

## Graduate Education Catalog Addendum 2017-2019 (Omission)

# MASTER OF SCIENCE IN BIOLOGY

### **PROGRAM DESCRIPTION**

Elizabeth City State University (ECSU) is a scholarly community committed to providing a comprehensive education to prepare students for rewarding professional careers or graduate study in science, technology, and science education-related areas. Consistent with the goals of the University, the Department of Natural Sciences, Pharmacy and Health Professions offers a Master of Science Degree in Biology with a focus on Biological Sciences and Biology Education. The program provides opportunities for advanced study in the biological sciences and to pursue research investigations in specialized areas of interest or further preparation in public school education. The broad base of formal coursework and research in the life sciences will provide the depth required for further graduate study or for careers in industry, government, community college teaching, or public school instruction. A thesis is required for the successful completion of the Master of Science degree in the Biology - Biological Sciences track and an action research project must be completed for the Master of Science in Biology - Biology Education track. The thesis or action research project is developed and completed under the guidance of a faculty advisor and both are defended and approved as a requirement for graduation. Appropriate thesis topics are developed within any of the broad range of areas of faculty expertise, including studies at the molecular to organism and population levels. Action research projects are developed as a collaborative between the department and public school facility, and research is carried out in a public school classroom. In addition to the thesis document or action research project, 30 credit hours of coursework are required to complete the Master of Science in Biology - Biological Sciences track and 36 credit hours for the Master of Science in Biology - Biology Education track.

### **Educational Objectives**

The Master of Science in Biology - Biological Sciences track is designed to provide a wide exposure to a number of advanced biological techniques, knowledge, and concepts, including, in part, those related to animal and plant biotechnology, microbiology, parasitology, cell biology, molecular biology, and environment.

Students graduating from this program will be in a strong position to enter PhD programs and professional schools, pursue private or governmental technological, health, and science management careers or teach at a community college. The Master of Science in Biology Biology Education track is designed for those individuals who have previously obtained a public school science teaching license in North Carolina (or its equivalent) and desire to further their education and skills in the area of public school instruction. One culmination of this program is the development of an approved action research project that encompasses data collected in a public school classroom and provides information toward improving public school instruction.

## **Facilities and Resources Available**

The Master of Science in Biology program conducts coursework and research in the Jenkins Science Center and Pharmacy Building on the ECSU campus. These two areas represent nearly 100,000 square feet devoted to classrooms, teaching laboratories, specialized research areas, instrumentation and equipment rooms, a planetarium, and graduate student, faculty and administrative offices. Additionally, there is a dedicated graduate program computer laboratory in the building where graduate students have access to thesis and action research project preparation resources. The faculty members in the Department of Natural Sciences, Pharmacy and Health Professions, specialize in diverse biology, chemistry and physics areas, allowing opportunity for interdisciplinary collaboration and research for students in the Biological Sciences track.

The Department collaborates closely with members of the ECSU Department of Education, Psychology and Health for those in the Biology Education track, and offers a host of projects that are critical to today's educational needs. Research faculty in the Graduate Program are engaged in a wide diversity of projects that are ideal for graduate-level involvement, including animal and plant biotechnology, cell transformation and physiology, parasitology, environmental microbiology, restoration ecology, and cancer biology. Graduate faculty members also understand issues concerning public school instruction in the 21st Century.

## **Admission Requirements**

Admission to the Graduate Education program with the specific intent of entering the Department of Natural Sciences, Pharmacy and Health Professions Master of Science in Biology - Biological Sciences or - Biology Education track requires the applicant to interview with the Department of Natural Sciences, Pharmacy and Health Professions Graduate Co-coordinator. An applicant interested in the Masters of Science in Biology cannot be admitted to the Graduate Program until the department-level interview has occurred and feedback is provided to the Office of Graduate Education. The purpose of the interview is to ensure that the Biological Sciences and Biology Education tracks meet the needs of the applicant and any educational areas that may need strengthening are identified prior to admission to the Graduate Education program. An interview with the Department will be scheduled after the Office of Graduate Education has received at least the applicant's transcript(s), one-page expository essay (career goals statement) and three letters of recommendation. The departmental interview can be conducted via telephone or in-person and may require communication with additional Department of Natural Sciences, Pharmacy and Health Professions' Graduate Faculty, depending, in part, on the applicant's potential research interests. Applicants to the Biology Education track must hold a North Carolina biology (or related science) public school teaching license (or equivalent) and have access to a public classroom in which to conduct teaching research for a culminating action research project.

Admission processes and documents submitted to the ECSU Office of Graduate Education with the intention of becoming a candidate in the Department of Natural Sciences, Pharmacy and Health Professions include:

- A Baccalaureate degree from an accredited institution;

- Undergraduate courses in genetics, microbiology, cell biology, biochemistry, molecular biology, general chemistry, biochemistry, organic chemistry, general physics and calculus;
- An overall minimum GPA of 2.5 (4.0 scale);
- A minimum GPA of 2.5 in all biology courses and a minimum GPA of 2.5 in all supporting coursework in chemistry, physics, and mathematics (4.0 scale);
- Two official transcripts from all institutions attended with indication of degree earned (if not in English, certified translations must accompany the transcripts);
- Three letters of recommendation on Graduate Recommendation Forms from faculty or those in a supervisory role that are familiar with your academic, research, and/or career performance;
- One page expository description of educational preparation, research interests, and career goals;
- An interview with the Department of Natural Sciences, Pharmacy and Health Professions Graduate Program Co-coordinator;
- Completed application for Graduate Education program admissions;
- Application fee;
- Submission of scores for the Graduate Record Examination (GRE) General Test, the Medical College Admission Test (MCAT), or the Dental Admission Test (DAT); Scores cannot be older than 5 years at the time of the submission;
- Test of English as a Foreign Language (TOEFL), if applicable;
- ECSU Health Form;
- A Residence Form;
- North Carolina Science Teaching License (for Biology Education track); and
- A letter of support from a public school official confirming the applicant's appropriate access to a classroom to conduct teaching research (if not employed as a public teacher). Required for Biology Education track.

Important Note: Upon admission to the Graduate Education program, the student is expected to assume, in part, the following responsibilities: (a) follow all of the policies of the Office of Graduate Education and the Department of Natural Sciences, Pharmacy and Health Professions Graduate Program as specified in the Graduate Catalog; (b) consult with an assigned advisor before registering for courses; (c) prepare a Program of Study within the first semester that is approved by the advisor, the Department Graduate Program Co-ordinator, the Department Chair, and the Director of the Office of Graduate Education; and (d) obtain full permission before making any substitutions or modifications to a Program of Study.

## **Degree Requirements**

The degree requirements are:

1. Total hours required: at least 30 for Biological Sciences and 36 for Biology Education;
2. Course Load: A full course load is nine credit hours per semester. The maximum number of graduate hours in any semester is twelve;

3. Grades: Students with a cumulative grade point average below required standards (3.0 on a 4.0 scale) must limit their course load to 6 semester hours and are subject to an academic warning (first occurrence), probation (second occurrence), and/or suspension (third occurrence). Students have the right to appeal academic suspensions and apply for readmission if they believe that failure to maintain the minimum cumulative grade point average for continued enrollment was due to extenuating circumstances. Students may appeal academic suspension and apply for readmission to the university;
4. Amount of transfer credit accepted: maximum of 6 hours;
5. Any course grade below a "C" irrespective of the credits associated with the course is grounds for dismissal from the program and may require a re- application for admission;
6. No more than two "C" grades may be obtained during the entire matriculation period irrespective of credits associated with course;
7. Other requirements:

Each student will be advised by the Department Graduate Program Co-coordinator initially, until such time as the student forms his or her graduate committee (by the second semester). The Department Graduate Program Co-coordinator will help students settle any concerns that they may have about the program.

Research/Thesis requirements: The Masters of Science in Biology degree program requires completion of research in a biological specialty or sub-specialty, or in an area of teacher education development, and it requires approval of a thesis or action research project and oral defense of that work. The student must complete and defend a thesis or action research project that resulted in high quality, scholarly work, approved by the student's committee. The student must orally present and successfully defend the thesis or action research project to his or her advisory committee.

## **Course Load**

Nine credit hours are required for full-time status. No more than twelve credit hours may be taken in a single semester. Note that the thesis-track Master of Science program requires original research be pursued outside of course meeting periods and an action research project to be conducted in a public school classroom. This thesis and action research project necessarily require a significant time commitment and the student must be prepared to undertake this effort.

## **Transfer Credits**

No more than six credit hours may be transferred from other accredited institutions. Transfer credits must be approved by the student's advisory committee. Transfer credits cannot have been completed in excess of six years prior to the time of the transfer request. Transfer course credit hours must exceed or equal the number of credit hours of the ECSU graduate course to be substituted and cannot be split between two ECSU graduate courses.

## **Graduate Committee and Thesis/Action Research Project Requirement**

The admitted student is responsible for contacting ECSU graduate faculty professors and potential experts in their research field to form a graduate committee.

The graduate committee is responsible for guiding the majority of student academic and research efforts and has final approval on such key areas as research topic, Program of Study, and thesis defense. The graduate committee must be composed of at least three and no more than four full-time ECSU graduate program faculty with at least two members serving in the Department of Natural Sciences, Pharmacy and Health Professions and one member serving as committee chair. The committee chair must be an ECSU full-time graduate faculty member, but may be affiliated with a department other than the Department of Natural Sciences, Pharmacy and Health Professions. If the student's thesis topic requires expertise outside the University, it is permissible to add a member from outside ECSU in addition to three ECSU full-time graduate faculty members. Any exceptions to the graduate committee structure outlined here requires approval of the Department Graduate Program Co- coordinator.

The Masters of Science in Biology - Biological Sciences and - Biology Education tracks require the completion of unique and high quality research designed under the guidance of the student's graduate committee. This specific process begins with the formal approval of the thesis or action research project proposal by the graduate committee. The research, which represents a significant portion of effort in the program, must make a notable contribution to the advancement of knowledge in the student's discipline area. The thesis or action research project is the culminating documentation of the research efforts, and the student must orally present and successfully defend the thesis or action research project to the full satisfaction of the graduate committee as a requirement for graduation.

### **Time Limit**

The program is designed to be completed in two years under full-time status enrollment for students in the Biological Sciences track and three years for students in the Biology Education track. The degree program must be completed within six successive calendar years from the initial acceptance semester. Students in programs that remain incomplete after six successive years must reapply for admission to the Graduate Education program. Note that course credits completed in excess of six years prior to the time of readmission are not eligible for use in the student's revised Plan of Study. Also, reapplication to the Graduate Education program under these circumstances does not guarantee readmission.

### **Dual Enrollment**

Permission from the student's graduate committee must be obtained for the student to be dual-enrolled in other academic programs (undergraduate, graduate, or professional), whether at ECSU or another institution at any time during matriculation in the ECSU graduate program.

### **Grade Requirements**

Students must earn an overall minimum GPA of 3.0 (4.0 scale) in graduate coursework.

Any single course grade below "C" or earning more than two "C" grades, regardless of the number of credit hours of a course, will be cause for termination of the student's program, regardless of past progress, and the termination will result in the need to reapply for admission to the Graduate Education program. Note that reapplication to the Graduate Education program under these circumstances does not guarantee readmission.

## **Exit Requirements**

To be awarded a Master of Science in Biology degree, each student must:

- Complete 30 total credit hours with at least 24 credit hours completed in residence for the Biological Sciences track. Complete 36 total hours with at least 30 completed in residence for the Biology Education track.
- Achieve an overall minimum GPA of 3.0 (4.0 scale);
- Earn no more than two "C" grades and no grade below "C";
- Complete a thesis on original research that has been orally defended and formally approved by the graduate committee (Biological Science); or complete and have approved by the committee an action research project developed from data collected on teaching methods in a public school classroom (Biology Education);
- Complete a graduation application and obtain all approval signatures;
- Meet all other requirements for a Master's Degree in effect for the masters programs at ECSU;
- Complete an exit interview with the Department Graduate Program Co-coordinator to evaluate program strengths and weaknesses; and
- Complete all exit requirements within six years of the initial acceptance semester.

For more information, contact: Graduate Program Co-coordinator  
Department of Natural Sciences, Pharmacy and Health Professions  
Elizabeth City State University  
Campus Box 930  
1704 Weeksville Road  
Elizabeth City, NC 27909  
Phone: 252-335-3244  
Fax: 252-335-3697

# MASTER OF SCIENCE IN BIOLOGY - BIOLOGICAL SCIENCES CURRICULUM

<b>A. Research Preparation</b>	<b>3 SH</b>
BIOL 500 Scientific Research and Communication	2 SH
BIOL 607 Thesis Proposal Preparation	1 SH
<b>B. Biology Content</b>	<b>18 SH</b>
<b>Core Courses</b>	<b>12 SH</b>
BIOL 503 Advanced Genetics	3 SH
BIOL 513 Applied Microbiology	3 SH
BIOL 510 Molecular Biology Techniques	3 SH
BIOL 605 Advanced Cellular Biology	3 SH
<b>Content Restricted Electives</b>	<b>6 SH</b>
500/600 level BIOL courses	6 SH
<b>C. Seminar</b>	<b>3 SH</b>
BIOL 610 Graduate Seminar	3 SH
<b>D. Thesis</b>	<b>6 SH</b>
BIOL 699 Thesis and Research	6 SH
<b>Total Required for Degree</b>	<b>30 SH</b>

# MASTER OF SCIENCE IN BIOLOGY - BIOLOGICAL SCIENCES CURRICULUM

<b>A. Pedagogy</b>	<b>12 SH</b>
EDUC 503 Computers in Education	3 SH
EDUC 600 Education Research Methods	3 SH
EDUC 615 Instructional Leadership	3 SH
SPED 660 Inclusion of Students with Special Needs	3 SH

<b>B. Biology Teaching</b>	<b>6 SH</b>
BIOL 521 Issues & Trends in Science Education	3 SH
BIOL 650 Advanced Theory & Practice in Teaching Science	3 SH

<b>C. Biology Content (choose 6 SH from below)</b>	<b>6 SH</b>
BIOL 503 Advanced Genetics	3 SH
BIOL 506 Environmental Microbiology	3 SH
BIOL 509 Ecology and Organismal Biology	3 SH
BIOL 510 Molecular Biology Techniques	3 SH
BIOL 513 Applied Microbiology	3 SH
BIOL 601 Advanced Human Anatomy and Physiology	3 SH
BIOL 605 Advanced Cellular Biology	3 SH

<b>Content Restricted Electives</b>	<b>6 SH</b>
500/600 level BIOL courses	6 SH

<b>D. Action Research Project</b>	<b>6 SH</b>
BIOL 640, 641 Planning for Action Research I-IV 642, 643	4 SH
BIOL 698 Action Research Project	2 SH

<b>Total Required for Degree</b>	<b>36 SH</b>
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