AY21-17-C

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA
PROGRAM PROPOSAL COVER SHEET

1. Institution
Old Dominion University

2. Program action (Check one):
New program proposal ____X_____
Spin-off proposal _____

Proposal for PhD in Biology
Table of Contents

Description of the Proposed Program

Program Background

Old Dominion University in Norfolk, Virginia requests approval to initiate a Doctor of Philosophy (PhD) degree program in Biology. The proposed program will be administered by the Department of Biological Sciences in the College of Sciences and is to be implemented by Spring Semester 2022.

The proposed PhD in Biology

program. Such transfe gh the admission committee for approval, and if approved, be added to courses may be accepted for research course requirements or electi t be substituted for by transfer courses.

Admission as a gradua s not imply acceptance into the PhD in Biology. A program admissions c f the Program Director, and at least two other faculty members from ce into the PhD in Biology program will be determined by the cor

t Population

The proposed PhD in sts who have completed an undergraduate or master's degree and w oming leaders, teachers, and scholars in their respective fields. This udents from internal, regional, national, and international undergra logy programs.

rriculum

A minimum of 48 sem st-master's coursework is required or, in the absence of a master's 78 semester credit hours beyond the bachelor's degree is required.

Courses are listed belo program of study of th provided in Appendix

Biology Core:
One of the following
BIOL859 Foundation ogy (3 credits)
BIOL804 Animal Eco
BIOL810 Advanced C its)
BIOL849 Biogeograp

One of the following
BIOL801 Practical Co (3 credits)
BIOL803 Advanced C (3 credits)
BIOL832 GIS in Life
BIOL872 Modeling a ciences (4 credits)

Plus:
BIOL0453.33 Tm0 G 5 1704BT/F3 12 Tf1F3 12 Tf1 0 0 1 106.05 225.58 Tm0 G[(03)] T

Dissertation Research:
BIOL898 Research (18+ credits; 12 credits for Master's degree holding students)
BIOL899 Dissertation (3+ credits)

Written and Oral Examinations
The candidacy examinations (written and oral) must be completed by the end of the third year in the program. The examinations qualifying a student for candidacy for the degree of Doctor of Philosophy are comprehensive in nature and consist of both oral and written components (see below for descriptions). Before taking the candidacy examinations, the student must meet the program's requirements and have the recommendation of the Advisory Committee. The research

Dissertation Research

Once the written and oral candidacy examinations have been passed, a dissertation committee will be formed to supervise dissertation research. This committee will be formed by the student in consultation with his or her advisor and approved by the Graduate Program Director. It will be comprised of the student's advisor as committee chair, at least one other faculty member active in the

per year. Faculty with expertise in Ecology (Eric Walters), Physiology (John Whiteman), Cellular and Molecular Biology (Pengwei Zhang), Computational Biology (Daniel Barshis), Geographic Information Systems and Modeling (Holly Gaff), Statistics (Eric Walters, Holly Gaff), Biogeography (Lisa Wallace), and Research Ethics (Wayne Hynes) will teach core courses. In addition to their participation in the core curriculum, the faculty listed will also teach a rotating Biology Graduate Seminar Course as well as mentor students and supervise student research.

Program Administration

The proposed program will be housed in the Department of Biological Sciences within the College of Sciences. A full-time faculty member from the Department will serve as the Graduateserve as

Research methods Collect, analyze, present, and defend original research data	BIOL857 Biometry Assessment: in class assignment, exam, independent research project, paper, and presentation BIOL801 Practical Computing for Biologists Assessment: assignments, group presentation/hackathon BIOL832 GIS in Life

Oral Communication Present their research as primary author at national/international conferences	BIOL801 Practical Computing for Biologists Assessment: group presentation/hackathon BIOL 847 Responsible Conduct of Research Assessment: presentation BIOL 803 Advanced Genomics Data Analysis Assessment: individual discussion presentation	Dissertation Defense

Employment Skills/Workplace Competencies

Graduates of the proposed program will have the skills and expertise in biology relevant to several career opportunities.

Serving as faculty members, graduates will be able to:

Develop and deliver effective instruction in an undergraduate or graduate college or university program. Such instruction would include topics in biology, evolution, ecology, physiology, and research methods in biology;

Collaborate with colleagues in different but related fields for education, research and publications;

Advise and mentor undergraduate and graduate students in their courses of study;

Participate in professional service activities locally, state-wide, nationally and internationally; and

Expand the body of knowledge in biology through research and dissemination of original scholarly work.

Working as a researcher in a non-academic institution, graduates will be able to:

Develop original research related to biology;

Publish findings related to research efforts;

Apply knowledge and understanding of biology in research and development of laboratory diagnostics, assessment and evaluation of resource management/conservation policies and strategies, and for best-practice guidance in applications that bridge scientific knowledge with applied actions;

Effectively communicate with other professionals, policy makers and the general public about topics in the biology.

Program Assessment

The program will be assessed by faculty and administrators in the Department of Biological Sciences, the College of Sciences, the Graduate School, and Old Dominion University. The review will be completed annually in the fall of each year starting from the second year after the program is approved, and will consist of:

Analyzing retention and attrition rates in order to maximize the positive influences and ameliorate the negative ones that affect program completion

Analyzing the results of the Old Dominion University Graduate Student Satisfaction Survey for areas where additional student support is needed

Analyzing graduate job placement to assess if the program is preparing students with the knowledge, skills and abilities for jobs in the field and evaluate the program's ability to meet market demands (following initial graduates' completion)

Analyzing the dissemination of graduate student related works (dissertation, abstracts, case-studies, research manuscripts)

Results of these assessments will be used to evaluate the quality of the program, to stimulate program development, and to assess the role of the program in fulfilling Old Dominion University's institutional mission. The program review may (a) result in strategic decisions about the program, (b) identify areas of i

on computational training at the M.S. level, with advanced level PhD training required for more

Labor Market Information: Virginia Employment Commission, 2020-2030 (10-Yr)

Occupation Title	Base Year Employment	Projected Employment	Total % Change	Annual Change #	Education
Microbiologist	389	407	4%	2	Bachelor's degree
Wildlife Biologist	271	281	4%	1	Bachelor's degree
Postsecondary Teachers, Biological Sciences	1814	2007	11%	19	Doctoral or professional degree
Biochemist and Biophysicists					

The University of Virginia (UVA)
The University of Virginia offers a Ph.D. program in Biology. The 72 credit-hour program, with a 10-credit hour core, aims to train scientists and scholars to perceive fundamental biological problems and to investigate them successfully.

Similarities to ODU
One of the five required courses of the Ph.D. program in Biology at UVA is BIMS 7100, Research Ethics. The content of the course includes several areas covered in a core course in the proposed program, BIOL 847 Responsible Conduct of Research.

Differences from ODU
The UVA program requires 72 credit-hours with a 10 credit-hour core while the ODU program requires 78 credit-hours (or 48 with an existing MS) with a 13-14 credit-hour core. The UVA program does not have fundamental's, quantitative, or statistics core courses. The UVA program also requires laboratory rotations, while students would matriculate directly into the lab of their major advisor for the ODU program.

Virginia Tech (VT)
The Virginia Polytechnic Institute and State University offers a Ph.D. program in Biological Sciences. The 90 credit-hour program, with a 1 credit-hour core, aims to teach both research skills and the ability to communicate effectively with professional colleagues and undergraduate students in an effort to foster individually tailored programs that lead to successful careers in research and education.

Similarities to ODU
The only required core course of Virginia Tech's program is a 1 credit orientation course BIOL 5174: Introduction to Graduate Studies in Biological Sciences. This course provides new students with critical information about the graduate program, requirements for degrees and the level of performance that constitutes normal progress, and required training. As this course is institution and program specific, there really are no similarities to the proposed program at ODU.

Differences from ODU
The Virginia Tech program requires 90 credit-hours with a 1 credit-hour core while the ODU program requires 78 credit-hours (or 48 with an existing MS) with a 13-14 credit-hour core. The Virginia Tech program does not have fundamental's, quantitative, or statistics core courses. As such, there is very little similarity between the VA Tech program and the proposed program at ODU.

The following data, supplied by SCHEV, show trends at these two institutions.

Institution/Year	2016	2017	2018	2019	2020
UVA Headcount	51	55	52	53	56
UVA Graduates	4	8	5	10	5

No new telecommunication resources are needed to initiate and sustain the proposed program.

Space

No additional space is required to initiate and sustain the proposed program.

Equipment (including computers)

No new equipment resources are needed to initiate and sustain this proposed program.

Other Resources

No new resources will be required to launch or operate the proposed PhD in Biology.

Funds to Initiate and Operate the Degree Program

Cost and Funding Sources to Initiate and Operate the Program			
	Informational Category	Program Initiation Year 2023-2024	Program Full Enrollment Year 2027-2028
1	Projected Enrollment (Headcount)	6	23
2	Projected Enrollment (FTE)	4.2	16

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Appendix A—Sample Plans of Study

TOTAL 6 credit All But

Appendix B—Course Descriptions

BIOL 801. Practical Computing for Biology. 3 Credits.
This hands-on training course emphasizes the use of general computing tools to work more effectively in the biological sciences. It integrates a broad range of powerful and flexible tools that are applicable to ecologists, molecular biologists, physiologists, and anyone who has struggled analyzing large or complex data sets. Text file manipulation with regular expressions, basic shell scripting, programming in Python and R, interaction with remote devices, and basic graphical concepts will be reviewed.

BIOL 803. Advanced Genomics Data Analysis. 3 Credits.
This course is designed to teach students the various steps involved in analyzing next-generation sequencing data for gene expression profiling and polymorphism identification and analyses. The class will follow a workshop setting with a combination of lectures, paper discussions, and instructor and student led programming sessions.

BIOL 804. Animal Ecophysiology. 3 Credits.
This course integrates the physiological and biochemical function of wild animals with population-sc-

Emphasis on historical biogeography, utilizing both dispersal and vicariance models for explanations of the geographic distribution of organisms. Ecological explanations are also considered. Useful techniques for biogeographic analyses, such as comparison of area cladograms are discussed at length.

BIOL 857. Biometry. 4 Credits.
A first course, or a refresher course, in statistical methods and experimental design for graduate students in biology and the natural sciences. The focus is on application and hypothesis testing with examples drawn from the field of biology. The course requires a significant amount of work outside of class on homework exercises and an independent project. Prerequisite: course background in statistics.

BIOL 859. Foundations and Principles in Ecology. 3 Credits.

Appendix E - Journal Articles

Appendix F—Employment Demand
(To be filled in for final SCHEV proposal)

A

What is the likelihood that you would enroll in the Biology PhD program at Old Dominion University described above?

O Very likely

O Somewhat Likely

O Not very likely

O Not at all likely

Display This Question:

If What is your level of interest in the Biology PhD program described above? = Not very interested

What is your class rank?

O Freshman

O Sophomore

O Junior

O Senior

O Other, please specify: _____

Which of the following would influence your decision to pursue a Biology PhD program at ODU?

Opportunity to achieve professional goals

Opportunity to work in the film industry

Proximity of the campus to where I work/live

Reputation of faculty

Availability of night courses

Opportunity to expand working knowledge of film production/screenwriting/film studies

Other: _____

Could you please comment on how this PhD program in Biology would fit with current or future career goals?

_____

_____

_____

_____

_____

Thank you for your time.

APPENDIX H—LIBRARY HOLDINGS