conduct laboratory experiments under the direct supervision of a faculty member. The primary objective of this course is to assist students in choosing a mentor and their area of dissertation specialization. Students in the BBSC are required to take three 8-week rotations in a minimum of two independent laboratories during their first year in the BBSC. The time commitment is at least 6-18 hours/week in the lab. Mentor expectations and grading criteria should be communicated between the mentor and student at the start of the rotation. Students will be required to submit a written report to include description of the research, experiments attempted,
interpretations, accomplishments, etc., along with a Student Evaluation Report form completed by the faculty member.

Prerequisites: None

Term offered: I, II, III with no more than nine credit hours (24 weeks) in one lab

Year offered: Annually

Hours per week: 6-18 hours/week in the lab

Instructor: Toliver-Kinsky

BBSC 6129 – 1 credit

RESPONSIBLE CONDUCT IN BIOMEDICAL RESEARCH

This course will cover all topics recommended by NIH for required instruction in responsible conduct of research (RCR), described in NOT-OD-10-019, and will incorporate contemporary ethical and regulatory issues in modern biomedical research. The course will begin in the Fall term and will extend over all 3 terms of the academic year. Students will register for the course in the Fall term and will be automatically enrolled the following Spring and Summer terms. A grade of "G" (longitudinal) will be assigned at the end of the Fall and Spring terms, and a single, 1-hour course grade will be assigned at the end of the Summer term. Specific RCR topics covered in a given term will be temporally aligned with relevant science or research topics being taught in the Basic Biomedical Sciences Curriculum courses during that term. Small group sessions and case studies will be utilized to discuss and integrate designated RCR topics, and will include various problem-based learning approaches. The average grade of all sessions over the three terms will be determined, and an average of 80% or greater is required to achieve a grade of Satisfactory.

Prerequisites: None

Term offered: I, II, III Longitudinal

Year offered: Annually

Hours: Lecture 2; Discussion 14

Instructor: Toliver-Kinsky

BBSC 6130 – 1 credit

SMALL SAMPLING OF BIG DATA

This eight-week course is designed to serve as an introduction to and overview of some aspects of modern data analysis in the biological sciences. As the data available to researchers becomes increasingly large, increasingly complex, and is generated faster and faster, content consumers, specialist scientists, and statistical data analysts are faced with problems in terms of management, transport, analysis, and interpretation never before seen. This evolution of data has also changed the ways in which the scientific process, scientific discovery and scientific theory are viewed. Essentially this course will be divided into six sections: big data, data sciences, computer science, data analysis,
informatics and bioinformatics. Grading will be based on the knowledge and preparation of material, as students are to design a group research project with emphasis on applying big data aspects.

Prerequisites: None
Term offered: III
Year offered: Annually
Hours: Lecture 2
Instructor: Jupiter

BBSC 6131 – 1 credit  
GENERAL LABORATORY SAFETY  
This course has been designed to include theoretical and practicum approach to laboratory for all students working in a research laboratory. This course will focus on general safety topics as they apply to BSL1 and introduction to BSL2. Topics will include: introduction to laboratory safety, chemical safety awareness, biological hazard classification, physical hazard awareness, radiation safety awareness, fire safety awareness, Introduction to laboratory design, Introduction to biosafety cabinets and chemical fume hoods, principles of personal protective equipment, waste handling and disposal procedures, transportation of laboratory material, risk associated with hazard exposures, safety and security, regulatory requirements, general lab practices. Emphasis will be on development of awareness in fundamental general laboratory safety and an introduction to risk assessment. This class will prepare students for the BBSC 6132 course and build fundamental knowledge required to work with infectious agents at BSL2-3 and 4 laboratories. The laboratory portion of the course will focus awareness of organization and techniques used in a BSC or fume hood, transportation of chemical material, disposing of wastes, and emergency procedures. Grades will be based on attendance, participation, oral presentation and laboratory skills. Both classroom and laboratory components must be successfully completed to pass the course.

Prerequisites: None  
Term offered: I, III  
Year offered: Annually  
Hours per week: Laboratory 1; Lecture 3.3; Discussion 1  
Instructor: Brocard

BBSC 6222 – 2 credits  
BIOSTATISTICS  
This is a required core course in the Basic Biomedical Science Curriculum (BBSC) which will provide students in the basic sciences with an introduction to statistical thinking. Specific topics include basic summaries, probability and distributions, inference, experimental design, hypothesis testing, and statistical modeling. Grading will be based
on the performance of multiple homework assignments, multiple lab assignments, several
in-class quizzes, a final take-home exam, and class participation. Students will learn
about the difference between populations and samples. They will learn the proper way to
describe experimental results based on descriptive statistics and visualization strategies.
They will learn about frequency distributions such as the normal distribution and the
basics of probability. They will learn about experimental design and hypothesis testing.
Specifically, they will learn when to correctly apply and how to perform the one sample t-
test, student's t-test, paired t-test, one-way ANOVA, two-way ANOVA, repeated
measures ANOVA, linear regression, correlation tests, nonparametric tests, and chi-
square analysis. They will learn the basics of power analyses and sample size
calculations. Each concept will be accompanied by a 2hr computer lab where the
students will practice with real data examples using the software package R. Additionally,
the students will critique basic science articles to learn the best way to present statistical
results in manuscript format. This will include discussions about graphs and figures as
well as how results are presented and discussed throughout the articles.
Prerequisites: BBSC 6302, BBSC 6401 or consent of instructor
Term offered: II
Year offered: Annually
Hours per week: Lecture 3
Instructor: Spratt

**Integrative Elective Courses**

Listed within this section are seven- or eight-week courses designated as electives. The
course descriptions for electives are as follows in numerical order.

**BBSC 6118 - 1 credit**
**GENES, ENVIRONMENT, AND DISEASE**
This eight-week course will address key mechanisms for the development of human
disease and, more importantly, the interrelationships between genetic characteristics
and exposure to environmental factors or pharmaceuticals in modifying the risks of
developing health problems. The course will be presented as a set of eight sessions
which will include lectures as well as discussions of assigned research papers that
address the objectives of the course. Students will be assigned papers for presentation
in the class. Each two-hour weekly session will discuss two papers if a lecture is not
given by the faculty. Background reading will be suggested for each discussion. At the
end of the course each student will select a recent published journal article, with
approval of the instructor, and will prepare a report that critiques the article and places it
in the context of the information gained from the course. The four specific topic areas
will be: 1) Mechanisms of DNA damage by endogenous and exogenous agents; 2) DNA
damage response including signaling pathways, DNA repair, cell cycle control and
apoptosis; 3) The role of genetic variability in modifying responses to exposure to toxic
substances and pharmaceuticals, and responses to DNA damage; and 4) The role of epigenetic effects and agents that modify them in determination of changes in gene expression, hormonal effects, and health outcomes. Grades will be calculated based on the performance of leadership in assigned paper discussions, participating in all discussions and report on published paper.

Prerequisites: BBSC 6302, BBSC 6401, or consent of instructor
Term offered: III
Year offered: Annually
Hours per week: Lecture 1
Instructor: Abdel-Rahman

**BBSC 6126 – 1 credit**
**NEURONAL TRANSMISSION**
This course provides a general background in cellular neuroscience with an emphasis on neuronal synaptic transmission. The first part of the course covers structure and molecular composition of excitatory and inhibitory synapses. Topics covered include: synaptic structure and dynamics, molecular composition of post-synaptic ligand-gated ion channels, metabotropic receptors, signal transduction pathways, functional analysis of postsynaptic currents, synaptic plasticity and neuronal homeostasis. The second part of the course includes an in-depth reading and discussion of topics related to synaptic receptors mediating neuronal transmission in the central nervous system. This course will prepare students for upper level Neuroscience and Neuropharmacology courses and is also suitable for students interested in basic cellular mechanisms underlying brain function. Grading is based on written midterm and final examinations.

Prerequisites: BBSC 6302, BBSC 6401, or consent of instructor
Term offered: II
Year offered: Annually
Hours per week: Lecture 1
Instructor: Laezza

**BBSC 6132 – 1 credit**
**LABORATORY BIOSAFETY AND BIOCONTAINMENT**
This course has been designed to include an advance theoretical and practicum approach to biosafety and biocontainment for all students working in a BSL2 and above research laboratory. This course will focus on advance biosafety topics as they apply to BSL2 and above laboratories. Topics will include: principles of biosafety containment, principles of biosafety cabinets and chemical fume hoods, principles of personal protective equipment, risks involved with aerosol producing procedures, principles of disinfection, waste handling and disposal procedures, medical evaluation for working with infectious agents emergency procedures, regulatory requirements. Emphasis will be on development of principals of biosafety and biocontainment based on proper risk assessments. This class
will build fundamental knowledge for advancement opportunities into BSL 3-4 laboratories. The laboratory portion of the course will focus on proper organization and techniques used in a BSC, transportation of biological material, disposing of wastes, and emergency procedures. Grades will be based on attendance, participation, oral presentation and laboratory skills. Both classroom and laboratory components must be successfully completed to pass the course.

Prerequisites: BBSC 6131
Term offered: I, III
Year offered: Annually
Hours per week: Laboratory 1; Lecture 2; Discussion 1
Instructor: Brocard

BBSC 6207 - 2 credits
NEURONAL EXCITABILITY
This eight-week course deals with fundamental concepts that underlie electrical excitability, conduction of electrical activity and presynaptic mechanisms. Topics covered include electrochemical potentials, properties of voltage-gated channels, electrotonic spread vs. propagated activity, regulation of exocytosis, quantal analysis of transmitter release and analytical techniques including current and voltage clamp, single channel recording and noise analysis. The class will be presented as lectures with student discussion. Grades will be based on class participation and examinations.

Prerequisites: BBSC 6302, BBSC 6401, or consent of instructor
Term offered: I
Year offered: Annually
Hours per week: Lecture 3, Conference/Discussion 1
Instructor: Hamill

BBSC 6208 - 2 credits
PRINCIPLES OF DRUG ACTION, PHARMACOKINETICS AND BIOTRANSFORMATION
This eight-week course will cover the principles underlying drug and toxin mechanisms of action, as well as their metabolism and clearance. In particular, we will focus on mechanisms underlying the interaction between hormone and neurotransmitter receptors and full, partial, and inverse agonists, as well as analysis of the mechanisms underlying the actions of competitive, partially competitive and non-competitive inhibitors. Additionally, the mechanisms underlying allosteric modulation by drugs and endogenous ligands will be discussed along with how receptor activation engages underlying effector mechanisms. The latter portion of the course will focus on the mechanisms underlying absorption, distribution, elimination and metabolism of both toxins and therapeutic drugs. This will include metabolism by phase I and phase II enzymes, glutathione reductase, as well as drug elimination, duration of action, plateau principle, and continuous and
intermittent dosing paradigms. The course will be taught primarily in lecture format with discussion of primary research articles. Grading will be based on class participation, homework problems, two written exams and a 15-minute oral presentation covering the similarities and differences between a pair of drugs that have similar therapeutic goals.

**Prerequisites:** BBSC 6302, BBSC 6401, or consent of instructor

**Term offered:** II

**Year offered:** Annually

**Hours per week:** Lecture 3, Conference/Discussion 1

**Instructor:** Snodgrass, Zhou

**BBSC 6210 - 2 credits**

**FUNDAMENTALS OF INFLAMMATION**

This seven-week course deals with fundamental concepts pertaining to inflammation. Inflammation plays a necessary role in wound healing and tissue surveillance, but can also lead to chronic wounds and pathologic states such as inflammatory bowel disease. By moving fluids and white blood cells from the blood into extravascular tissues the host can eliminate abnormal cells, foreign particles, microorganisms, etc. and initiate repair processes. Topics include inflammatory cells, the role that pathogens (bacterial, viral and parasitic) play in inflammation, the mediators (lipids, cytokines, peptides, and other molecules) and cellular events involved in cell recruitment and movement through the vessel wall into tissue spaces. Common inflammatory processes and wound healing will be discussed. Grades will be determined by performance in the discussion of current literature and on one take-home short-essay exam.

**Prerequisites:** BBSC 6302, BBSC 6401, BBSC 6403 or consent of instructor

**Term offered:** III

**Year offered:** Annually

**Hours per week:** Lecture 3; Conference/Discussion 1

**Instructor:** Hawkins, Midori-Horiuti, Reyes

**BBSC 6219 – 2 credits**

**VACCINE DEVELOPMENT PATHWAY: FROM DISCOVERY TO LICENSURE**

This eight-week introductory course will be taught in lecture format with a small number of expert lecturers. The course is designed to provide the basic scientist with an understanding of vaccine development from conceptualization through development, testing, and utilization. This multidisciplinary course was designed to introduce students to all of the aspects of vaccine development and utilization to include aspects of vaccines for infectious diseases and chronic non-infectious diseases (e.g., cancer, neurodegenerative diseases, and addiction). Grades will be based on performance of two examinations and class attendance.

**Prerequisites:** BBSC 6302, BBSC 6401, BBSC 6403, or consent of instructor

**Term offered:** III
BBSC 6220 – 2 credits
ANIMAL MODELS OF HUMAN DISEASES
This eight-week course is intended to give an overview of the use of animal models in biomedical research, help students acquire the skills to write applications and protocols involving research animals, and prepare the students for their qualifying exams. The course will consist of weekly lectures and in depth sessions on animal models of infectious and non-infectious diseases led by experienced faculty. Students will be required to present research paper(s) and evaluate the approach, usefulness, and validity of the models discussed. Also, students will be expected to write and submit an IACUC protocol, which will be critically reviewed by the course directors and randomly assigned members of the class. Grading will be based on presentations, written IACUC protocol, written critique of an IACUC protocol, final in-class exam, and attendance/participation in discussions.
Prerequisites: BBSC 6302, BBSC 6401, or consent of instructor
Term offered: I
Year offered: Annually
Hours per week: Lecture 2; Conference/Discussion 1.5
Instructor: Dann Grice, Travi

BBSC 6221 – 2 credits
PROJECT PROPOSAL PREPARATION
This course provides skills to develop a dissertation proposal and tools to understand how to best proceed in the preparation of a research proposal or to anticipate reviewer responses. Its goals are to acquire knowledge about basic principles governing proposed topic of dissertation; to become familiar with assessment of current research literature; to acquire practice in process of preparing, giving and critiquing a chalk talk; to acquire some practice in process of preparing, giving and critiquing a research proposal; to learn how to evaluate a grant and respond to such a critique by participating in an NIH style study section. Sample NIH grants and reviews are provided; and to learn how to present such evaluations in a group setting; to prepare a riposte and resubmit a research proposal after review. The course will be taught using some didactic presentations by faculty on what is a chalk talk, desired features of a proposal, the NIH study section approach, how to critique a proposal, and how to respond to a critique with examples. The faculty will also facilitate interactive discussions related to the above. The student will be expected to prepare a chalk talk of their proposed project, to write a proposal and a critique of a fellow student’s proposal, to discuss the critiqued proposal, to prepare a riposte and resubmission. Grades will be based on class participation, presentations,
and written material.

Prerequisites: Admission to a research group by a mentor
Term offered: I
Year offered: Annually
Hours per week: Lecture 1; Conference/Discussion 3
Instructor: Hamill, Navarro

Additional Courses

The following courses are additional offerings, but are not eligible towards the first-year BBSC requirements. These are only taken by students in other programs.

BBSC 6103 – 1 credit
INTRODUCTION TO THE STUDY OF BIOLOGICAL SYSTEMS
This eight-week course is designed to introduce graduate students to the study of biological systems, with specific emphasis on fundamental biochemistry principles. The course provides a review of the chemical structures of biomolecules, as well as the noncovalent forces underlying biomolecular structure, function and interaction. Course topics include macromolecule-solvent interactions, pH and dissociation, quantitative descriptions of biochemical equilibria, and laboratory strategies involving protein manipulation and purification. Basic thermodynamic principles are presented, including the concept of the free energy of a reaction as it relates to the synthesis, metabolism, and function of biomolecules. The format of the course includes lectures and problem-solving sessions. Students are expected to lead class discussions following the completion of assigned homework, and grades will be satisfactory (S) or unsatisfactory (U) based on completion of assignments and classroom participation.
Prerequisites: None
Term offered: III
Year offered: Annually
Hours per week: Lecture 1.5
Instructor: Toliver-Kinsky

BBSC 6104 – 1 credit
CRITICAL READING OF SCIENTIFIC LITERATURE
This eight-week course is designed to introduce graduate students to critical concepts involved in understanding scientific literature. Emphasis will be placed on analyzing, comprehending, interpreting and evaluating scientific articles from peer-reviewed journals. This class is based on discussion format, and students will be expected to actively participate in classroom discussions, as well as lead one classroom discussion on an article of their choice. Grades will be based on the performance of presentation, attendance, and class participation.
BBSC 6127 – 1 credit
TEACHING IN MOLECULAR BIOLOGY AND GENETICS
In this course, trainees will learn and practice how to facilitate small-group learning teams. Trainees will acquire teaching skills through workshops, observing faculty during small group discussions and finally applying these skills to serve as facilitators in BBSC 6403 Molecular Biology and Genetics (MBG) small-group discussions. Facilitator Skills Workshops will be imparted by personnel from the School of Medicine Office of Educational Development. MBG course instructors will meet with the trainees and provide key discussion topics and teaching tactics prior to MBG small-group discussions with enrolled students. The trainees will then serve as lead facilitators for MBG small-group discussions to practice newly learned skills. In addition, trainees will participate in problem set review sessions for MBG students to observe and learn different teaching styles employed in an informal question/answer teaching sessions. Each facilitator will provide formative and summative evaluations of their co-facilitators and those BBSC 6403 students in their respective small groups. Grading will be on a Satisfactory/Unsatisfactory basis. A grade of satisfactory will be dependent on: (a) attendance of the student to all scheduled course sessions and instructor discussions (as detailed above); (b) writing a one-page reflective piece that will serve as self-evaluation; (c) acceptable performance as a facilitator judged by the course instructor with input from students enrolled in the MBG course.

Prerequisites: BBSC 6403 or consent of instructor
Term offered: I
Year offered: Annually
Hours per week: Conference 2
Instructor: Wairkar

BBSC 6128 – 1 credit
TEACHING IN BIOSTATISTICS
In this course, students will learn and practice skills necessary to facilitate students participating in biostatistics labs. Facilitator Skills Workshops will be imparted by personnel from the School of Medicine Office of Educational Development. At the end of the course, students will: (a) Be able to distinguish between actual content (the concept the small group is working on) and process (how the group works on acquiring and developing knowledge on that concept); (b) Understand the various group member roles related to both content and process; (c) Have practiced methods for effective
communication; (d) Have learned effective questioning skills; (e) Have practiced effective listening skills and empathy; (f) Be capable of providing effective feedback; (g) Be capable of maintaining engaging group discussions and (h) Be able to provide constructive evaluations. Students will serve as lead facilitators for the lab component of students enrolled in BBSC 6222 (Biostatistics), where they will implement and develop their facilitation skills. Prior to each session with the BBSC 6222 students, small group facilitators will be provided with fully answered laboratory solutions and will have an opportunity to discuss these computer labs with course instructors. Each facilitator will provide formative and summative evaluations of those BBSC 6222 students in their lab sessions. This course is offered on a Satisfactory/Unsatisfactory basis. A grade of satisfactory will be dependent on: (a) attendance of the student to all scheduled course sessions and instructor discussions (as detailed above); (b) writing a one-page reflective piece that will serve as self-evaluation; (c) acceptable performance as facilitator as judged by the course instructor, after consulting with the students being facilitated.

Prerequisites: BBSC 6222 or PHS 633 Biostatistics or PHS 6347 Applied Statistical Methods

Term offered: II
Year offered: Annually
Hours per week: Laboratory 2
Instructor: Spratt

BBSC 6195 – 1 credit
FRONTIERS OF SCIENCE
This course provides students the opportunity to hear about the latest advancements and techniques in a wide variety of biomedical sciences. Students are required to attend seminars by on- or off-campus speakers during each of the Fall and Spring terms. Students choose twelve seminars to attend on the basis of student interest and/or program recommendations. A required module on avoiding plagiarism and the proper use of citations and paraphrasing is part of the fall calendar. Grades will be satisfactory (S) or unsatisfactory (U) based on attendance.

Prerequisites: None

Term offered: I, II
Year offered: Annually
Hours per week: Seminar 1
Instructor: Toliver-Kinsky, Vargas
VIII. OTHER REQUIREMENTS

There are other required activities for first-year BBSC students, described below.

**Milestone Agreement Form**

Every student pursuing a PhD must complete a Milestone Agreement Form ([https://gsbs.utmb.edu/forms/#faculty](https://gsbs.utmb.edu/forms/#faculty)) indicating progress and future planning towards their degree. It is required that it be updated once a year during the Summer term and due at its end.

**Individual Development Plan**

The Individual Development Plan (IDP) is an item on the Milestone Agreement Form described above. Preparing for the IDP is covered within mandatory career development events which all first-year PhD students must attend.

**Inter-Professional Education**

BBSC students are also required to participate in Inter-Professional Education (IPE) that involves all four UTMB schools. The IPE day is normally a 4-hour afternoon event done in early part of the Spring term.

**Program Declaration**

By the end of the Summer term of the first year, students in the BBSC choose a lab within their sponsoring graduate program for their advanced coursework and dissertation research, ultimately leading to a Ph.D. degree in a particular discipline of biomedical sciences. It would be advisable to investigate the courses required by that program. A Change of Program Request form is completed effective Fall 2019. The mentor will be financially responsible for paying tuition and fees beginning the Fall term of their second year. Mentor-funded stipend support would begin in January 2020. Students may declare a program at any time, but students must declare a program before the Fall term begins of the 2nd year.