Biomedical Sciences Degree Program
for the
Doctor of Philosophy (PhD)
Concentration in
Biochemistry and Molecular Biology

at East Carolina University
The Brody School of Medicine
Greenville, NC 27834
(Member of the University of North Carolina System)

Policies and Procedures
Handbook for Students

Assembled by the Graduate Committee
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POLICIES AND PROCEDURES

For The Graduate Concentration in ***Biochemistry and Molecular Biology, PhD in Biomedical Sciences***

CONTENTS

I. General Information 3
A. Introduction 3
B. Biochemistry and Molecular Biology Graduate Committee (BGC) 3
C. Application for Graduate Study 3

II. General Policies 4
A. Vacation Policies 4
B. Student Concerns 4
C. Student Health and Wellness 4
D. Disability Support Services 5
E. Leave of Absence and Readmission 5
F. Time Limits for Degree Completion 5

III. Information for First Year Students 6
A. Advisors and Research Rotations for new Students 6
Track 1 Details 6
Track 2 Details 7
B. Selection of Dissertation Advisor 7
C. Graduate Advisory Committee 7
D. Responsibilities of Student's Advisory Committee Members 8

IV. Graduate Curriculum in Biochemistry and Molecular Biology 9
A. Research Requirement 9
B. Course Requirements 9
C. Requirement Checklist 10
D. Example Program of Study 11
E. Transfer of Graduate Coursework 12

V. Admission to Candidacy for Doctoral Degree 13
A. General Information 13
B. Eligibility and Timing 13
C. Candidacy Examination 13

VI. Doctoral Dissertation 15
A. Dissertation Requirements 15
B. Request to Defend 15
C. Dissertation Requirements 15
D. Dissertation Defense and Completion of Program 16

VII. Academic Performance 17
A. Academic Integrity 17
B. Grade Point Average 17
C. Progress Evaluations 18
D. Student Appeal Policy 18

VIII. Required Forms 19-25

VIII. Revision History 26

I. GENERAL INFORMATION REGARDING THE GRADUATE PROGRAM

A. *Introduction*

This handbook defines the guidelines and policies governing the doctoral program in the Department of Biochemistry and Molecular Biology at East Carolina University and is supplemental to the current university graduate catalog. The Graduate Handbook, Degree Works, and the ECU Graduate Catalog should be consulted by graduate students to ensure specific requirements are met during their graduate studies. The information provided in this handbook has been prepared for the graduate faculty, graduate students, and applicants to the Biomedical Sciences PhD graduate program, Concentration in Biochemistry and Molecular Biology. All faculty and students should be familiar with the information provided and should adhere to these policies and procedures in formulating the student's program of study.

B. *Biochemistry and Molecular Biology Graduate Committee (BGC)*

This committee of the faculty of the graduate concentration in Biochemistry and Molecular Biology is responsible for implementation and management of the graduate program, as described in this handbook and for formulating new or amended policies and practices that are subject to approval by vote of the graduate faculty. The BGC shall consist of at least two members who mentor graduate students (or have recently done so), appointed periodically by the Departmental Chair, and the Graduate Director for the Biochemistry and Molecular Biology PhD Concentration, who shall act as BGC chair. The BGC will report at each Department of Biochemistry and Molecular Biology (BMB) faculty meeting. These reports will inform the faculty of the progress of all BMB graduate students, and to discuss and act on policy changes. New policies formulated by BGC become binding only after they have been approved by two-thirds of the departmental graduate faculty.

C. *Application for Graduate Study in Biochemistry and Molecular Biology*

Specific requirements for admission to the graduate program are given in the university catalog. Applicants may apply for admission to begin studies in either the second summer session or the fall semester of the academic year. Application instructions can be found on the Graduate School's website at: https://gradschool.ecu.edu/application-process/. Applications must be supported by official transcripts from each institution attended since high school, at least one letter of recommendation from a person able to assess the applicant's potential as a research scientist, and statement of purpose (1-2 pages) from the applicant describing their future career goals. International applicants who do not use English as their native language must provide evidence of English proficiency- (TOEFL, IELTS, or Duolingo). Details regarding requirements for international graduate students can be found on the Graduate School's website. Inquiries regarding admission to the graduate program in BMB should be referred to the Graduate Director for processing.

Admission to the graduate program requires recommendation by the BGC and approval by the Departmental Chair. Selections are made after consideration of individual qualifications and availability of facilities and resources. Final admission to the graduate program is granted by the Dean of the Graduate School.

Applicants enrolled in another program must complete their current program before matriculating into the Biomedical Science PhD program. Students from other Concentrations in the Brody School of Medicine must obtain permission in writing from the BGC before transferring into the BMB Concentration.

II. GENERAL POLICIES

A. *Vacation Policy*

Graduate students receive 10 working days of vacation, in addition to the 12 State holidays provided each year. State holiday dates can be found online at ECU Human Resources.

The 10 working days of vacation begin on the student's matriculation date in the graduate program. Unused vacation days are not rolled over to the next year. Graduate students must submit a leave request in writing to their Dissertation Advisor at least two weeks prior to their planned vacation leave. If the student is still rotating or has not yet selected a Dissertation Advisor, leave requests should be submitted in writing to the Graduate Program Director. The student's Dissertation Advisor will keep track of the annual vacation days.

B. *Student Concerns*

There may be times when students have a concern regarding a course, aspects of the graduate program, or other issues. The following serves as a guideline for graduate students experiencing various concerns in the graduate program.

- For concerns regarding a course, students should first discuss the concern with the faculty member who is teaching the course and/or the course director. If the concern is not satisfactorily addressed, then the student should bring the concern to the Graduate Director who will then pursue resolution.
- For questions or concerns related to the graduate program, the student should speak with their Dissertation Advisor. If further assistance is needed, the student should consult members of the BGC or their dissertation committee members in consultation with the Graduate Director for guidance.
- The BGC members serve as advocates for graduate students and should be approached with personal concerns that cannot be addressed by the above guidelines. Students can schedule an appointment to meet with any member of the BGC when experiencing unresolved issues. Issues will remain confidential according to university policy guidelines.
- The student appeal procedure can be found in the ECU Graduate Catalogue. The policy to appeal a grade can also be found in the ECU Graduate Catalogue, under Graduate Student Grade Appeals.

C. *Student Health and Wellness*

A variety of health-related topics can be found at Brody Office of Student Affairs: Student Healthcare Options.

Health Services
The ECU Student Health Center provides medical care to enrolled students. There is no cost for the visits. Labs/other items may be billed to insurance.
To make a new appointment: call 252-328-6841 or schedule through myPIRATEchart
Locations:
Main Campus: ECU Student Health Services between Flanagan Building/Joyner East
BSOM Campus: second floor of the Health Science Student Center

Counseling Services
The Office of Student Success and Wellness (OSSaW) provides a variety of counseling services to meet the individual needs of each student.

Please do not hesitate to make an appointment with a certified counselor at the following OSSaW link: Appointments | Office of Student Success and Wellness | ECU

D. *Disability Support Services*

Disability Support Services (DSS) is a resource for students with disabilities. The primary role of DSS is to ensure students with disabilities have equitable access to all ECU programs, services, facilities and activities of the university. DSS works with ECU students, faculty and staff to coordinate a range of services and accommodations designed to support students with disabilities on an individualized basis. (https://accessibility.ecu.edu/students/)

E. *Leave of Absence and Readmission*

Students enrolled in graduate degree programs who take a leave of absence for one or more semesters (excluding summer terms) must notify their Dissertation Advisor, Graduate Advisory Committee, and the Graduate Director. In order to return to the program, the student must file a readmission application. During a leave of absence students will not be permitted to utilize university resources. Readmission to a graduate program is not guaranteed.

Students who take a leave of absence may file an application for readmission online at https://gradschool.ecu.edu. Students wishing to change graduate degree or certificate programs after a leave of absence must submit a new admissions application. Students readmitted after a leave of absence of three years or more will be required to meet new or changed degree requirements. East Carolina University course credit will be evaluated for applicability towards degree requirements in accordance with established time limits (see below) from the date of course completion (see the ECU Graduate Catalog).

F. *Time Limits for Degree Completion*

A student's time limit for completion starts with the first course approved for inclusion in the degree plan (including transfer credits) or the date of admission to the program, whichever occurs first, and includes planned and unplanned leaves of absence. Students who do not achieve candidacy or do not complete their degrees within the required time limits will be dismissed from their degree program and the Graduate School unless a time extension is granted. All requests for time extensions must be received by the Graduate School prior to expiration of the degree program's time limit and must use the official Request for Time Extension to Complete Graduate Degree Requirements form (found at https://gradschool.ecu.edu/forms/).

G. *Importance of Requirements and Deadlines*

All policies and procedures have been implemented to ensure student success and completion of the PhD degree in a timely fashion. As such, it is the responsibility of the student to be familiar with all requirements, deadlines, etc. Failure to meet required deadlines will result in a verbal warning/inquiry to ensure the student is aware and working on the requirement. Continued failure to address the issue will result in a written warning that is distributed to the student and the Dissertation Advisor. Continued inaction can result in interruption in stipend and/or tuition payment, delays in degree completion, and ultimately expulsion from the program.

III. INFORMATION FOR FIRST YEAR STUDENTS

A. *Advisors and Research Rotations for New Students*

The Graduate Director will serve as temporary advisor to all students who have not chosen a dissertation advisor at the time of admission. The student should also familiarize themselves with both the graduate school requirements as well as the additional requirements for the Biomedical Sciences PhD and the BMB Concentration.

All incoming students will enroll in BIOC 7330: Intro to Research for their first semester to begin their research training. During the first year of study, students will typically conduct research rotations with graduate faculty members whose research areas are of interest (Track 1). Rotations may be waived if the student is entering with a Master's degree in the biological or chemical sciences and an agreed Dissertation Advisor at the time of entry, or if the student is recruited directly into a funded laboratory (Track 2). In the second and subsequent semesters, the student will enroll in BIOC 8333 Research for 3 credit hours, or BIOC 8336 for 6 credit hours, per semester.

All new students are required to meet with all departmental faculty members to become apprised of research opportunities in the department and to learn of each faculty member's expertise and interests. A completed Research Orientation Form (**BMB_1**) must be submitted to the Graduate Director within three weeks of the First Day of Classes (to verify that these meetings have taken place). This information is expected to aid the student in identifying possible rotation laboratories (Track 1) as well as potential dissertation committee members (Tracks 1 and 2).

Track 1 Details

Research rotations provide students with the opportunity to work closely with faculty to gain laboratory experience in multiple areas of biochemistry and molecular biology and to gauge the "fit" of the student in the laboratory. For the first research rotation, the Graduate Director, after consultation with the student and the BGC will assign the student to a rotation laboratory. After meeting with the faculty and submitting the Research Orientation Form (**BMB_1**), students will then request their preferences for the second and subsequent research rotations. To do so, students will submit the Research Rotation Request Form (**BMB_2**) to the Graduate Director identifying the proposed mentor and an alternate for the second laboratory rotation. Assignment of rotation must be approved by the Graduate Director after consultation with the BGC.

Rotating students are required to spend a minimum of 20 hours per week in the laboratory. Rotating students will complete 2-3 rotations of 10 weeks each beginning with the First Day of Classes. The rotation schedule is as follows:

- 1st Rotation, First Day of Classes (mid-August) to end of October
- 2nd Rotation, First full week of November to end of January (excluding holiday breaks)
- 3rd Rotation (as needed), First full week of February to mid-April

By the 6th week of the 2nd rotation, both rotation mentors will consult with the Graduate Director to discuss if a 3rd rotation would be beneficial/required for the student. At the completion of each research rotation, the rotation advisor and the student are required to submit a Research Rotation Evaluation Form (**BMB_3**) to the Graduate Director. The rotation advisor is also responsible for assigning a grade to the rotation to forward to the Graduate Director for submission. With the approval of the BGC, students may request to take a 3rd or 4th research rotation in the spring semester and summer if a Dissertation Advisor has not yet been chosen.

Track 2 Details

If the student is entering with a Master's degree in the biological or chemical sciences, or if the student is recruited directly into a funded laboratory they may be able to waive rotations. In this case, students are required to form their dissertation committee within 8 weeks of the first day of class and schedule their first committee meeting by the end of the Fall semester their first year. The purpose of this first meeting will be to evaluate the compatibility of the student and dissertation advisor and ensure that the pairing is working for all parties involved. At the end of the Spring semester of the first year, the student and the Dissertation Advisor are required to meet independently with a member of the BGC to ensure continued compatibility. If the pairing is working, the student should submit a signed Selection of Dissertation Lab and Advisor Form (**BMB_4**) to the Graduate Director.
If at any time the student and mentor agree that the situation is not working, the student can transfer to Track 1, and begin what would then be considered a second rotation.

B. *Selection of a Dissertation Advisor*

Selection of a Dissertation Advisor occurs either following the completion of research rotations (Track 1), or with the decision to directly join a laboratory either through direct recruitment or the waiving of rotations (Track 2). The Graduate Director and the BGC may assist the student in selecting a Dissertation Advisor appropriate to the research interests and professional goals of the student. Importantly, the selection must also be consistent with the resources of the proposed Dissertation Advisor and the department, as signified by the necessary approval of the Departmental Chair. Selection should be weighted toward funded laboratories. The assignment should also be mutually agreeable to both the student and the Dissertation Advisor.

The timeline and requirements for choosing a dissertation laboratory is different depending on whether students completed rotations (Track 1) or were directly recruited to a dissertation laboratory (Track 2). Although typically chosen by the end of rotations, all full-time students in the graduate program in BMB are required to have a Dissertation Advisor by the First Day of Classes of the Fall semester at the beginning of their second year. Once a dissertation laboratory has been chosen, the student is required to submit a signed Selection of Dissertation Lab and Advisor Form (**BMB_4**) to the Graduate Director.

With their signature on the Selection of Dissertation Lab and Advisor Form, the faculty member selected as advisor signifies in writing to the BGC, department, and Departmental Chair their willingness to assist the student and to accept the responsibility of directing the doctoral dissertation. After reviewing the request, the BGC will make a recommendation to the Departmental Chair for approval of the appointment. To change the advisor-advisee relationship, a revised form must be approved by the BGC and the Departmental Chair.

A student may not be suitable for a dissertation lab recommendation; in this case the student will be asked to transfer from the BMB Concentration or the program. Students without a Dissertation Advisor and Graduate Advisory Committee are unable to stand for the Candidacy Exam for the PhD (Section IV).

C. *Graduate Advisory Committee*

Within 8 weeks of selecting their Dissertation Advisor, the student, with council from their Dissertation Advisor, will identify members to serve on their Graduate Advisory Committee to be submitted to the BCG for approval. Committee members names and signatures will be submitted by the student in the Appointment of Student's Graduate Advisory Committee form (**BMB_5**) to be submitted to the Graduate Director.

The student's Dissertation Advisor will serve as the chair of the student's Graduate Advisory Committee. This committee is composed of at least four graduate faculty members. Two of these must be members of the graduate faculty in BMB, one of whom must be tenured and trained at least 1 graduate student. The third committee member must also be a member of the graduate faculty at ECU but can be from any department, including BMB. The fourth committee member must be a member of the graduate faculty of another department or another

university. Qualifications and responsibilities of members are outlined in the "Best Practices for Thesis and Dissertation Oversight" document found at the ECU Graduate School website and in the Graduate Program Director's handbook.

The student's Graduate Advisory Committee serves as mentors, advisors, and advocates for the student. The Graduate Advisory Committee is responsible for administering the Candidacy Examination (see Section V), counseling the student throughout their graduate experience, including the development of the student's program of study (recommending classes, training, etc.), approval of the research program, monitoring student's progress, and administration and evaluation of the dissertation defense (see Section VI). The Dissertation Advisor carries the responsibility to keep the Graduate Advisory Committee abreast of the student's progress during regular advisory meetings (see below).

The student's Graduate Advisory Committee **is required** to meet at least once a year, but also recommended during times of difficulty or transition. Annual meetings are typically held immediately after the student's research presentation in the Student Seminar Series in the spring semester. During this meeting the student should update the committee on their progress since the last meeting including any research milestones, papers, conference presentations, etc. There should also be discussion of any difficulties or changes in the project as well as an estimated timeline to completion. The student generally should be present for at least a part of all meetings but may be asked to step out for some discussions. Within one week of the advisory committee meeting, the student and advisor should complete the Graduate Student Progress Report Form (**BMB_6**) and submit them to the Graduate Director and provide copies to the student and each committee member. This report shall include a brief description of the overall achievement and development of the student as well as documentation of future goals and proposed timelines discussed by the committee.

If the Dissertation Advisor leaves this institution, the advisor and the student's Advisory Committee must ensure that the student's progress toward the degree can continue at this or another institution. If the advisor goes on sabbatical or becomes incapacitated, another faculty member must assume the role of acting chair of the Graduate Advisory Committee with the approval of the BGC and Departmental Chair.

D. *Responsibilities of Student's Advisory Committee Members*

The Graduate Advisory Committee is formed from members of the graduate faculty in accord with departmental or interdisciplinary program policies. Through its regular meetings, the committee is responsible for evaluating the student's potential for independent and creative research. Each committee member bears a responsibility to the student and to East Carolina University for maintenance of academic standards within the graduate school. The committee should also ensure consistency in standards and expectations among graduate students. To achieve these objectives, committee members are expected to regularly provide critical evaluation of the student's research and advocate for progress toward completion of an independent research project. Each committee member has a responsibility to attend all committee meetings (at least one per year), and to discuss with the student their critical evaluation of the dissertation prior to the final examination.

The following are specific expectations for Graduate Advisory Committees at the BSOM

1. Serve as the Candidacy Examination Committee
2. Approve the student's dissertation project.
3. Provide on-going critical advice to the student on his/her research project.
4. Critically evaluate the student's progress and performance.
5. Critically advise the student on the development of the dissertation to its final form.
6. Approve, administer and evaluate the Dissertation Defense.
7. Encourage student's professional development through membership in professional societies and communication of research findings at professional meetings and in publications.

IV. GRADUATE CURRICULUM IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

A. *Research Requirement*

PhD students in BMB are required to conduct an original, independent research project under the supervision of their Dissertation Advisor. The research project is a major component of the PhD curriculum. The student is required to present their research in public forums with scientific audiences such as local, regional, national, and international conferences. The student also must submit a first author primary research manuscript to at least one peer-reviewed journal. Decisions regarding journal suitability and exceptions to this requirement are determined by the student's Advisory Committee. Upon completion of the research project, a written Dissertation describing the research project and the results must be prepared under the direction of the student's Dissertation Advisor. See Section VI for more details on dissertation requirements.

B. *Course Requirements*

To obtain a degree, students must meet all requirements outlined in the Biomedical Sciences PhD catalog under BMB concentration and the departmental requirements outlined in this handbook.

A minimum of 76 credit hours of required and elective courses is required for graduation, as recorded in ECU DegreeWorks. Core courses as well as elective courses are used for calculating grade point averages required to remain in good standing in the department. Students must meet the 9 credit hour enrollment minimum for a full-time student in the Fall and Spring semesters. Students may take a maximum of 3 credits for BIOC 7330 (Introduction to Research) and 12 credits of BIOC 7355 (Current Topics). A minimum of 27 hours of BIOC 9000 (Dissertation Research) are required for the PhD degree. The credit hour requirements for the Biomedical Sciences core, the concentration courses, and elective courses are specified in DegreeWorks.

Research credit

Students must be registered for research credit in each semester. During their first semester, students are enrolled in BIOC 7330 (Introduction to Research) for 3 credits. In the following semesters prior to Candidacy, students need to enroll in either BIOC 8333 for 3 credits or BIOC 8336 for 6 credits of research depending on what is needed for the student to reach the 9 credit hour enrollment minimum. Starting in their 5th semester, students will enroll in BIOC 9000 (Dissertation Research).

Program of Study

The student must work with their Dissertation Advisor and Advisory Committee to establish a program of study before the start of the student's third semester. The program of study outlines the course work the student must take to complete a PhD degree. All Biomedical Sciences required coursework is mandatory and must be included on the student's program of study. The student's Advisory Committee can request to alter the BMB departmental program requirements when such changes are beneficial to the student. Recommended alterations must be submitted in writing to the BGC for review and forwarded to the Departmental Chair for approval.

PhD students are required to register for the graduate student seminar every semester throughout their program. A total of 4 credits are required by the Biomedical Sciences core curriculum. Additional credits are required by the Concentration equal to the length of the student's degree program (1 credit per semester enrolled). Modifications to this requirement must be approved by the student's Advisory Committee through the student's program of study.

Students must consult with their Dissertation Advisor to choose electives. The Graduate Director may provide a list of current elective offerings to the student, the Advisor and/or the Advisory Committee.

Biomedical Sciences required coursework for completion of the degree		
General Core:		Credits Acquired
PHAR 7777 or BIOS 7021	Biostatistics for Health Professionals Practical Problems in Biometry	2
HUMS 7004	Ethics and Research: Humanities and Basic Medical Sciences	2
BIOC 7335	Seminars in Biochemistry and Molecular Biology	4
BIOC 7330	Introduction to Research	3
BIOC 9000	Dissertation Research	27+
Biochemistry and Molecular Biology Concentration Core :		
BIOC 8320	Biochemistry II	4
BIOC 7310	Molecular Biochemistry	3
BIOC 7335	Seminars in Biochemistry and Molecular Biology (each registered semester)	n
BIOC 7365	Research Proposal Strategies	2
BIOC 8333 and/or BIOC 8336	Research (3 credit version) Research (6 credit version)	n
BIOC 7301 and others	Electives (Biochemistry I plus 1-2 additional courses recommended by Advisor or Committee)	

C. ***Requirements Checklist***

Quick reference chart outlining important tasks associated with meeting departmental and Biomedical Sciences requirements. By adhering to the deadlines below, the student is positioned for a smooth matriculation through the degree program. **Disregarding deadlines can result in interruption in stipend and/or tuition payment as well as delays in degree completion.**

Requirement	**Completion Deadline**
Core courses	By the end of the second or third year (exceptions may apply).
Seminar (BIOC 7335)	Taken every semester
Select Dissertation Advisor	By First Day of Classes of 2nd year
Establish Advisory Committee	Within 8 weeks of selecting a Dissertation Advisor
Research	Every semester and summer. Typically, the research by a graduate student is expected to yield several publications in reputed journals.
Candidacy Exam	By the First Day of Classes of 3rd year.
Dissertation Defense	Must follow the candidacy exam by at least 9 months. Occurs at the end of the graduate studies. Typically completed in about 5 years but maybe up to 6 years.
Graduation	Within the same or following semester of the dissertation defense. Graduate College deadline is 6 years (12 semesters, excluding summer) from the first semester enrolled in the PhD program. Continuation beyond 12 semesters requires a waiver from the graduate school.

D. ***Example Program of Study***

9 credits per semester are required for continued stipend support. Students are recommended to register for at least 10 credits but less than 14 credits per semester.

First Year		**Credits**
Fall Semester		
BIOC 7301	Biochemistry I	3
HUMS 7004	Ethics in Research	2
BIOC 7330	Introduction to Research	3
BIOC 7335	Seminar in Biochemistry (Section 1)	1
BIOC 7310	Molecular Biochemistry	3
Spring Semester		
BIOC 8320	Biochemistry II	4
PHAR7777	Problems in Biometry	3
BIOC 7335	Seminar in Biochemistry (Section 1)	1
BIOC 8333	Research	3
Optional elective		
Second Year		**Credits**
Fall Semester		
BIOC 7335	Seminar in Biochemistry (Section 2)	1
BIOC 8336	Research	6
Elective Course		2-4
Spring Semester		
BIOC 7335	Seminar in Biochemistry (Section 2)	1
BIOC 7365	Research Proposal Strategies	2
BIOC 8333/6	Research	3/6
Optional elective		
Third Year		
Fall Semester		
BIOC 7335	Seminar in Biochemistry (Section 2)	1
BIOC 9000	Dissertation	9
Optional elective (if needed)		
Spring Semester		
BIOC 7335	Seminar in Biochemistry (Section 2)	1
BIOC 9000	Dissertation	9
Optional elective (if needed) or BIOC 8305		
Fourth Year and beyond		
Fall and Spring Semesters		
BIOC 7335	Seminar in Biochemistry (Section 2)	1
BIOC 9000	Dissertation	9

Possible Elective Options

It is the responsibility of the student to identify available electives that can be used to tailor the student's program of study. Currently offered courses can be found in the Graduate Catalog. Below is a list of potential electives offered across ECU that our students have taken in the past.

BIOC 7301	Biochemistry I
BIOC 7310	Molecular Biochemistry
BIOC 7345	Cell Motility
BIOC 8305	Physical Biochemistry
MCBI 7410	Molecular Cell Biology
MCBI 7420	Physiology and Ultrastructures of Microorganisms
MCBI 7430	Cytology Technologies
MCBI 7440	Advances in Molecular Genetics
MCBI 7450	Immunology
MCBI 7460	Advanced Virology
MCBI 7490	Molecular Cellular Biology
NEUR 6900	Cellular and Molecular Neuroscience
ONCO 7200	Molecular and Cellular Biology of Cancer
PHAR 7609	Introduction to Pharmacology
PHAR 7610	Basic Mechanisms of Drug Actions
PHAR 7640	CNS Pharmacology
PHAR 7660	Cardiovascular Pharmacology
PHAR 7680	Toxicology
PHLY 7701	Graduate Physiology I
PHLY 7703	Graduate Neuroscience
PHLY 7704	Physiological Proteogenomics
PHLY 7705	Critical Thinking in Physiology
PHLY 8710	Adv Topics: Mito Diagnostics
BIOL 7080	Molecular Endocrinology
BIOL 7090	Advanced Developmental Biology
BIOL 7130	Current Literature in Development Biology
BIOL 7170	Graduate Immunology I
BIOL 7180	Cell Culture and Hybridoma Technology
BIOL 7200	Invertebrate Biology
BIOL 7240	Evolution of Genes and Genomes
BIOL 7345	Cell Motility
BIOL 7480	Cell Biology
BIOL 7870	Molecular Genetics
BIOL 7880	Bioinformatics +Lab
CHEM 6210	Organic and Inorganic Reaction Mechanisms
CHEM 6230	Advanced Applications of Analytical Methods
CHEM 7532	Organic Synthesis
CHEM 7540	Biophysical Techniques for Studying Biology Structures

E. ***Transfer of Graduate Coursework***

In some cases, students can obtain credit for graduate courses completed at other institutions or as part of other programs at ECU. Requests for transfer are suggested to the Graduate Director and prepared in conjunction with the Brody Associate Dear for Graduate Studies. Acceptance of credits from transfers is subject to approval by the BGC and the Dean of the Graduate School. With the approval of the BGC and Departmental Chair, one or both portions of the doctoral candidacy examination requirement may be waived for transfer students who have successfully passed an equivalent candidacy examination in their former graduate work. Transfer of credit is subject to further approval by the Dean of the Graduate School.

V. ADMISSION TO CANDIDACY FOR THE DOCTORAL DEGREE

A. *General Information*

Doctoral students must successfully pass the doctoral candidacy examination. The examination consists of both written and oral formats. The doctoral candidacy examination is centered on the ability of a student to write and present a research proposal in selected dissertation research laboratory and scored by the Dissertation Advisor and Graduate Advisory Committee. The Dissertation Advisor will assist in creation of the specific aims that reflect past research of the Dissertation Advisor's laboratory and preliminary data acquired by the student for the proposed research project. The proposal and presentation should reflect the student's own approach to the science rather than the approaches of the mentor to experiments, design or conclusions; this is part of the learning process. The composition of the written proposal is solely the responsibility of the student, based on the draft proposal they created in the Research Proposal Strategies (BIOC 7365) course (or a subsequent rewrite if the project has changed). Dissertation Advisors are encouraged to assist students with planning and ideas only and should not participate in writing the research proposal. Students may approach faculty other than their advisor for assistance with editing, and furthermore may seek assistance from the ECU writing center for grammar and formatting difficulties.

It should be noted that the proposal is simply a vehicle to permit examination over a broad area of biochemistry and molecular biology. The research proposal is not a contract containing the research that must be completed by the student. The actual dissertation research, while it may contain elements of the proposal, will change and be refined as data are collected. After passing the written and oral sections of this examination (see below) the student is recommended for admission to candidacy for the PhD degree. (See Advancing to Doctoral Candidacy for more information).

B. *Eligibility and Timing*

A student's eligibility for the examination will be determined by the student's Dissertation Advisor and Graduate Advisory Committee. Eligibility is based on satisfactory completion of coursework for the first four semesters, along with initial progress in research of selected dissertation research laboratory.

The Candidacy Exam is expected to be completed by the First Day of Classes of the third year. Deviations from this timetable must be discussed with the Graduate Director and Departmental Chair.

C. *Candidacy Examination*

The candidacy examination will require the student to compose a research proposal, prepared in a format similar to a National Institutes of Health grant application. The area of research proposed is in the area of selected dissertation research laboratory. Sections of the research proposal should include a project narrative (up to 3 sentences in length), project summary (≤ 30 lines of text), specific aims page (not exceeding 1 page in length), research strategy (6 pages in length), and references. The research strategy section should include a significance, innovation and approach subsections. Page margins should be at least 0.5 inches and a font size of at least 11 point. The budget, biographical sketch and ancillary pages need not be completed.

The student must present a Specific Aims page to the Graduate Advisory Committee in a meeting at least 4 weeks before the actual Candidacy Exam, to ensure that the project and approach being proposed is appropriate and defendable. The student should inform the Graduate Director of this meeting. This is generally a short (30 min) meeting, and the purpose is to ensure there are no glaring issues with the approach that would preclude passing of the exam. Once the Specific Aims are approved, the student can then submit the completed proposal to their Graduate Advisory Committee and schedule the candidacy exam. The final version of the proposal will

be submitted to the student's Committee at least 1 week before the scheduled candidacy exam. The student should inform the Graduate Director of the scheduled event, whose permission and attendance is not necessary.

The student, along with the Dissertation Advisor will select a tenured faculty member of the department, not on the committee, to act as the Moderator for the candidacy exam. The Moderator will ensure the exam is run appropriately and intervene if questioning is stalled or appears unfair to student or advisor. Moreover, the Moderator will keep track of time and will not participate in formal questioning.

Once the written proposal is approved it is to be presented to the Graduate Advisory Committee in a closed formal presentation with the Moderator present. The format will be:

1. Student provides an oral presentation of the proposal, 20 to 30 min, to the Graduate Advisory Committee with the Moderator present.
2. Immediately after the presentation, the student will defend their proposal and the scientific principles upon which it is based. Questioning will generally proceed allowing each committee member to ask questions for 10 min during the first round. This is followed by a brief break. A second round of questioning allotting about 5-10 minutes per member for follow-up questions.
3. After questioning is complete, the student is excused from the room to permit the committee to discuss the student's performance upon examination.
4. Approval of the student's performance will be by a roll call vote of all faculty members in attendance with no abstentions. A passing vote consists of no more than one negative vote. Members will be asked to recommend pass/fail grade on the written proposal and oral presentation separately. Students may pass both portions, one or the other, or neither portion. The Moderator will invite the student back into the room and relate the result to the student based on Graduate Advisory Committee consensus.
5. The Moderator will be responsible for submitting the Doctoral Candidacy Examination Report (**BMB 7**) in paper form to the Graduate Director specifying which portions of the exam were successfully passed.
6. Students have two opportunities to pass both portions of the exam. Only the failed portion must be repeated for approval by the Graduate Advisory Committee. Once approved by the Committee, the student will initiate Advancement to Candidacy status via the DocuSign online signature process.

VI. DOCTORAL DISSERTATION

A. *Dissertation Requirements*

Doctoral candidates must meet the following requirements to prepare for defending their dissertation:

1. All coursework must be completed while maintaining a 3.0 GPA throughout the course of study (see Section IV for details)
2. 27 hours of Dissertation (BIOC 9000) credits accumulated
3. Presentation of research at scientific conferences
4. Submission of a first author primary research manuscript
5. Verbal approval from dissertation committee

It is the joint responsibility of the Dissertation Advisor and the Graduate Advisory Committee to verify in ECU DegreeWorks that the curricular requirements stated above have been met.

B. *Request to Defend*

Once the doctoral candidate has met the above requirements, they will hold a meeting with their Graduate Advisory Committee to obtain permission to prepare their dissertation for distribution to Graduate Advisory Committee and for Graduation. In this meeting, the doctoral candidate should provide a general outline of the planned dissertation and give a brief summary of the work they have completed with an emphasis on their publication record and scientific achievement. The committee should discuss the amount and quality of the work and provide feedback regarding the layout of the planned dissertation and decide if the candidate is ready to defend. In the same meeting, the Committee and student must verify the completion of curricular requirements documented in DegreeWorks (see VI, A.). Once approved, the doctoral candidate may begin to write their dissertation.

C. *Dissertation Requirements*

The doctoral candidate's written dissertation must meet the requirements of the Graduate School, but also reflect independent and novel research that contributes to the body of knowledge of the candidate's field (see Graduate Catalog, Biomedical Sciences PhD.

The written dissertation must include the following elements:

1. Abstract
2. Blank Page
3. Title Page
4. Copyright Page
5. Table of Contents
6. Introduction summarizing the body of literature pertaining to the doctoral candidate's research
7. Body of Novel and Independent Research
8. Discussion of contribution of research to the field and future directions
9. References
10. List of Tables/Figures
11. List of symbols/abbreviations

More information on dissertation formatting and required elements can be found here.

Under the direction of the candidate's Dissertation Advisor, the candidate will prepare the written dissertation. The candidate must submit a written draft of the dissertation to their Graduate Advisory Committee 3 weeks prior to the projected defense date. This draft of the dissertation should be completed or close to completion. The student should inform the Director upon submission of their intent to defend. The Committee will have 1

week to assess the quality of the dissertation and to determine if it is sufficient to defend. Revisions are not suggested at this time unless the document is deemed indefensible. If the dissertation is not approved by the committee, revisions must be made, and the dissertation must be resubmitted following the same 3-week scheduling period.

Following approval and after the first week, the doctoral candidate will discuss the defense date with all members of the committee and select a date at least 3 weeks from when the draft of the draft of the dissertation was submitted to the committee. Then the doctoral candidate will submit the "Request to Schedule Student Defense" form via DocuSign (found at the BSOM Office of Research and Graduate Studies website under "Current Students" tab) that will require approval of each member. All members of the committee must approve and sign the Request to Schedule Student's Defense document and agree to the Defense date.

In cases where there are serious extenuating circumstances (e.g. acute health issues, unavailability of student funding, etc.), the timing may be altered by consent of the doctoral candidate's Dissertation Advisor, the Graduate Director and the Departmental Chair.

D. ***Dissertation Defense and Completion of the Program***

The dissertation defense will consist of an oral presentation of the dissertation research in a publicly announced departmental seminar (scheduled by the BSOM Office of Research and Graduate Studies after submission of Request to Schedule Defense document) to which all interested persons are invited. The open seminar will be followed by a closed defense that includes the student, the Graduate Advisory Committee, and a representative of the Office of Research and Graduate Studies. In the closed defense, all Graduate Advisory Committee members ask questions for 10-15 minutes each. The Dissertation Advisor will act as Moderator for questioning and will ask their questions last. The candidate must successfully defend the research findings by responding to all questions and criticism. Upon completion of the question session, the student is excused from the room to permit the Committee to discuss their performance on the defense. The Dissertation Advisor will ask if further questions are warranted; if so the student will be invited in for the follow up. Approval of the student's performance will be voted on by the student's Graduate Advisory Committee members. The vote will be recorded by a representative of the Office of Research and Graduate Studies. Voting shall be a roll call vote with no abstentions. Successful defense requires no more than one negative vote. Recommendation to the Dean of the Graduate School to award the degree will be made by the Graduate Advisory Committee and the Departmental Chair using the DocuSign Dissertation Signature form (see below). If the presentation is unsatisfactory the defense will be re-scheduled. If the research findings contain major weaknesses, the candidate will be offered an opportunity to obtain additional data before re-scheduling a defense.

Following a successful defense, the Graduate Advisory Committee may request moderate corrections to the written document from the Candidate. The candidate must address and/or implement these corrections and then the revised dissertation must be provided to all committee members for verbal approval. Once approved, the candidate should initiate the DocuSign Dissertation Signature approval from all Advisory Committee members. The corrected dissertation must be electronically submitted to the ECU Graduate School in the Vireo portal. Details pertaining to the preparation and electronic submission of the dissertation are specified on the ECU Graduate school's website.

The doctoral degree program is considered complete when the dissertation has been successfully defended, approved via the DocuSign signature page, fully signed by all Graduate Advisory Committee members, and the dissertation uploaded to the ECU thesis/dissertation repository, Vireo, and approved by the Dean of the Graduate School. These electronic submissions to the Graduate School should be done in a timely manner (1 to 2 weeks prior to the university deadline found on the "thesis/dissertation" page of the graduate school website) to allow time for requested changes and approval prior to the semester's scheduled graduation date. If the Candidate is unable to meet the deadline, they will formally graduate in the following semester. The student

must therefore be registered in the graduation semester for at least 1 credit, but will not draw additional stipend. Stipend support ceases in the week following Dissertation completion.

The doctoral degree program must be completed before the end of the twelfth semester, excluding summers, following initial enrollment. If special circumstances require, a doctoral candidate may request an extension from the BGC with endorsement from their Graduate Advisory Committee in writing. The BGC will review the request and will make a recommendation to the Graduate Director.

VII. ACADEMIC PERFORMANCE

A. *Academic Integrity Policy*

Maintaining the academic integrity of ECU is the responsibility of all members of the academic community. Academic integrity ensures that students derive optimal benefit from their educational experience and their pursuit of knowledge. Violating the principle of academic integrity damages the reputation of the university and undermines its educational mission. Without the assurance of integrity in academic work, including research, degrees from the university lose value, and the world beyond campus (graduate schools, employers, colleagues, neighbors, etc.) learns that it cannot trust credits or a diploma earned at ECU. For these reasons, academic integrity is required of every ECU student.

East Carolina University Faculty Manual: Academic Integrity Policy

Brody School of Medicine: Student Code of Conduct

B. *Grade Point Average*

Students in the doctoral program must maintain a program grade point average (GPA) of at least 3.0 for all graduate courses. If the student's (not on probation) GPA falls below a 3.0, the student has one full academic year to complete the necessary coursework or repeat necessary coursework in order to return the GPA to a 3.0 or higher. At the discretion of the student's Graduate Advisory Committee and the BGC, additional course work may be added to the program of study to allow the student to bring the cumulative GPA to 3.0.

Students who are admitted to the program by exception are automatically placed on academic probation by the Graduate School. Students who fail to remain in good academic standing in accordance with the paragraph above are automatically placed on academic probation by the Graduate School. During the probationary period students will have an opportunity to correct their academic deficiencies. The probationary period will last for the term(s) in which the next nine credit hours are attempted. Enrollment in the Graduate School will be automatically terminated for students who fail to correct their academic deficiencies by the end of the probationary period. Graduate students will not be allowed to take classes and subject to immediate dismissal once it becomes mathematically impossible to achieve an overall cumulative GPA of 3.00 by the end of the remaining probationary period.

Students may appeal dismissal decisions except for reasons of insufficient GPA by following the process outlined in the Graduate School Appeals Procedure outlined in section D below.

A cumulative program GPA of 3.0 is a prerequisite for the administration of the doctoral Candidacy Examination. Only core (required) courses with a grade of "B" or better (or "S" for BIOC 9000 Dissertation) may be used to satisfy the minimum 76 credit hours required for the Ph.D. degree. Any required course in which a student makes a "C" grade must be repeated, and a grade of B or better must be obtained. A failure to achieve a B or better on the repeated class will result in dismissal from the Concentration. Elective courses with a "C" or lower may be replaced by other elective courses with "B" or better.

A grade of "F" is grounds for termination of a student's program. Students have the right to petition to continue their program. The petition must be approved by the student's Graduate Advisory Committee, the BGC, and the Departmental Chair. If approved, the student must repeat the course and earn a grade of "B" or better before a subsequent Candidacy Exam or Dissertation Defense can be scheduled. The course (credits and grade) can be counted only once for graduation. If the petition is denied, the BGC will petition the Graduate School to terminate the student's enrollment in the doctoral program.

C. ***Progress Evaluations***

As briefly described in preceding paragraphs, students and their Graduate Advisory Committee are required to submit progress reports (**BMB 6**) to the Graduate Director by the end of each spring semester that the student is enrolled in the program. This is typically completed immediately after the student's yearly Spring committee meeting. This progress report should include the student's grades (as recorded in DegreeWorks), research accomplishments, and a summary of the student's progress for the academic year. The report should also include an evaluation by the Dissertation Advisor that objectively discusses the student's academic and research performance to date. The report should be then signed by the Dissertation Advisor and submitted to the Graduate Director for consideration by the BGC indicating satisfactory or unsatisfactory progress. If by majority vote, the BGC feels that the student is not making satisfactory progress the student and Graduate Advisor will need to devise a plan to improve progress for the next academic year.

The plan should be signed by both the student and the Graduate Advisor and approved by the Graduate Advisory Committee, then submitted to the chair of BGC. If in the next review, the Graduate Advisory Committee finds evidence of inadequate progress by the student, as determined by major vote of the Graduate Advisory Committee, then student and Dissertation Advisor will be required to meet with the BGC and Departmental Chair to determine appropriate next steps that could include actions such as termination from the graduate program or moving to a new Dissertation Advisor or new Concentration depending on the circumstances.

Examples of unsatisfactory performance include poor grades, non-compliance with regulations, irresponsibility, threats towards faculty or other students, insufficient effort on dissertation research, unsatisfactory progress in writing the dissertation, scientific misconduct, and unethical behavior.

D. ***Student Appeal Policy***

Graduate students may appeal decisions concerning unsatisfactory performance on comprehensive assessments, academic probation for reasons of unsatisfactory progress toward the degree other than insufficient grade point average, termination of or election to void an assistantship for reasons set forth in the terms and conditions applicable to graduate assistant appointments, or dismissal from the graduate program. This policy does not apply to the appeal of decisions regarding course grades.

The student appeal procedure can be found in the ECU Graduate Catalogue. The policy to appeal a grade can also be found in the ECU Graduate Catalogue, under Graduate Student Grade Appeals.

BMB_1: GRADUATE STUDENT RESEARCH ORIENTATION FORM

Student's Name:_____

All new graduate students in the Department of Biochemistry and Molecular Biology are required by the Graduate Committee (BGC) to schedule short, informal meetings with each of graduate faculty members of the department to become knowledgeable regarding their research programs. In addition, these meetings will help you become acquainted with the faculty and will aid you in choosing mentors and advisors. Please use this form to document your meetings with graduate faculty members.

Following is a list of Biochemistry and Molecular Biology graduate faculty members. These meetings must be completed within three weeks of the First Day of Classes. Please have each faculty sign the form following the discussion. Turn in completed forms to the BGC, via the Graduate Director, Dr. Keiper.

Faculty Member	Office	Meeting Date	Signature
Dr. Myles Cabot	ECDOI 4115		
Dr. John Cavanagh	Brody 5E-124		
Dr. Holly Ellis	Brody 5W-32		
Dr. Ronald Johnson	Brody 5W-37		
Dr. Brett Keiper	Brody 5S-26		
Dr. Maranke Koster	Brody 3E-59B		
Dr. Kyle Mansfield	Brody 5S-12		
Dr. Morgan Milton	Brody 5W-56		
Dr. Ruth Schwalbe	Brody 5S-36		
Dr. Brian Shewchuk	Brody 5W-52		
Dr. Tonya Zeczycki	Brody 3N-80A		

Graduate Director: _____ Date: _____

BMB_2: RESEARCH ROTATION REQUEST FORM

Second or Third Rotation

Student's Name:_____ Banner ID: _____

This is a request that the following faculty member be assigned for the ☐second/☐third required laboratory research rotations. The student understands that in some cases they may be assigned to the alternate faculty member list. The Biochemistry Graduate Committee will consider these requests and make recommendations to the Departmental Chair.

Requested Faculty Member

Name: Signature:

Alternate Faculty Member

Name: Signature:

Student Signature: _____ Date: _____

Graduate Director: _____ Date: _____

BMB_3: RESEARCH ROTATION EVALUATION FORM

Student's Name:_____ Date: _____

Laboratory:_____

Select one: ☐ First rotation ☐ Second rotation ☐ Third rotation

Student Report: Attach a separate page describing the laboratory experience in a few sentences. This will include a very brief statement of the project goals and what you were able to accomplish. If results have the potential to be included in a future publication, please mention those briefly. Your text should also describe what you learned in the training.

Rotation Advisor's Evaluation: In the space provided below, describe the student's progress and performance in the laboratory.

Student Signature: _____

Rotation Advisor Signature: _____

BMB_4: SELECTION OF DISSERTATION LAB AND ADVISOR FORM

Student's Name:_____ Banner ID: _____

Chosen PhD Dissertation Lab:_____ Date: _____

Signatures of the student and Dissertation Advisor signify that each understands the following:

- The student has considered their choice and understands their responsibilities to the commitment.
- The Dissertation Advisory signifies their commitment to provide guidance, training, education, and resources, in conjunction with the student's selected Graduate Advisory Committee, that are in the best interests of the student and the furthering of the research project.
- Advising is intended to continue through the process of PhD Candidacy and the completion of the Dissertation Defense.
- Alteration of this agreement will require consultation of the student, Dissertation Advisor, Graduate Director, Graduate Advisory Committee (or BMB Graduate Committee), and Department Chair.
- Within eight weeks of establishing this agreement, the student and Dissertation Advisor will jointly choose a Graduate Advisory Committee to oversee annual progress of the student and evaluate the Candidacy Exam and final Dissertation and Dissertation Defense.

Student: _____ Date: _____

Dissertation Advisor: _____ Date: _____

Approved

Graduate Director: _____ Date: _____

Department Chair: _____ Date: _____

BMB_5: APPOINTMENT OF STUDENT'S GRADUATE ADVISORY COMMITTEE

Student's Name:_____ Date:_____

Date entered PhD Program:_____ Banner ID: _____

Instructions: This form is to be prepared by the student, signed by Graduate Advisory Committee members to signify their willingness to serve, and then forwarded to the Graduate Director withing eight weeks of selecting a Dissertation Advisory.

Graduate Advisory Committee:

By signing, the following graduate faculty members agree to serve on the student's Graduate Advisory Committee.

Name	Department	Signature

Approved

Graduate Director: _____ Date: _____

Department Chair: _____ Date: _____

BMB_6: GRADUATE STUDENT PROGRESS REPORT

Student's Name:_____

Dissertation Advisor: _____

From the period:_____ (semester) _____(year)

I. Progress since last evaluation

1. Courses taken:

Course title	Credit hours	Grade received

2. Progress in research laboratory:

3. Presentations (type, date, location):

4. Papers published:

5. Graduate Advisory Committee Meetings (date and purpose):

6. Anticipated date of Dissertation Defense:

II. Overall evaluation of the student's preformation and progress (completed by advisor):

Student Signature: _____ Date: _____

Dissertation Advisor Signature: _____ Date: _____

BMB_7: DOCTORAL CANDIDACY EXAMINATION REPORT

Student's Name:_____ Banner ID: _____

On _____(date), _____(student) presented the written and oral portion of the Doctoral Candidacy Exam to their Graduate Advisory Committee. In agreement with the Department of Biochemistry and Molecular Biology standards, the student's Graduate Advisory Committee has determined that:

☐ The responses are satisfactory. The student is recommended to candidacy for the doctorate.

☐ Some responses are unsatisfactory, and the student is to be re-examined at a specific time. Subjects and time are to be set by the Graduate Advisory Committee.

☐ The responses are unsatisfactory, but a full re-examination will be administered during the subsequence semester.

☐ The responses are unsatisfactory, and the termination of the program is recommended.

Faculty Moderator: _____ Date: _____

Dissertation Advisor: _____ Date: _____

Graduate Director: _____ Date: _____

Department Chair: _____ Date: _____

VIII. REVISION HISTORY

Adopted: August 4, 1997
Revised July 17, 1998
Revised July 14, 1999
Revised May 8, 2001
Revised August 14, 2002
Revised August 6, 2003
Revised January 23, 2004
Revised July 25, 2006
Revised July 23, 2009
Revised July 21, 2010
Revised August 5, 2013 bdk
Revised May 27, 2014 bdk
Revised May 11, 2015
Revised December 9, 2016
Revised August 15, 2017
Revised November 16, 2017
Revised 25 June 2018
Revised 12 February 2019
Revised 2 January 2020
Revised 17 September 2021
Revised 15 November 2022
Revised 22 December 2022
Revised 12 September 2023
Revised 24 January 2024
Revised 10 September 2024