

# Baylor College of Medicine®

## **Catalog Academic Year 2019-2020**

### **Baylor College of Medicine's Mission, Vision and Values**

#### College's Mission

Baylor College of Medicine is a health sciences university that creates knowledge and applies science and discoveries to further education, healthcare and community service locally and globally.

#### College's Vision

Improving health through science, scholarship and innovation

#### College's Values

##### Respect

- ❖ Value others and treat them with courtesy, politeness and kindness
- ❖ Promote and support diversity, inclusion and equity
- ❖ Encourage civil dialogue that considers diverse opinions and ideas

##### Integrity

- ❖ Interact with honesty, consistency and transparency
- ❖ Operate in ways that demonstrate ethical behaviors
- ❖ Foster personal accountability to build trust

##### Innovation

- ❖ Cultivate creative ideas and unique talents across the organization
- ❖ Embrace a culture of continuous improvement
- ❖ Inspire the creation and application of new knowledge

##### Teamwork

- ❖ Sustain a culture that values collaboration
- ❖ Communicate openly to enhance understanding
- ❖ Establish effective partnerships

##### Excellence

- ❖ Promote the highest standards of safety, quality and service
- ❖ Strive to excel in every aspect of our mission
- ❖ Support an environment that inspires the best from our people



**Catalog**  
**Academic Year 2019-2020**

Baylor College of Medicine is committed to a safe and supportive learning and working environment for its learners, faculty and staff. College policy prohibits discrimination on the basis of race, color, age, religion, gender, gender identity or expression, sexual orientation, national origin, veteran status, disability or genetic information.

Harassment based on any of these classifications is a form of discrimination and also violates College policy (02.2.25, 02.2.26) and will not be tolerated. In some circumstances, such discriminatory harassment also may violate federal, state or local law.

Baylor College of Medicine fosters diversity among its students, trainees, faculty and staff as a prerequisite to accomplishing our institutional mission, and setting standards for excellence in training healthcare providers and biomedical scientists, promoting scientific innovation, and providing patient-centered care.

Diversity, respect, and inclusiveness create an environment at Baylor that is conducive to academic excellence, and strengthens our institution by increasing talent, encouraging creativity, and ensuring a broader perspective. Diversity helps position Baylor to reduce disparities in health and healthcare access and to better address the needs of the community we serve. Baylor is committed to recruiting and retaining outstanding students, trainees, faculty and staff from diverse backgrounds by providing a welcoming, supportive learning environment for all members of the Baylor community.



**Catalog  
Academic Year 2019-2020**

# **GRADUATE SCHOOL OF BIOMEDICAL SCIENCES**

**Catalog  
Academic Year 2019-2020**

Our Mission

The Graduate School of Biomedical Sciences at Baylor College of Medicine (BCM) is dedicated to providing a rigorous and stimulating research and training environment for qualified PhD. and Masters level candidates in the biomedical sciences. Outstanding PhD, Masters and MD./PhD. students provide the intellectual capital needed to advance the research and educational mission of the college and to provide a new generation of scientific leaders. The faculty is committed to excellence in interdisciplinary research training for students whose intellectual contributions will continue to fill the reservoir of fundamental knowledge needed to conquer disease and promote health and wellbeing for all people.

Description of Program

The Graduate School of Biomedical Science (GSBS) offers Doctor of Philosophy (Ph.D.) degrees in seven distinct specialties in biomedical sciences, as well as Master of Science (M.S.) & Ph.D. degrees in a Clinical Scientist Training Program. The GSBS also partners with the School of Medicine on a dual-degree Medical Scientist Training Program (M.D./Ph.D.). A certificate of added qualification is available in clinical investigation.

Students and faculty will adhere to the policies, procedures, and guidelines referenced within this Catalog.

Course Catalogs include an overview of BCM’s health sciences mission and values (e.g., preamble), student handbooks (which detail expectations of students and obligations of the institution), course descriptions, and degree requirements for each academic year that are generated by, and specific to, each BCM school and its corresponding academic program(s).

Five years of archived catalogs are available online at [www.bcm.edu/registrar](http://www.bcm.edu/registrar)

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# POLICY HANDBOOK

## Graduate School of Biomedical Sciences

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Baylor  
College of  
Medicine®

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## ARTICLE 1. ADMINISTRATION

### 1.1 The Graduate School of Biomedical Sciences

Training leading to the PhD degree in the biomedical sciences is an integral component of BCM. The Graduate School of Biomedical Sciences is a division within the College whose activities complement and are closely coordinated with those of the School of Medicine.

#### 1.1.1 Mission Statement

The Graduate School of Biomedical Sciences at Baylor College of Medicine (BCM) is dedicated to providing a rigorous and stimulating research and training environment for qualified PhD. and Masters level candidates in the biomedical sciences. Outstanding PhD, Masters and MD./PhD. students provide the intellectual capital needed to advance the research and educational mission of the college and to provide a new generation of scientific leaders. The faculty is committed to excellence in interdisciplinary research training for students whose intellectual contributions will continue to fill the reservoir of fundamental knowledge needed to conquer disease and promote health and well-being for all people.

#### 1.1.2 Accreditation

Baylor College of Medicine is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award masters and doctorate degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, GA 30033-4097 or call (404)679-4500 for questions about the accreditation of Baylor College of Medicine.

### 1.2 Dean (Revised 08/01/11)

The Dean of the Graduate School is the administrative head of the Graduate School. The Dean, and only the Dean, may make exceptions to any of the policies of the Graduate School. Any exception to policy will be brought to the attention of the Graduate Executive Council at its next meeting. All actions of Graduate School Committees are recommendations. They may be implemented after approval by the Dean. Usually this is done by the Dean's approval of Committee minutes. The recommendations will become policy only after the Dean has presented the recommendations to the Graduate Executive Council for approval. The Dean will: 1) coordinate the activities of other deans and assist in the development of new initiatives; 2) chair the Policy Committee; 3) serve as the representative of the Graduate School to the Academic Council; and 4) chair the Executive Council.

### 1.3 Senior Associate Dean for Graduate Education and Academic Program Development (New 8/24/15)

The Sr. Associate Dean for Graduate Education and Academic Program Development provides collaborative leadership ensuring integrity, quality and student success around a range of activities including Program development, curriculum, outcomes assessment, Programmatic accreditation and faculty development. This role involves active engagement in policy implementation and compliance, strategic planning and day-to-day problem solving. This position requires ongoing communication with graduate school staff, Program directors, graduate school teaching faculty, major advisors and the Dean. The Sr. Associate Dean will: 1) Support Program directors and faculty course directors in the implementation of activities associated with new and revised Program curriculum 2) Act on behalf of the Dean in the Dean's absence on matters related to the graduate school and its Programs etc.

**1.4 Assistant Dean for Curriculum** (New 08/01/11)

The Assistant Dean for Curriculum is appointed by the Dean of the Graduate School to assist in all matters pertaining to the curriculum. The Assistant Dean for Curriculum will: 1) serve as *ex officio* member of the Curriculum Committee; 2) maintain, evaluate and develop the core curriculum in consultation with the Curriculum Committee, Program Directors, faculty and students; and 3) monitor promotions and serve as *ex officio* member of the Promotions Committee.

**1.5 Assistant Dean for Postdoctoral Research and Career Development** (New 08/01/11)

The Assistant Dean for Postdoctoral Research and Career Development is appointed by the Dean of the Graduate School to assist in all matters pertaining to the appointment and career development of research postdoctoral trainees. The Assistant Dean for Postdoctoral Research and Career Development will: 1) oversee the Office of Postdoctoral Research and the appointments and policies for research postdoctorals; 2) manage and evaluate the career development course for research postdoctorals and graduate students, including the development of new topics; and 3) serve as the Graduate School administrative contact for the Postdoctoral Association.

**1.6 Faculty** (Revised 04/26/02, 08/16/19)

The Graduate Faculty shall consist of those faculty who play an active role in the education and training of BCM graduate students through teaching, supervision of research, and other supporting activities, including recruitment, evaluation and Committee participation. Graduate Faculty serving solely in an Educator role (e.g. not serving as a major thesis advisor) must be members of the BCM faculty. Graduate faculty eligible to serve as Major Advisors for research students are faculty of BCM or other academic institutions that meet qualifications for membership (defined in 1.6.1).

**1.6.1 Criteria for Appointment to the Graduate Faculty** (Revised 04/26/02, 03/31/04, 07/30/12, 04/06/18, 08/16/19)

All faculty of BCM or other Gulf Coast Consortium academic institutions that meet qualifications for membership in its Graduate Programs are eligible for consideration for appointment to the Graduate Faculty. An appointee must hold a terminal degree (e.g. the PhD or M.D degree, or its foreign equivalent) and be nominated for membership by one or more Graduate Programs. Faculty must be resident in their home institutions at least 9 months each year.

Requests for appointment to the Graduate Faculty and to the faculty of an individual Graduate Program are made by the Graduate Program Director. Following satisfactory review by the Graduate Faculty Membership Committee, appointment to the Graduate Faculty is made by the Dean.

Application for initial appointment to the Graduate Faculty must be accompanied by a nomination from the Program Director, a recommendation letter from the faculty member's Chair and a current CV in BCM format. Application of a current member of the Graduate Faculty for membership in an additional Graduate Program must be accompanied by a nomination from the Program Director. The request for appointment to the Graduate Faculty denotes the faculty's consent to abide by the policies established by the Graduate School and the Graduate Program. Appointment to the Graduate

Faculty and membership in a Graduate Program comes with reasonable expectations of service to the Graduate School and Graduate Program as outlined in Section 1.6.2.

### **1.6.2 Duties of the Graduate Faculty** (Revised 04/26/02, 08/16/19)

In addition to the duties defined by BCM for its full-time faculty, Graduate Faculty members are expected to perform specialized duties unique to graduate training. Foremost among these, for faculty eligible to serve as Major Advisors, is participation in ongoing research in biomedical science, principally providing research opportunities to PhD. trainees. Other duties for Major Advisors and Educators include teaching and extramural service activities. Teaching experience may include a number of activities in addition to formal classroom participation, such as participating in research seminars, serving as a member of student TACs within the Graduate School or as a preceptor for student journal clubs and discussion groups, and participating in Program and School-wide academic Committees. Faculty participation in community activities shall be undertaken as directed by the Department or Program Chair. Summer research training outreach activities for secondary school and undergraduate students are acknowledged valuable responsibilities of full-time faculty of the College and constitute evidence of continued community service. Assignments of these activities are reviewed annually by each Graduate Program to ensure equitable distribution of responsibilities and excellence of academic purpose and training.

### **1.6.3 Major Advisor (also see 9.2.1)** (Revised 04/26/02, 08/16/19)

Membership in the Graduate Faculty is a requirement for service as a Major Advisor. In addition, the faculty member must show evidence of being an established principal investigator with sources of research space and financial support, undertaking an independent Program in biomedical research. The Major Advisor is required to assume financial responsibility for the student at stipend levels set by the Graduate School and health insurance during his/her tenure in the faculty member's laboratory. The Major Advisor is responsible for monitoring student time commitment as defined in Section 1.8.4. It is the duty of the Major Advisor to maintain and guide the student's satisfactory steady progress toward the degree and to ensure that the student becomes a well-educated, productive research scientist. The Major Advisor must demonstrate that sufficient research and stipend and health insurance financial resources are available on an annual basis. The Advisor must notify the Program Director in advance of funds termination that may jeopardize the continued participation of a student in the laboratory.

## **1.7 Programs and Departments** (Revised 08/01/16)

Faculty within an academic unit such as a Department or Division may assemble a plan for the purpose of recruiting and training graduate students in teaching and research leading to the PhD. degree. In addition, specialized autonomous training units (called Programs) may be formed by faculty from multiple academic units for the purpose of offering training in a scholarly discipline of common interest not already represented by preexisting units. Training units must propose a detailed plan for classroom research and seminar instruction which comply with the academic policies and procedures of the Graduate School. A training unit receives approval from the Executive Council upon the recommendation of the Curriculum Committee. Creation of new programs must comply with the BCM [Academic Program Approval Policy](#) (Section 30.1.02).

### **1.7.1 Program Director**

The Program Director is a full-time faculty member appointed by the Department Chair (if a departmental Program), or appointed by the Steering Committee (if an interdisciplinary Program) with the approval of the Dean, and is a member of the Graduate Executive Council. The Program Director has oversight of the PhD training unit and coordinates the Graduate Program in his/her department or division with the aid of a Program Committee. This responsibility implies that the Program Director represents the department and the students by: 1) Assisting the Admissions Committee in processing applications to the Graduate School; 2) Acting as advisor to graduate students until the student's Thesis Advisory Committee (TAC) is appointed; 3) Assisting the Graduate School in recording the student's progress toward the degree and recommending to the Promotions Committee transfer of credit and unusual course loads; 4) Making recommendations to the Dean regarding establishment of TACs, scheduling and administering of Qualifying Examinations, defense of dissertations, leaves of absence, withdrawals, and awarding the degree; 5) Transmitting administrative forms directly to the Graduate School office; and 6) Transmitting information from the Graduate School office to the graduate students.

## **1.8 Student Membership in Programs**

A full-time graduate student is a member of either two or three academic entities, depending upon his or her level of progression to the PhD degree.

### **1.8.1 Membership in the Graduate School of Biomedical Sciences**

Upon enrollment, a student becomes a member of the Graduate School of Biomedical Sciences and is subject to the rules defined herein. Continued enrollment shall require satisfactory performance. Dismissal shall be done only by the Dean, upon recommendation of the Promotions Committee and appropriate appeal procedures as described in this Policy Book.

### **1.8.2 Membership in a Departmental or Interdisciplinary PhD Program**

Entry into a PhD Program, either Departmental or Interdisciplinary, shall make the student a member of that entity as well. The Program may impose additional policies and performance criteria which strengthen or modify the overall policies of the Graduate School, but those policies may not diminish nor eliminate any academic requirements. Membership in a PhD Program and continuation of any established financial support shall continue provided that the student is in good academic standing and is making satisfactory academic progress toward the degree. The latter criteria include punctual performance of administrative tasks such as choosing a major advisor, appointing a TAC, choosing a scientific research project acceptable to that Committee, and completing required academic documents (such as status reports, Committee meetings and the dissertation) within specified time limits as defined in the policy handbooks of the Graduate School and the Program.

Dismissal from the Program shall be done by the Program Director, following review of the student's past and current performance by a Committee appointed by the Program Director. The members of that Committee shall include at least one member of the student's TAC. A faculty member who has a conflict of interest in the matter shall not serve. The Committee shall have at its disposal in making its decision (1) a report from the student's TAC recommending dismissal for causes described in their report, (2) copies of all Graduate School transcripts of the student and of all progress reports turned

in to the Graduate School by that student and (3) any additional research or academic documents it deems necessary for the proper conduct of the inquiry.

If the student wishes to continue enrollment in the Graduate School, the Program is obligated to provide a period of no more than 8 weeks with full stipend and insurance support for the student to transfer to another Program, unless that period of support has previously been granted to the student for the purpose of finding another laboratory.

### **1.8.3 Membership in a Major Advisor's Laboratory** (Revised 03/31/04, 08/01/11, 08/16/19)

A student shall choose a Major Advisor by mutual agreement, and inform the Program and the Graduate School of this selection. Membership in a laboratory is a privilege; during the student's traineeship time in that laboratory the student and major advisor are expected to conduct science and scholarship according to high ethical principles as defined for faculty members in the BCM Faculty Handbook, and the Research Ethics standards defined in the College's Administrative Guide. Continued membership in the major advisor's laboratory shall be assumed, unless unforeseen circumstances occur. Those circumstances include (1) loss of funding by the faculty member for the conduct of the research; (2) academic or scientific misconduct by the student or advisor, causing dissolution of the bond of trust between student and faculty member; or (3) other disagreements which break that bond of trust.

Major advisors and their students should work to construct a mutually agreeable set of expectations for the relationship, including time spent in research activities in the laboratory or other locations. However, in the case that a major advisor or student wishes to terminate the student's membership in the major advisor's lab, the initiating party (student or major advisor) must contact the Program Director. In the case that the Program Director is the student's major advisor, the program's Associate Director or a member of the program's Program Executive Committee (PEC) shall fulfill the role of the Program Director. The Program Director will review the circumstances in separate meetings with both the major advisor and student to ensure that the differences between the student and major advisor cannot be resolved. The Program Director, at his/her discretion, may utilize the Thesis Advisory Committee as a resource or to request a joint meeting between the two parties.

The Request to Leave Laboratory Form will be completed and signed by the Program Director, co-signed by the major advisor, student and the student's Committee and sent to the Graduate School for approval. The effective date for leaving the laboratory will be the effective date indicated on the form. The request to leave a laboratory must also contain a signed agreement between the major advisor and student concerning the student's authorship status on any publications resulting from the student's work while in the laboratory. Decisions regarding authorship should be made in accord with the BCM [Policy on Authorship](#) (Section 02.9.40) and in the spirit of the Authorship Policy of the Graduate School (Section 9.12). After termination of the student-mentor relationship, the Program Director shall assume the temporary duties of advisor, and shall intercede actively to assist the student in finding a new Major Advisor.

If the action is initiated by the major advisor, the major advisor must provide the student at least 4 weeks of stipend and insurance support following the official termination date of membership in the laboratory. Terminating the membership of a student in a laboratory does not constitute discharge from the Program. If the student wishes to

continue enrollment, the Program is obligated to provide an additional period of no more than 8 weeks with full stipend and insurance support for the student to find another laboratory or to transfer Programs.

#### **1.8.4 Effort Required for Satisfactory Progress Towards Degree** (New 08/16/19)

Students are expected to attend academic activities and/or conduct research daily, Monday-Friday, unless prior arrangements are made with their Major Advisor and/or Program Director. An absence that has not been approved in advance is considered 'unexcused'. Approval for absences must be obtained in advance from the student's Major Advisor, or Program Director if the student does not have a Major Advisor. In the event of an absence due to illness, the student should immediately notify the Major Advisor or Program Director. In the event of an emergency or extreme illness, the student should ask a representative to contact the Major Advisor or Program Director on the student's behalf. In the case of special or unforeseeable circumstances (such as a natural disaster or flood), the Dean may provide an exception to these attendance or absence approval requirements.

Major Advisors must notify the student's Program Director if their student has an unexcused absence of greater than three successive business days. Students with unexcused absences of more than 5 successive business days may be placed on Administrative Leave of Absence with attendant loss of stipend until such time that the student returns to their academic and research activities.

### **1.9 Student Interest Groups** (New 07/30/12, Revised 8/24/15, 08/01/16)

Official student interest groups may be designated by the Dean upon the request of the Graduate Student Council or Postdoctoral Association. The designation as a recognized trainee interest group entitles the group to develop a BCM web page and to use BCM and its logo in publicizing their activities. Interest groups must abide by all college policies concerning use of the BCM name, logo, and internet/social media.

BCM students or student groups may from time to time invite outside speakers to address BCM functions. Outside speakers must be approved in advance by the Dean or designee. The names and credentials of proposed speakers, purpose of the presentation, and proposals for any costs such as travel, expenses, and honoraria, must be presented to the Dean or designee for review and approval at least three weeks prior to the event. All outside speakers will be required to meet the professional standards expected of BCM faculty, with evidence based presentations when applicable and complete disclosure of funding and conflict of interest.

Students are required to comply with BCM [Fundraising Policies](#) (Section 17.1.03) and [Student/Trainee Fundraising Project](#) Policy (Section 17.1.07).

### **1.10 Evaluation** (Revised 08/30/12)

To improve our academic Programs, an internal self-evaluation of individual Graduate Programs and the graduate school as a whole will occur annually. The evaluation will consist of an academic planning and evaluation document that sets Program learning objectives and outcome measurements for the coming year along with an analysis of the previous year's plan and student learning outcomes. Each Program will be provided with a standard set of outcome measurements including student performance in the first-year curriculum, qualifying exam performance, student retention, and publications.

Individual teaching evaluations by students enrolled in each didactic course offered by the graduate school will be conducted at the end of each term. The evaluations of the course and individual instructors will be provided to the course director to help formulate changes in the course for next year. Each instructor will be provided with a copy of the overall course evaluation and their own teaching evaluations. Teaching evaluations will be considered by the Curriculum Committee during its periodic evaluation of the curriculum (section 2.43), and every five years, in preparation for an external review, the Curriculum Committee will evaluate the curriculum of each Program along with the utilization of the core curriculum with respect to content and quality.

Every five years, an external evaluation Committee composed of scientists involved in graduate education will be appointed by the President of the College to conduct a comprehensive evaluation of the graduate school as a whole along with individual Graduate Programs.

## **ARTICLE 2. STANDING COMMITTEES** (Revised 01/16/04, 08/23/04, 07/14/14, 08/16/19)

The standing Committees of the Graduate School are appointed by the Dean of the Graduate School. The Committees include the Graduate Executive Council, Admissions, Appeals, Curriculum, Graduate Faculty Membership, Promotions, Policy and Graduate Student Council. Students serving on any Graduate School Committee must have the approval of their major advisor and Program Director and must be in good academic standing. *Ex officio* members may be included on any Committee with the approval of the Dean and/or be invited to attend meetings as guests of the Executive Council. A simple majority of the members of a Committee constitutes a quorum. Only duly appointed members may vote; proxy members may vote with authorization from the Program. Students serve for a period of one two-year term. Recommendations by the standing Committees will be forwarded to the Dean for final decision.

### **2.1 Graduate Executive Council** (Revised 08/01/11, 07/14/14)

The Executive Council voting membership is composed of the Dean (who chairs the Council), Assistant and Associate Deans, Graduate Program Directors, Director of the MD/PhD Program, Chairs of the Graduate School standing Committees, President and Vice President of the Student Council, President and Vice President of the Postdoctoral Association, and Chair of the Graduate Program Administrators Group. Meetings are held once per term (approximately every 10 weeks). This Committee is responsible for academic affairs and policies of the Graduate School, and together with the Dean, this Committee advises the President of the College on Graduate School matters. The Executive Council broadly and actively considers the policies of the Graduate School. Standing Committees of the Graduate School report to the Executive Council for ratification of decisions. The Executive Council may, on its own initiative, consider matters of interest to the Graduate School.

### **2.2 Admissions Committee** (Revised 07/14/14, 06/18/15)

The Admissions Committee is composed of at least six faculty members appointed by the Dean and two Student Council representatives. The chair and vice-chair are appointed by the Dean and the vice-chair is expected to become the chair. Faculty members may not be Graduate Program Directors, departmental Chairs or division heads. Faculty members of this Committee serve for three years, and may be recommended for re-appointed by the Dean. Student members serve for one two-year term with staggering starting years. The Admissions Committee

considers applications from all Graduate Programs and recommends acceptance of qualified applicants to the Dean.

### **2.2.1 Admission Committee Conflict of Interest** (New 01/29/15, 06/18/15, 08/16/19)

Decisions by any GSBS Admissions Committee regarding student applicants must be free from intimidation and not influenced by any political, financial or other outside factors. Members of the Committee must immediately report a real or perceived conflict of interest to the GSBS Dean or designee and/or a faculty Chair(s) of the Admissions Committee. A conflict of interest is determined to exist, without limitation, in instances where the Committee member:

1. Has an Immediate Family or Extended Family relationship to the applicant; or
2. Is or has been in a significant teaching, social or personal relationship with the applicant or a member of the applicant's immediate or extended family; or
3. Has a business or financial relationship with the applicant or a member of the applicant's immediate or extended family.

If a Committee member meets any of these criteria, the Committee member must recuse him/herself from participation in any evaluation, discussion or deliberation of such applicant.

A Committee member must report a real/perceived conflict of interest immediately upon learning of the identity of the applicant creating the real/perceived conflict of interest. In the event of doubt as to the existence of a conflict of interest, the Committee member should err on the side of reporting relevant facts to the GSBS Dean or designee and/or faculty Chair(s) of the School or Program Admissions Committee. Any Committee member may raise the issue of a real/perceived conflict of interest with respect to an applicant and any other Committee member. Failure to report a real or perceived conflict of interest may result in the Committee member's removal from the admissions Committee. The GSBS Dean or designee shall make the determination of the existence of a real/perceived conflict of interest after reviewing relevant facts. This decision is final with no option for appeal.

Annual Statement: Each Committee member shall complete and return to the Dean of the GSBS or the Dean's designee annually, and prior to participating in the applicant review process, a conflict of interest acknowledgement. Failure to complete and return the acknowledgement form in a timely manner is grounds for removal from the Admissions Committee.

## **2.3 Appeals Committee** (New 07/14/14)

The Appeals Committee, chaired by the Dean, consists of one member nominated from each Graduate Program, and two Student Council representatives. Members may not be members of the Promotions Committee. Faculty members serve for a three-year term, and may be recommended for re-appointed by the Dean. Student members serve for one two-year term with staggering starting years. Members of the Appeals Committee will be excused from considering appeals from students to whom they serve as thesis or major advisor. The Dean will select one student to serve as an ad hoc member of the Appeals Committee. One member of the Promotions Committee will be appointed by the Dean to serve as an ex officio member of the Appeals Committee. The Appeals Committee reviews appeals of students that do not agree with Promotion Committee decisions.

**2.4 Curriculum Committee** (Revised 08/03/09, 09/04/12, 07/14/14)

The Curriculum Committee is composed of a representative from each Program, and two Student Council representatives. The chair and vice-chair are appointed by the Dean and the vice-chair is expected to become the chair. Faculty members serve for one 3-year term, but may be recommended for reappointment by the Dean. Student members serve for one 2-year term with staggering starting years. The Curriculum Committee considers proposals for new Graduate Programs and new courses, reviews the curriculum every five years, and evaluates content and quality of current courses. Course duplication and overlap are also considered by this Committee. The Curriculum Committee ensures that any course not offered during two consecutive periods is removed from the general catalog. Re-institution of a course requires approval of this Committee.

**2.5 Promotions Committee** (Revised 07/14/14, 08/16/19)

The Promotions Committee is composed of a faculty representative of each Program. The chair and vice-chair are appointed by the Dean and the vice-chair is expected to become the chair. Faculty members serve for one 3-year term, and may be recommended for re-appointed by the Dean. The Promotions Committee is responsible for recommending policies concerning requirements of promotion, probation, dismissal, and graduation to the Policy Committee. This Committee ensures that all Programs issue a course grade at the end of each term, regardless of overall course length and enforces policies concerning deficient academic progress and grades that result in academic warning, probation or dismissal. The Committee reviews the records of all students and evaluates course credits presented for transfer. Decisions of the Promotions Committee are reported to individual students, Program Directors, the Chair of the student's TAC, the Dean, and the Executive Council.

**2.5.1 Promotions Committee Conflict of Interest** (New 08/16/19)

Decisions by any BCM Promotions Committee regarding student promotion, progression, probation, dismissal or other academic action must be free from intimidation and not influenced by any political, financial or other outside factors. Members of the Committee must immediately report a real or perceived conflict of interest to the GSBS Dean or designee and/or the faculty Chair of the Promotions Committee. A conflict of interest, requiring recusal from voting and decision making is determined to exist in instances where the Committee member has:

1. an immediate Family or Extended Family relationship with the student;
2. a personal or social relationship with the student, or a member of the student's Immediate or Extended Family;
3. a business or financial relationship with the student, or a member of the student's Immediate or Extended Family;
4. graded the student in a course for which the course grade is the subject of a pending adverse action or proposed remediation plan;
5. served as the student's faculty advisor or formal Major Advisor, or other significant relationship with the student; or
6. provided healthcare services to the student.

A Committee member must report a real/perceived conflict of interest immediately upon learning of the identity of the student creating the real/perceived conflict of interest. In the event of doubt as to the existence of a conflict of interest, the Committee member should err on the side of reporting relevant facts to the GSBS Dean or designee and/or the faculty Chair of the Promotions Committee. Any Committee member may raise the

issue of a real/perceived conflict of interest with respect to a student and any other Committee member. Failure to report a real or perceived conflict of interest may result in the Committee member's removal from the Promotions Committee. The GSBS Dean shall make the determination of the existence of a real/perceived conflict of interest after reviewing relevant facts. This decision is final with no option for appeal.

Annual Statement: Each Committee member shall complete and return to the GSBS Dean, prior to participating in the Promotion Committee activities, a conflict of interest acknowledgement. Failure to complete and return the acknowledgement form in a timely manner is grounds for removal from the Promotions Committee.

## **2.6 Policy Committee** (Revised 07/30/12, 07/14/14, 8/27/15, 8/01/16)

Policy Committee members are recommended for appointment by the Dean of the GSBS, who also serves as the chair of this Committee. The Policy Committee is composed of representatives from the Admissions, Curriculum and Promotions Committees, other faculty appointed by the Dean, a representative Program Administrator and the President and Vice-President of the Student Council. The Committee considers new policies or revisions to existing policies, and recommends new policies or policy changes to the GSBS Executive Council. GSBS Policies are developed in accordance with the BCM [Development and Approval Policy](#) (Section 01.1.01).

## **2.7 Graduate Student Council** (Revised 07/14/14, 08/16/19)

The Graduate Student Council is composed of a president (or co-presidents) and a vice-president, two students from each Graduate Program, a representative of the first year class, and a representative of the MD/PhD Program. Council members serve for one 2-year term with elections occurring in the fifth term of each year. The Council is autonomously elected by and is exclusively responsible to the graduate student body. The Student Council president and vice-president are voting members of the Executive Council and the Policy Committee. Two Student Council members also serve as voting members of the Curriculum and Admissions Committees.

The Council provides a forum for discussion of problems or ideas relating to life as a BCM graduate student. They serve as a liaison between the student body, the GSBS administration and other BCM student bodies to maintain open communication and to promote understanding. The Council organizes and hosts the annual Graduate Student Research Symposium and assists the Dean with the planning of orientation for incoming students. The Council meets once every month to review each of its subcommittee's recent findings or upcoming events, and discuss any current issues. All GSC members are required to attend 8 out of the 12 GSC meeting each year; exceptions can be granted by the GSC President or Vice-President. Minutes of all Council meetings are recorded and distributed to the Dean.

## **2.8 Graduate Faculty Membership Committee** (New 08/16/19)

The Graduate Faculty Membership Committee is composed of seven members of the Graduate Faculty nominated by the Dean. Faculty members serve for one 3-year term, but may be recommended for reappointment by the Dean. The Graduate Faculty Membership Committee considers applications for membership in the Graduate Faculty following criteria outlined in

Section 1.6.1 (Criteria for Appointment to the Graduate Faculty), and makes recommendations for appointments to the Dean.

## ARTICLE 3. ADMISSION

### **3.1 Academic Requirements** (Revised 01/25/02, 06/21/02, 08/16/19)

An applicant must hold a bachelor's or more advanced degree or be in the final stages of a Program leading to a bachelor's degree or equivalent. An official transcript verifying the degree will be required at matriculation. The following undergraduate courses are recommended but not required: Biology, Organic Chemistry, Biochemistry, Mathematics (calculus preferred) and Physics. Most applicants have an overall grade point average greater than 3.0 (where 4.0 = A), with grades of B or better in courses relevant to his/her field of study. Questions about specific aspects of the curriculum or recommended undergraduate courses should be addressed to the specific Program to which the applicant is applying.

The Graduate Record Examination (GRE) is not required. Foreign applicants for whom their prior baccalaureate or higher education was not in English, must demonstrate proficiency in spoken and written English through obtaining a score of 90 or greater for the Test of English as a Foreign Language (TOEFL), or a score of 6.5 or greater on the International English Language Testing Service (IELTS) examination.

### **3.2 Non-Discrimination Policy** (Revised 04/22/03)

BCM and the Graduate School of Biomedical Sciences admits students of any race, sex, sexual orientation, color, national ethnic origin, disability or age to all the right, privileges, Programs, and activities generally accorded or made available to students at the school. It does not discriminate on the basis of race, sex, sexual orientation, color, national or ethnic origin, disability or age, in administration of its educational policies, admissions policies, scholarship and loan Programs, and other school school-administered Programs.

### **3.3 Student Disability Policy** (New 8/27/15, 08/01/16)

BCM provides equal educational access for qualified students with disabilities in accordance with state and federal laws including the Americans with Disabilities Act of 1990, as amended in 2008, and Section 504 of the Rehabilitation Act of 1973 and the BCM [Student Disability Policy](#) (Section 23.1.07).

### **3.4 Acceptance of Admissions Offers** (Revised 04/22/03)

The BCM Graduate School of Biomedical Sciences is a member of the Council of Graduate Schools (CGS). According to the bylaws of the CGS, applicants have no obligation to accept an offer before April 15. While the BCM Graduate Programs can encourage accepted applicants to commit to an offer prior to April 15 to aid the Program in establishing the optimal entering class, the student does not have to declare before that date. The provisions of the CGS state: "Students are under no obligation to respond to offers of financial support prior to April 15; earlier deadlines for acceptance of such offers violate the intent of this Resolution. In those instances in which a student accepts an offer before April 15, and subsequently desires to withdraw that acceptance, the student may submit in writing a resignation of the appointment at any time through April 15. However, an acceptance given or left in force after April 15 commits the student not to accept another offer without first obtaining a written release from the institution to which a commitment has been made. Similarly, an offer by an institution after April 15 is conditional on presentation by the student of the written release from any previously

accepted offer. It is further agreed by the institutions and organization subscribing to this Resolution that a copy of the Resolution should accompany every scholarship, fellowship, traineeship, and assistantship offer.”

Applications for Admission to the Graduate School should be addressed to the Graduate School, BCM, One Baylor Plaza, Houston, TX 77030. (Deleted last sentence)

### **3.5 Reinstatement of Admission** (New 04/13/06, 08/24/15)

Students who withdraw or are dismissed for academic reasons, or who receive a terminal M.S. degree from BCM Graduate School of Biomedical Sciences must reapply for admissions before they may be reinstated as a student. A student who is dismissed on the basis of misconduct is ineligible to reapply.

### **3.6 Retention of Admissions Records** (New 04/13/06)

In accordance with Federal Policy (IRS), the Graduate School of Biomedical Sciences will retain admissions records for a period of three years for all applicants. The admissions records of matriculated applicants (excluding letters of recommendation) will become a part of the student’s permanent file maintained by the Registrar.

## **ARTICLE 4. FINANCIAL REGULATIONS**

### **4.1 Tuition**

Tuition for a full-time course of study for one school year (5 terms, minimum of 12 credit hours per term) is set by the Board of Trustees. All students will be charged full tuition during their entire graduate school career. Students who are enrolled for less than the entire academic year are charged on a proportional basis.

### **4.2 Financial Assistance** (Revised 11/15/02, 08/01/16)

All students receive an annual stipend while enrolled as full time students in the Graduate School. The amount of the stipend and any individual exceptions are established by the Executive Council and Dean. The stipend is continued as long as the student is making progress toward the degree. The BCM [Financial Responsibilities, Financial Aid Eligibility, and Satisfactory Academic Progress Requirements for Students](#) policy (Section 23.1.02) outlines academic standards for financial aid eligibility. The Office of Student Financial Aid considers all applications for loans with the exception of the Emergency Loan Fund. Emergency Loans may be obtained through the Graduate School office.

### **4.3 Outside Employment**

The first obligation of students is to their graduate studies. Students should arrange their financial affairs so that employment during the academic session should not be necessary. However, if the need arises, they should consult their Graduate Program Director.

### **4.4 Financial Responsibility** (Revised 08/02/10)

Graduate students are expected to conduct their financial affairs in such a manner that their personal accounts and outstanding loans through the Graduate School remain current. Student fees (other than student health insurance, tuition and facilities fee) are the responsibility of the graduate student and must be paid by September 1 and February 1. For non-payment of student fees (by the published deadlines) the student is charged a late fee by Student Account Services and a hold is placed on the student record blocking on-line registration, the posting of grades and production of transcripts. Payment of student health insurance is the responsibility of the

BCM organizational unit (Org Unit) that pays the student's stipend. Non-payment of the student health insurance does cause a hold to be placed on the student record however no late fine is imposed. Charges for tuition and the Facilities fee are cleared from the student account when scholarships are applied automatically. The Graduate School processes scholarships at the beginning of each semester (in July and January). The Dean can, at his/her discretion, discontinue tuition scholarships and/or refuse registration in those instances where there is no progress toward reducing the indebtedness.

## **ARTICLE 5. REGISTRATION**

### **5.1 Academic Year**

The academic year is approximately August 1 to July 31, and terms are designated First, Second, Third, Fourth, and Fifth (one term = 8 weeks' instruction plus one exam week). All students begin their studies in August unless circumstances justify special permission in writing from the Graduate Program Director for beginning at another date. The request should be made in writing, by the student, to the specific Program Director who, in turn, notifies the Graduate School office. All requests for office-cycle admissions must be approved by the Dean.

### **5.2 Deadline for Registration** (Revised 08/23/04, 08/16/19)

The student will be billed a \$25.00 late registration fee when registering after the stated deadline. If a student fails to register by the end of the second week of the term, they may be administratively withdrawn from the Graduate School.

### **5.3 Program of Courses**

#### **5.3.1 Course Schedule** (Revised 08/16/19)

The Graduate Program pre-registers students for most courses, and students may self-register in CAMs during designated Open Registration periods. Changes to course registration after the close of Open Registration up to the end of the second week of class require notification to the Program Administrator. Changes to course registration after the second week of class require the approval of the Program Director. After appointment of the Major Advisor, approval is indicated by the signature of the Program Director and the Major Advisor.

#### **5.3.2 Research Rotation Requirement** (New 06/15/06, Revised 08/16/19)

Research rotations begin to teach students how researchers approach biological problems. A rotation is expected to provide an introduction to the laboratory's research goals as well as instruction in basic laboratory skills. Rotations also familiarize the students with different laboratories in their Graduate Program and facilitate the ultimate selection of a Major Advisor. A typical research rotation lasts a whole term, but students may split a rotation in consultation with the Program Director. The number of credits earned in each rotation is adjusted so that the combination of research rotation and all other courses sums to a total of at least 12 credit hours per term.

In order to maximize the benefits of the research rotations, students are required to complete a minimum of three research rotations in different laboratories (or three full terms in the case of split rotations). All rotation mentors must be members of the Graduate Faculty. The first and second research rotations must be done with a rotation mentor who is a member of the student's graduate program. Subsequent rotations may

be done with a mentor-qualified member of the Graduate Faculty outside of the student's Graduate Program with approval of the PEC.

Students and faculty are encouraged to discuss the potential for joining a laboratory during or after the rotation. However, students need the opportunity to explore various laboratories without pressure. Therefore, faculty will make no commitment and will not request commitment from a student prior to completion of three rotation terms. Official appointment of a major advisor can be approved only after the completion of three rotation terms. The three-rotation requirement is managed and monitored by the individual Graduate Programs.

Exceptions:

- Students may choose to work at BCM during the summer before matriculation and count the summer research as one rotation, pending approval by the Graduate Program Director. Permanent employment at BCM prior to matriculation (e.g. as a research technician), or research conducted outside of a BCM degree granting program, cannot be counted as a rotation.
- MD/PhD students who participate in research during their initial MD training period may count their experience as one rotation pending approval by the Graduate Program Director and in consultation with the MD/PhD Program Director.
- Students who transfer to BCM with their advisor after joining his/her laboratory in another institution are exempt from the three-rotation requirement but are encouraged to familiarize themselves with the work done in other laboratories in their Program.

#### **5.4 Course Load** (Revised 08/16/19)

All students must be enrolled for at least 12 hours of credit each term. Students who have been admitted for candidacy and who have a TAC in place, will be automatically registered by their Program administrator for 12 hours of dissertation each term. The number of contact hours required for coursework and research credit are defined in the BCM [Credit Hour Policy](#) (Section 23.1.11). A student wishing to take more than 17 term hours per term must obtain written permission from their Major Advisor, and have the approval of the Dean.

#### **5.5 Course Changes** (Revised 8/27/15, 08/01/16, 08/16/19)

Throughout the first two weeks of a class, registration may be changed with notification to the Graduate Program Administrator and the Graduate School. These changes are not reflected on the transcript. During the third and fourth weeks of the class, a student may withdraw from a course with the approval of the Graduate Program Director and the Major Advisor and notification of the Graduate School office. Withdrawal is designated on the transcript by the symbol WD.

Withdrawal after the fourth week, but prior to the final exam date, must be approved by the Dean of the Graduate School. The notation on the Transcript will be WD. If the Dean does not give permission to withdraw, the notation will be I (incomplete) or F (Failing) depending on the student's performance to the date of withdrawal. The BCM [Course Repeat Policy](#) (Section 23.1.09) outlines how repeated coursework is listed on student transcripts.

#### **5.6 Dissertation Registration**

A graduate student may not register for dissertation until a TAC has been appointed, the Qualifying Examination has been successfully Passed, and the Program has proposed the student for candidacy.

**5.7 Retroactive Credit**

Credit cannot be given retroactively for a course in which a student was not officially enrolled.

**5.8 Inter-Program Transfer** (Revised 01/13/97, 07/29/13)

Once a student has committed to a specific Program, it is expected that the course of study will be pursued to completion. In exceptional circumstances, students may transfer from one Graduate Program to another upon approval by the director of each of the Programs concerned and by the Dean; however, it is the student's responsibility to present compelling reasons for such a transfer. Before a transfer request can be initiated, all parties must be certain that the resident Program has not been able to address the concerns of the student. Neither Program will approve such a transfer without consultation between the directors of both Programs. Students are encouraged to consult with the Graduate School administration if they feel that conditions have arisen necessitating an inter-Program transfer, and may appeal disapproval by their current Program to the Dean, who will have the final authority for approval. Any transfer will be noted on the student's permanent record upon submission of "Interdepartmental Transfer" form. Even if the student has been admitted to candidacy prior to transfer, the new Program may require that the student complete all requirements for admission to candidacy in the new Program.

**5.9 Audit Students** (Revised 11/08/07)

BCM graduate students are allowed to attend any courses offered by the graduate school for no credit and without examination if the instructor approves. No registration is required for informally auditing courses and no indication will appear on the student's transcript. If a student wishes to formally AUDIT a BCM graduate school course, the student must register for a formal AUDIT and obtain permission of their Program Director and the course director. Registration is completed by using the Add/Drop Form. For the course to be listed on the student's transcript (without any credit hours awarded toward graduation), the student must submit to the graduate school a course syllabus (dates, lecture titles and lecturer name only) in which the student's attendance at 70% or more of the classes is documented by the lecturer's signature for each lecture attended. An AUDIT student may not take examinations. If the student Fails to submit an attendance document by end last day of the term, they will be withdrawn from the course and it will not appear on their transcript.

Other individuals may audit Graduate School courses under the following conditions: The individual is a full-time student of an institution with which BCM has a reciprocal agreement, or a member of the BCM faculty or staff. Should the auditor be a BCM employee, written consent is required from the faculty employer, the course instructor and the Graduate Program Director. Upon recommendation of the instructor, transcripts will bear the course name and will be marked AUDIT. No more than 15 term hours of audit may be accumulated by anyone other than a full-time student.

**5.10 Special Students** (Revised 01/16/04)

Baylor College of Medicine associated personnel who hold a Bachelor's or higher degree but who are not students may, with permission, register as Special Students for courses offered by the Graduate School and its Programs. Special Students may not take courses through the reciprocal agreement with another institution. Written consent is required from the faculty employer, the course instructor and the graduate school. A special student may register for a maximum of 15 term hours of credit. Any credit hours for which grades of C or F are received count toward the 15-hour limit. Petitions for exception should be directed to the Dean of the Graduate School. The performance of special students is subject to review by the Promotions

Committee and a grade of C or lower may be grounds for the graduate school to refuse permission for enrollment in subsequent courses. For courses with limited enrollment, priority will be given to BCM graduate students.

### **5.11 Inter-Institutional Student Registration - Reciprocal Agreements** (Revised 06/15/06, 07/30/12, 08/16/19)

In addition to full-time students accepted in the PhD and MD/PhD Programs, matriculated full-time students in a school with which BCM has a reciprocal agreement (Rice University, Texas A&M University, University of Houston, The University of Texas Graduate School of Biomedical Sciences, and The University of Texas School of Medicine may take courses for credit without going through formal admissions procedures or paying tuition. The established BCM procedures for registration must be followed. BCM graduate students may take graduate level courses at reciprocating institutions under the same conditions. BCM students can register for inter-institutional courses only when the course is approved by the student's Program, offered at the host institution for graduate credit, and when a comparable course is not offered at BCM. During the registration process (Inter-institutional registration form), the Graduate School will evaluate the effectiveness of inter-institutional courses in supplementing the BCM curriculum and in meeting the overall goals of the student's Program. Registration must be approved by the student's Program, the BCM GSBS, the host institution and the host instructor. BCM students must comply with all of the requirements of the institution offering the course (e.g., background checks, immunizations, etc.)

### **5.12 Floating Holidays and Term Breaks** (New 08/01/11)

Courses, exams, or other required activities will not be scheduled on the four BCM floating holidays (Good Friday, Christmas Eve, Day after Thanksgiving, President's Day) or during graduate school term breaks. For research students, including research rotations, arrangements for floating holidays or other time off should be made with the PI.

## **ARTICLE 6. ACADEMIC REGULATIONS**

### **6.1 The Grading System and Assigning Credit**

#### **6.1.1 The Grading System** (Revised 04/15/98, 04/26/02)

| Grade | Description                         |
|-------|-------------------------------------|
| A     | Honors Work                         |
| B     | Passing Work                        |
| P     | Passing Work                        |
| C     | Marginal Work                       |
| MP    | Marginal Pass-Research Courses Only |
| I     | Temporary Incomplete Work           |
| F     | Failing Work                        |

A grade of C or F does not confer credit toward Graduate School degree requirements. MP only applies to research related courses (Special Projects, Research Rotation and Dissertation). Incomplete (I) is to be used only to represent incomplete work; no other use of the grade is to be accepted. The grade may be carried no longer than three terms. After the third elapsed term, the I automatically becomes an F. For all courses that are graded without objective examination (e.g., graded on attendance) only grades of P

(Pass), F (Fail) or I (incomplete) can be used. These include but are not limited to Readings (courses numbered 548) and Seminar (courses numbered 466). Grades of P (Pass), MP (marginal Pass) or F (Fail) are to be used for Special Projects (courses numbered 435), Research Rotations (courses numbered 549) and Dissertation (courses numbered 550). In all courses (School of Medicine and Graduate School), all students must be graded on the identical criteria. If a Program wishes additional criteria for its students in a required course, such criteria should not be reflected in the recorded grade.

Please refer to the institutional [Course Repeat Policy](#) (Section 23.1.09) for criteria for calculating repeats in coursework.

### **6.1.2 Assigning Academic Credit** (2/29/12, Revised 8/27/15, 8/01/16)

The academic calendar of the Graduate School is divided into five academic terms. Each term is of 8 weeks duration followed by one week of exams. Terms 1 and 2 are offered in the fall (August-December), terms 3 and 4 occur in the Spring (January-May) and Term 5 occurs in the Summer (May-July). Credits for coursework (term hours) are awarded on the basis of the Carnegie Unit. A term unit of credit is equal to one hour of lecture, seminar or small group discussion time per week or three hours of laboratory research activity per week. One term credit hour is equivalent to 0.5 semester credit hours. If the calculation of credit hours using the convention specified above is a non-integral number, the credit hours will be rounded to the closest integer. Please refer to the institutional [Credit Hour Policy](#) (Section 23.1.11) for additional guidance on how academic credit is awarded and for overall guidance on the number of credits required for each BCM degree.

## **6.2 Grade Changes** (Revised 08/23/04, 8/27/15, 08/01/16)

Grades submitted by the faculty become final on the official date that grades are due each term. Grade changes for other than numerical error are discouraged. If an exam is re-evaluated, all students' answers to the affected sections of the exam are subject to review. Grade alterations affecting one student only, must be justified on the basis of a mathematical or related error. Requests to change final grades must be submitted in writing by the course director, with the approval of the Program Director, to the Promotions Committee. The request must specifically state the reason for the change. If student concerns regarding final grade are not resolved through discussion with the course director, students may choose to proceed with a formal grade appeal. Guidance for the appeal process, inclusive of timeline, is outlined in the BCM [Student Grievances Policy](#) (Section 23.1.08).

## **6.3 Student Evaluation** (Revised 06/15/06)

Students are encouraged to complete evaluation-of-course/instructor forms at the end of each term, including courses taken at other institutions through inter-institutional agreements (see article 5.11). The Graduate School office shall distribute these forms for each service course to each student engaged in classroom-based course work. Completed forms are to be returned to the Graduate School, before the end of the subsequent term, where they will be collated and sent to the respective course directors.

## **6.4 Transcripts**

All grades and academic actions will be permanently recorded on the transcript. Students may be provided with unofficial copies of transcripts. Official copies will be released only by written request of the student to the Registrar's office.

**6.5 Unsatisfactory Academic Progress** (Revised 04/26/02, 08/23/04, 08/03/09, 07/30/12; 07/29/13, 07/14/14, 08/01/16, 04/06/18)

Students are considered to be making good academic progress unless they have been placed on Academic Warning, Academic Probation or recommended for dismissal. Graduate students are expected to maintain satisfactory progress toward the degree. One or more credit hours with the grade of C, MP, F, or I makes a student subject to review by the Promotions Committee. The Promotions Committee will take one of the following actions: 1) Place the student on Academic Warning; 2) Place the student on Academic Probation; 3) Recommend the student for dismissal to the Dean; 4) Other action deemed appropriate by the Promotions Committee.

In the case of a grade of MP or F in a research-related course, the student's TAC and Program Director will be notified as soon as possible by the Graduate School. If a TAC has not been established, the Program Director will be notified. The Program Director or designee will meet with the student and major advisor. A plan of remediation, signed by student, major advisor, Program Director and TAC (if appropriate) must be submitted to the Graduate School within two (2) weeks of the preceding term's grade submission deadline. Before assigning a grade of F in a research-related course, the major advisor must notify the Program Director of the reason(s) for the grade, documenting that the student has been given written warning of their unsatisfactory performance and potential remedies.

A student must be making good academic progress when granted permission to write and at graduation for either the MS or PhD degrees.

**6.6 Academic Warning** (Revised 04/13/06, 11/08/07, 07/14/14)

Any student who receives one to three credit hours of C, or one instance of MP (in a research-related course), will be placed on Academic Warning by the Promotions Committee. The Promotions Committee will notify the student, in writing, of its decision. To be removed from Academic Warning, the student must retake the required course within one year and obtain a grade of B (P in a research-related course) or better, and must also complete two terms with no grades lower than B (or P in a research-related course). A student who Fails to comply with the specific conditions of the Academic Warning may be placed on Academic Probation by the Promotions Committee. A student who satisfies the conditions of the Academic Warning will be removed from Academic Warning upon review by the Promotions Committee.

**6.7 Academic Probation** (Revised 06/21/02, 04/13/06, 11/02/06, 11/08/07, 07/14/14)

Any student who accumulates four or more credit hours of C, or receives one or more credit hours of F, or two (cumulative) grades of MP in research-related courses, will be placed on Academic Probation by the Promotions Committee. A student who fails their first attempt at their Qualifying Examination will be placed on Academic Probation. The Promotions Committee will notify the student, in writing, of its decision. When a student is placed on probation or when a student on probation accumulates additional grades of C or lower, a plan of remediation must be submitted to the Promotions Committee by the student's Program. To be removed from Academic Probation the student must: (1) retake required course(s) within one year and obtain a grade of B or better (P in a research-related course), or their second qualifying exam, and (2) complete two terms with no grades lower than B (P in a research-related course).

A student who fails to comply with the specific conditions of his/her probation will be recommended to the Dean for dismissal from the Graduate School. A student who satisfies the

conditions of probation will be removed from Academic Probation upon review by the Promotions Committee.

## **6.8 Dismissal** (Revised 06/23/00, 11/16/01, 04/13/06)

### **6.8.1 Dismissal due to poor academic performance** (Revised 11/11/99, 11/16/01, 07/29/13, 07/14/14)

A student who receives a grade of C or lower in nine or more term hours of courses, three (cumulative) grades of MP in a research-related course or 9 or more hours of a grade of F in a research-related course will be recommended for dismissal from the Graduate School after grade verification by the Promotions Committee and Dean. A student who fails to pass their first qualifying examination may be recommended for dismissal to the Dean by the Promotions Committee (see Section 9.8.1). A student who fails to pass their second qualifying examination will be recommended for dismissal to the Dean by the Promotions Committee (see Section 9.8.1). The Dean will notify the student, in writing, of the decision for dismissal. If the dismissal is upheld on appeal, Dismissal is entered on the permanent transcript, along with the student's academic status at the time of dismissal. Outstanding grades of I at the time of dismissal will remain incomplete.

The student will have the right to appeal the dismissal as outlined in Section 6.10, and must notify the Dean of the intent to appeal, in writing, within one week of receipt of notification of the dismissal action.

### **6.8.2 Dismissal for nonacademic reasons** (Revised 08/29/97, 11/16/01, 06/14/05, 02/07/08, 07/14/14)

A student also may be dismissed for non-academic reasons that seriously violate the expectations of professional behavior (Section 6.11). After investigation of any allegations, any finding of non-professional conduct will be forwarded to the Promotions Committee for review and action. After its review, the Promotions Committee may recommend appropriate sanctions or penalties, including a recommendation for dismissal for non-academic reasons to the Dean. The Dean will notify the student, in writing, of the Promotions Committee's recommendation. If the Promotions Committee recommends dismissal, the student will have the right to appeal, the dismissal as outlined in Section 6.10. The request to appeal a dismissal decision must be made in writing to the Dean within one week of receiving notification of the dismissal action.

## **6.9 Withdrawals**

### **6.9.1 Request to Withdraw** (New 01/16/04, Revised: 06/14/05, 04.13.06, 08/03/09, 07/29/13, 07/14/14)

A student may withdraw from the Graduate School at any time, but to do so, the student must submit to the Dean a completed "Request to Withdraw/Clearance Form" signed by the Program Director for approval. The student's academic status at the time of the withdrawal will be reflected on the transcript. If the request to withdraw is approved by the Graduate School after the student has completed all the course requirements, including the final examination if applicable, the transcript will reflect the grade earned. Outstanding grades of I at the time of withdrawal will be changed to WD (Withdrawn).

A student charged in a misconduct issue may withdraw; however, if the allegations are substantiated by an investigation, and the Promotions Committee subsequently

recommends dismissal, the transcript shall be amended to show that the student was dismissed for reasons of misconduct.

### **6.9.2 Administrative Withdrawal** (New 01/20/04, Revised 11/02/06)

Students who fail to register during a term without specifically requesting leave or permission to withdraw, shall be withdrawn administratively. Transcripts will bear the notation "Administratively Withdrawn". All payments and benefits, including the tuition waiver, will cease upon administrative withdrawal.

## **6.10 Appeal of Promotions Committee Decisions** (Revised 11/16/01, 07/14/14)

A student who disagrees with a Promotions Committee decision may appeal that judgment in writing to the Dean within **one week** of being notified of the decision.

### **6.10.1 Appeal Process** (Revised 11/16/01; 'Review by the Promotions Committee' removed on 07/14/14; 'Composition of the Appeals Committee' moved to Article 2 on 07/14/14)

#### **6.10.1.1 Review by the Appeals Committee** (Revised 11/16/01, 07/29/13, 07/14/14)

A student who disagrees with the Promotions Committee may appeal the decision in writing to the Dean within one week of being notified of the Promotions Committee's decision. The appeal request must state the basis of the appeal (Section 6.10.1.2). The Dean will notify the Appeals Committee of the Graduate School to review the Promotions Committee decision within two weeks of receiving a written request.

#### **6.10.1.2 Appeals Committee Process** (Revised 11/16/01, 07/14/14)

The Appeals Committee will meet within two weeks of the Dean receiving the written appeal. The student may ask to meet with the Committee and may bring a faculty member of their choice as an advocate. The Appeals Committee may request to speak with persons that may have information pertinent to the appeal.

The Appeals Committee will review the appeal request with regards to: 1) whether Graduate School policies as outlined in this manual were followed, 2) the appropriateness of the evaluation of any information provided by the student, faculty or Program to the Promotions Committee, or 3) any other relevant information that was not available to the Promotions Committee.

Recommendations the Appeals Committee should reflect the decision of the majority of Committee members on the issues above. Based on recommendations of the Appeals Committee, the Dean will make the final decision regarding the appeal. If the recommendation of dismissal or other decision by the Promotion Committee is overturned by the Appeals Committee, the Dean, together with the Appeals Committee, must recommend a remediation plan for the student.

#### **6.10.1.3 Responsibility of the Student's Graduate Program During the Appeals Process**

During the appeals process(es), the student will retain his/her financial and research support from the student's Graduate Program, and will maintain academic enrollment.

**6.11 Professional Conduct** (New 02/07/08, 08/16/19)

Students are expected to perform their duties in a professional manner and abide by all the policies of Baylor College of Medicine including the [BCM Code of Conduct](#), the Graduate School, and their Programs. Any conduct not in keeping with the ethical or professional standards of BCM is defined as professional misconduct. This includes, but is not limited to, actions of academic misconduct that occur in the context of meeting academic requirements (courses and Qualifying Examinations), scientific misconduct as defined by the College, violation of College policies, and acts of a criminal nature.

**6.11.1 Academic Misconduct** (New 02/07/08, 07/29/13)

Academic misconduct is defined as dishonesty (cheating, plagiarism, etc.) that occurs in conjunction with academic requirements such as courses or Qualifying Examinations. Allegations of academic misconduct should be made in writing to the Dean. In cases of alleged academic misconduct, the Dean will, within one week, appoint an Investigative Committee consisting of three faculty members and two students to investigate the allegations and report their findings and recommendations to the Promotions Committee (Section 6.8.2). The student has a right to receive a copy of the written allegations of academic misconduct provided to the Investigative Committee and to respond to the Committee orally or in writing concerning any allegations if he or she chooses. The student may bring a faculty member of their choosing to serve as an advocate.

**6.11.2 Scientific Misconduct** (New 02/07/08)

Scientific misconduct is defined as “fabrication, falsification, plagiarism or other acts that deviate from commonly accepted practices within the scientific community for proposing, conducting or reporting research” (US Public Health Service Regulations).

Allegations of scientific misconduct should be reported to the College officer in charge of investigating these allegations using the policies defined by the College. Once the College process has reached a conclusion and any appeals have concluded, any finding of scientific misconduct will be sent to the Promotions Committee for their review and action (section 6.8.2)

**6.11.3 Violation of College Policies** (New 02/07/08, Revised 8/27/2015, 08/01/16)

Graduate Students are expected to abide by all College policies that apply to them, including the policies set by the Graduate School, their Program and the College. The College policies include, but are not limited to, those pertaining to:

[Human Resources](#) (BCM Policy Section 02)

Information Technology [Acceptable Use Policy](#) (BCM Policy Section 12.02.01)

[Use of Copyrighted Material](#) (BCM Policy Section 20.8.03)

[Diversity](#) Policy (BCM Policy Section 02.2.40)

[Gift Acceptance and Processing](#) Policy (BCM Policy Section 17.02.01)

Environmental Safety:

[http://intranet.bcm.tmc.edu/index.cfm?fuseaction=home.showpage&tmp=research/enviro\\_safety/main](http://intranet.bcm.tmc.edu/index.cfm?fuseaction=home.showpage&tmp=research/enviro_safety/main)

Office of Research (Human and Animal Subject Research):

<http://intranet.bcm.tmc.edu/apps/research/oor/>

Allegations of the violation of College policies by graduate students will be initially dealt with by the normal processes for handling such allegations within the College. When other College entities deal with professional misconduct allegations involving graduate students, the Graduate School Dean should be informed of these allegations if in keeping with confidentiality requirements. Under extraordinary circumstances, where there may be concerns about well-being of the student or others, the Dean may suspend the student while awaiting a final resolution of the allegation by the College.

If an allegation is substantiated, the Dean will inform the student, their Program Director, and major advisor in writing of the responsibilities of students to follow College and Program Policy and may recommend the matter to the Graduate School Promotions Committee if it is judged to be sufficiently serious to serve as grounds for dismissal (section 6.8.2).

#### **6.11.4 Criminal Acts** (New 02/07/08)

The Dean may recommend review of the status of a graduate student convicted of a criminal offense. If the criminal act is judged to be of a serious nature, the Dean may forward the case to the Promotions Committee for their review and recommendation concerning dismissal (section 6.8.2).

### **6.12 Participation in Extracurricular Activities** (New 08/23/04, Revised 08/01/16)

Student who participate in extracurricular activities sponsored by the College requiring a significant time commitment including mentoring, recruiting, teaching assistantships, externships, etc. must be making good academic progress and have the permission of their major advisor and Program Director.

### **6.13 Student Written Grievance Policy** (New 08/15/05, Revised 07/30/12, 01/29/15, 8/27/15, 08/01/16)

A grievance is a complaint arising out of any alleged unauthorized or unjustified act or decision by a member of the faculty, member of the administration, or member of the staff which in any way adversely affects the status, rights, or privileges of a member of the student body. A complaint is considered a written grievance whether it is filed on paper, online or on the phone. The burden of proof shall rest with the complainant.

Student complaints or grievances should initially be addressed, if possible, by the student discussing the problem with the individual (student, faculty, staff) most closely related to the area of the grievance. Following that, the student should contact the individual's Supervisor, Program Director, Departmental Chair, Associate or Assistant Dean and the Dean in the Graduate School of Biomedical Sciences. If the problem is not resolved, the student may file a formal written grievance with the Dean of the Graduate School of Biomedical Sciences using the Student Grievance form. If the problem is not resolved the student is encouraged to contact the Integrity Hotline (855-764-7292) to file a written grievance with the Office of the Provost. The Integrity Hotline may also be accessed through [www.bcm.ethicspoint.com](http://www.bcm.ethicspoint.com). Additional information is located in the BCM [Student Grievances Policy](#) (Section 23.1.08).

### **6.14 BCM Statement of Student Rights** (New 8/27/15)

BCM is committed to creating an environment for students that is conducive to academic success and academic freedom commensurate with all applicable laws and regulations. As

students are not only members of the BCM academic community but are also members of society as a whole, BCM works to ensure that all rights, protections, and guarantees that students are assured as citizens of society are also provided to them within BCM.

Baylor College of Medicine's Statement of Student Rights aligns with the College's mission as a health sciences university that creates knowledge and applies science and discoveries to further education, healthcare and community service locally and globally. These rights embody our values of respect, integrity, innovation, teamwork, and excellence, our vision to improve health through science, scholarship and innovation and our adherence to the Institutional Code of Conduct.

Students have the right to freedom of expression within an atmosphere of culturally responsive inclusiveness and sensitivity. The free dissemination of ideas is key to promoting the academic, personal, and professional growth of BCM students.

Students have the right to a safe learning environment that is free of discrimination, violence, and harassment. Baylor College of Medicine seeks to provide a community of respect, open communication, collaboration, and inclusiveness.

Students have the right to due process in incidents of alleged student misconduct, and have the right to appeal decisions in this regard. Baylor College of Medicine strives to guarantee accuracy in academic results and decisions.

Students have the right to confidentiality of education records. Explicit written confidentiality policies and procedures are in place to achieve the protection of all personal information and academic records.

## **ARTICLE 7. STUDENT RECORDS**

### **7.1 Maintenance of Student Records** (Revised 08/01/16)

The Office of the Registrar is responsible for maintenance of all official academic records of students. BCM maintains a file on each student. Included in a student's file are the original application form of the student for admission to BCM, transcripts of any college records, and test scores. Subsequent to the enrollment of the student at BCM, the student file contains enrollment forms, grades, letters of correspondence to other institutions concerning the student, narrative summaries rendered by the faculty concerning the student's academic work, letters indicating actions of the Promotions Committee, communications concerning the scholarships and loans, and other correspondence relating to the student's education at BCM. In addition to written material kept in the student files, BCM maintains, on a computer, general information about each student: courses taken, grades, summary statements of academic actions, and enrollment information. BCM's policy regarding creation and maintenance of student records is based upon practice recommended by the American Association of Collegiate Registrars and Admissions Offices.

### **7.2 Confidentiality of Student Records** (Revised 8/27/15, 08/01/16)

It is the Institutional [Student Records Policy](#) (Section 23.1.06) that the material contained in the student records is confidential; transfer of such information within the school is permitted only for legitimate academic purposes. The school complies with the provision of both the Texas Open Records Act of 1973 and the Federal Family Educational Rights and Privacy Act of 1974, and regulations governing educational institutions written by the Department of Health and

Human Resources. The institution is responsible for ensuring that student academic records are properly secured and trains all staff supporting the education mission in Family Educational Rights and Privacy Act (FERPA), American Association of College of Registrars and Admissions Officers (AACRAO) and Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) accreditation requirements.

### **7.3 Student Access to Records** (Revised 08/01/16)

A student may examine student records at BCM concerning himself/herself by presenting the request to the Office of the Registrar. These records shall be made available for review by the student as promptly as possible. The records shall be examined in the office in which they are kept, under observation of administrative personnel, and shall not be altered, destroyed, or carried away from the office by the student. Material which relates to more than one individual shall not be made available for direct review, but the student shall be told the information contained in such records which relates to him/her. Former students have the same access to their records as those currently enrolled. A student may obtain a copy of his/her records.

### **7.4 Challenge of Content Accuracy** (Revised 08/01/16)

A student may challenge the accuracy of information contained in a record or may challenge information in a record that appears to represent an undue invasion of privacy. In the case of a challenge, the student should meet with the faculty member or administrative official responsible for the information being questioned. The faculty member or administrative official may, through discussions with the student, concur with the challenged points and correct or delete the information accordingly. If no compromise can be reached, the student may file a grievance (see GSBS policy 6.13).

### **7.5 Faculty Access to Records** (Revised 08/01/16)

All review of information in the file of a student in the Office of the Registrar by faculty members and administrative officers other than by those persons responsible for keeping the records, requires the signature of the faculty member or administrative official on a written form kept within the student's file and accompanied by the date of review and by a brief statement indicating the reason for review of the records.

### **7.6 Transfer of Information from Records**

The student shall be notified prior to the transfer of any information within the student file to persons or institutions other than those associated with or affiliated with BCM. Such information may be transferred only: 1) By reason of a valid subpoena or judicial order of a court; 2) To federal or state educational agencies, providing the agency legally requests the information in writing and specifies the purpose for acquiring the information. 3) To organizations responsible for the accreditation of BCM; 4) Upon written request of the student, to persons he/she designates.

### **7.7 Criminal Background Checks and Health-Related Information** (New 02.07.09, 08/01/16)

Although applicants are required to disclose any criminal background on their applications, formal criminal background checks, drug and/or alcohol testing, or vaccination or other health records may be required of students who perform research laboratory, hospital or clinical settings. Information obtained from these checks will only be used in accord with state and federal laws. The Graduate School and its representatives will hold such information in strict confidence and it will not become part of the student's official file. The student will have the right of access to all information collected and will be afforded the right to challenge its

accuracy. In cases where there are findings reported on these checks, the Dean will appoint a Committee consisting of an Associate or Assistant Dean and the Program Director of the student's Program to recommend what if any actions should be taken.

Students are required to comply with the BCM [Influenza Vaccination Policy](#) (Section 18.1.04).

## ARTICLE 8. RESIDENCY

### **8.1 Residency Requirements** (Revised 06/21/02, 11/02/06)

All candidates for the degree of Doctor of Philosophy are required to spend 15 terms (3 years) in residency at BCM with the exception of those students receiving transfer of credit. The residency requirement will be reduced by one term for each 12 term hours transferred. The student who has obtained approval of the full transfer of credit (60 term hours) will have a residency requirement of 10 terms (2 years). Under rare circumstances (for example, the departure of the Major Advisor, so that the student must leave BCM to complete his/her research) the residency requirement may be waived upon request. This request must be approved by the Dean and by the Promotions Committee. Completion, in good standing, of the first year's Program in the BCM School of Medicine may be used by a student in the MD/PhD Program to satisfy one year of the residency requirement in the Graduate School.

### **8.2 Leave of Absence (LOA)** (Revised 01/16/04, 06/14/05, 11/02/06, 08/03/09, 08/16/19)

A student who seeks an LOA must submit a completed Leave-of-Absence/Clearance Form to the GSBS prior to the start of the leave. Requests are subject to approval by the Program Director and subsequently by the Dean. An LOA may be granted for a period of up to one year and shall be permanently noted on the student's transcript. Types of LOA (e.g. medical, personal) and required documentation are defined in the [BCM Student Leave of Absence Policy](#) (Section 23.1.12).

If the request for LOA is approved by the Graduate School after the student has completed all the course requirements in a given term, including the final examination if applicable, the transcript will reflect the grade earned. Grades for courses not yet completed at the time of withdrawal will be assigned as WD (withdrawn).

Students on LOA who fail to register within one week of the termination of the LOA shall be administratively withdrawn. A request from the student for an extension to the leave must be submitted in writing to the Dean no later than the day in which the original leave will expire. When an LOA is granted to a student with incomplete grades, the Promotions Committee determines whether or not to extend the time allowed for completing course requirements.

Students on an LOA will not be charged tuition. Baylor College of Medicine student health insurance may be continued during an LOA for up to 12 months. Release from the group policy during an LOA may be obtained by signing the appropriate forms in the Graduate School Office. (Request for Leave-of-Absence and LOA Clearance Form). Payment for health insurance, if continued during the LOA, must be arranged by the student prior to the start of the leave. An authorized LOA, for a period of up to one year, may be granted to graduate students who have completed their dissertation research, have accepted another position, and plan to complete the writing of their dissertation during the leave.

Students on an approved LOA who go into year eight during the leave period will automatically have an extension of the 7-year rule through the end of their approved leave. Students on an

approved LOA which begins after the defense will be granted an automatic extension of the 7-year rule to accommodate the 2-month period provided for revising their thesis. A student returning to BCM for the purpose of dissertation defense, may petition the Dean for return to active status for the period required to defend the dissertation. Registration as a full-time student is not required during this period.

Foreign students may be prohibited by selective regulations of the U.S. Immigration and Naturalization Service from going on leaves of absence.

### **8.3 Remote Student Status** (Revised 04/15/98, 01/16/04, 08/03/09, 08/02/10, 08/01/16, 08/16/19)

Eligible students who wish to leave BCM with their Major Advisor and also continue their studies as a full-time BCM graduate student may do so by becoming a remote student. Before a student can be placed into remote status, they must be admitted to candidacy. A remote student's Major Advisor remains the chair of the student's Committee and must attend each meeting of the Thesis Advisory Committee and the thesis defense. The Major Advisor must also guarantee that the student will continue to receive a stipend and health insurance benefits, and must have a BCM faculty appointment (e.g. adjunct faculty). A local BCM advisor must also be appointed to serve as a local contact. The local BCM advisor must also be a member of the student's TAC. Approval to become a Remote Student must be obtained prior to departure and prior to receiving a stipend from the remote institution. Students on remote status without permission may be subject to dismissal.

Remote students are responsible for all requirements expected of other BCM graduate students (i.e. status reports, registration, symposium abstracts, etc.). Remote students and their Remote Advisors are required to meet with their Thesis Advisory Committee every six months. If traveling to BCM twice a year presents financial or logistical problems and if approved by the Program Director, remote faculty advisor, and local faculty advisor at the time of the remote status, a student may be permitted to hold one of the biannual status report meetings by communicating with TAC members over the telephone, or via video conferencing, and the Status Report Signature page can be sent electronically to the Committee members for their signatures. The Remote Advisor must be physically present at the student's dissertation defense. The required travel to BCM for the student and the Remote Advisor for at least one Thesis Advisory Committee meeting per year and for the final dissertation defense is the financial responsibility of the Remote Advisor.

### **8.4 Remote Advisor** (New 06/14/07, Revised 08/02/10, 08/01/11, 08/01/16)

If a student's advisor leaves the College permanently or is on a LOA or sabbatical that is likely to be of duration of greater than a year, the advisor will become a Remote Advisor and a local BCM advisor will be appointed. The Remote Advisor will be the student's Major Advisor. Remote Advisor status requires the submission of a Remote Advisor Status form which includes a plan that satisfactorily addresses the continued progress of the student toward their degree. Remote Advisor Status requires approval of the student, the advisor, the Thesis Advisory Committee, the Graduate Program and the Dean. Students cannot have a Remote Advisor until they have been admitted to candidacy and have been enrolled in the Graduate School for at least three years.

The plan accompanying the request for Remote Advisor Status must include the following: (1) the appointment of a local BCM advisor who will have the responsibility of monitoring the student's progress and facilitate communication with the Remote Advisor, the Thesis Advisory Committee and the Graduate Program. The BCM advisor will have co-mentor status with the Remote Advisor and serves as a member of the TAC; (2) an approximate time-line for the

student's completion of thesis research and their defense which is acceptable to the student's Graduate Program; (3) a mechanism for local supervision of the student's research, including a description of the role of the local advisor and other BCM personnel that will be available to the student on a regular basis; (4) a description of assigned laboratory space and the student's access to equipment, materials and supplies that will be sufficient to complete the dissertation research; (5) a guarantee that the student's stipend, insurance and research expenses will be paid for the duration of their enrollment. The source of the stipend, including any mechanisms for transferring remote funds to BCM to pay for the stipend must be described. Ultimately, the Graduate Program will be responsible for ensuring that financial support continues; (6) a description of how status reports and Thesis Advisory Committee meetings will be held. The Remote Advisor must be physically present at BCM for at least one of the status report meetings each year.

### **8.5 Childbirth/Adoption Accommodation** (New 06/15/06, Revised 08/01/11, 07/29/13, 01/29/15, 08/01/16)

A graduate student is entitled to a maximum of eight (8) weeks stipend and benefits continuation from the current financial provider following the birth or adoption of his or her child. Students will not be placed on LOA during childbirth/adoption accommodation.

A graduate student who seeks a childbirth/adoption accommodation must submit a completed Childbirth/Adoption Accommodation form to the Graduate Program Director prior to the start of the leave. Baylor College of Medicine strongly encourages graduate students to submit requests approximately three (3) months prior to the anticipated childbirth or adoption. Requests approved by the Program Director are submitted for approval to the Dean. In most cases, the childbirth/adoption accommodation period will begin on the date specified in the childbirth/adoption accommodation form which is filed with and approved by the Graduate School Office but may be amended as necessary to correspond with the actual birth/adoption date. If childbirth/adoption occurs prior to the filing of the childbirth/adoption accommodation form, the accommodation period begins on the date of childbirth or adoption.

In order to be eligible for childbirth/adoption accommodation, the graduate student is required to provide the appropriate documentation to the Graduate Program Director. If the graduate student fails to provide the appropriate documentation within fourteen days of delivery or adoption, the stipend and benefits may be discontinued until the documentation is submitted.

The general policies of the school will remain in effect during the period of childbirth/adoption accommodation. During the childbirth/adoption accommodation period, the student may be assigned some reasonable reading, writing, data analysis or other activities that may be accomplished without being present at BCM. The student is expected to make prior arrangements to submit work needed for the completion of any requirements missed during the accommodation period (e. g. status reports or course requirements) when the graduate student returns to the College. If the accommodation requires the student to miss classes or exams, the student may make arrangements to complete these requirements after returning or the student may withdraw from the course.

[Accommodations for Breastfeeding Mothers](#) as defined by BCM policy (Section 02.2.50) are available to students.

### **8.6 Pursuit of Other Degrees While Enrolled in the GSBS** (New 08/02/10)

Students in the Graduate School of Biomedical Sciences are expected to devote their academic efforts entirely to the PhD/M.S. Programs. The GSBS does not enroll students on a part-time

basis. BCM students may pursue multiple degrees while enrolled as a BCM student only if they are part of an official joint/dual degree Program of BCM (i.e. MD/PhD or School of Medicine Research Track/M.S.). Enrollment at another institution (such as the UT School of Public Health) that may be required as part of a BCM degree Program is permitted as are the completion of courses at other institutions for BCM credit that are covered by a reciprocal agreement for education (i.e. Rice, University of Houston, The University of Texas-Houston, Texas A&M, and UTMB-Galveston).

## **ARTICLE 9. PROGRESS TOWARD THE DEGREE**

### **9.1 Oversight** (Revised 06/16/08)

Students must continue to make satisfactory progress toward their degree. The student should set goals toward completing their studies with the assistance of the TAC and the Director of Graduate Studies their Program. Before appointment of the student's TAC, the Director of Graduate Studies of the student's Program is responsible for advising and mentoring the student. After the appointment of the TAC, the student is under the direction of a faculty preceptor supported by the student's TAC. Through the status report meetings, the TAC regularly reports the student's progress to the Director of Graduate Studies who conveys the status reports to the Promotions Committee of the Graduate School.

### **9.2 The Major Advisor & TAC**

#### **9.2.1 Appointment of Major Advisor and Advisor/Student Compact** (also see 1.6.3) (New 04/22/03, Revised 06/16/08, 08/16/19)

The Major Advisor is the Chair of the student's TAC. In the case of co-advisors, the senior faculty member is the chair, unless one of the co-advisors is designated as the major advisor. The Major Advisor is responsible for providing mentorship and direction in helping the student develop research skills and the ability to do independent research. The Major Advisor must be selected by the student and the selection must be agreed to by the Major Advisor and the Graduate Program by the beginning of the student's second year. The Major Advisor must be present at all meetings of the TAC.

Upon appointment of the Major Advisor the Student and Major Advisor should review and sign the Compact between Students and their Major advisors and return a signed copy to the Graduate School.

#### **9.2.2 Appointment of Thesis Advisory Committee** (Revised 04/22/03, 08/23/04, 11/08/07, 06/16/08, 08/16/19)

Each student will be provided with advice from a faculty group charged with oversight of the student's academic, technical and professional development. Before appointment of a TAC, the Program's Graduate Education Committee shall perform this role. The student's TAC must be appointed by the end of the third term of the student's second year in residence, but it may be appointed earlier and students are strongly encouraged to meet with their TAC as soon as practical after the Committee is appointed. TAC members agree to provide the student with oral and written feedback on their progress two times each year at the TAC meetings and to fulfill their commitment to attend these meetings. The TAC mediates academic disputes between student and major advisor in issues that relate to the scope and content of the doctoral

thesis, time in program and conditions for graduation. If the TAC cannot resolve a dispute, it should refer the dispute to the graduate program leadership by the Reporting or other member of the TAC.

This Committee shall consist of a minimum of five members: the Chair of the Committee (the student's Major Advisor, who must be a member of the Graduate Faculty with an appointment in any Program offering a graduate degree), one Reporting Member, two additional faculty members of the student's Program who must be eligible to train students, and at least one external faculty member. The requirement for a Reporting Member applies to students matriculating in 2019 and thereafter.

The Reporting Member is an experienced faculty member of the graduate program who is responsible for monitoring student progress and reporting back to the Graduate Program. The external committee member must hold an academic appointment in a medical or academic institution in the greater metropolitan Houston area that is in a department different from the primary academic appointment(s) of the Major Advisor(s) and should not be a member of the student's graduate program. The Graduate Program Director or their designee is an *ex officio* member of the Committee.

Additional members can be appointed to the TAC at any time. There is no upper limit to the membership of the TAC, and additional members do not need to be members of the Graduate Faculty, so long as a majority of the TAC members is eligible to train graduate students in their respective programs and institutions. The student and/or their Major Advisor(s) may invite guests to participate in TAC meetings in a non-voting capacity, but the Reporting Member may ask them to leave a TAC meeting for discussion pertaining to academic progress to degree or dispute between student and Major advisor.

Members of the laboratory of the Major Advisor(s) are not eligible to serve on the student's TAC. Spouses or domestic partners of the Major Advisor are not eligible to serve on the student's TAC. This restriction applies to all TAC appointments, beginning in 2019.

The Committee shall be appointed by the Dean upon written request from the Graduate Program Director. The student and Major Advisor suggest the two program faculty and the external faculty member, and select the Reporting Member from a pre-approved group of Reporting Members designated by the PEC. The PEC can modify the composition of the TAC when necessary. Requests to change the composition of the TAC are made in writing by the Graduate Program Director to the Dean.

The TAC shall be responsible for choosing any additional course work that the student must complete, for monitoring progress made, for requesting transfer of credit, and for petitioning, with the approval of the Graduate Program Director, to the Dean for exception to any academic regulations.

The TAC may also participate in mediating potential disputes which may arise between the student and the Major Advisor. It shall review requests for dismissal of the student submitted by the advisor and approve or oppose such requests. In these cases, a temporary Chair will be appointed by the Program Director from the TAC members. The Committee's decisions shall be reported in writing by the temporary

Chair to the Program Director who shall inform the Dean regarding substantive changes in the student's progress or status.

The Thesis Advisory Committee administers the final oral examination component of the thesis defense and approves (by signing) the final copies of the student's dissertation. All members of the TAC must be present at the thesis defense. In the case of unforeseen extenuating circumstances, the student, Major Advisor, and Graduate Program Director may petition the Dean for an exception.

### **9.3 Appeal of TAC Decisions** (Revised 06/16/08)

A student or a Committee member, who disagrees with a TAC decision, may appeal in writing to the Dean.

### **9.4 Status Reports** (Revised 08/01/97, 06/21/02, 04/22/03, 03/31/04, 06/14/07, 06/16/08, 01/16/13)

Graduate students, second year and above, are responsible for meeting with their TAC and submitting a status report at least twice a year. The purpose of these meetings is to ensure that students receive feedback and direction on their thesis research and to promote a timely assessment of progress toward their degree and to help plan future work.

#### **9.4.1 Due Dates** (Revised 06/16/08, 1/16/13)

Status reports for second year students are due in the Graduate School by 5:00 p.m. on the last business day preceding December 24 (Year 2 Fall Status Report) and the last business day in June (Year 2 Spring Status Report). For students third year and above, status reports are due by 5:00 p.m. on the last business day in the month of their birth and the 6-month anniversary of their birth month. For the purpose of these status reports, the month of July will count towards the Fall reporting period (e.g. a 2<sup>nd</sup> year student with a July/January birthday should use the form 'Status Report – Year 3 Fall-Year 4 Fall). There are no extensions of these deadlines, but the TAC meeting may be held at any time between the deadlines. It is the responsibility of the student to schedule and hold the TAC meeting so that they are completed before the deadlines. Since scheduling difficulties may be encountered, the student should begin arranging the meeting significantly in advance of the deadlines. Committee members are expected to respond to the student's request for a meeting in a timely fashion and to be as accommodating as possible in helping the student arrange the Committee meeting. Unanticipated emergencies and other significant extenuating circumstances may be considered by the Dean on a case-by-case basis.

#### **9.4.2 Status Report Contents** (Revised 06/16/08, 08/16/19)

The Status Report Form, which must be submitted after the completion of the status report meeting, includes a summary of the meeting prepared by the Major Advisor, an evaluation of the student's progress, and a completed signature page, as well as the student's written summary, and updated publication and award information.

At least five days prior to the Thesis Advisory Committee meeting, the student will submit to all members of the Committee a succinct written summary of their accomplishments since the last Committee meeting, including significant experimental findings, results and/or difficulties with an experimental approach, and the status of any publications. The status report should also include a brief description of plans for experiments in the coming six months. For meetings held during the spring of the student's fourth year and thereafter, a timeline (Section 9.4.2.1) must be submitted with the status report and reviewed by the TAC. The Graduate School strongly recommends

that the status report and the TAC meeting follow the guidelines published by the Graduate School (available from the Graduate School web site).

#### **9.4.2.1 Status Report Timeline** (New 06/16/08)

The TAC should help ensure that the student is continuing to make timely progress toward the degree. By the spring meeting of the fourth year of enrollment, the student, major advisor and TAC members must evaluate the student's progress and future plans for completion of the PhD. Before the meeting, the student, in consultation with the major advisor, should prepare a timeline that lists graduation requirements and estimated dates of completion, if possible (i.e. June 20XX, summer 20XX, or too early to predict). The timeline, which must be included with the Status Report Form, is intended to represent the best estimates at the time it is written. The timeline should be revised and updated in each subsequent status report meeting. The timeline should follow the format guidelines established by the Graduate School (available from the Graduate School web site).

#### **9.4.3 The Status Report Meeting** (Revised 06/16/08, 08/16/19, 11/25/19)

Status report meetings (except under the special circumstances described in Section 9.4.7) must include the Major Advisor, Reporting Member and at least two other members of the Thesis Advisory Committee. A Committee member (including the major advisor) may be present through teleconferencing or video conferencing arrangements. Substitution of an alternate Reporting Member is possible with approval of the PEC and/or Program Director. Students should not be pressured to bring food or beverages to TAC meetings; therefore the practice is discouraged, but not prohibited.

#### **9.4.4 Status Report Signature Page** (Revised 06/16/08)

Before the meeting ends, the Chair and Committee members will read any notes that might have been taken during the Committee meeting and together they will come to a consensus on the content of the summary statement. Any Committee member who disagrees with the summary and evaluation may append a statement to the status report indicating the basis for their disagreement.

The signatures of the major advisor, all Committee members and the student on the status report form denotes their presence or absence at the meeting and indicates their agreement with the evaluation and summary statement. If one or more Committee members write a dissenting statement, the signatures on the status report form signify that the Committee members and the student have read the dissenting opinion.

If a student disagrees with comments in the summary statement or a Committee member's addendum, he/she may submit a written rebuttal to the status report describing the disagreement. The rebuttal must be submitted within one month of the date of the Thesis Advisory Committee meeting with a copy of the disputed status report. The rebuttal statement must be signed by the Major Advisor, all members of the Thesis Advisory Committee and Program Director in acknowledgment that they have seen it and discussed it with the student. Signatures of the Thesis Advisory Committee, including the Chair, do not indicate that they agree with the student's objections. The signed statement should be submitted to the Graduate School for inclusion in the student's file.

**9.4.5 Permission to Write** (Revised 06/10/08, 08/03/09, 08/02/10, 08/01/16, 08/16/19)

By granting Permission To Write, the student's Thesis Advisory Committee acknowledges that all key experiments have been completed, and a thesis outline describing a sufficient body of work to merit a PhD if the dissertation and defense are satisfactorily completed, was presented and reviewed.

To be eligible to request 'Permission to Write' status, students who matriculate in 2019 or thereafter, must have at least one 1<sup>st</sup> or co-1<sup>st</sup> author manuscript accepted for publication in a peer-reviewed research journal on the topic of their thesis research. A co-1<sup>st</sup> author publication is one in which multiple first/lead authors with equal contributions are designated. Exceptions to this requirement may be approved by the PEC, taking into account the recommendation of the thesis advisory committee. In addition, the student, in consultation with the major advisor, must present a detailed outline of the thesis to the Committee at least two weeks before the meeting. The outline should present sufficient detail to judge the completeness of the experimental work with a clear indication of which portions of the experimental work are finished and which remain to be completed.

The Committee expects that the student will complete all requirements and defend the thesis before the next status report deadline, and a timeline for completion of the written thesis and the oral defense should be set at the time permission to write is granted. Permission to Write is not automatically renewed, and if a subsequent status report meeting is held, permission to write must be requested again.

A quorum of the Thesis Advisory Committee (Major Advisor, Reporting Member and two members) is required to hold a meeting to request Permission To Write. Committee members unable to attend the meeting must review the proposed thesis outline and requirements to complete proposed experiments, and if they concur with the Committee to award Permission To Write, sign the status report form in the appropriate section. A single dissent, even from a member not in attendance at the TAC meeting, is sufficient to prevent awarding Permission To Write.

Once Permission To Write is granted, the primary responsibility of the student is to write and defend their dissertation. The student may continue to perform experiments in the lab if they and their major advisor agree, but the student is not obligated to do so.

A student must be making good academic progress, including the completion of the required training in the responsible conduct of research (16 hours) when granted permission to write. The ethics requirement can be met by attending the required topics in the Science as a Profession course, the Postdoc Career Development Course, or for Clinical Scientist Training Program students, completion of the Fundamental of Clinical Investigation course. Ethics training requirements cannot be transferred from other institutions. This requirement will go into effect for students entering in academic year 2010-2011. For students entering prior to academic year 2010-2011, the completion of ethics training is required for admission to candidacy so that this requirement does not apply to permission to write status. "Permission to write" status does not relieve the student from any academic requirements including submission of status reports, attendance at seminars, retreats, and other activities required by the Program or the Graduate School.

**9.4.6 Late Penalties** (Revised 06/16/08, 01/16/13, 07/20/13, 07/29/13)

The status report meeting is an integral part of a student's progress toward their degree. If a report is not submitted by the deadlines specified for year 2, or year 3 and above students (Section 9.4.1) and the student has had no prior late penalties assessed at previous deadlines, the student will be assessed a \$25 fine. If the completed status report is not submitted within 15 calendar days of the original deadline, an additional \$50 fine will be assessed and if still delinquent after 30 calendar days from the original deadline, the student will receive a grade of F for Dissertation or Special Projects. The Thesis Advisory Committee will be notified of delinquent status reports.

On the second instance of status report delinquency, the initial fine will be \$50 and if still delinquent, 15 calendar days after the original deadline, the student will receive a grade of F for Dissertation or Special Projects. On the third instance of status report delinquency, the student will receive a grade of F for Dissertation or Special Projects immediately after the original deadline.

A grade of F in Dissertation or Special Projects may be sufficient to cause a recommendation for dismissal from the Graduate School by the Promotions Committee (Section 6.8). The student may appeal the grade of F, any fines, and/or their dismissal through the appeals process of the Promotions Committee (Section 6.10).

**9.4.7 Special Circumstances** (Revised 08/02/10, 08/01/11, 01/16/2013, 08/16/19)

Students who are standing for their final dissertation examination (defense, or examination of a terminal M.S. thesis) no later than three months after their given status report deadlines (Section 9.4.1) may submit the "Defense of Dissertation Date" or "Application for a Terminal M.S." form to the Graduate School office in lieu of the status report if it is received in the Graduate School before the status report deadline. If the defense of the PhD dissertation or examination of the terminal M.S. thesis is not conducted on the scheduled date, a status report becomes due within 2 weeks.

In cases of illness or other unexpected circumstances beyond the student's control that prevent the attendance of the student, major advisor, or a quorum of the committee (two members, student and major advisor), the Dean or designee may grant an extension of the status report deadline and waive any penalties.

Remote students (Section 8.3) or students with Remote Advisors (Section 8.4) will be allowed to have one status report meeting conducted by teleconference without returning to BCM if this is approved by the student's Graduate Program. However, the status report and the Status Report Signature page must be completed and submitted on time. At least one Thesis Advisory Committee meeting a year must be held with the student present at BCM along with a majority of the Thesis Advisory Committee present (section 9.4.3), including the local advisor. The Remote Advisor must at least be present by phone or teleconference.

**9.5 The Seven Year Rule** (previously part of 8.1)**9.5.1 Monitoring student progress at the beginning of Year 6** (Revised 08/03/09, 07/20/13, 08/01/16)

The purpose of PhD training is for the student to develop the ability to function as an independent researcher. This includes maintaining steady progress toward completing the degree and the development of critical research skills and knowledge. This responsibility is shared among the student, his or her Major Advisor, the TAC and the

Graduate Program. Once a student has entered their sixth year of study (including time on LOA), unless they have already received permission to write, the student's Program Executive Committee will appoint an *ex-officio* member to the student's Thesis Advisory Committee from the Program steering Committee or another designated member of their graduate faculty. The student or any member of the Thesis Advisory Committee may, at any time, request that the Graduate Program appoint an *ex-officio* member. The Promotions Committee, at their discretion, may place an *ex officio* member representing the Promotions Committee on the student's TAC to monitor the student's progress toward the degree.

The *ex-officio* member must be present at the Thesis Advisory Committee meetings beginning at the Fall status report of year six and continuing until the student sets a defense date. The role of the Program's *ex-officio* member is to monitor the student's progress and to ensure that progress toward degree, including alternative strategies, has been discussed at the Committee meeting and that an appropriate time-line for graduation is presented. The Program's *ex-officio* member may not vote in any decisions of the Committee. After the meeting, a written evaluation (*ex-officio* check list) will be completed by the *ex-officio* member and submitted to the Program Director for review. The Program Director should discuss the report with the student and their major advisor and submit a copy of the *ex-officio* report to the Graduate School. The function of the *ex officio* member is to report to the Promotions Committee and the *ex officio* member may not vote in any Committee decisions. For students with an appointed *ex-officio member*, a status report that is not accompanied with a report from the *ex-officio* member will not be accepted by the Graduate School.

#### **9.5.2 Extension of the Seven Year Rule** (Revised 08/03/09, 07/29/13, 08/01/16)

No more the 7 years may elapse between matriculation into the Graduate School, excluding leaves-of-absence, and completion of all degree requirements for the PhD degree. At the Spring TAC meeting preceding the beginning of the student's 8<sup>th</sup> year, the TAC and Graduate Program must request an extension of the 7-year rule by completing and signing the Seven Year Rule extension section of the Status Report Form, including the summary of the circumstances leading to the request. The extension of the seven-year rule must be requested by the TAC at each subsequent Thesis Advisory Committee meeting. If a student has defended prior to the beginning of their 8<sup>th</sup> year, a waiver of the 7-year rule will be granted automatically to accommodate the two-month period for revision between the defense and the submission of the final thesis. After review of the recommendations from the student's Program Director and the Program's *ex-officio* Committee member, the Promotions Committee will make a recommendation to the Dean concerning request to waive the 7-year requirement.

#### **9.6 Credit Requirements** (Revised 08/03/09)

The PhD requires satisfactory completion of 180 term hours. A minimum of 60 term hours of course work is required (includes Special Projects, Research Rotation, Seminar and Readings and other courses). Thirty term hours of this requirement must be from courses which either:

- 1) have a letter grade assignment ("letter graded" courses) and be graded A-F by objective criteria, or
- 2) are designated by the Curriculum Committee as "approved Pass/Fail" graded courses (excluding seminars and journal clubs).

Any course counting toward the 30-hour requirement must be approved by the Curriculum Committee. Special Topics courses (course number xxx-463) cannot be applied to the 30-hour requirement.

At least 24 of the required 30 term hours must come from courses assigning a letter grade; 6 term hours may come from the approved Pass/Fail category. For courses grades on a PASS/FAIL basis that are offered for graduate credit at another institution or by the School of Medicine, more than 6 term hours of Pass/Fail courses can be used toward the 30 term hour requirement if the courses are required by a BCM Graduate Program and after review and approval by the Curriculum Committee on a case-by-case basis.

“Letter-graded courses” must be graded A, B, C or F and grades must be assigned by objective criteria, i.e. by examination. Approved Pass/Fail courses must also use specific grading criteria. While such criteria may not include written exams *per se*, each approved Pass-Fail course must utilize appropriate assessment tools, consistent with the educational goals of the course: (i.e. a paper, an oral presentation, homework problem solving, etc.).

The remaining 120 term hours may consist of any courses approved by the Curriculum Committee and listed by a Program in the catalogue, including dissertation research. Specific required courses might differ among the various Programs as long as they conform to the above requirements.

Specific required courses might differ among the various Programs as long as they conform to the above requirements. At the beginning of the academic year, each Program will inform the Graduate School as to their specific course requirements, including any tracks or groups of flexible required electives and these requirements will be posted on the Program’s web site. The Graduate School must be notified prior to any changes to course requirements. Students must repeat any required course when they receive a grade of C or F; however, the Program may determine if elective courses, including flexible requirements, must be repeated.

### **9.7 Transfer of Credit** (Revised 04/22/03, 06/14/05, 08/03/09, 06/18/15, 8/27/15, 08/16/19)

A student may request transfer of graduate level course work completed (with grades of B or above, satisfactory or Pass) at another university, provided that the courses were taken within 5 years of the date of matriculation at BCM, and a grade of A or B was earned. Only those courses in which a grade is assigned as the result of an examination (not seminar, special projects, or research) will be considered by the Promotions Committee for transfer. Courses shown on the transcript for a previously conferred degree are not eligible for transfer as a routine matter. Students may petition their graduate program to waive specific course requirements based on prior completed graduate level coursework.

A maximum of 60 term hours (30 semester hours) may be submitted for transfer. Of the 30 hours required for Admission to Candidacy, individual Programs may set different limits on the number of hours that may be transferred, but no more than 24 hours of transfer credit will be allowed.

Course work completed at a university outside the USA will be considered on a case by case basis.

BCM School of Medicine courses that are preapproved for transfer credit by the Promotions Committee will be automatically allowed as transfer credit upon completion of a transfer of credit form. Other School of Medicine courses will be considered by the Promotions Committee on a case-by-case basis.

The specific courses transferred will not be listed on the graduate school transcript, only total credit hours transferred. Programs may accept previous course work to satisfy Program requirements without requesting transfer of credit from the Promotions Committee.

BCM School of Medicine courses that are offered for Pass/Fail credit can be considered for transfer of credit if they have been reviewed and approved by the Curriculum Committee. Courses that are approved for transfer credit can be used toward the 30 hour of required course work if the course is evaluated by specific grading criteria.

Additionally, the Graduate School complies with the BCM [Acceptance of Transfer Credit Policy](#) (Section 23.1.05) that provides criteria for evaluating, awarding, and accepting transfer credit by examination, advanced standing and professional certificates.

## **9.8 The Qualifying Examination** (Revised 11/13/96, 06/16/08, 08/16/19)

The purpose of the qualifying exam is to determine whether the student has sufficient general and discipline-specific knowledge, oral and written communication skills, and intellectual ability to successfully carry out independent, scholarly research that will satisfy the requirements for awarding of the PhD or M.S. degree. The qualifying exam is administered by the individual Graduate Programs, following GSBS-wide guidelines. In general, the exam tests the ability of the student to formulate a significant scientific hypothesis, to identify, develop and articulate an original approach to experimentally test the hypothesis and interpret the possible results, and to discuss the proposed project with respect to the relevant body of knowledge.

All candidates for the PhD degree must take the Qualifying Examination by the end of their 2<sup>nd</sup> year of enrollment. The student must pass all pre-requisite activities defined by their Program before taking the Qualifying Examination with no more than three unresolved non-passing didactic credits. Any exception must be approved by the Dean. Passing the Qualifying Exam is a requirement for Admission to Candidacy.

Each Program's PEC selects up to 3 individuals to serve as Qualifying Exam Chairs. The Qualifying Exam Chairs jointly share the responsibility of chairing all qualifying exams in a given year. The Qualifying Exam Chairs shall recommend the examination date, and select the members of the Examining Committee that shall consist of a Qualifying Exam Chair, two members of the TAC and two members of the program's faculty. If the TAC has not been appointed prior to the examination, the QE Chairs shall select two program members with expertise in the field of the proposal in place of TAC members. All members of the Qualifying Exam Committee are voting members. The student's Major Advisor must attend the examination, but serves solely as a silent observer. It is the responsibility of the student to submit the completed Statement of Qualifying Examination Date Form to the GSBS for approval prior to the date of the exam. Once the examination date has been set, if any member of the Examination Committee finds he/she cannot be present at the examination, he/she must inform the Dean in writing prior to the start of the exam.

Transfer students must take the Qualifying Examination at BCM and all exceptions must be approved by the Promotions Committee.

### **9.8.1 Results of the Examination** (Revised 08/29/97, 02/05/00, 11/08/07, 07/29/13, 08/21/14)

In the event of Programs using both a written and oral Qualifying Examination, all phases of the examination process must be complete before indicating a result on the "Result of Qualifying Examination Form." Passage, incomplete, or Failure of the

Qualifying Examination is certified by the Examining Committee, the Program Director, and endorsed by the Dean (Result of Qualifying Examination Form). There are three possible outcomes of a Qualifying Examination – **Pass, Incomplete, or Fail**.

A **Pass** is awarded to students who successfully complete the examination.

An **Incomplete** is used when the Examining Committee determines that the student's performance is inadequate and that additional requirements must be completed to remedy the deficiency. The additional requirements must be specified by the Examining Committee on the Result of Qualifying Examination Form, including a date by which the additional requirements must be completed (the Program Director and the Dean must sign the Result of Qualifying Examination Form). After the requirements stipulated by the Examining Committee have been satisfied, the Examining Committee and Program Director will notify the Dean using the Result of Qualifying Examination Form and the student's academic record will be updated from incomplete to Pass. If the requirements to remediate an incomplete are not completed satisfactorily, the Examining Committee and Program Director will notify the Dean using the Result of Qualifying Examination Form and the student's academic record will be updated from Incomplete to Fail on the date the Program submits written verification of the resolution of the incomplete.

A **Fail** is awarded if the student's performance on the Qualifying Examination is unsatisfactory, either at the initial examination or when an incomplete is resolved with a grade of Fail. Failure of the Qualifying Examination is reported to the Promotions Committee and the student will be placed on Academic Probation. A student who Fails their initial Qualifying Examination may be recommended for dismissal to the Dean by the Promotions Committee. A second Qualifying Examination may be taken only if recommended by the student's Program. Students remain on Academic Probation until successfully completing a second qualifying exam.

The second examination must be taken within six months of the initial examination date. In the event of a second Failure, the student will be recommended for dismissal by the Promotions Committee. To appeal this recommendation of dismissal, see Article 6.10.

### **9.9 Admission to Candidacy for the Degree** (Revised 06/23/99, 01/25/02, 06/14/05, 08/02/10, 08/16/19)

A student is accepted into candidacy only after successful completion of the Qualification Exam and Passing the Program required curriculum, including the completion of 60 term hours of which 30 term hours must be in courses that meet the credit requirements as described in section 9.6, and completion of the first two years of the ethics requirement. The ethics requirement can be met by completing Responsible Conduct of Research Year 1 and Year 2, or for CSTP students through the Fundamentals of Clinical Investigation course. To provide alternative instruction that will meet this requirement, Programs offering their own ethics training must provide at least 8 contact hours, cover all of the NIH-proscribed topics, and provide at least 30% of the instruction in small group case discussions. Ethics training requirements cannot be transferred from other institutions. This requirement will go into effect for students entering in academic year 2010-2011. For student entering prior to academic year 2010-2011, admission to candidacy requires completion of the seven required topics presented in the Science as a Profession course prior to 2010.

The TAC must be appointed prior to admission to candidacy. Admission to candidacy must be approved nine months (36 weeks) prior to the date of dissertation defense. A student with

transfer credit must have spent at least four academic terms in residency before admission to candidacy. He/she must present 48 term hours of course work completed in residence. Admission to candidacy requires approval of the Graduate Program Director and the Dean (Admission to Candidacy Form). Students who are not admitted to candidacy by the end of their second year will be reviewed for potential academic action by the Promotions Committee and Dean. Any exception to the two-year rule must be approved by the Program Director and the Dean.

### **9.10 Other Examinations**

Programs reserve the right to examine students upon admission or during their studies to determine their qualifications for graduate work. Such examinations shall not be the Qualifying Examination for admission to PhD candidacy, but purely a Program procedure. Based on its evaluation of these exams, the Program may recommend to the Promotions Committee that the student be placed on probation or dismissed from the Program.

### **9.11 Candidates for the Master of Science Degree** (Revised 08/30/01, 06/16/08, 01/29/2015, 06/18/15)

The Graduate School considers applications for master's degree admission for the Clinical Scientist Training Program (CSTP) and medical students participating in the School of Medicine Research Track (MSRT). A PhD candidate student may request permission to terminate graduate study by completing the requirements for a Master's degree. Eligibility for the terminal Master's degree may be considered when a student is not able to complete the requirements for a PhD degree.

The MS requires satisfactory completion of 84 term credit hours and all Program curriculum requirements. Thirty (30) term hours of this requirement must be from courses which either: 1) have a letter grade assignment ("letter graded" courses) and be graded A-F by objective criteria, or 2) are designated by the Curriculum Committee as "approved Pass/Fail" graded courses (excluding seminars and journal clubs). Any course that counts toward the 30-hour requirement must be approved by the Curriculum Committee as didactic credit. Special Topics courses (course number xxx-463) cannot be applied to the 30-hour requirement.

At least 24 of the required 30 term hours must come from courses assigning a letter grade; 6 term hours may come from the approved Pass/Fail category. More than 6 term hours of courses graded on a P/F basis that are offered for graduate credit at another institution or by the School of Medicine can be used toward the 30 term hour requirement if the courses are required by a BCM Graduate Program and are reviewed and approved by the Curriculum Committee on a case-by-case basis.

"Letter-graded courses" must be graded A, B, C or F and grades must be assigned by objective criteria, i.e. by examination. Approved Pass/Fail courses must also use specific grading criteria. While such criteria may not include written exams, each approved Pass-Fail course must utilize appropriate assessment tools, consistent with the educational goals of the course: (i.e. a paper, an oral presentation, homework, problem solving, etc.).

The remaining 54 term hours may consist of any course approved by the Curriculum Committee and listed by a Program in the catalogue, including dissertation research.

#### **9.11.1 Qualifications for the Terminal Master of Science Degree** (New 08/30/01, Revised 08/03/09, 08/01/11, 01/29/2015, 06/18/15, 08/01/16, 07/30/18)

To be eligible to apply for a terminal master's degree, a student must have completed the 30 credit hour coursework requirement and all department curriculum

requirements and appointment of TAC. The applicant's Program must submit to the Dean a request to apply for the M.S. degree (Application for a Terminal M.S. Form). The request should confirm that the applicant meets the requirements, outline any additional requirements placed on the applicant by the Program (i.e. a formal defense and/or public seminar may be required) and indicate a date by which the completed thesis must be submitted to the Graduate School. A student granted permission for a terminal M.S. degree and who is enrolled as a student must fulfill all requirements for attendance at seminars or other Program activities (see section 9.4.7 regarding requirements for Status Reports). The request must be signed by the applicant, the applicant's major advisor, all members of the TAC, and the Program Director.

If the request is approved, the applicant shall prepare a thesis based on original work completed to date which must be submitted to the TAC no less than one week prior to the thesis examination. The thesis will be evaluated by the student's TAC in a closed session oral examination. Successful defense of the thesis shall be indicated by the signatures of the entire Committee on the Defense of MS Thesis Result form. The preparation of the thesis should be guided by the policies found in sections 10.2 and 10.2.1. If the Committee notes deficiencies, all corrections must be made prior to Committee acceptance and signature.

Once accepted and signed by the Committee, the Director of Graduate Studies shall sign the thesis. An original, signed copy of the thesis and three additional copies must be presented to the Graduate School for acceptance, binding, and archiving as part of the degree requirements. At the time the Dean accepts and signs the thesis, the student shall have completed all academic obligations for the degree and be making good academic progress. After the Dean signs the thesis, the student will be eligible to have the degree conferred. If awarded a terminal M.S. degree, a student cannot be admitted to any Graduate Program at BCM without successfully re-applying to graduate school.

**9.11.2 Qualifications for the Master of Science Degree in CSTP** (New 08/30/01, Revised 08/23/04, 01/29/2015, 06/18/15)

The Clinical Scientist Training Program accepts students who seek the Master of Science degree. A student is accepted into candidacy after completing the Program required curriculum including 60 term hours of which 30 must be in courses that meet the credit requirements as described in section 9.5. Upon satisfactory completion of the research project approved by the TAC, the thesis is prepared and defended before the Final Examination Committee. The preparation of the thesis should be guided by the policies found in sections 10.2 and 10.2.1. Upon approval of the thesis by the Final Examination Committee, the thesis is signed by the Committee members and the Director of the CSTP Program and presented to the Dean for signature. At the time the Dean accepts and signs the thesis, the student shall have completed all academic obligations for the degree and will be eligible to have the degree conferred. An original, signed copy of the thesis and three additional copies must be presented to the Graduate School for acceptance, binding, and archiving as part of the degree requirements.

**9.11.3 Pursuit of an M.S. Degree by Medical Students Participating in the School of Medicine Research Track** (New 06/16/08, Revised 01/29/15, 08/16/19)

Medical students participating in the School of Medicine Research Track (MSRT) may enroll in a degree Program leading to the M.S. degree. The student, at any time

during their first year of research as part of the MSRT Program may make application to a Graduate Program for the M.S. Degree. Accepted students will matriculate into the Graduate School during their leave from School of Medicine. MSRT students may be on leave from School of Medicine for no more than two years. Requirements for the M.S. degree include 30 term hours of graduate course work, with no more than 24 hours transferred from School of Medicine courses, the appointment of a major advisor and Thesis Advisory Committee. Students matriculated in the MSRT-M.S. Program must submit status reports during their time of enrollment as a graduate student. Completion of the MSRT-M.S. requires a seminar and the submission of an M.S. thesis. All requirements for the MSRT-M.S. degree must be completed prior to the student's graduation from School of Medicine. The preparation of the thesis should be guided by the policies found in sections 10.2 and 10.2.1. After its defense and any needed corrections are made, the thesis must be signed by the members of the Thesis Advisory Committee and Program Director and submitted to the Dean for final approval. At the time the Dean accepts and signs the thesis, the student shall have completed all academic obligations for the degree and will be eligible to have the degree conferred. If awarded an MS degree through this Program, a student cannot be admitted to any Graduate Program at BCM without successfully re-applying to graduate school.

### **9.12 Publication Policy for Students and Postdocs** (New 08/01/11)

Communication of research results to the scientific community is an integral part of research activity and is especially important for trainees (students and postdoctorals). Major advisors are expected to give students and postdocs, even those that are no longer in the laboratory, the opportunity to satisfy all the criteria for authorship as specified in the BCM Authorship Policy when they have contributed work to a manuscript. The [Policy on Authorship](#) (Section 02.9.40) states in part:

“An author is one who has met all of the three criteria a) made a substantial contribution to the conception and design of the project, acquisition of data, the analysis and interpretation of the data, or other substantial scholarly effort; b) participated in drafting and/or revising the Publication critically for important intellectual content; and c) approved the final version to be submitted”

## **ARTICLE 10. GRADUATION**

### **10.1 Dissertation Examining Committee** (Revised 11/11/99, 08/01/16)

The Examining Committee is appointed by the Major Advisor, in consultation with the Program Director and is approved by the Dean. The Examining Committee shall be composed of the student's TAC, and any additional ex-officio members deemed appropriate by the Major Advisor and Program Director. A student must be making good academic progress to schedule the defense dissertation.

### **10.2 The Dissertation** (Revised 08/30/01)

The PhD dissertation represents an authoritative contribution to scientific knowledge and demonstrates that the student has the intellectual and technical ability to conduct an independent and scholarly research project. The PhD dissertation is an academic document submitted by the student to the Graduate School following the defense and approval of the entirety of the document by the Dissertation Committee. The Committee members shall indicate their

approval of the dissertation by signing on the Approval Page. No signatures may be affixed until all changes are completed as requested by the Committee members. Unanimous approval of the dissertation is required. The dissertation shall consist of original scientific research carried out by the student. Collaborations or participation by others and the conduct of the work shall be clearly defined. The dissertation shall reach conclusions that are a logical result of the experiments performed. Sufficient experimental details shall be included to allow the work to be reproduced by an individual skilled in the methodology, from the information provided. The dissertation can include information already published by the student, but this fact must be acknowledged by appropriate references, and the text and data presentations must be reformatted to conform to the dissertation style. Any experimental results obtained by others and included in the original publication must either be expunged from the dissertation or attributed by name in footnotes or text citations to the original experimenter. The form of the dissertation shall follow a standard format as outlined below.

### 10.2.1 Format and Organization of the Dissertation (Revised 08/30/01)

Detailed instructions for completing the dissertation, its defense, submission to the Graduate School, and text format are available from the Graduate School Office in a document entitled, "Instructions for Submitting a Thesis or Dissertation." In those instances when published work is to be incorporated in the dissertation suitable adjustments in style shall be made to bring all sections of the document into a uniform presentation style, including bibliographic citations.

| Section Name            | Order | Section Name              | Order |
|-------------------------|-------|---------------------------|-------|
| Title Page*             | 1     | Introduction & Background | 8     |
| Approval Signature Page | 2     | Methods & Materials       | 9     |
| Acknowledgments         | 3     | Results                   | 10    |
| Abstract                | 4     | Discussion                | 11    |
| Table of Contents       | 5     | Summary & Significance    | 12    |
| List of Figures         | 6     | Bibliography              | 13    |
| List of Tables          | 7     | Appendices                | 14    |

\* For the PhD dissertation, the Title Page shall bear the exact title of the dissertation, followed by the statement: "A Dissertation submitted to the Faculty of The Graduate School of Biomedical Sciences of BCM in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy by *name of student*. Houston, Texas, *Month, Year*." For the M.S. thesis, the Title Page shall bear the exact title of the thesis, followed by the statement: "A Thesis submitted to the Faculty of The Graduate School of Biomedical Sciences of BCM in Partial Fulfillment of the Requirements for the Degree of Master of Science by *name of student*. Houston, Texas, *Month, Year*."

The Introduction and Background (Section 8) shall constitute a literature review which sets the stage for the research and its rationale.

The order of sections 9, 10 and 11 may be repeated or combined to facilitate production of the dissertation's chapters from the student's scientific publications. It is usual to choose to combine all methods sections together, but at the student's and Committee's discretion sections may be kept apart for clarity. Similarly, results and discussion can

appear together in discrete chapters separated by content or specific aims. These sections must, however, be reformatted to conform to the dissertation style.

Individual chapters may contain their own discussion sections. However, at the end of the dissertation the Summary and Significance section should re-capitulate the salient findings and conclusions of the work and place these observations in the context of current studies in that field. The student is encouraged to use this section to speculate on the work's significance, and/or to recommend future avenues of fruitful experimentation.

The dissertation is an academic document submitted by the student to the Graduate School

## **10.2.2 Defense of the Dissertation**

### **10.2.2.1 Scheduling the Defense of Dissertation** (Revised 11/11/99, 08/16/19)

Within 3 months of receiving Permission to Write, the student should identify their dissertation defense date. All members of the Examining Committee are expected to be in attendance at the dissertation seminar and defense, and scheduling done sufficiently in advance so that all Committee members can be present. Committee members should acknowledge their acceptance of the examination date by signing and dating the form. When necessary, a Committee member can attend the defense by video conferencing with the permission of the Dean. Once the date of the examination has been set, members can be excused from attendance only under extraordinary circumstances. Permission to be absent from a dissertation defense examination must be requested by the Committee member and acknowledged by the Dean prior to the examination date.

### **10.2.2.2 Defense of Dissertation** (Revised 11/11/99, 08/02/10, 08/16/19)

The students must submit the dissertation to the Examining Committee no less than two weeks prior to the defense. The dissertation should be complete and near to its final form. A public dissertation seminar must be presented before the final defense. In addition, the Examining Committee will meet with the student in either closed or open session (at the discretion of the student's Graduate Program) for the final dissertation examination. Successful defense of the dissertation shall be indicated by the signatures of the entire Committee and the approval of the Dean (Result of Defense of Dissertation form).

If unexpected circumstances prevent the occurrence of the defense, it should be rescheduled as soon as possible. Any status reports that were waived because of the schedule defense become due.

If there are any significant deficiencies of the thesis (other than typographical errors) that must be corrected before final approval, these should be indicated directly on the results form or on attached pages. A single dissenting vote is sufficient grounds for Failing the dissertation defense. Failure of the dissertation defense can be appealed to the Promotions Committee by the student or the student's Major Advisor. The Promotions Committee may recommend to the Dean to uphold the Failure, award the PhD, appoint a new Committee and examination, or recommend

another examination of the student by the same Committee. The defense of dissertation should be satisfactorily completed at least one month before the intended date of graduation.

**10.2.3 Submission of Completed Dissertation with Revisions** (Revised 1/02/06, 08/03/09, 08/01/16)

No later than two months after successful defense of the dissertation and at least one month prior to the annually scheduled graduation ceremony, the amended dissertation must be typed in final form, signed by all members of the Examining Committee and Department Chair, approved by the Dean, and submitted for binding. Any extension of the two month deadline for submission of the final dissertation must be requested by the student prior to the deadline and approved by the Dean. The Graduate School cannot verify completion of the degree until all requirements, including submission and approval of the dissertation are completed. It is the student's responsibility to submit the original and three copies of the dissertation, completely ready for binding, to the Graduate School office in order to complete degree requirements. Students on an approved LOA (after the defense) which is longer than 2-months, shall have an extension of the 2-month dissertation rule through the end of the approved leave. At the time the Dean accepts and signs the dissertation, the student must be making good academic progress, will have completed all academic obligations for the degree and will be eligible to have the degree conferred. The official date of graduation will be the day the dissertation was signed by the Dean.

**10.3 Financial Clearance**

During the 4th year of enrollment, student must pay a graduation fee that covers the diploma and academic regalia rental. Other fees payable prior to graduation are binding fees and optional microfilm agreements, copyright, and reprint fees. The student must be certified to be free of debts and obligations to the school before the degree can be conferred. This is accomplished by obtaining a Graduation Clearance Form requiring validating signatures from the various departments and divisions of the Medical Center with whom the student could have done business. All signatures must be obtained. Failure to do so will prevent release of any official documents. A student in financial obligation to the school should quickly move to dispose of the debt.

**10.4 Commencement** (Revised 07/01/16, 08/01/16)

Instructions for the annually scheduled graduation ceremony originate from the Office of Student Affairs. The graduating student is responsible for meeting these requirements.

**ARTICLE 11. BCM SEXUAL HARASSMENT AND SEXUAL VIOLENCE** (New 04/24/03, Revised 01/16/04, 04/08/2015, 08/27/2015, 08/01/16, 07/30/18)

BCM Title IX of the Education Amendments of 1972, 20 U.S.C. §1681, prohibits discrimination based on sex in all Programs or activities that receive Federal financial assistance. Title IX also prohibits sexual harassment, including same-gender harassment and student-to-student harassment. BCM does not discriminate based on sex and will not tolerate discrimination which includes sexual harassment, sexual violence, dating violence, domestic violence and stalking. Incidents of sexual harassment, sexual violence, dating violence, domestic violence and stalking are taken seriously. Reports will be promptly investigated and appropriate actions will be taken to remedy the effects of the harassment or violence and prevent the reoccurrence.

A student who experiences sexual harassment, sexual violence, dating violence, domestic violence and/or stalking may contact the BCM Title IX Coordinator for assistance.

Interim Title IX Coordinator  
Mikiba W. Morehead  
Office of Student Services  
BCM  
One Baylor Plaza-Main Campus  
Cullen Building, 415A  
[Mikiba.morehead@bcm.edu](mailto:Mikiba.morehead@bcm.edu) (713)798-8137.

A student may also report to the BCM Security Office via the campus emergency line at 8811 or the non-emergency campus extension of 8-8300. The BCM Security Office can assist students with filing a report with local law enforcement and in the case of any emergency encourages you to call the police at 911. BCM complies with the Family Educational Rights and Privacy Act (FERPA), and to the extent possible will protect the privacy of all persons involved in the report of sexual harassment, sexual violence, dating violence, domestic violence and/or stalking.

Baylor College of Medicine has designated certain College leaders as [Responsible Employees](#) based on either their administrative title (Director Level and above) or responsibilities by serving in a major education role. Responsible Employees have a duty to promptly report incidents of sex based discrimination, and Prohibited Conduct directly to the Title IX Coordinator. Additionally, Responsible Employees are not confidential reporting resources.

BCM does not tolerate acts of retaliation. Individuals responsible for retaliation against any person who provides information, or participates in an investigation or the adjudication of a report will be met with disciplinary action up to and including removal from the BCM community. See BCM [Whistleblower](#) policy (Section 02.10.10).

BCM provides prevention programs and education to faculty, staff and students in an effort to dispel the myths, address the effects, and reduce the occurrence of sexual harassment, sexual violence, dating violence, domestic violence and stalking. More information on BCM's efforts, options for reporting and available support services can be found by visiting the [Office of Student Services](#) webpage.

## **ARTICLE 12. STUDENT SERVICES** (New 07/30/18)

### **12.1 Wellness Intervention Team**

The Baylor College of Medicine (BCM) Wellness Intervention Team (WIT) effectuates a coordinated institutional response to a health or wellness crisis causing student distress, when the student is referred by the Dean or Designee. WIT does not provide emergency services or immediate, direct intervention with students purported to be in distress, but primarily coordinates an acute care assessment of the health and safety of students and links them with necessary resources to promote mental, emotional, psychological, or physical wellness and well-being. The School Dean or Designee will activate the WIT to initiate one of these primary functions, as appropriate: Acute Care & Crisis Management, Access to Academic & Non-Academic Support Resources, or Processing of Long-Term Leave of Absence (LOA) Requests & Returns from LOA. Students referred to WIT may register dissent or concern regarding the WIT process by filing a Grievance, as described in the [Student Appeals and Grievances Policy](#) (Section 23.1.08). For further details about the WIT purpose and process, contact the GSBS Dean or [studentservices@bcm.edu](mailto:studentservices@bcm.edu).

**NOTICE OF NON-DISCRIMINATORY POLICY**

BCM and the Graduate School of Biomedical Sciences admits students of any race, gender, ethnic or national origin, sexual orientation, disability, economic status or age to all the rights, privileges, Programs, and activities generally accorded or made available to students at the school. It does not discriminate on the basis of race, gender, ethnic or national origin, sexual orientation, disability, economic status or age in administration of its educational policies, admissions policies, scholarship and loan Programs, and other school-administered Programs.

**Appendix A: New Student-Related Policies Published by Baylor College of Medicine, August 17, 2019 to Present**

| New or Revised? | #     | Policy Title/Link      | Stakeholders Affected                       | Purpose   | Pub Date |
|-----------------|-------|------------------------|---|---|----------|
| Revised         | 9.4.3 | The Status Report Link | Students, Thesis Advisory Committee members | Student provision of food or beverages at TAC meetings is voluntary | 11.25.19 |

# GSBS Course Descriptions

**Interpreting Course Numbers:** The first digit indicates if the course is counts toward the 30-credit hour requirements for all PhD students. Courses starting with 5 are non-didactic and do not count toward the 30-credit requirement. Courses starting with 6 are didactic and do count toward the 30-credit requirement. The second digit indicates the number of credits in the course. (A zero denotes a course which has a variable number of credits depending on student scheduling needs.) The last two digits are an internal identifier of the course.

## Core Service Curriculum (GS-GS)

### GS-GS-5010

**MSTP Reading** MSTP Reading provides MSTP students early in their combined physician-scientist training with in-depth exposure to critical reading of the current biomedical literature in order to improve their ability to identify and design research strategies for solving current biomedical problems.

Credits: 1.5

Term: 1, 2, 3, 4, 5

Director: Dr. Sharon Plon

### GS-GS-5101

#### **Responsible Conduct of Research –**

**Year 1** Sessions will involve students in discussion during lectures, as well as in small groups where case studies will be reviewed. Students will be mentored on this scientific process (accessing the scientific literature, thinking with the scientific method). Issues surrounding rigor, reproducibility, research material and its ownership will be presented, as will responsible authorship, plagiarism and copyright. Classes will also be devoted to the practical aspects of being a student scientist such as what to look for in laboratory rotations, selecting mentors, coping with stress and deadlines, what to do when experiments don't work, and how to go about career decision-making as well as professional aspects of being a scientist such as funding and advocacy.

Term: 1

Director: Dr. Carolyn Smith

### GS-GS-5102

#### **Responsible Conduct of Research –**

**Year 2** Sessions will involve students in discussion during three lectures, as well as in one small group session where case studies will be reviewed. Students will be mentored on research misconduct, focusing on topics such as falsification, fabrication, and plagiarism. College and federal policies and procedures for handling misconduct allegations will be reviewed. A session with 2nd year students and their mentors will review expectations between mentor and student. Students will receive training on the ethics of biomedical studies with animals, covering topics such as when can animals be used ethically in research, the importance of avoiding unnecessary pain/suffering and euthanasia and animal use approval. The final session, which will be held in a small group discussion format with faculty facilitators, will focus on case studies involving scientific misconduct and experiments with animals.

Term: 2

Director: Dr. Carolyn Smith

### GS-GS-5103

#### **Responsible Conduct of Research –**

**Year 3** Sessions will involve students in discussion during four lectures, as well as in one small group session where case studies will be reviewed. Topics covered during this module include authorship and peer review conflicts of interest and their management, and collaboration within academia and with industry. The mentorship lecture will be a meeting with 3rd year students and their mentors. The final large group session will be focused on rigor and reproducibility using interactive case studies, reviewing principles introduced in year 1. Finally, the session conducted in a small group discussion format with faculty facilitator will utilize case studies to highlight issues relevant to the review of grants and papers, conflicts of interest, and collaboration.

Term: 3

Director: Dr. Carolyn Smith

### GS-GS-5104

#### **Responsible Conduct of Research –**

**Year 4** Sessions will involve students in discussion during three lectures, as well as in one small group session where case studies will be reviewed. Topics covered during the lecture on research with human subjects will include defining what constitutes research with human subjects versus experiments with human material, confidentiality of medical data, and informed consent. The mentorship session on will be a meeting with 4th year students and their mentors. The lecture on the scientist as a responsible member of society will address contemporary ethical issues in biomedical research and the environmental and societal impacts of scientific research. Finally, the session conducted in a small group discussion format with faculty facilitator will utilize case studies to highlight issues relevant to research with human subjects and societal impact of research, focused on genetics/genomics, stem cells and neuroethics.

Term: 3

Director: Dr. Carolyn Smith

### GS-GS-5105

**Scientific Writing** This course will increase student knowledge and skills in effective scientific writing. Students will learn basic principles of scientific writing that they can put into practice immediately such as selecting high impact words, building effective sentences and paragraphs, and structuring individual sections of a scientific manuscript. The course, which centers on the concept of writing with clarity and brevity, includes exercises to build skills.

Term: 3

Director: Dr. Susan Marriott

### GS-GS-5106

**Intellectual Property** So you now have a great discovery or idea, how can you protect and market it? In this course we will learn about intellectual property law and technology transfer. We will cover different types of intellectual property, such as patents, trademarks, copyrights, etc., with an emphasis on genetic and biotechnology patents, both in the USA and internationally. We will also discuss copyrights: their nature, acquisition, and how to avoid infringing them, with an emphasis in instructional activity and educational settings.

Term: 4

Director: Dr. Patrick Turley

### GS-GS-5107

**Leadership Skills** The objective of the course is to provide students with knowledge regarding the importance of leadership skills in their training and future career development. While leadership skills are essential components in career development, it is appreciated that leadership skills can't be taught and imparted upon students in a short didactic lecture-based setting. Therefore, the objective of this course is to introduce students to the basic concepts of leadership skills.

Term: 3

Director: Dr. Suzanne Fuqua

### GS-GS-5108

#### **Pharmacoepidemiology and**

**Pharmacogenetics** The purpose of this course is to outline strategies to avoid serious systemic toxicities from chemotherapy and radiotherapy. This course will review the principles of pharmacogenetics and pharmacogenomics, pharmacodynamics and pharmacokinetics, and will outline the impact of genetic polymorphisms in drug metabolism and other pathways on the toxicity of anticancer agents and other therapies. The emphasis is on research concepts and applications and the interdisciplinary nature of the field.

Term: 3 (even year course)

Director: Dr. Michael Scheurer and Dr. Melanie Bernhardt

### GS-GS-5111

#### **Strategies for Success in Graduate**

**School** This course will prepare incoming students to become scientific and professional leaders by developing skills for a successful graduate career early in their training. The objectives are to understand the expectations of a professional lab environment; take ownership over your training and graduate career, identify your scientific and personal working style and motivations, discuss how to evaluate potential mentors and thesis labs, learn how to successfully

manage the mentor-mentee relationship, discuss scientific and personal support services at BCM, and develop networking skills.

Term: 1

Director: Dr. Melanie Samuel and Dr. Roy Sillitoe

#### GS-GS-5112

**Powerful Presentations** The goal of this course is to develop and scientific communication skills to effectively convey your ideas to both experts and nonexperts. Effective presentation is the basis for career advancement at all levels in science. In this class, you will hone these skills through understanding how to develop and deliver longer format talks. Topics we will cover include the fundamentals of effective talk design, how to construct potent slides, how deliver information effectively, and in class presentations. For feedback and presentations, each student will be matched with a faculty mentor in groups of eight to ten students.

Term: 2

Director: Dr. Melanie Samuel

#### GS-GS-5113

**Effective Project Design and Management** The goal of this course is to develop skills in designing and executing your thesis research. The course will discuss the scope of a thesis and what it means to make an original scientific contribution. Students will also be exposed to and practice using effective tools and approaches for managing and developing their thesis projects.

Topics covered will include: how to design your own project, the challenges and opportunities of hypothesis driven and hypothesis independent research, and how to turn projects into papers through project management and time management.

Term: 4

Director: Dr. Buck Samuel and Dr. Swathi Arur

#### GS-GS-6101

**Neuroscience** This is an introductory course covering fundamental aspects of modern neuroscience. The lecture series begins with a discussion of neural development, evolution and the resulting organization of the mammalian nervous system, then progresses into the molecular and structural specializations that allow neurons to process and transmit information via electrical current. The course next explores how neurons contribute to autonomic functions that keep us alive and higher brain functions such as learning and memory. The course will close on an examination of how neural dysfunction leads to common neurological disorders such as developmental pathophysiology, autism, and Alzheimer's disease.

Term: 3

Director: Dr. Russell Ray

#### GS-GS-6102

**Principles of Immunology** In the field of biology, the immune system is unique in that it crosses all organ boundaries and affects a vast number of processes critical for organismal function and survival. This short course introduces the basic cellular and molecular mechanisms of immunity. These include: the innate immune system (molecular "danger" patterns); the acquired immune system (B and T cell receptor gene rearrangement and their effector functions); the cross-talk between innate and acquired immunity; an overview of the principles of immune tolerance exemplified by mechanisms of transplant rejection and cancer immunity; and a discussion of autoimmune diseases & immunotherapies.

Term: 4

Director: Dr. Jonathan Levitt

#### GS-GS-6201

**Cell Division and Cancer** This course examines the fundamental concepts in cell cycle regulation, DNA, telomeres and chromatin duplication, chromosome segregation as well as cytokinesis. The course presents principals of cellular response to DNA damage, telomere dysfunction, perturbation in DNA replication and chromosome segregation. The molecular mechanisms of various DNA repair pathways including recombination and their regulation in cell cycle is discussed. The relevance of cell cycle in growth regulation, development and cancer is presented.

Term: 3

Director: Dr. Grzegorz Ira and Dr. Eric Chang

#### GS-GS-6202

**Gene Regulation** This course covers the mechanisms of regulated gene expression with a focus on eukaryotes beginning at the gene and chromatin, processing of pre-RNA and mRNA through protein turnover.

Term: 3

Director: Dr. Thomas Cooper

#### GS-GS-6203

**Data Mining** Data mining provides practical approaches and tools that allow biomedical researchers to analyze and understand their data and to craft new hypotheses. The course focuses on data mining essentials and will cover standard approaches to clustering, classification, regression and model selection, along with several domain-oriented techniques such as gene enrichment analysis. We focus on applications of these methods through a visual programming platform that requires no training in programming. We provide a basic introduction to the inner workings and mathematics, helping students to intuitively understand the data analysis algorithms without having to understand deep mathematical concepts.

Term: 1

Director: Dr. Gad Shaulsky

#### GS-GS-6204

**Ethics, Conduct and Practical Aspects of Clinical Research** This course is designed to provide students practical insight into the bioethical conduct, practical aspects, including types and categories of clinical trials and the different phases of translational research, as well as regulatory considerations of clinical and translational research. The course encompasses a series of interactive didactic lectures, homework assignments, and observation of an IRB meeting. The purpose of the course is to provide a broad understanding of bioethical issues within the context of clinical research, as well as an understanding of the complex relationship between investigators, their designees, and research subjects.

Term: 5

Director: Dr. Melissa Suter

#### GS-GS-6205

**Fundamentals of Epidemiology** This course introduces the basic principles and methods of epidemiology, with an emphasis on critical thinking, analytic skills, and application to clinical practice and research. Topics include outcome measures, methods of adjustment, surveillance, quantitative study designs, and sources of data. The course is designed for professionals intending to engage in, collaborate in, or interpret the results of epidemiological research as a substantial component of their career.

Term: 3

Director: Dr. Michael Scheurer

#### GS-GS-6400

**Foundations B: Biostatistics** This course will introduce biostatistical principles and technology most likely to be useful to laboratory scientists interested in basic and translational research. Topics include ANOVA, linear regression, contingency table analysis, logistic regression, survival analysis, and nonparametric statistics. The course also introduces basic experimental design principles and designs for clinical trials. The R software environment will be introduced and used for statistical analysis of real-life problem sets.

Terms: 1+2

Director: Dr. Susan Hilsenbeck & Dr. Charles Minard

#### GS-GS-6600

**Foundations A: Molecules to Systems** This course provides students with foundational and comprehensive knowledge in several critical areas of biology. Lectures are divided into nine modules that cover essential aspects of biology. Lectures will begin with a description of macromolecules, and then incrementally expand into more complex mechanisms, and finally into the presentation of systems. The diversified format includes a series of lectures, discussion sessions, and TA sessions in which "active learning" techniques and "backwards design" are implemented to promote both knowledge and skill development for learners.

Terms: 1+2

Director: Dr. Richard Sifers

# Cancer & Cell Biology (GS-CC)

## GS-CC-5000

**Special Topics** Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.

Credits: Variable  
Term: 1, 2, 3, 4, 5

## GS-CC-5010

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable  
Term: 1, 2, 3, 4, 5

## GS-CC-5030

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable  
Term: 1, 2, 3, 4

## GS-CC-5040

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable  
Term: 1, 2, 3, 4, 5

## GS-CC-5050

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable  
Term: 1, 2, 3, 4, 5

## GS-CC-5100

**Student Research Seminar** The objective of the course is for students within the Graduate Program to have an opportunity to present their ongoing research to a diverse group of colleagues, and to receive feedback from these colleagues on the quality of their presentation and research.

Term: 1, 2, 3, 4  
Director: Dr. Joel Neilson

## GS-CC-5201

**NRSA Grand Writing & Project Development 1**

Term: 1  
Director: Dr. Frederick Pereira and Dr. Stephanie Pangas

## GS-CC-5202

**NRSA Grant Writing & Development 2**

Term: 2  
Director: Dr. Frederick Pereira and Dr. Stephanie Pangas

## GS-CC-6101

**Cancer** This is a short course on the biology of cancer. The course objective is to introduce students

to basic mechanisms that lead to tumor initiation, progression, and metastasis. A history of oncogenes and tumor suppressor genes and their modern definitions are presented. Current concepts of cancer stem cells, tumor microenvironment, mouse models, and cancer therapeutics are discussed. Class includes lecture and group discussion of key recent papers in which students are expected to participate.

Term: 3  
Director: Dr. Stephanie Pangas

## GS-CC-6102

**Biology of Aging 1** This course will familiarize students with the biology of aging, including mechanisms, models, clinical aspects, and the development of novel treatments, and the concepts of gerontology and geroscience

Term: 2  
Director: Dr. Andre Catic and Dr. Weiwei Dang

## GS-CC-6201

**Translational Cancer Biology** This course integrates the basic science and translational aspects of research with clinical applications, thus enhancing student understanding of current research and clinical correlations in particular cancers. Each week will have a particular cancer focus and the meeting time will include a clinically focused lecture, a basic science focused lecture, and a journal club article presented by students. Students will attend a minimum of two tumor board sessions during the term, which include a patient case presentation followed by discussion detailing the background, treatment, outcomes, and research avenues of the patient's malignancy. These tumor boards can be attended at any time during the course.

Term: 2  
Director: Dr. Jason Yustein

## GS-CC-6202

**Explorative Data Analysis** Explorative Data Analysis will teach concepts of statistical learning and of data integration in database systems that together will enable students to explore and learn from large and complex datasets to generate new and unique biological insights. The approach to teaching will emphasize methods of statistical learning and their conceptual underpinnings rather than their mathematical properties, and will use a hands-on approach to progressive 'omics'-data integration and mining by using community-based resources for data analysis rather than on writing codes

Term: 3  
Director: Dr. Rainer Lanz

## GS-CC-6203

**Integrated Microscopy** The course is composed of a set of lectures that cover basic and advanced forms of light and electron microscopy, and an accompanying set of practical labs where students receive hands-on training on all the available instruments. The main topics addressed in the class are: basic optics, light- and fluorescence-based microscopy (i.e., brightfield, DIC, phase contrast, deconvolution, confocal, live cell imaging),

fluorescence-based molecular tools (i.e., FRET, FRAP, fluorescent proteins), transmission electron microscopy, super-resolution microscopy (i.e., SIM, STORM), and specialized automated high throughput microscopy and image analysis.

Term: 3  
Director: Dr. Michael Mancini and Dr. Fabio Stossi

## GS-CC-6204

**Regulation of Energy Homeostasis**

Regulation of Energy Homeostasis addresses the control of metabolism in health and disease, and how energy balance is signaled among organs. Emphasis will be placed on defining regulatory mechanisms and pathways, with particular attention to abnormalities occurring with disease. The approach will be interdisciplinary, including metabolic, biochemical, genetic and cellular aspects.

Term: 4  
Director: Dr. Robb Moses and Dr. David Moore

## GS-CC-6205

**Translational Breast Cancer Research**

This course provides an introduction into current issues in translational breast cancer research. The course encompasses a series of lectures on problems in clinical breast cancer diagnosis and treatment, breast development, and evolution of breast cancer, and approaches to translational breast cancer research. The purpose of the course is to provide a broad understanding of clinical issues and problems in breast cancer, familiarize students with breast cancer from the clinician's standpoint, and with research areas of active development in the field.

Term: 2  
Director: Dr. Suzanne A. W. Fuqua

## GS-CC-6206

**Cell Death in Development and Disease**

This course will discuss the most updated molecular mechanisms of different forms of cell deaths (apoptosis, necrosis, and autophagy) identified in invertebrate model organisms and in mammals, and the functions and regulation of cell death in human diseases. It will also cover the history, methods, and logic of cell death studies in model organisms.

Term: 2  
Directors: Dr. Zheng Zhou, Dr. Lisa Bouchier-Hayes

## GS-CC-6207

**Ethics & Regulatory Preparation for**

**Research with Animal Models** This course will use lecture-discussion format as well as providing several hands-on sessions to instruct trainees on the regulatory and oversight requirements, guidelines for developing and reporting results, and several sampling and delivery procedures when performing research involving animal models.

Term: 2  
Director: Dr. Frederick Pereira

## GS-CC-6208

**Cellular Signaling** Cellular signaling covers major cellular signaling pathways, actions of intracellular kinases and nuclear receptors, and

strategies for regulating cell signaling. The pathways covered include those regulated by GPCR, receptor tyrosine kinases, TGF $\beta$ , Notch, Hedgehog, WNT, Hippo and nuclear receptors. In addition, signaling pathways regulated by small molecules including calcium, phospholipids, cAMP, cGMP, and AMP are discussed.

Term: 3

Director: Dr. Brian York and Dr. Nancy Weigel

#### GS-CC-6209

**The Clock-Cancer Connection** This course will cover the fundamental principles of the mammalian circadian clock, the mechanism driving chronic circadian disruption, and the role of circadian homeostasis in cancer prevention and treatment.

Lecture topics will cover the historical background of the connections between circadian disruption and cancer, the importance of this topic, recent progress and unsolved problems, and the future promise in prevention and treatment.

Term 4

Director: Dr. Loning Fu and Dr. Zhang Sun

#### GS-CC-6301

**Biology of Aging 2** This course provides students and post-docs with the up-to-date information and current understanding of the aging process and age-related human disorders. The course covers molecular aspects of aging research, models and theories of aging, and clinical perspectives of aging processes. This advanced graduate elective course is offered for trainees who will specialize in or have a strong background in the interrelated areas of development, aging and age-related diseases. Students comment that participation in discussions of each topic is a highlight of the course.

Term: 4

Director: Dr. Frederick Pereira

#### GS-CC-6302

**Molecular Carcinogenesis** The course explores the fundamental concepts and experiments in tumor biology, cancer virology and oncogenes and growth control. This course provides a broad based introduction to students who have an interest in

modern cancer research. Faculty from four departments (Cell Biology, Molecular Virology, Pharmacology and Biochemistry) serve as instructors.

Term: 4

Director: Dr. Yi Li

#### GS-CC-6303

**Reproductive Biology** Reproductive Biology covers mammalian reproductive processes at all levels of biological organization (anatomical, physiological, cellular, biochemical and molecular). The course is taught with a comparative approach analyzing findings in different animal model systems and clinical studies to ensure that clinical issues affecting reproductive success are presented, and to also demonstrate how basic science is moving toward understanding the causes and treating reproductive failure and diseases.

Term: 4

Director: Dr. JoAnne Richards and Dr. Stephanie Pangas

## Chemical, Physical, & Structural Biology (GS-CP)

#### GS-CP-5000

**Special Topics** Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-CP-5010

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-CP-5030

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable

Term: 1, 2, 3, 4

#### GS-CP-5040

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-CP-5050

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-CP-5100

**Student Research Seminar** The Graduate Student Seminar Series gives students the opportunity to present their research formally to an audience of their peers. Students in years 2 through 5 will give different presentations designed to prepare them for different kinds of scientific speaking.

Term: 1, 2, 3, 4

Director: Dr. B.V. Venkatar Prasad

#### GS-CP-5101

**Thinking Like A Scientist 1** This is the first in a series of 4 courses that aim to help first year graduate students develop the critical thinking, speaking and writing skills that are necessary for their professional success in graduate school and beyond.

In this term, students set short-term professional goals around courses and laboratory rotations and gain strategies to improve their skills in technical writing and critical evaluation of the literature. Learning is achieved through group-based problem solving.

Term: 1

Director: Dr. Nicolas Young

#### GS-CP-6202

**Thinking Like a Scientist 2** The goal of this term is to develop critical reading skills for evaluating the scientific literature. For a set of assigned papers, student will learn to identify the gap in knowledge and the hypothesis that was tested, and analyze the experimental outcomes in relation to the hypothesis. Students will also develop reasonable future directions in the form of a new set of hypotheses that follow from the results of each paper. Each week one student will present an assigned paper in the style of a journal-club. The other students will write a summary of the same paper, highlighting the logical flow of the paper.

Term: 2

Director: Dr. Timothy Palzkill

#### GS-CP-6203

**Thinking Like a Scientist 3** The goal of this term is to build up on the analytical and presentation skills students develop through critical reading of the literature in Term 2. Students will continue to use the concept of the framing funnel to identify an existing gap in knowledge, and formulate a hypothesis/model that makes specific predictions that can be critically tested experimentally. Each student will write an abstract of a research proposal that will be discussed and revised in response from feedback from students and faculty.

Term: 3

Director: Dr. Zheng Zhou

#### GS-CP-6204

**Thinking Like a Scientist 4** The goal of this term is to build upon the activities of Term 3 that culminated in writing a proposal abstract based on a published paper. Students will do additional literature-based research to add both depth and breadth to each component of the abstract using the concept of the framing funnel, and develop one new specific aim building off of published results. By the end of the course, each student will have written a full research proposal, whose specific aims, outline and early drafts will be presented to the class in written and oral form. They will receive feedback from students and faculty in the process of finalizing the proposal. Each student will also present a final presentation on the full proposal in a format similar to that of the qualifying examination.

Term: 4

Director: Dr. Ming Zhou

**GS-CP-6205**

**Chemical Biology** Chemical Biology is a scientific discipline spanning the fields of chemistry, biology, and physics. It involves the application of chemical techniques, tools, and analyses, and often compounds produced through synthetic chemistry, to the study and manipulation of biological systems. The course teaches topics including an introduction to chemical biology, bio-orthogonal ligand reactions, small molecule inhibitors for protein-protein interactions and epigenetics, chemoproteomics, sensors for living cells, and state-of-the-art imaging techniques. The course content emphasizes applications of chemical tools in solving biological and biomedical problems.

Term: 5

Director: Dr. Jin Wang

**GS-CP-6206****Drug Discovery: From Bench to Bedside**

The objective of this course is to provide an overview of the making of a small-molecule drug. The topics include the identification of a drug target, bioassay development, structural biology, rational drug design and development, intellectual property protection as well as FDA regulations on new drug clinical trials.

Term: 5

Director: Dr. Yongcheng Song

**GS-CP-6207**

**Electron Cryomicroscopy** This course discusses in-depth theoretical and practical techniques in structural biophysics with a particular emphasis on electron imaging and crystallography. The topics include cryo-specimen preparative techniques, electron microscope optics, image contrast theory, specimen radiation damage, single particle image reconstruction, tomographic reconstruction, density based modeling, 3-D visualization, biological knowledge discovery from cryo-electron imaging.

Term: 4

Director: Dr. Zhao Wang

**GS-CP-6301**

**Advanced X-ray Crystallography** X-ray crystallography is a powerful technique to determine atomic resolution structures from small, inorganic molecules to large, multi-subunit macromolecular assemblies. This course covers both theory and practical applications starting with crystallization, crystal systems, and data processing to finding a structure solution, model building, and structure refinement/validation. The course will prepare students with diverse scientific backgrounds to expand their research to protein crystallography as an analytical tool to probe the structure-function relationship of proteins and enzymes at the atomic level.

Term: 4 (even year course)

Director: Dr. Francis T.F. Tsai

**GS-CP-6302**

**Chemical Concepts in Chemical Biology** Chemical biology is a relatively modern and highly interdisciplinary paradigm that centers on using small molecules to probe fundamental and disease-associated biological processes. This course will provide students with a firm foundation in synthetic, medicinal, biological, physical and analytical chemistry concepts for conducting chemical biology research. Upon successful completion of CCCB, the student will have an advanced knowledge of the chemical underpinnings of chemical biology research.

Term: 3

Director: Dr. Damian Young

**GS-CP-6303**

**Macromolecules: Structure and Interactions** This course will provide fundamental information on macromolecular structures, techniques used in structure determination, principles of thermodynamics and kinetics, and how this information can be leveraged to design/develop lead compounds to modulate disease targets for clinical

relevance with the help of novel cell-based screening techniques.

Term: 3

Director: Dr. B.V. Venkatar Prasad and Dr. Ming Zhou

**GS-CP-6401**

**General Pharmacology** Basic pharmacological principles as they apply to basic research and to everyday life. The objectives of this course are to present the basic principles of pharmacology. Principles of pharmacodynamics, pharmacokinetics and major classes of therapeutic agents will be discussed.

Term: 4

Director: Dr. Pui-Kwong Chan &amp; Dr. Timothy Palzkill

**GS-CP-6601**

**Molecular Biophysics: Methods and Principles** This course presents in lecture format a survey of the major techniques of molecular biophysics, and the underlying physical principles and mathematics on which they are based.

Terms: 1+2

Director: Dr. Theodore Wensele

**GS-CP-6602**

**Computational Molecular Biophysics and Structural Biology** This course is designed for students in computationally-oriented theoretical, biophysical, biomedical and bioengineering majors to introduce the principles and methods used for computer simulations and modeling of macromolecules of biological interest. Particular emphasis is also given to the applications of molecular graphics. During the final reading period, each student carries out an original research project that makes use of the techniques and grading is based on the written and oral presentations of the results from the final projects.

Term: 1

Director: Dr. Jianpeng Ma

## Clinical Scientist Training Program (GS-CT)

**GS-CT-5010**

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-CT-5030**

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable

Term: 1, 2, 3, 4

**GS-CT-5040**

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-CT-5050**

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-CT-5100**

**Seminar in Clinical Sciences** The purpose of this course is to provide a forum for students to improve their knowledge and skills in planning, preparing and effectively presenting their research to an inter-disciplinary audience.

Term: 1, 2, 3, 4, 5

Director: Dr. Ashok Balasubramanyam

**GS-CT-5101**

**Responsible Conduct of Research for Clinical Investigators** The RCRCI course is designed for the early career scientist/clinical or translational investigator, and will provide students with a fundamental competency and appreciation for the core topics within the ethical dimensions of

biomedical research. During this one-week course, students will receive lectures from faculty with expertise in each of these core topics, to be followed by small group case study discussions illustrating ethics topics from the preceding lecture.

Term: 1

Director: Dr. Maria Gramatges

**GS-CT-6101**

**Development and Commercialization of Biomedical Innovations** This course provides a general overview of the steps required to move a biomedical innovation into the marketplace. The course begins with an overview of the ecosystem and a framework to assess opportunities for product development and commercialization. Other lectures take the students through the product development process, and provide insights into strategies for funding translational research projects through the "valley of death" gap that exists between basic research funding and commercial funding. Other

topics include an introduction to intellectual property basics, and options for commercialization of biomedical assets, licensing and new ventures.

Term: 4

Director: Dr. Ashok Balasubramanyam

#### GS-CT-6201

**CICS 1: Grant Development for Clinical Investigators** This course provides students with the skills to develop an important research question, formulate strong hypotheses and specific aims, and begin to draft the components of a career development grant proposal.

Terms: 1

Director: Dr. Ashok Balasubramanyam

#### GS-CT-6205

**CICS 5: Evaluating a Completed Career Development Grant** This course provides students with an appreciation of the NIH study section review process and a completed career development award.

Terms: 5

Director: Dr. Frederick Pereira

Prerequisites: GS-CT-6201 and GS-CT-6304

#### GS-CT-6300

##### **Fundamentals of Clinical Investigation**

The objective of this course is to train students to interpret the results of other clinical investigators and to use the knowledge for providing state-of-the-art care for their patients. The course includes three modules reflecting specific areas relevant to a clinical researcher. These modules are: principles of clinical research; statistical methods in clinical research; special topics.

Term: 1

Director: Dr. Farrah Kheradmand

#### GS-CT-6302

##### **CICS 2: Clinical Trials for Clinical Investigators**

This course provides students with an understanding of the theory and practice of conducting scientifically rigorous clinical trials. Building on the work of the previous CICS I course and from knowledge gained from the Fundamentals in Clinical Investigation course, students will fully develop the hypothesis, specific aims, and experimental design of their projects.

Terms: 2

Director: Dr. Farrah Kheradmand

Prerequisites: GS-CT-6201 and GS-CT-6300

#### GS-CT-6303

##### **CICS 3: Translational Research for Clinical Investigators**

This course provides students with an understanding of the theory and practice of conducting bench-to-bedside translational research. Building on the work of the previous term, students will continue the development of a K-type grant proposal, focusing on the career development plan and mentor's letters.

Terms: 3

Director: Dr. Jesus Vallejo

Prerequisites: GS-CT-6201 and GS-CT-6302

#### GS-CT-6304

##### **CICS 4: Health Services Research for Clinical Investigators**

This course provides students with an understanding of the theory and practice of health services research. Building on the work of the previous term, students will continue the development of a K-type grant proposal.

Terms: 4

Director: Dr. Frederick Pereira

Prerequisites: GS-CT-6201 and GS-CT-6303

## Development, Disease Models, & Therapeutics (GS-DD)

#### GS-DD-5000

**Special Topics** Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-DD-5010

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-DD-5030

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable

Term: 1, 2, 3, 4

#### GS-DD-5040

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-DD-5050

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable

Term: 1, 2, 3, 4, 5

#### GS-DD-5101

##### **Effectively Writing & Reviewing Proposals**

This course will explain the requirements and expectations of the qualifying exam. The course is geared specially towards second year students who have successfully completed their first year coursework and several months' work in their chosen thesis lab. The course will cover the format of the written and oral exams, tips for structuring the aims and scope of the written proposal, and provide students with opportunity to develop and deliver their oral presentation for feedback from the group. The goal of the course is to help students begin thinking about their work independently and to present their research problem and experimental goals clearly. Ultimately, this course is intended to encourage independent NRSA or other fellowship applications from those students who qualify.

Term: 2

Directors: Dr. Melanie Samuel, Dr. Benjamin Arenkiel

#### GS-DD-5110

**DDMT Journal Club** This course is required of all first and second year students enrolled in the Development, Disease Models & Therapeutics Graduate Program. The course is conducted as a journal club to study current literature, to practice critical analysis of the literature and to refine presentation techniques. First year students present papers from the current literature, all students join in discussion of the paper presented.

Terms: 3,4,5

Director: Dr. Daniel Gorelick and Dr. Hyun-Kyuong Lee

#### GS-DD-6201

**Development** The Development of a mature organism from a single cell is one of the most fascinating problems in biology. Understanding development can shed light on fundamental processes such as gene regulation and control of the cell cycle, and on translational problems such as the origins and progression of cancer and the possibility of tissue engineering and regeneration to treat human disease. This course is designed as an introduction to some of the concepts of modern developmental biology.

Term: 2

Director: Dr. Andrew Groves

#### GS-DD-6202

**Classical Developmental Biology** This course provides introductory information related to major questions in developmental biology. It also provides an introduction to classical experimental methods and examples are provided which highlight how developmental principles have been tested. These examples will allow the students to grasp how earlier investigations presaged present areas of inquiry for each organism. The course introduces the anatomy and histology of most organs and cells during development with a particular emphasis on *C. elegans*, *Drosophila*, mouse, chick, zebrafish, and *Xenopus*. The development of each organism is described in lectures and observed by the students in lab settings so that students can readily grasp the complex issues of modern developmental biology and begin to see how questions might be approached.

Term: 1

Directors: Dr. Ross Poché and Dr. Michael Lewis

**GS-DD-6203**

**Animal Models of Human Disease** This course is designed to expose students to methodologies employed in generating animal models for human diseases and in analyzing these models. The major emphasis is on mouse models, but other model organisms will be discussed as well.  
Term: 5

Director: Dr. Cindy Buckmaster

**GS-DD-6204**

**Cell Physiology** This course will introduce students to a variety of topics related to cellular physiology while also providing instruction as to how one critically evaluates primary research literature. The topics covered will include Neurophysiology, Metabolism and Physiology, Cancer Physiology, Cardiovascular Physiology, Muscle Physiology and Biophysics/Bioengineering. The lectures will be general overviews of the stated topics so that students of varying academic backgrounds may become familiar with systems they will encounter in subsequent physiology courses. The course will consist of a 1-hour class that meets twice weekly. The first class will consist of a faculty lecture from an expert in each respective field. The second class will be in the format of a journal club Powerpoint presentation and include an open discussion and critical evaluation of literature pertaining to the previous faculty lecture. The presenting faculty member will choose a single paper to accompany their lecture.  
Term: 1

Director: Dr. Ross Poché

**GS-DD-6205**

**Transmembrane Signaling** This highly interactive upper level course is designed for students interested in understanding in-depth the important principles of trans-membrane signaling. In addition to introducing the roles of lipids, ion channels, kinases, and second messengers, selected examples of signal transduction pathways underlying muscle physiology and cell survival will be discussed in detail. One half of the course will be lectured by experts from related fields. Each lecture is paired with a group discussion of a relevant article.  
Term: 4

Director: Dr. Christine Beeton

**GS-DD-6206**

**Pathophysiology and Mechanisms of Human Disease** This course will provide students with an understanding of the basic mechanisms of human disease with a systems biology perspective. Molecular defects at different levels including the gene, RNA, protein, cell, tissue, and organ will be covered. The focus is on helping students develop critical thinking skills that will help them approach complex scientific problems.  
Term: 4

Director: Dr. Daniel Lacorazza

**GS-DD-6207**

**Advanced Topics in Muscle Physiology** This course will focus on skeletal muscle and integrate current information on molecular structure of muscle, its function, signaling pathways controlling its development, growth and response to disease. The course consists of lectures by faculty, presentations by students of assigned papers with student participating and a final exam.

Term: 3

Director: Dr. George Rodney

**GS-DD-6208**

**Evolutionary Conservation of Developmental Mechanisms** This course focuses on the similarities and differences of developmental mechanisms between vertebrates and invertebrates. Invertebrates, such as *Drosophila* and *C. elegans*, have allowed scientists to isolate many genes that are required for proper development through genetic screens. Vertebrate homologs of many of these genes have been identified, and their role is being studied through a variety of approaches, including manipulations in chick and zebrafish as well as through mouse knockouts. The view of vertebrate and invertebrate developmental biologists on a series of topics like segmentation, Hox and Polycomb-group genes, limb development, and cell death is presented in this course. In addition, the lecturers discuss and compare the function of proteins required for specific developmental pathways in invertebrates whose homologs are involved in tumorigenesis in vertebrates. Additional topics include: evolution, evolutionary trees, and the evolution of developmental pathways, as well as how during evolution numerous molecular players are conserved and how they are deployed in various developmental processes in diverse organisms.  
Term: 3

Director: Dr. Andrew Groves

**GS-DD-6209**

**Animal MRI** This course provides an introduction to the theory and application of small animal MRI which is currently not readily available through other courses.  
Term: 3

Director: Dr. Robia Pautler

**GS-DD-6301**

**Cardiovascular Diseases** This course provides a general overview of the main common cardiovascular diseases and their causes. Topics covered include atherosclerosis, hypertension, congenital heart disease, ischemic heart disease, cerebral stroke, cardiac arrhythmias, and the effects of aging on the cardiovascular system. The course will be taught by a combination of clinicians, basic scientists, and physician scientists throughout the Texas Medical Center.  
Term: 3

Director: Dr. Xander Wehrens

**GS-DD-6301**

**Human Physiology 1** This course will provide students with the basic knowledge of organ systems and integrative physiology in humans upon which the pathophysiology of human diseases can later be expanded. Lectures are intended to educate students about the current research being performed in each field and to elicit ideas about future research and human applications. Topics covered in this course, which is the first of two Human Physiology courses, include: cellular physiology, the nervous system, skeletal muscle, the cardiovascular system, and the respiratory system.  
Term: 2

Director: Dr. Frank T. Horrigan and Dr. Ross Poché

**GS-DD-6302**

**Human Physiology 2** This course will provide students with the basic knowledge of organ systems and integrative physiology in humans upon which the pathophysiology of human diseases can later be expanded. Lectures are intended to educate students about the current research being performed in each field and to elicit ideas about future research and human applications. Topics covered in this course, which is the second of two Human Physiology courses include: the immune system, renal physiology, bone, the endocrine system, the reproductive system, the gastrointestinal system and liver.  
Term: 3

Director: Dr. Frank T. Horrigan and Dr. Ross Poché

**GS-DD-6303**

**Neural Development** This advanced graduate course in developmental neurobiology provides students with a more detailed background of neural development that will serve as conceptual framework for future studies. It particularly focuses on molecular genetic studies that have helped us elucidate the mechanisms underlying the development of the nervous system. This course integrates knowledge about molecular patterning of the nervous system using a cross-species approach that also emphasizes evolutionary relationships. The role of genes and mechanisms that play a role in the selection of neuroblasts and neuronal differentiation, in the specification and function of glial cells, in growth cone guidance and synapse formation are covered in detail.  
Term: 4

Directors: Dr. Benjamin Arenkiel and Dr. Roy Sillitoe

**GS-DD-6304**

**Topics in Development** The purpose of this course is to introduce the students to some current topics in developmental biology, to improve the students' ability to read and interpret primary literature, and to improve the students' skills in presenting scientific data. A lecturer introduces a topic and then assigns two papers to two students to present in the next lecture. All students are expected to critically evaluate and interpret the assigned papers prior to attending class, and the selected students prepare a 45 min lecture on the assigned topic. Each student presents twice. Topics discussed include sex determination, epithelial morphogenesis and cancer, hematopoietic and cardiac development, stem cell therapy, skin cancer, nuclear hormone receptors, cell motility and invasive behavior (metastasis), and ectoderm-mesoderm interactions.  
Term: 4

Director: Dr. Daisuke Nakada and Dr. Joshua Wythe

**GS-DD-6401**

**Advanced Topics in Cardiovascular Physiology** Topics covered include cardiac cycle, cardiac contractility, neural, and nonneural control of the circulation, biomedical instrumentation, and physical analytical methods. The various components of the cardiovascular system is integrated to define its basic control functions.  
Term: 4

Director: Dr. Xander Wehrens and Dr. Na Li

**GS-DD-6402****Advanced Topics in Cardiovascular**

**Disease Pathogenesis** This course explores cause and mechanism of cardiovascular disease. Specific topics include mechanistic discussion of atherosclerosis (lipids and lipoproteins, inflammation, oxidatively modified LDL), hypertension

(epidemiology, mechanisms, and consequences), hemostasis (thrombosis and bleeding disorders), cerebral stroke, heart failure (systolic and diastolic dysfunction), cardiac arrhythmias, myocardial ischemia (healing and remodeling, cardiac fibrosis, myocarditis), laterality in heart disease and aging in the cardiovascular system. This course is taught by a

combination of clinicians, basic scientists, and clinician scientists from throughout the Texas Medical Center.

Term: 5

Director: Dr. James Martin and Dr. Jun Wang

## Genetics & Genomics (GS-GG)

**GS-GG-5000**

**Special Topics** Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.

Credits: Variable

Term: 1, 2, 3, 4, 5

Director: Dr. Hamed Jafar-Nejad and Dr. Shinya Yamamoto

**GS-GG-6101**

**Clinical Genetics** The course is aimed at training graduate students in the applied aspects of clinical genetics. Students will learn how Human Geneticists address medical genetic problems in the clinic, interact with genetic fellows and learn how to design tests and experiments to address clinical problems.

Term: 1

Director: Dr. Daryl Scott

pattern formation, mutation isolation and mapping and mosaic analysis. Mouse genetics (gene knock-out, generating specific strains by crosses, and the use of transgenic approaches) and human genetics (linkage and pedigree analysis, gene mapping and analysis, and population biology and evolution) will be covered.

Term: 2

Director: Dr. Christophe Herman

**GS-GG-5010**

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-GG-6102**

**Genetic Epidemiology and Population Genetics** This introductory level course in genetic epidemiology focuses on the design of studies to identify disease-gene associations. The lectures concentrate on the two most common study designs for genetic association studies: case-control studies and case-parent trios, and address disease-gene associations, gene-environment interactions, and maternal genetic effects. Students will learn about study design and data analysis through class lectures, independent readings, completion of problem sets and class discussions.

Term: 4

Director: Dr. Philip Lupo and Dr. Michael Scheurer

**GS-GG-6202**

**Mammalian Genetics** This course describes the contribution of mammalian molecular genetics techniques to understanding the function of genes and the impact of genetic and epigenetic factors on human disease. The first half of the course focuses on historical aspects and advanced technologies used in mouse genetics. The second half of the course explores topics such as the human genome project, primate genetics, epigenetics, comparative sequence analysis and RNAi-based screens in the mammalian systems.

Term: 3

Directors: Dr. Hamed Jafar-Nejad and Dr. Jason Heaney

**GS-GG-5030**

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable

Term: 1, 2, 3, 4

**GS-GG-5040**

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-GG-6203**

**Gene and Cell Therapy** This course covers various approaches to somatic and germ cell gene therapy, with emphasis on vector systems and other methods for gene delivery and targeting; model systems for specific applications of gene therapy; and the status of current therapeutic strategies for various inherited and acquired disorders.

Term: 4

Director: Dr. Philip Ng

**GS-GG-5050**

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-GG-6103****Genetics and Genomics in Vision**

**Research** This course provides graduate students and postdoctoral fellows with broad exposure to the molecular genetics underlying normal and abnormal visual system development and function. This course offers an in-depth analysis of normal vertebrate and invertebrate development, genetic causes of disease, as well as the use of animal models for genetic analysis of normal and abnormal development and function.

Terms: 4 (even year course)

Director: Dr. Graeme Mardon

**GS-GG-6301****Bioinformatics and Genomic Analysis**

This course is intended to provide a background in the theory and application of standard computational methods for molecular biology research. The topics to be discussed include databases, sequence comparison, phylogeny, pattern inference and matching, RNA secondary structure, and protein structure. The course will also address computational issues for the Human Genome Program in the areas of large-scale DNA sequencing, chromosome mapping, and gene recognition. During the term, a seminar speaker, with expertise in an area relevant to the subject area of the course, is invited as a guest lecturer. Students are required to attend this seminar.

Term: 4

Director: Dr. Kim Worley

**GS-GG-5100**

**Student Research Seminar** Student Seminar.

Term: 1, 2, 3, 4

Director: Dr. Christophe Herman and Dr. Herman Dierick

**GS-GG-5105**

**Genetics & Genomics Journal Club** This course is required of all first and second year students enrolled in the graduate programs in Genetics & Genomics. The course is conducted as a journal club to study current literature, to practice critical analysis of the literature and to refine presentation techniques. First year students present papers from the current literature, all students join in discussion of the paper presented.

Term: 3, 4, 5

**GS-GG-6201**

**Model Systems Genetics** This course focuses on introducing genetic approaches offered by different model organisms for solving biological problems, understanding how these models can address problems related to human diseases, and learning technical terms and concepts unique to each system. Yeast genetics will be used to demonstrate how to order genes in a genetic pathway. Classical and modern genetic methods for studying gene function in *C. elegans* during development will be discussed, as will use of *Drosophila* genetics to study

**GS-GG-6302**

**Human Genetics** The goal of this course is help graduate students learn the fundamental principles of human genetics they will need to be effective contributors to the field of human genetics. By the end of the course, students will have an increased ability to comprehend the human genetics literature, conduct human genetics research, accurately interpret genetic data obtained from human subjects and communicate these findings to other researchers and the general public.

Term: 4

Director: Dr. Daryl Scott and Dr. Neil Hanchard

**GS-GG-6303**

**Medical Genetics** This course will provide students insight into the specialty of medical genetics and its place within the practice of medicine in the United States; offer students an opportunity to understand what it is like to be a medical geneticist and work in a diagnostic laboratory; and, inform students about educational and training requirements that lead to eligibility for board certification by the ABMG. The focus of the course will be on laboratory specialties, however, the specialties of Clinical Genetics and Genetic Counseling will also be discussed.

Term: 4

Director: Dr. Marco Sardiello

**GS-GG-6304****Method and Logic in Genetics & Genomics**

This course is intended to train first year graduate students how to read and interpret the primary literature. In particular, we will teach students to discern what conclusions can be drawn from experimental data without over-interpretation. Students will learn what constitutes a well-designed experiment with proper controls. In addition, students will learn the fundamental experimental principles that pervade biological science, such as complementation, assigning function and specificity.

Term: 3

Director: Dr. Graeme Mardon & Dr. Noah Shroyer

## Immunology & Microbiology (GS-IY)

**GS-IY-5000**

**Special Topics** Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-IY-5010**

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-IY-5030**

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable

Term: 1, 2, 3, 4

**GS-IY-5040**

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-IY-5050**

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-IY-5100**

**Student Research Seminar** Graduate students will attend and present in a weekly research seminar series with presentations by Immunology & Microbiology Graduate students to discuss new developments and findings in their thesis research and develop networks. Students having passed their Qualification Exam will present their laboratory research once per year. Student evaluators will

provide student presenters with constructive feedback on their presentations.

Term: 1, 2, 3, 4

Director: Dr. Gretchen Diehl and Dr. Jason Kimata

**GS-IY-5105****Seminars in Immunology & Microbiology**

**Research** Graduate students will attend the combined seminar series supported by Immunology/Immunobiology/Molecular Virology and Microbiology. Presentations will be primarily scientists from other institutions along with BCM faculty and postdocs. Seminar topics or speaker suggested readings will be coordinated with the Literature Review in Immunology & Microbiology and Student Research in Immunology & Microbiology Seminar courses.

Term: 1, 2, 3, 4

Director: Dr. Jason Kimata and Dr. Gretchen Diehl

**GS-IY-5110****Literature Review in Immunology & Microbiology**

Immunology and Microbiology (I&M) graduate students will critically evaluate and present current research articles in areas of immunology, vaccine and immune therapy, microbiology, virology, parasitology and microbiome research. First and second year graduate students will give oral presentations (generally twice a year) of research articles to an audience comprised of fellow graduate students, postdocs, faculty and other scientists. Students will be paired with I&M faculty that will assist in choosing a journal article often related to the Seminars in Immunology and Microbiology faculty presentation(s) of the week that directly follows this course. Presenting students will be evaluated and receive feedback from fellow attendees, including students and faculty.

Term: 1, 2, 3, 4

Director: Dr. Anthony Maresso and Dr. Antony Rodriguez

**GS-IY-6201**

**Cells, Tissues and Organs** The Cells, Tissues and Organs course focuses on analysis of structure/function relationships in tissues and organs. This will include correlating tissue histology with organ physiology. Interactive lectures and discussions occur simultaneously with direct

observation of human and some animal model tissues by the students through multi-head microscopes with a pathologist. Students participate in weekly essays and presentations.

Term: 4

Director: Dr. David Rowley

**GS-IY-6202**

**The Microbiome** This course will facilitate deeper understanding a host-associated community of microbes, termed the 'microbiome'. Through examination of a series of landmark and cutting edge papers, students will learn what constitutes a microbiome both in form and functions it provides to the host, plus the many molecular ways that it can influence health and progression of a wide range of diseases. Students will also learn about the key methodologies used to characterize and quantitatively analyze the microbiome in an associated lab. Together, this class is intended to provide a robust foundation of knowledge and methodological know-how to be able to integrate microbiome studies into any research program.

Term: 3

Director: Dr. Buck Samuel & Dr. Joseph Petrosino

**GS-IY-6301**

**Immunology** This is a series of lectures stressing basic concepts in immunology. These include immunoanatomy and cytology, innate immunity, development of the immune system, immunoglobulin structure and genetics, antigen-antibody reactions, the major histocompatibility complex and antigen presentation, T cell receptors (genetics, structure, selection), T cell activation and effector functions, cell trafficking, phagocytic cell functions, immune responses to infections organisms and tumors, autoimmunity, allergies and immunodeficiency. The course includes weekly reviews led by senior graduate students that help to explore and clarify concepts.

Term: 3

Director: Dr. Jonathan Levitt

**GS-IY-6302****Grand Challenges and Methods in Immunology & Microbiology**

This course will utilize primary literature to provide students an understanding of how important challenges in Immunology & Microbiology are addressed with a particular focus on rationale, thoughtful experimental design and rigorous methodologies are leveraged to answer the biggest questions in Immunology and Microbiology. The session topics will be organized around Grand Challenges in the fields of Immunology & Microbiology, such as Vaccines, Antimicrobial Resistance, Autoimmunity, HIV, Cancer Immunotherapy, and the like.

Term: 3

Director: Dr. Joseph Hyser and Dr. Maksim Mamonkin

**GS-IY-6303****Fundamentals of Effective Grant Writing (Keystone 3)**

An ability to conceive significant and innovative research questions and to communicate them clearly is essential to achieve grant funding. This course is designed to introduce 1st or 2nd year graduate students to the fundamentals of successful grant writing including grant organization, strategy, and the review process using NIH as the model funding agency. Students will learn to strategically design at least two specific aims and to expand one of those aims into a fully developed research strategy section. During the course, students will present their aims and rationale several times with written and oral feedback from

peers and faculty. The course will culminate in an oral presentation with questioning by a select group of upper level graduate students, post-docs, and faculty. All students in the course will observe these oral presentations. This course is intended to develop skills in critical thinking, written presentation of complex scientific information, and oral presentation, as well as preparing students for their qualifying exam, and encouraging independent NRSA or other fellowship applications..

Term: 4

Director: Dr. Susan Marriott

**GS-IY-6304****Clinical Aspects of Immunology**

This course is designed for immunology students to learn more about the roles and importance of immunology in various human diseases and animal models, including cancer immunology, autoimmune diseases, infectious/tropical diseases, allergy and immunodeficiency. The goals of this course are to introduce students to these active research topics, to bridge basic immunology to clinical immunology, and motivate them for the selection of their own research topics related to important human diseases. This course will combine faculty lectures (50%), student presentations of scientific papers and student-designed future directions in the selected topics (50%).

Term: 5

Director: Dr. Jonathan Levitt

**GS-IY-6401****Concepts of Host Immune System-Microbiome Interactions (Keystone 1)**

This course facilitates an integrated understanding of host immune system-microbe interactions, including how they are established, maintained in health, and altered in disease states. Students will develop a conceptual understanding of the primary components and functions that drive these interactions from both a host and microbial perspective and will apply this understanding to real-world problems using student-centered and team-based learning approaches..

Terms: 1-2

Director: Dr. Margaret Conner and Dr. Ronald Javier

**GS-IY-6402****Concepts in Microbial Pathogenesis**

Microbial Pathogenesis will provide interested graduate students or postdoctoral fellows with knowledge of the basic and clinical aspects of mechanisms and consequences of microbial (bacterial and viral) pathogenesis. This course will provide students with the knowledge to understand how bacteria and viruses cause disease, insights into research approaches used to answer questions on microbial pathogenesis, and a forum for in depth discussion of data from selected papers and enhance their ability to critically analyze, discuss, and present data.

Term: 4

Director: Dr. Margaret Conner

## Neuroscience (GS-NE)

**GS-NE-5000**

**Special Topics** Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-NE-5010**

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-NE-5030**

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable

Term: 1, 2, 3, 4

**GS-NE-5040**

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-NE-5050**

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-NE-5100****Seminar Journal Club in Neuroscience**

This course is required of all first and second year students enrolled in the Neuroscience Graduate Program. The course is conducted as a journal club to study the scientific literature, to practice critical analysis of the literature, and to develop and refine presentation skills. This course is coordinated with the Department of Neuroscience seminar series such that second-year students present papers from the laboratory of the upcoming seminar speaker. All students join in discussion of the paper and evaluation of the journal club presentation.

Terms: 2, 3, 4

Director: Dr. Javier Medina and Dr. Jeannie Chin

**GS-NE-5101****Preparing for Your Neuroscience**

**Qualifying Exam** This course will explain the requirements and expectations of the qualifying exam in Neuroscience. The course is geared specifically towards second year students who have successfully completed their first year coursework and several

months' work in their chosen thesis lab. The course will cover the format of the written and oral exams, tips for structuring the aims and scope of the written proposal, and provide students with opportunity to develop and deliver their oral presentation for feedback from the group. The goal of the course is to help students begin thinking about their work independently and to present their research problem and experimental goals clearly.

Term: 2

Directors: Dr. Joanna Jankowsky and Dr. Kim Tolias

**GS-NE-5111**

**Neuroscience Lab 1** Students will be introduced to basic approaches of molecular and cellular neuroscience including learning how to model biological systems and how to perform basic laboratory techniques. Primary focus will be on understanding how to break complex neuronal systems down to enable useful computational analyses as well as the importance of design and controls in different experimental approaches. Students will be exposed to a combination of problem solving, practical demonstrations, and discussions of pluses and minuses for different approaches.

Term 1

Director: Dr. Paul Pfaffinger

#### GS-NE-5201

##### **Advanced Functional MRI Laboratory**

This laboratory course will teach students to use blood-oxygen level dependent functional magnetic resonance imaging (BOLD fMRI) to explore human brain function. BOLD fMRI is the most popular method for examining the human brain, but poses unique technical, methodological, and data analysis obstacles. Students will learn how to overcome these obstacles by designing experiments and collecting fMRI data using the 3-tesla MRI scanners in BCM's Core for Advanced Magnetic Resonance Imaging (CAMRI).

Term: 4

Director: Meghan Robinson

Prerequisites: GS-NE-6400 and permission from Course Director

#### GS-NE-6101

##### **Core Concepts in Computational Neuroscience**

How do brains compute? This course covers the basic concepts underlying neuronal computation, from individual neurons up to networks of neurons in circuits. The focus will be on achieving a computational level understanding: how populations of neurons compute tasks critical for the organism's survival from sensory input. Students will also be exposed to key ideas from the field of Deep Machine Learning wherein artificial neural networks are employed to solve difficult real-world tasks.

Term: 4

Director: Dr. Ankit Patel

Prerequisites: GS-NE-6301. (GS-NE-6302 can be taken concurrently)

#### GS-NE-6112

**Neuroscience Lab 2** This course extends the practical laboratory demonstrations begun in GS-NE-449 with hands-on demonstrations in systems and computational neuroscience. Methods to be covered include classical and modern neuro-anatomical techniques, in vivo phar-maco- and opto-genetics, model systems behavioral assays, fMRI, and computational modeling among others. One hour lecture and 3 hour laboratory demonstration per week.

Term: 2

Director: Dr. Russell Ray

#### GS-NE-6201

**Analyses of Neuronal Function** This course will cover the basic concepts of synaptic biology. The topics include the organization of the synapses, neurotransmitter release, neurotransmitter receptors, synaptic plasticity in learning and memory, synaptic organization of microcircuits, and synaptic dysfunction in diseases. Students will learn synaptic biochemistry, cell biology, and physiology and how to study synapses.

Term: 2

Director: Dr. Mingshan Xue

#### GS-NE-6202

**Anatomy of the Nervous System** The course will cover the basic concepts in neuroanatomy in a combined lecture, demonstration, and hands-on lab format. The emphasis will be on the structural organization of the nervous system. A large part of the course will consist of lectures that cover a structure or region of the brain augmented by simultaneous hands-on dissection of fixed sheep

brain tissue, histological photographs, and representative MRIs. The students will be divided into small teams and will dissect a sheep brain along with the instructor. It is expected that the teams will interact with the instructors as the lecture/demonstration progresses. Additional lectures and demonstrations will be used to compare and contrast mammalian brains with other species' brains commonly used in neuroscience research.

Term: 2

Director: Dr. Brett Foster

#### GS-NE-6203

**Genetics for Neuroscience** This course is intended to teach neuroscience students how to tackle neurobiological problems using genetic strategies and tools. Students will be exposed to the basic concepts in genetics and will be taught the advantages and approaches used in invertebrate model organisms, *C. elegans* and *D. melanogaster*, focusing on different genetic, cell biological and neurobiological tools available in those organisms. The course will also focus on mouse genetics, highlighting the different techniques and approaches commonly used in the mouse, followed by genetic approaches in humans.

Term: 3

Director: Dr. Ronald Parchem

#### GS-NE-6204

**Neurobiology of Disease** This course will cover important and scientifically tractable disorders of nervous system function. The course will expose the students to the incidence, clinical manifestations, pathophysiology and current scientific models of the causes and mechanisms of some of the most common disorders of brain and nervous system function and development throughout the lifespan.

This is an advanced course assuming basic knowledge of neuroscience. Completion of an introductory course is required. Students outside the Neuroscience Graduate Program must receive permission from course director to register, as registration is limited to 20 students.

Term: 4

Director: Dr. Jeffrey Noebels

#### GS-NE-6301

**Neural Systems 1** Neural Systems I course covers the mechanisms involved in processing sensory information by the brain. The course will cover the major sensory systems from organizational principles to the transformation of information. This course will cover the key topics in the processing of sensory information by the brain. The course will also introduce students to in depth analysis of important papers in systems neuroscience to better assist their development of critical reading skills. This course will prepare students for Neural Systems 2 which will cover how sensory inputs are transformed into motor actions by the brain. Following completion of this course students will understand the locations, functional organization, and functional significance of the main sensory processing streams in the central nervous system.

Term: 3

Director: Dr. Jeffrey Yau

#### GS-NE-6302

**Neural Systems 2** Neural Systems 2 course covers the mechanisms involved in transforming sensory inputs into motor action and higher brain functions. The course will cover the spinal, cortical, limbic and cerebellar systems involved in motor planning and execution, behavioral control, and learning and memory. This course will cover the key topics in translation of sensory inputs into patterns of motor behavior as well as brain circuits involved in higher cognitive functions. The course will also introduce students to in depth analysis of important papers in systems neuroscience to better assist their development of critical reading skills. Following completion of this course student will understand the locations, functional organization, and functional significance of the main motor pathways as well as key findings linking brain function to complex cognitive behaviors.

Term: 4

Director: Dr. Roy Sillitoe

Prerequisites: GS-NE-6301

#### GS-NE-6303

**Electrical Signaling in the Brain** This course covers the basic concepts of electrical signaling from the chemical and physical principles involved, to the biological components involved in generating, modulating and transmitting electrical signals in the brain. Students will learn about the foundations of electrical signaling, how ion channel function and regulation actively regulate membrane potential, how to analyze membrane potential using circuitry methods, and how to understand how electrical signals propagate across long distances. Finally this course will explore some of the new methods to measure and manipulate electrical signaling in awake behaving animals.

Term: 1

Director: Dr. Paul Pfaffinger

#### GS-NE-6304

**Brain Cell Biology and Development** This course covers the basic molecular and cellular organization of the Nervous system. The first 2/3 of the course provides an overview and focal lectures on topics of particular importance to understanding molecular and cellular organization of neurons. The last third of the course covers aspects of neural development that integrates principles learned in the first 2/3 of the course.

Credits: 3

Term: 1

Counts for 30 hr. requirement: Y

Director: Dr. Matthew Rasband

#### GS-NE-6305

**Concepts of Learning and Memory** This course is designed to introduce graduate students to the field of learning and memory. The course will introduce the student to classical and modern concepts of learning and memory across all levels at which learning and memory is studied, including behavioral, anatomical, cellular, molecular and genetic levels of analysis. The basic concepts of learning and memory will also be related to known diseases of learning and memory.

Term: 4

Directors: Dr. Mauro Costa-Mattioli and Dr. Daoyun Ji

**GS-NE-6306**

**Cellular Neurophysiology** This course provides a general background in cellular neurophysiology with an emphasis on an understanding of the properties of excitable nerve membranes and chemical synapses. The first part of the course covers the theory of ions in solutions, ion conduction through membranes, ion transport and distribution, nonlinear properties of neurons, nerve excitation and conduction, and stochastic properties of single ion channels. The second part of the course covers linear cable theory, multiple types of voltage-gated conductances, synaptic transmission including, quantal analysis; the role of calcium and transmitter release, various forms of synaptic plasticity.

Term: 4

Director: Dr. Samuel Wu

**GS-NE-6307**

**Physiology of the Visual System** This is an advanced level course on the physiology of the visual system. It covers the biochemistry, physiology and

biophysics of phototransduction, synaptic transmission in the retina and functional architecture of the retina and central visual pathways. Additionally, principles of visual information processing in the eye and in the brain, mechanisms controlling eye movement and gaze stabilization are discussed.

Terms: 4

Director: Dr. Samuel Wu

**GS-NE-6401****Fundamentals of**

**Human Neuroimaging** Neuroimaging has rapidly become one of the most popular and powerful tools for neuroscience. This course surveys a variety of brain imaging modalities, describing what each measures and how the results are used for research. Neuroscience has classically relied on invasive electrode measurements, mostly in animals, to directly map electrical activity in the brain, and modern microelectrode arrays have expanded this method. Two other brain activity measurement

schemes, electroencephalography (EEG) and magnetoencephalography (MEG), provide non-invasive measurements with excellent temporal resolution but limited spatial accuracy. Recently, magnetic resonance imaging (MRI) has become tremendously popular because it is non-invasive, involves no ionizing radiation, and offers substantial flexibility. In particular, MRI is used to measure brain structure in a variety of fashions, to measure white-matter connectivity using diffusion-weighted imaging (e.g., DTI), and to measure brain function (e.g., fMRI). Extensive techniques have been developed to localize and probe cortical activity in a variety of specialized areas. Optical imaging techniques have also contributed substantially to our understanding of brain function, mostly as an invasive technique in animal models. Positron-emission tomography (PET) provides additional specialized information about brain function. Students should have introductory physics and calculus capability at the freshman level.

Terms: 1-2

Director: Dr. David Ress

## Quantitative and Computational Biosciences (GS-QC)

**GS-QC-5000**

**Special Topics** Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-QC-5010**

**Readings** Faculty directed literature projects that survey a specialized topic of interest.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-QC-5030**

**Research Rotation** Faculty mentored research for students who have not yet selected a faculty advisor.

Credits: Variable

Term: 1, 2, 3, 4

**GS-QC-5040**

**Special Projects** Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-QC-5050**

**Dissertation** Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.

Credits: Variable

Term: 1, 2, 3, 4, 5

**GS-QC-5100**

**Student Research Seminar** QCB graduate students will attend the course weekly where upper level student who have passed their qualifying exam

will present their research. These research presentations will be presented to an audience of 1st year students and a faculty member to help develop their oral communication and research presentation skills. Following each student's presentation, constructive advice from faculty and students will be provided in a survey about improving oral and presentation skills and about producing effective presentation materials.

Term: 4

Director: Dr. Aleksandar Milosavljevic

**GS-QC-5105**

**Seminar in Quantitative Biosciences** This course introduces graduate students to the diversity of biological and clinical research problems that benefit from computational approaches. On alternating weeks the students will be exposed to speakers, or they will present a journal club. The speakers are drawn from across BCM, the TMC, Rice University and the greater Houston area and occasionally will include outside seminar speakers. During this one hour, a format of two short talks from two different speakers will discuss some of the most salient current problems studied in their laboratories, often with a significant emphasis on computational aspects. Style and content vary but, generally, the level is introductory and accessible to all members of the audience. Topics range from genomics to clinical text-mining and from bioengineering to public health, representing the rich diversity of computational biology research in the Gulf Coast area. .

Term: 1, 2, 3, 4

Director: Dr. Oliver Lichtarge and Dr. Richard Sucgang

**GS-QC-5110**

**Advanced Topics in QCB** QCB 1st year graduate students will attend the course weekly where QCB faculty will present their research. Each presentation will be 15 minutes, plus 5 minutes for discussion, and cover an advanced topic on recent development from the faculty's lab. Following each

presentation, the students will discuss with the faculty any potential rotation projects in the lab. The course is aimed to supply the students with the topics for their rotations and research projects.

Term: 1, 2

Director: Dr. Aleksandar Milosavljevic

**GS-QC-5301**

**QCB Research Design** This course is designed to guide the student through the process of identifying a research problem, developing specific hypotheses and designing well-controlled experiments to test them. It will be taught in small groups of ~8 students/class. A faculty mentor helps formalize and organize the process, but students will develop their ideas through literature searches and discussion. The terms and discussion will center around the NIH format for grant applications (Specific Aims, Background and Significance, Experimental Design).

Term: 4

Director: Dr. BVVenkatar Prasad, Dr. Nicolas Young

**GS-QC-6201**

**Applications to Biology of Computation** The course will offer a broad survey of different topics from a computational perspective: genomics, epigenomics, population genetics, transcriptomics, proteomics, structure-function, systems biology, networks, cellular imaging, phylogenomics, pattern discovery, drug design, medical informatics, the microbiome, the cancer genome and neurosystems. The objectives are to become familiar with basic computational challenges in these fields and with the current algorithmic solutions.

Term: 3

Director: Dr. Olivier Lichtarge

**GS-QC-6301**

**Practical Introduction to Programming for Scientists** In this course students will learn Python, one of the most widely used scripting languages in scientific computing. The course is primarily aimed at students with little or no programming background, but those with some programming experience in other languages wishing to learn Python are also welcome. The course covers basic programming concepts and data structures, and students will learn to write simple programs to improve their data processing productivity. We will also cover a number of open source scientific libraries available in Python (Biopython, SciPy, Matplotlib, etc.). Some basic familiarity with using a computer will be expected, and each student must have a laptop computer for use in class by the beginning of the term.

Term: 1

Director: Dr. Steven J. Ludtke

**GS-QC-6302**

**Computer-Aided Discovery Methods** The objective of this course is to introduce students to the concepts, methods and tools relevant for computer-aided discovery using data collected using high-throughput technologies. The course will focus on the methods of integration of data, tools, and discovery processes and the methods of computational pattern discovery, hypothesis generation and testing. The students will master advanced applications of computing that enable new methods of discovery in a field of focus, which will initially be cancer biology. The course will not focus exclusively on technical, algorithmic or mathematical aspects nor will it focus on biology alone. Instead, the focus will be on genuine integration of the two fields.

Term: 4

Director: Dr. Aleksandar Milosavljevic

**GS-QC-6801**

**Computational Mathematics for Quantitative Biomedicine** This course introduces essential computational, statistical and mathematical concepts to students who are interested in computational biology. It is intended that each of the concepts will be taught in the context of the real biological problems ranging from genomics bioinformatics, structural biophysics, computational neuroscience, systems biology, protein design, drug discovery, and medical bioinformatics

Terms: 2+3

Director: Dr. Zhandong Liu

## Tropical Medicine (GS-TM)

**GS-TM-5600****Diploma in Tropical Medicine Module 1**

This module is a component of the four-module Diploma in Tropical Medicine program. This module will provide the learners with knowledge and basic understanding of epidemiology, biostatistics, ethics, health economics & public health policies. By the end of the module, learners will be able to explain epidemiological surveillance of emerging infectious diseases, perform basic biostatistics computation skills, and describe ethics, health economic, policy and other public health topics as they relate globally.

Term: 3

Director: Dr. Kristy Murray and Dr. Laila Woc-Colburn

**GS-TM-5100****Seminar in Tropical Medicine - Global Health Policy (GS-TM-5100)**

This course consists of a series of weekly lectures on a topic in tropical medicine. Lectures will convey different themes in tropical medicine from one year to the next. The learning themes are global health policy, one health, globalization and the impact on Houston health, tropical medicine abroad, and tropical medicine research.

Term: 3

Director: Dr. Peter Jay Hotez

## Legacy Program Courses

**Seminar in Cell Biology (GS-CB- 466)**

Student Seminar

Credits: 1

Term: 1, 2

Counts for 30 hr. requirement: N

Director: Dr. Charles Foulds

**Seminar in Developmental Biology (GS-DB-466)**

The purpose of this course is to guide the students into learning how to approach scientific literature directly. Students are expected to read the primary literature and lead discussions in a group setting. Students in the Program in Developmental Biology participate in this seminar every term during their first four years at BCM.

Credits: 1

Term: 2, 3, 4

Counts for 30 hr. requirement: N

Director: Dr. Andrew Groves

**Grant Writing Skills (GS-PY- 413)**

The goal of this course is to guide students to write a specific aims page on a specified theme while teaching them about grant structure, grant writing styles, and reinforcing scientific thinking in developing models, hypotheses, and experimental tests through question and answer sessions. The course interleaves lectures with group discussion. In the lectures, the

students will be instructed in the overall layout of a grant, the purpose of the various grant sections, and the writing style for grants. Before each discussion, the students will be required to write a section of the specific aims page. In the discussion, the students will question each other's hypotheses, aims and approaches.

Credits: 1

Term: 2

Counts for 30 hr. requirement: N

Director: Dr. Irina Larina and Dr. William Lagor

**Seminar in Molecular Physiology & Biophysics (GS-PY- 466)**

Student Seminar

Credits: 1

Term: 1, 2, 3, 4, 5

Counts for 30 hr. requirement: N

Director: Dr. Joshua Wythe and Dr. Jason Karch

**TBMM: Bench to Bedside (GS-TB-466)**

This course is designed to provide a forum for an in-depth discussion of translational research. Each term will cover one subject or a specific aspect of a larger topic to allow for a more detailed review of the biomedical literature. The emphasis is on student participation and the role of the faculty member(s) at any given session is to facilitate the discussion.

Students are expected to have reviewed assigned article(s) prior to each session and come prepared with comments, criticisms, questions or points of discussion. The faculty member will typically provide a brief overview of the topic at hand to provide some perspective on the subject, but will not direct the discussion. An outside speaker of national prominence engaged in translational research relevant to the topic will give a school-wide talk and meet with the TBMM students.

Credits: 1

Term: 1, 2, 3, 4

Counts for 30 hr. requirement: N

Director: Dr. William J. Craigen

**Seminar in TBMM (GS-TB-467)**

Students who have been admitted to candidacy (years 3 and above) will be required to present a seminar yearly on the topic of their ongoing thesis research project with emphasis on the translational aspects of their research project. The purpose of this course is to provide a forum for students to improve their knowledge and skills in planning, preparing and effectively presenting their scientific research to an inter-disciplinary audience.

Credits: 1

Term: 2, 3, 4

Counts for 30 hr. requirement: N

Director: Dr. Sundararajah Thevananther

# GRADUATE SCHOOL OF BIOMEDICAL SCIENCES



## Degree Requirements Academic Year 2019-2020

This document includes all degree requirements for programs in the Graduate School of Biomedical Sciences. A table of contents is included below.

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# Graduate Degree Plan

## PhD in Cancer & Cell Biology

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses
- Completion of at least three terms of Research Rotation
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|         |            |  |  |                |
|---------|------------|--|--|----------------|
| Term 1: | GS-GS-6600 | Foundations A: Molecules to Systems    | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date  |
|         | GS-GS-6400 | Foundations B: Biostatistics           | 2 (Didactic)<br><i>(two-term course)</i> |                |
|         | GS-GS-5101 | Responsible Conduct of Research 1      | 1  |                |
|         | GS-GS-5111 | Success Strategies for Graduate School | 1  |                |
|         | GS-CC-5100 | Student Research Seminar               | 1  |                |
|         | GS-CC-5030 | Research Rotation ± Electives          | 4  |                |
|         | Total:     |  |  |                |
| Term 2: | GS-GS-6600 | Foundations A: Molecules to Systems    | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date  |
|         | GS-GS-6400 | Foundations B: Biostatistics           | 2 (Didactic)<br><i>(two-term course)</i> |                |
|         | GS-GS-5112 | Powerful Presentations                 | 1  |                |
|         | GS-CC-5100 | Student Research Seminar               | 1  |                |
|         | GS-CC-5030 | Research Rotation ± Electives          | 5  |                |
|         | Total:     |  |  |                |
| Term 3: | GS-GS-6202 | Gene Regulation                        | 2 (Didactic)                             | Total to Date  |
|         | GS-CC-6208 | Cellular Signaling                     | 2 (Didactic)                             |                |
|         | GS-GS-5105 | Scientific Writing                     | 1  |                |
|         | GS-CC-5100 | Student Research Seminar               | 1  |                |
|         | GS-CC-5030 | Research Rotation ± Electives          | 6  |                |
|         | Total:     |  |  |                |
| Term 4: | GS-CC-6302 | Molecular Carcinogenesis               | 3 (Didactic)                             | Total to Date  |
|         | GS-CC-5100 | Student Research Seminar               | 1  |                |
|         | GS-GS-5113 | Effective Project Design & Management  | 1  |                |
|         | GS-CC      | Research Hours ± Electives             | 7  |                |
|         | Total      |  |  |                |
| Term 5: | GS-CC      | Research Hours ± Electives             | 12                                       | Total to Date: |
|         | Total:     |  |  | 12             |

| <b>Year Two Requirements:</b>   |            |                                     |    |                           |
|---|------------|-------------------------------------|----|---------------------------|
| Term 1:   | GS-CC-5301 | NRSA Grant Writing & Project Dev. 1 | 3  | Total to Date<br>72 (17)  |
|   | GS-CC-5100 | Student Research Seminar            | 1  |                           |
|   | GS-CC      | Research Hours ± Electives          | 8  |                           |
|   | Total:     |                                     | 12 |                           |
| Term 2:   | GS-CC-5302 | NRSA Grant Writing & Project Dev. 2 | 3  | Total to Date<br>84 (17)  |
|   | GS-CC-5100 | Student Research Seminar            | 1  |                           |
|   | GS-GS-5102 | Responsible Conduct of Research 2   | 1  |                           |
|   | GS-CC      | Research Hours ± Electives          | 7  |                           |
|   | Total:     |                                     | 12 |                           |
| Term 3:   | GS-CC-5100 | Student Research Seminar            | 1  | Total to Date<br>96 (17)  |
|   | GS-CC      | Research Hours ± Electives          | 11 |                           |
|   | Total:     |                                     | 12 |                           |
| <i>Student's Thesis Advisory Committee must be appointed by the end of Term 3 in the student's second year of enrollment.</i> |            |                                     |    |                           |
| Term 4:   | GS-CC-5100 | Student Research Seminar            | 1  | Total to Date<br>108 (17) |
|   | GS-CC      | Research Hours ± Electives          | 11 |                           |
|   | Total:     |                                     | 12 |                           |
| Term 5:   | GS-CC      | Research Hours ± Electives          | 12 | Total to Date<br>120 (17) |
|   |            |                                     | 12 |                           |

*Remaining required didactic hours should be elective courses*

### **Qualifying Exam Requirement:**

- Must be taken by the end of the second year of enrollment.
- Student must complete all prerequisite activities defined by their program before taking the exam

### **Year Three Requirements:**

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-CC-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5103 | Responsible Conduct of Research 3 | 1        |  |
| Terms 1-5: | GS-CC-5050 | Dissertation                      | 55 total |  |

### **Year Four Requirements:**

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-CC-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5104 | Responsible Conduct of Research 4 | 1        |  |
| Terms 1-5: | GS-CC-5050 | Dissertation                      | 55 total |  |

### **Research Course Work:**

|            |                   |
|------------|-------------------|
| GS-CC-5010 | Readings          |
| GS-CC-5030 | Research Rotation |
| GS-CC-5040 | Special Projects  |
| GS-CC-5050 | Dissertation      |

Students Starting Academic Year: 2019-2020

## General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses
- Completion of at least three terms of Research Rotation
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

## Year One Requirements:

|         |            |                                     |  |               |
|---------|------------|-------------------------------------|--|---------------|
| Term 1: | GS-GS-6600 | Foundations A: Molecules to Systems | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-GS-6400 | Foundations B: Biostatistics        | 2 (Didactic)<br><i>(two-term course)</i> |               |
|         | GS-CP-5101 | Thinking Like a Scientist 1         | 1  |               |
|         | GS-GS-5101 | Responsible Conduct of Research 1   | 1  |               |
|         | GS-CP-5100 | Student Research Seminar            | 1  |               |
|         | GS-CP-5030 | Research Rotation ± Electives       | 4  |               |
|         | Total:     |                                     |  |               |
| Term 2: | GS-GS-6600 | Foundations A: Molecules to Systems | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-GS-6400 | Foundations B: Biostatistics        | 2 (Didactic)<br><i>(two-term course)</i> |               |
|         | GS-CP-6202 | Thinking Like a Scientist 2         | 2 (Didactic)                             |               |
|         | GS-CP-5100 | Student Research Seminar            | 1  |               |
|         | GS-CP-5030 | Research Rotation ± Electives       | 4  |               |
|         | Total:     |                                     |  |               |
| Term 3: | GS-CP-6203 | Thinking Like a Scientist 3         | 2 (Didactic)                             | Total to Date |
|         | GS-CP-5100 | Student Research Seminar            | 1  |               |
|         | GS-CP-5030 | Research Rotation ± Electives       | 9  |               |
|         | Total:     |                                     |  |               |
| Term 4: | GS-CP-6204 | Thinking Like a Scientist 4         | 2 (Didactic)                             | Total to Date |
|         | GS-CP-5100 | Student Research Seminar            | 1  |               |
|         | GS-CP      | Research Hours ± Electives          | 9  |               |
|         | Total:     |                                     |  |               |
| Term 5: | GS-CP      | Research Hours ± Electives          | 12                                       | Total to Date |
|         | Total:     |                                     |  |               |

## Year Two Requirements:

|         |            |                                   |              |               |
|---------|------------|-----------------------------------|--------------|---------------|
| Term 1: | GS-CP-6304 | Molecular Biophysics 1            | 3 (Didactic) | Total to Date |
|         | GS-CP-5100 | Student Research Seminar          | 1            |               |
|         | GS-CP      | Research Hours ± Electives        | 8            |               |
|         | Total:     |                                   |              |               |
| Term 2: | GS-GS-5102 | Responsible Conduct of Research 2 | 1            | Total to Date |
|         | GS-CP-5100 | Student Research Seminar          | 1            |               |
|         | GS-CP      | Research Hours ± Electives        | 10           |               |
|         | Total:     |                                   |              |               |

|   |            |                            |    |               |
|---|------------|----------------------------|----|---------------|
| Term 3:   | GS-CP-5100 | Student Research Seminar   | 1  | Total to Date |
|   | GS-CP      | Research Hours ± Electives | 11 |               |
|   | Total:     |                            | 12 |               |
| <i>Student's Thesis Advisory Committee must be appointed by the end of Term 3 in the student's second year of enrollment.</i> |            |                            |    |               |
| Term 4:   | GS-CP-5100 | Student Research Seminar   | 1  | Total to Date |
|   | GS-CP      | Research Hours ± Electives | 11 |               |
|   | Total:     |                            | 12 |               |
| Term 5:   | GS-CP      | Research Hours ± Electives | 12 | Total to Date |
|   |            |                            | 12 | 120 (19)      |

*Remaining required didactic hours should be elective courses*

### Qualifying Exam Requirement:

- Must be taken by the end of the second year of enrollment.
- Student must complete all prerequisite activities defined by their program before taking the exam

### Year Three Requirements:

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-CP-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5103 | Responsible Conduct of Research 3 | 1        |  |
| Terms 1-5: | GS-CP-5050 | Dissertation                      | 55 total |  |

### Year Four Requirements:

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-CP-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5104 | Responsible Conduct of Research 4 | 1        |  |
| Terms 1-5: | GS-CP-5050 | Dissertation                      | 55 total |  |

### Research Course Work:

|            |                   |
|------------|-------------------|
| GS-CP-5010 | Readings          |
| GS-CP-5030 | Research Rotation |
| GS-CP-5040 | Special Projects  |
| GS-CP-5050 | Dissertation      |

### Suggested Electives

#### Chemical Biology/Pharmacology Emphasis

|            |                                       |      |
|------------|---------------------------------------|------|
| GS-CP-6401 | General Pharmacology                  | 4(D) |
| GS-CP-6302 | Chemical Concepts in Chemical Biology | 3(D) |
| GS-CP-6206 | Drug Discovery                        | 2(D) |
| GS-CP-6205 | Chemical Biology                      | 2(D) |

### Suggested Electives

#### Structural Biology/Biophysics Emphasis

|            |                                |      |
|------------|--------------------------------|------|
| GS-CP-6305 | Molecular Biophysics 2         | 3(D) |
| GS-CP-6301 | Advanced X-ray Crystallography | 3(D) |
| GS-CP-6207 | Electron Cryomicroscopy        | 2(D) |

# Graduate Degree Plan

## PhD in Clinical Scientist Training Program

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses (6000-level)
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|         |            |   |              |               |
|---------|------------|---|--------------|---------------|
| Term 1: | GS-CT-6300 | Fundamentals of Clinical Investigation  | 3 (Didactic) | Total to Date |
|         | GS-CT-6201 | CICS 1: Grant Development for CIs       | 2 (Didactic) |               |
|         | GS-CT-5101 | Responsible Conduct of Research for CIs | 1            |               |
|         | GS-CT      | Special Projects ± Electives            | 6            |               |
| Total:  |            |   | 12 (5)       | 12 (5)        |
| Term 2: | GS-CT-6302 | CICS 2: Clinical Trials for CIs         | 3 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives            | 9            |               |
|         | Total:     |   |              |               |
| Term 3: | GS-CT-6303 | CICS 3: Translational Research for CIs  | 3 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives            | 9            |               |
|         | Total:     |   |              |               |

*Student's Thesis Advisory Committee must be appointed by the end of term 3 of the student's first year of enrollment.*

|         |            |   |              |               |
|---------|------------|---|--------------|---------------|
| Term 4: | GS-CT-6304 | CICS 4: Health Services Research for CIs                | 3 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives                            | 9            |               |
|         | Total:     |   |              |               |
| Term 5: | GS-CT-6205 | CICS 5: Evaluating a Completed Career Development Grant | 2 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives                            | 10           |               |
|         | Total:     |   |              |               |

### Year Two Requirements:

|         |        |                            |    |               |
|---------|--------|----------------------------|----|---------------|
| Term 1: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 2: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 3: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 4: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 5: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |

*Remaining required didactic hours should be elective courses*

### Qualifying Exam Requirement:

- Must be taken by the end of Term 2 of the second year of enrollment
- All phases of the exam process must be completed before a result is indicated
- Any student earning an Incomplete on any phase of the exam must retake the exam within six months.

**Biostatistics Requirement:**

Students are required to take GS-GS-6400 Foundations B: Biostatistics, or a substitute biostatistics course approved by the Program Director

**Recommended Electives:**

|        |            |  |              |
|--------|------------|--|--------------|
| Term 3 | GS-QC-6201 | Applications to Biology of Computation | 2 (Didactic) |
| Term 3 | GS-GS-5105 | Scientific Writing                     | 1            |
| Term 4 | GS-QC-6302 | Computer-Aided Discovery Methods       | 3 (Didactic) |
| Term 5 | GS-CP-6202 | Drug Discovery: Bench to Bedside       | 2 (Didactic) |

# Graduate Degree Plan

## MS in Clinical Scientist Training Program

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 84 term hours
- At least 30 of those term hours must be in Didactic courses (6000-level)
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|         |            |   |              |               |
|---------|------------|---|--------------|---------------|
| Term 1: | GS-CT-6300 | Fundamentals of Clinical Investigation  | 3 (Didactic) | Total to Date |
|         | GS-CT-6201 | CICS 1: Grant Development for CIs       | 2 (Didactic) |               |
|         | GS-CT-5101 | Responsible Conduct of Research for CIs | 1            |               |
|         | GS-CT      | Special Projects ± Electives            | 6            |               |
| Total:  |            |   | 12 (5)       | 12 (5)        |
| Term 2: | GS-CT-6302 | CICS 2: Clinical Trials for CIs         | 3 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives            | 9            |               |
|         | Total:     |   |              |               |
| Term 3: | GS-CT-6303 | CICS 3: Translational Research for CIs  | 3 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives            | 9            |               |
|         | Total:     |   |              |               |

*Student's Thesis Advisory Committee must be appointed by the end of term 3 of the student's first year of enrollment.*

|         |            |   |              |               |
|---------|------------|---|--------------|---------------|
| Term 4: | GS-CT-6304 | CICS 4: Health Services Research for CIs                | 3 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives                            | 9            |               |
|         | Total:     |   |              |               |
| Term 5: | GS-CT-6205 | CICS 5: Evaluating a Completed Career Development Grant | 2 (Didactic) | Total to Date |
|         | GS-CT      | Special Projects ± Electives                            | 10           |               |
|         | Total:     |   |              |               |

### Quantifying Progress Review Requirement:

- Takes place following first year of coursework

### Year Two Requirements:

|         |        |                            |    |               |
|---------|--------|----------------------------|----|---------------|
| Term 1: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 2: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 3: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 4: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |
| Term 5: | GS-CT  | Research Hours ± Electives | 12 | Total to Date |
|         | Total: |                            |    |               |

*Remaining required didactic hours should be elective courses*

**Biostatistics Requirement:**

Students are required to take GS-GS-6400 Foundations B: Biostatistics, or a substitute biostatistics course approved by the Program Director

**Recommended Electives:**

|        |            |  |              |
|--------|------------|--|--------------|
| Term 3 | GS-QC-6201 | Applications to Biology of Computation | 2 (Didactic) |
| Term 3 | GS-GS-5105 | Scientific Writing                     | 1            |
| Term 4 | GS-QC-6302 | Computer-Aided Discovery Methods       | 3 (Didactic) |
| Term 5 | GS-CP-6202 | Drug Discovery: Bench to Bedside       | 2 (Didactic) |

# Graduate Degree Plan

## PhD in Development, Disease Models & Therapeutics

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses
- Completion of at least three terms of Research Rotation
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|  |            |   |  |               |
|--|------------|---|--|---------------|
| Term 1:  | GS-GS-6600 | Foundations A: Molecules to Systems       | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|  | GS-GS-6400 | Foundations B: Biostatistics              | 2 (Didactic)<br><i>(two-term course)</i> |               |
|  | GS-GS-5101 | Responsible Conduct of Research 1         | 1  |               |
|  | GS-GS-5111 | Strategies for Success in Graduate School | 1  |               |
|  | GS-DD-5030 | Research Rotation ± Electives             | 5  |               |
|  | Total:     |   |  |               |
| Term 2:  | GS-GS-6600 | Foundations A: Molecules to Systems       | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|  | GS-GS-6400 | Foundations B: Biostatistics              | 2 (Didactic)<br><i>(two-term course)</i> |               |
|  | GS-GS-5112 | Powerful Presentations                    | 1  |               |
|  | GS-TB-467  | Seminar in TBMM                           | 1  |               |
|  | GS-DD-5030 | Research Rotation ± Electives             | 5  |               |
|  | Total:     |   |  |               |
| <i>Students must file a degree plan supplement with at least 7 credits 6000-level GS-DD coursework by November 30.</i> |            |   |  |               |
| Term 3:  | GS-TB-467  | Seminar in TBMM                           | 1  | Total to Date |
|  | GS-GS-5105 | Scientific Writing                        | 1  |               |
|  | GS-DD-5110 | DDMT Journal Club                         | 1  |               |
|  | GS-DD-5030 | Research Rotation ± Electives             | 9  |               |
|  | Total:     |   |  |               |
| Term 4:  | GS-TB-467  | Seminar in TBMM                           | 1  | Total to Date |
|  | GS-GS-5113 | Effective Project Design & Management     | 1  |               |
|  | GS-DD-5110 | DDMT Journal Club                         | 1  |               |
|  | GS-DD      | Research Hours ± Electives                | 9  |               |
|  | Total:     |   |  |               |
| Term 5:  | GS-DD      | Research Hours ± Electives                | 11                                       | Total to Date |
|  | GS-DD-5110 | DDMT Journal Club                         | 1  |               |
|  | Total:     |   |  |               |
| <b>Year Two Requirements:</b>  |            |   |  |               |
| Term 1:  | GS-DD      | Research Hours ± Electives                | 12                                       | Total to Date |
|  | Total:     |   |  | 12            |

|         |            |   |    |                          |
|---------|------------|---|----|--------------------------|
| Term 2: | GS-GS-5102 | Responsible Conduct of Research 2         | 1  | Total to Date<br>84 (10) |
|         | GS-DD-5101 | Effectively Writing & Reviewing Proposals | 1  |                          |
|         | GS-DD-5100 | Student Research Seminar                  | 1  |                          |
|         | GS-DD      | Research Hours ± Electives                | 9  |                          |
|         | Total:     |   | 12 |                          |
| Term 3: | GS-DD-5100 | Student Research Seminar                  | 1  | Total to Date<br>96 (10) |
|         | GS-DD-5110 | DDMT Journal Club                         | 1  |                          |
|         | GS-DD      | Research Hours ± Electives                | 10 |                          |
|         | Total:     |   | 12 |                          |

*Student's Thesis Advisory Committee must be appointed by the end of Term 3 in the student's second year of enrollment.*

|         |            |                            |    |                           |
|---------|------------|----------------------------|----|---------------------------|
| Term 4: | GS-DD-5100 | Student Research Seminar   | 1  | Total to Date<br>108 (10) |
|         | GS-DD-5110 | DDMT Journal Club          | 1  |                           |
|         | GS-DD      | Research Hours ± Electives | 10 |                           |
|         | Total:     |                            | 12 |                           |
| Term 5: | GS-DD-5110 | DDMT Journal Club          | 1  | Total to Date<br>120 (10) |
|         | GS-DD      | Research Hours ± Electives | 11 |                           |
|         | Total:     |                            | 12 |                           |

*Remaining required didactic hours should be elective courses*

#### **Qualifying Exam Requirement:**

- Must be taken by the end of the second year of enrollment.
- Student must complete all prerequisite activities defined by their program before taking the exam

#### **Year Three Requirements:**

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-DD-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5103 | Responsible Conduct of Research 3 | 1        |  |
| Terms 1-5: | GS-DD-5050 | Dissertation                      | 55 total |  |

#### **Year Four Requirements:**

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-DD-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5104 | Responsible Conduct of Research 4 | 1        |  |
| Terms 1-5: | GS-DD-5050 | Dissertation                      | 55 total |  |

#### **Research Course Work:**

|            |                   |
|------------|-------------------|
| GS-DD-5010 | Readings          |
| GS-DD-5030 | Research Rotation |
| GS-DD-5040 | Special Projects  |
| GS-DD-5050 | Dissertation      |

# Graduate Degree Plan

## PhD in Genetics & Genomics

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses
- Completion of at least three terms of Research Rotation
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|         |            |   |  |               |
|---------|------------|---|--|---------------|
| Term 1: | GS-GS-6600 | Foundations A: Molecules to Systems     | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-GS-6400 | Foundations B: Biostatistics            | 2 (Didactic)<br><i>(two-term course)</i> |               |
|         | GS-GS-5101 | Responsible Conduct of Research 1       | 1  |               |
|         | GS-GG-5100 | Student Research Seminar                | 1  |               |
|         | GS-GG-5030 | Research Rotation ± Electives           | 5  |               |
|         | Total:     |   |  |               |
| Term 2: | GS-GS-6600 | Foundations A: Molecules to Systems     | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-GS-6400 | Foundations B: Biostatistics            | 2 (Didactic)<br><i>(two-term course)</i> |               |
|         | GS-GG-6201 | Model Systems Genetics                  | 2 (Didactic)                             |               |
|         | GS-GG-5100 | Student Research Seminar                | 1  |               |
|         | GS-GG-5030 | Research Rotation ± Electives           | 4  |               |
|         | Total:     |   |  |               |
| Term 3: | GS-GG-6202 | Mammalian Genetics                      | 2 (Didactic)                             | Total to Date |
|         | GS-GG-6204 | Method & Logic in Genetics & Genomics   | 2 (Didactic)                             |               |
|         | GS-GG-5105 | Genetics & Genomics Journal Club        | 1  |               |
|         | GS-GG-5100 | Student Research Seminar                | 1  |               |
|         | GS-GS-5105 | Scientific Writing                      | 1  |               |
|         | GS-GG-5030 | Research Rotation ± Electives           | 5  |               |
| Total:  |            |   | 12 (4)                                   | 36 (16)       |
| Term 4: | GS-GG-6302 | Human Genetics                          | 3 (Didactic)                             | Total to Date |
|         | GS-IY-6303 | Fundamentals of Effective Grant Writing | 2 (Didactic)                             |               |
|         | GS-GG-5105 | Genetics & Genomics Journal Club        | 1  |               |
|         | GS-GG-5100 | Student Research Seminar                | 1  |               |
|         | GS-GG      | Research Hours ± Electives              | 5  |               |
|         | Total:     |   |  |               |
| Term 5: | GS-GG-5105 | Genetics & Genomics Journal Club        | 1  | Total to Date |
|         | GS-GG      | Research Hours ± Electives              | 11                                       |               |
|         | Total:     |   |  |               |

### Year Two Requirements:

|         |            |                            |    |               |
|---------|------------|----------------------------|----|---------------|
| Term 1: | GS-GG-5100 | Student Research Seminar   | 1  | Total to Date |
|         | GS-GG      | Research Hours ± Electives | 11 |               |
|         | Total:     |                            |    |               |

|         |            |                                   |    |                          |
|---------|------------|-----------------------------------|----|--------------------------|
| Term 2: | GS-GG-5100 | Student Research Seminar          | 1  | Total to Date<br>84 (19) |
|         | GS-GS-5102 | Responsible Conduct of Research 2 | 1  |                          |
|         | GS-GG      | Research Hours ± Electives        | 10 |                          |
|         | Total:     |                                   | 12 |                          |
| Term 3: | GS-GG-5105 | Genetics & Genomics Journal Club  | 1  | Total to Date<br>96 (19) |
|         | GS-GG-5100 | Student Research Seminar          | 1  |                          |
|         | GS-GG      | Research Hours ± Electives        | 10 |                          |
|         | Total:     |                                   | 12 |                          |

*Student's Thesis Advisory Committee must be appointed by the end of Term 3 in the student's second year of enrollment.*

|         |            |                                  |    |                           |
|---------|------------|----------------------------------|----|---------------------------|
| Term 4: | GS-GG-5105 | Genetics & Genomics Journal Club | 1  | Total to Date<br>108 (19) |
|         | GS-GG-5100 | Student Research Seminar         | 1  |                           |
|         | GS-GG      | Research Hours ± Electives       | 10 |                           |
|         | Total:     |                                  | 12 |                           |
| Term 5: | GS-GG-5105 | Genetics & Genomics Journal Club | 1  | Total to Date<br>120 (19) |
|         | GS-GG      | Research Hours ± Electives       | 11 |                           |
|         | Total:     |                                  | 12 |                           |

*Remaining required didactic hours should be elective courses*

### Qualifying Exam Requirement:

- Must be taken by the end of the second year of enrollment
- All phases of the exam process must be completed before a result is indicated
- Any student earning an Incomplete on any phase of the exam must retake the exam within six months.

### Year Three Requirements:

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-GG-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5103 | Responsible Conduct of Research 3 | 1        |  |
| Terms 1-5: | GS-GG-5050 | Dissertation                      | 55 total |  |

### Year Four Requirements:

|            |            |                                   |          |  |
|------------|------------|-----------------------------------|----------|--|
| Terms 1-4: | GS-GG-5100 | Student Research Seminar          | 4 total  |  |
| Term 3:    | GS-GS-5104 | Responsible Conduct of Research 4 | 1        |  |
| Terms 1-5: | GS-GG-5050 | Dissertation                      | 55 total |  |

### Research Course Work:

|            |                   |
|------------|-------------------|
| GS-GG-5010 | Readings          |
| GS-GG-5030 | Research Rotation |
| GS-GG-5040 | Special Projects  |
| GS-GG-5050 | Dissertation      |

# Graduate Degree Plan

## PhD in Immunology & Microbiology

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses
- Completion of at least three terms of Research Rotation
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|         |            |  |  |                              |
|---------|------------|--|--|------------------------------|
| Term 1: | GS-GS-6600 | Foundations A: Molecules to Systems                          | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date<br><br>12 (7)  |
|         | GS-GS-6400 | Foundations B: Biostatistics                                 | 2 (Didactic)<br><i>(two-term course)</i> |                              |
|         | GS-GS-5101 | Responsible Conduct of Research 1                            | 1  |                              |
|         | GS-GS-5111 | Strategies for Success in Graduate School                    | 1  |                              |
|         | GS-IY-6401 | Concepts in Host Immune System-<br>Microbe Interactions      | 2 (Didactic)<br><i>(two-term course)</i> |                              |
|         | GS-IY-5105 | Seminars in Immunology & Microbiology                        | 1  |                              |
|         | GS-IY-5110 | Literature Review in I & M                                   | 1  |                              |
|         | GS-IY-5030 | Research Rotation  | 1  |                              |
| Total:  |            |  | 12 (7)                                   | 12 (7)                       |
| Term 2: | GS-GS-6600 | Foundations A: Molecules to Systems                          | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date<br><br>24 (14) |
|         | GS-GS-6400 | Foundations B: Biostatistics                                 | 2 (Didactic)<br><i>(two-term course)</i> |                              |
|         | GS-GS-5112 | Powerful Presentations                                       | 1  |                              |
|         | GS-IY-6401 | Concepts in Host Immune System-<br>Microbe Interactions      | 2 (Didactic)<br><i>(two-term course)</i> |                              |
|         | GS-IY-5100 | Student Research Seminar                                     | 1  |                              |
|         | GS-IY-5105 | Seminars in Immunology & Microbiology                        | 1  |                              |
|         | GS-IY-5110 | Literature Review in I & M                                   | 1  |                              |
|         | GS-IY-5030 | Research Rotation  | 1  |                              |
| Total:  |            |  | 12 (7)                                   | 24 (14)                      |
| Term 3: | GS-IY-6302 | Grand Challenges and Methods in<br>Immunology & Microbiology | 3 (Didactic)                             | Total to Date<br><br>36 (17) |
|         | GS-GS-5105 | Scientific Writing   | 1  |                              |
|         | GS-IY-5100 | Student Research Seminar                                     | 1  |                              |
|         | GS-IY-5105 | Seminars in Immunology & Microbiology                        | 1  |                              |
|         | GS-IY-5110 | Literature Review in I & M                                   | 1  |                              |
|         | GS-IY-5030 | Research Rotation ± Electives                                | 5  |                              |
|         | Total:     |  |  |                              |
| Term 4: | GS-IY-6303 | Fundamentals of Effective Grant Writing                      | 3 (Didactic)                             | Total to Date<br><br>48 (20) |
|         | GS-GS-5113 | Effective Project Design & Management                        | 1  |                              |
|         | GS-IY-5100 | Student Research Seminar                                     | 1  |                              |
|         | GS-IY-5105 | Seminars in Immunology & Microbiology                        | 1  |                              |
|         | GS-IY-5110 | Literature Review in I & M                                   | 1  |                              |
|         | GS-IY      | Research Hours ± Electives                                   | 5  |                              |
|         | Total:     |  |  |                              |
| Term 5  | GS-IY      | Research Hours ± Electives                                   | 12                                       | Total to Date                |
| Total:  |            |  | 12                                       | 60 (20)                      |

| <b>Year Two Requirements:</b>   |            |                                       |          |                           |
|---|------------|---------------------------------------|----------|---------------------------|
| Term 1:   | GS-IY-5105 | Seminars in Immunology & Microbiology | 1        | Total to Date<br>73 (20)  |
|   | GS-IY-5110 | Literature Review in I & M            | 1        |                           |
|   | GS-IY      | Research Hours ± Electives            | 10       |                           |
|   | Total:     |                                       | 12       |                           |
| Term 2:   | GS-IY-5100 | Student Research Seminar              | 1        | Total to Date<br>85 (20)  |
|   | GS-IY-5105 | Seminars in Immunology & Microbiology | 1        |                           |
|   | GS-IY-5110 | Literature Review in I & M            | 1        |                           |
|   | GS-GS-5102 | Responsible Conduct of Research 2     | 1        |                           |
|   | GS-IY      | Research Hours ± Electives            | 8        |                           |
|   | Total:     |                                       | 12       |                           |
| Term 3:   | GS-IY-5100 | Student Research Seminar              | 1        | Total to Date<br>97 (20)  |
|   | GS-IY-5105 | Seminars in Immunology & Microbiology | 1        |                           |
|   | GS-IY-5110 | Literature Review in I & M            | 1        |                           |
|   | GS-IY      | Research Hours ± Electives            | 9        |                           |
|   | Total:     |                                       | 12       |                           |
| <i>Student's Thesis Advisory Committee must be appointed by the end of Term 3 in the student's second year of enrollment.</i>   |            |                                       |          |                           |
| Term 4:   | GS-IY-5100 | Student Research Seminar              | 1        | Total to Date<br>109 (20) |
|   | GS-IY-5105 | Seminars in Immunology & Microbiology | 1        |                           |
|   | GS-IY-5110 | Literature Review in I & M            | 1        |                           |
|   | GS-IY      | Research Hours ± Electives            | 9        |                           |
|   | Total:     |                                       | 12       |                           |
| Term 5:   | GS-IY      | Research Hours ± Electives            | 12       | Total to Date<br>121 (20) |
|   | Total:     |                                       | 12       |                           |
| <i>Remaining required didactic hours should be elective courses</i>   |            |                                       |          |                           |
| <b>Qualifying Exam Requirement:</b>   |            |                                       |          |                           |
| <ul style="list-style-type: none"> <li>• Must be taken by the end of the second year of enrollment.</li> <li>• Student must complete all prerequisite activities defined by their program before taking the exam</li> </ul> |            |                                       |          |                           |
| <b>Year Three Requirements:</b>   |            |                                       |          |                           |
| Terms 2-4:  | GS-IY-5100 | Student Research Seminar              | 3 total  |                           |
| Terms 1-4:  | GS-IY-5105 | Seminars in Immunology & Microbiology | 4 total  |                           |
| Terms 1-4:  | GS-IY-5110 | Literature Review in I & M            | 4 total  |                           |
| Term 3:   | GS-GS-5103 | Responsible Conduct of Research 3     | 1        |                           |
| Terms 1-5:  | GS-IY-5050 | Dissertation                          | 48 total |                           |
| <b>Year Four Requirements:</b>  |            |                                       |          |                           |
| Terms 2-4:  | GS-IY-5100 | Student Research Seminar              | 3 total  |                           |
| Terms 1-4:  | GS-IY-5105 | Seminars in Immunology & Microbiology | 4 total  |                           |
| Terms 1-4:  | GS-IY-5110 | Literature Review in I & M            | 4 total  |                           |
| Term 3:   | GS-GS-5104 | Responsible Conduct of Research 3     | 1        |                           |
| Terms 1-5:  | GS-IY-5050 | Dissertation                          | 48 total |                           |
| <b>Research Course Work:</b>  |            |                                       |          |                           |
|   | GS-IY-5010 | Readings                              |          |                           |
|   | GS-IY-5030 | Research Rotation                     |          |                           |
|   | GS-IY-5040 | Special Projects                      |          |                           |
|   | GS-IY-5050 | Dissertation                          |          |                           |

# Graduate Degree Plan

## PhD in Neuroscience

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses
- Completion of at least three terms of Research Rotation
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|         |            |   |              |               |
|---------|------------|---|--------------|---------------|
| Term 1: | GS-NE-5111 | Neuroscience Lab 1                          | 1            | Total to Date |
|         | GS-NE-6303 | Electrical Signaling in the Brain           | 3 (Didactic) |               |
|         | GS-NE-6304 | Brain Cell Biology & Development            | 3 (Didactic) |               |
|         | GS-GS-5101 | Responsible Conduct of Research 1           | 1            |               |
|         | GS-NE-5030 | Research Rotation ± Electives               | 4            |               |
| Total:  |            |   | 12 (6)       | 12 (6)        |
| Term 2: | GS-NE-6201 | Analyses of Neuronal Function               | 2 (Didactic) | Total to Date |
|         | GS-NE-6202 | Anatomy of the Nervous System               | 2 (Didactic) |               |
|         | GS-NE-6112 | Neuroscience Lab 2                          | 1 (Didactic) |               |
|         | GS-NE-5100 | Neuroscience Seminar Journal Club           | 1            |               |
|         | GS-NE-5030 | Research Rotation ± Electives               | 6            |               |
| Total:  |            |   | 12 (5)       | 24 (11)       |
| Term 3: | GS-NE-6301 | Neural Systems 1                            | 3 (Didactic) | Total to Date |
|         | GS-NE-6203 | Genetics for Neuroscience                   | 2 (Didactic) |               |
|         | GS-NE-5100 | Neuroscience Seminar Journal Club           | 1            |               |
|         | GS-NE-5030 | Research Rotation ± Electives               | 6            |               |
| Total:  |            |   | 12 (5)       | 36 (16)       |
| Term 4: | GS-NE-6302 | Neural Systems 2                            | 3 (Didactic) | Total to Date |
|         | GS-NE-6101 | Core Concepts in Computational Neuroscience | 1 (Didactic) |               |
|         | GS-NE-6204 | Neurobiology of Disease                     | 2 (Didactic) |               |
|         | GS-NE-5100 | Neuroscience Seminar Journal Club           | 1            |               |
|         | GS-NE      | Research Hours ± Electives                  | 5            |               |
| Total:  |            |   | 12 (6)       | 48 (22)       |
| Term 5: | GS-NE      | Research Hours ± Electives                  | 12           | Total to Date |
|         | Total:     |   |              | 12            |

### Year Two Requirements:

|         |            |                              |  |               |
|---------|------------|------------------------------|--|---------------|
| Term 1: | GS-GS-6400 | Foundations B: Biostatistics | 2 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-NE      | Research Hours ± Electives   | 10                                       |               |
| Total:  |            |                              | 12 (2)                                   | 72 (24)       |

|   |            |   |  |               |
|---|------------|---|--|---------------|
| Term 2:   | GS-GS-6400 | Foundations B: Biostatistics                    | 2 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|   | GS-NE-5101 | Preparing for your Neuroscience Qualifying Exam | 1  |               |
|   | GS-GS-5102 | Responsible Conduct of Research 2               | 1  |               |
|   | GS-NE-5100 | Neuroscience Seminar Journal Club               | 1  |               |
|   | GS-NE      | Research Hours ± Electives                      | 7  |               |
|   | Total:     |   | 12 (2)                                   |               |
| Term 3:   | GS-NE-5100 | Neuroscience Seminar Journal Club               | 1  | Total to Date |
|   | GS-NE      | Research Hours ± Electives                      | 11                                       |               |
|   | Total:     |   | 12                                       |               |
| <i>Student's Thesis Advisory Committee must be appointed by the end of Term 3 in the student's second year of enrollment.</i> |            |   |  |               |
| Term 4:   | GS-NE-5100 | Neuroscience Seminar Journal Club               | 1  | Total to Date |
|   | GS-NE      | Research Hours ± Electives                      | 11                                       |               |
|   | Total:     |   | 12                                       |               |
| Term 5:   | GS-NE      | Research Hours ± Electives                      | 12                                       | Total to Date |
|   |            |   | 12                                       | 120 (26)      |

*Remaining required didactic hours should be elective courses*

### Qualifying Exam Requirement:

- Must be taken by the end of the second year of enrollment.
- Student must complete all prerequisite activities defined by their program before taking the exam

### Year Three Requirements:

|            |            |                                   |    |  |
|------------|------------|-----------------------------------|----|--|
| Terms 1-5: | GS-NE-5050 | Dissertation                      | 59 |  |
| Term 3:    | GS-GS-5103 | Responsible Conduct of Research 3 | 1  |  |

### Year Four Requirements:

|            |            |                                   |    |  |
|------------|------------|-----------------------------------|----|--|
| Terms 1-5: | GS-NE-5050 | Dissertation                      | 59 |  |
| Term 3:    | GS-GS-5104 | Responsible Conduct of Research 4 | 1  |  |

### Research Course Work:

|            |                   |
|------------|-------------------|
| GS-NE-5010 | Readings          |
| GS-NE-5030 | Research Rotation |
| GS-NE-5040 | Special Projects  |
| GS-NE-5050 | Dissertation      |

# Graduate Degree Plan

## PhD in Quantitative & Computational Biosciences

Students Starting Academic Year: 2019-2020

### General Degree Requirements:

- Completion of at least 180 term hours
- At least 30 of those term hours must be in Didactic courses
- Completion of at least three terms of Research Rotation
- Students must maintain satisfactory academic progress as detailed in the Student Handbook

### Year One Requirements:

|         |            |  |  |               |
|---------|------------|--|--|---------------|
| Term 1: | GS-GS-6600 | Foundations A: Molecules to Systems                    | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-GS-6400 | Foundations B: Biostatistics                           | 2 (Didactic)                             |               |
|         | GS-QC-6301 | Practical Introduction to Programming for Scientists   | 3 (Didactic)                             |               |
|         | GS-GS-5101 | Responsible Conduct of Research 1                      | 1  |               |
|         | GS-QC-5105 | Seminar in Quantitative Biosciences                    | 1  |               |
|         | GS-QC-5110 | Advanced Topics in QCB                                 | 1  |               |
|         | GS-QC-5030 | Research Rotation                                      | 1  |               |
| Total:  |            |  | 12 (8)                                   | 12 (8)        |
| Term 2: | GS-GS-6600 | Foundations A: Molecules to Systems                    | 3 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-GS-6400 | Foundations B: Biostatistics                           | 2 (Didactic)                             |               |
|         | GS-QC-6801 | Computational Mathematics for Quantitative Biomedicine | 4 (Didactic)<br><i>(two-term course)</i> |               |
|         | GS-QC-5105 | Advanced Topics in QCB                                 | 1  |               |
|         | GS-QC-5110 | Seminar in Quantitative Biosciences                    | 1  |               |
|         | GS-QC-5030 | Research Rotation                                      | 1  |               |
| Total:  |            |  | 12 (9)                                   | 24 (17)       |
| Term 3: | GS-QC-6801 | Computational Mathematics for Quantitative Biomedicine | 4 (Didactic)<br><i>(two-term course)</i> | Total to Date |
|         | GS-GS-5105 | Scientific Writing                                     | 1  |               |
|         | GS-QC-5105 | Seminar in Quantitative Biosciences                    | 1  |               |
|         | GS-QC-5030 | Research Rotation ± Electives                          | 6  |               |
| Total:  |            |  | 12 (4)                                   | 36 (21)       |
| Term 4: | GS-QC-5301 | QCB Research Design                                    | 3  | Total to Date |
|         | GS-QC-5105 | Seminar in Quantitative Biosciences                    | 1  |               |
|         | GS-QC-5100 | Student Research Seminar                               | 1  |               |
|         | GS-QC      | Research Hours ± Electives                             | 7  |               |
| Total:  |            |  | 12                                       | 48 (21)       |
| Term 5: | GS-QC      | Research Hours ± Electives                             | 12                                       | Total to Date |
|         | Total:     |  |  | 12            |

| <b>Year Two Requirements:</b>   |            |                                     |          |               |
|---|------------|-------------------------------------|----------|---------------|
| Term 1:   | GS-QC-5105 | Seminar in Quantitative Biosciences | 1        | Total to Date |
|   | GS-QC      | Research Hours ± Electives          | 11       |               |
|   | Total:     |                                     | 12       | 72 (21)       |
| Term 2:   | GS-QC-5105 | Seminar in Quantitative Biosciences | 1        | Total to Date |
|   | GS-GS-5102 | Responsible Conduct of Research 2   | 1        |               |
|   | GS-QC      | Research Hours ± Electives          | 10       |               |
|   | Total:     |                                     | 12       |               |
| Term 3:   | GS-QC-5105 | Seminar in Quantitative Biosciences | 1        | Total to Date |
|   | GS-QC      | Research Hours ± Electives          | 11       |               |
|   | Total:     |                                     | 12       | 96 (21)       |
| <i>Student's Thesis Advisory Committee must be appointed by the end of Term 3 in the student's second year of enrollment.</i>   |            |                                     |          |               |
| Term 4:   | GS-QC-5105 | Seminar in Quantitative Biosciences | 1        | Total to Date |
|   | GS-QC-5100 | Student Research Seminar            | 1        |               |
|   | GS-QC      | Research Hours ± Electives          | 10       |               |
|   | Total:     |                                     | 12       |               |
| Term 5:   | GS-QC      | Research Hours ± Electives          | 12       | Total to Date |
|   | Total:     |                                     | 12       | 120 (21)      |
| <i>Remaining required didactic hours should be elective courses</i>   |            |                                     |          |               |
| <b>Qualifying Exam Requirement:</b>   |            |                                     |          |               |
| <ul style="list-style-type: none"> <li>• Must be taken by the end of the second year of enrollment.</li> <li>• Student must complete all prerequisite activities defined by their program before taking the exam</li> </ul> |            |                                     |          |               |
| <b>Year Three Requirements:</b>   |            |                                     |          |               |
| Terms 1-4:  | GS-QC-5105 | Seminar in Quantitative Biosciences | 4 total  |               |
| Term 3:   | GS-GS-5103 | Responsible Conduct of Research 3   | 1        |               |
| Term 4:   | GS-QC-5100 | Student Research Seminar            | 1        |               |
| Terms 1-5:  | GS-QC-5050 | Dissertation                        | 54 total |               |
| <b>Year Four Requirements:</b>  |            |                                     |          |               |
| Terms 1-4:  | GS-QC-5105 | Seminar in Quantitative Biosciences | 4 total  |               |
| Term 3:   | GS-GS-5104 | Responsible Conduct of Research 4   | 1        |               |
| Term 4:   | GS-QC-5100 | Student Research Seminar            | 1        |               |
| Terms 1-5:  | GS-QC-5050 | Dissertation                        | 54 total |               |

| <b>Research Course Work:</b> |                   |  |
|------------------------------|-------------------|--|
| GS-QC-5010                   | Readings          |  |
| GS-QC-5030                   | Research Rotation |  |
| GS-QC-5040                   | Special Projects  |  |
| GS-QC-5050                   | Dissertation      |  |