Certificate Title: Online Graduate Certificate in Biology for Educators

Classification of Instructional Programs (CIP) Discipline #: 26.0101

Certificate Type:
- On-Campus: □
- Distance: ☒
- On-Campus & Distance: □

Projected Enrollment:

<table>
<thead>
<tr>
<th></th>
<th>Yr. 1-</th>
<th>Yr. 2-</th>
<th>Yr. 3-</th>
<th>Yr. 4-</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Campus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>Yr. 1-10</td>
<td>Yr. 2-20</td>
<td>Yr. 3-30</td>
<td>Yr. 4-40</td>
</tr>
</tbody>
</table>

Catalog Description:
The Graduate Certificate in Biology for Educators will provide additional training in biological sciences to K-12 teachers and other educators. The certificate will provide recognition to those individuals who complete 12 credit hours of coursework in graduate level biology, with the option to complete up to 18 credit hours for those interested in teaching AP courses or teaching at the community college level. Students will choose between four and six courses (3 credits each) in topic areas that align with their own goals. Course topics will include animal behavior, communicable and non-communicable diseases, toxicology, evolution, genetics and microbiology, and faculty will continue to develop new courses to increase options.

Attachments:
- Proposal Document
- Statement of other departments likely to be affected and summary of consultation with those departments
- Program-level assessment (Education Advisory Board Study)
- Campus Routing Form
- Signature Page
Proposal for Graduate Online Certificate in Biology for Educators

Program Justification

The US Department of Education and the North Carolina Board of Instruction both predict large increases in STEM related jobs over the next 5-10 years. In preparation for this increase, the North Carolina State Board of Education has created a STEM education plan, which includes three items of high priority. These items include: improving STEM achievement of students, bolstering community understanding and support, and connecting, leveraging, and increasing STEM resources. To achieve the goal of improving STEM achievement in students, we need an adequate number of teachers highly trained in STEM disciplines, especially the biological sciences. Market research performed by the Education Advisory Board has corroborated that there is a strong need for STEM discipline courses for teachers. Our proposed online Graduate Certificate in Biology for Educators will provide not only a much-needed opportunity for educators in all settings to increase their background in biological sciences, but it may also serve as a bridge for those wanting to pursue additional degrees in scientific disciplines or a graduate degree in education.

This certificate will offer educators the opportunity to take courses in biological sciences designed by faculty in the Department of Biological Sciences.

The online nature of this certificate program will (1) allow us to offer the program regionally, statewide and nationally, and (2) will increase accessibility to working educators who may have little flexibility in their schedule.

Program Objectives

Completion of this certificate program will allow teachers to improve their literacy in biological sciences. With this enhanced knowledge, they will be able to bring improved content and lesson plans to their students. Those who enroll in this certificate program will choose courses to complement their existing biology background and expand their knowledge in areas in which they may have a special interest or in which they feel the need for additional training. Ultimately, the NC State Graduate Certificate in Biology for Educators will help them develop a stronger knowledge base to use in developing learning activities, expanding upon those they already implement, and presenting scientific material to their students in new ways.

As an added benefit, this program will offer courses that could be completed by teachers looking to satisfy their subject-specific continuing education credits. North Carolina requires teachers to complete subject-specific continuing education credits every five years, and completion of one of these courses would satisfy that requirement.

Finally, courses offered within the certificate program will be available to students involved in other graduate education programs (for example, STEM M.Ed. and Ph.D. and Elementary Education Science Specialist M.Ed.), and would provide an additional pool of much-needed online courses from which such students could select to fulfill their requirements for credit hours in the sciences.
Graduate Catalog Description

The Graduate Certificate in Biology for Educators will provide additional training in biological sciences to pre-college teachers, community college instructors, and other educators (e.g., at museums, zoos, national parks). The certificate will provide recognition to those individuals who complete 12 credit hours of coursework in graduate-level biology, with the option to complete up to 18 credit hours for those interested in teaching AP courses or teaching at the community college level. Students will choose three or five courses (3 credits each) in topic areas that align with their own interests. Students also will be required to complete the capstone course, BSC 580 Neurobiology of Learning (3 cr).

Projected Enrollment

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

Admissions Requirements

Applicants must meet one of these three requirements:

- have earned a bachelor’s degree from a regionally accredited college or university with minimum 3.0 GPA in the last 60 credit hours of undergraduate study
- be a graduate student in good standing in an education-related masters or doctoral program
- have earned a master’s degree from an accredited college or university

In addition, applicants will be required to submit a one-page statement describing how this program will benefit their personal or professional development and career goals. Preference will be given to applicants with a background in college biology/STEM.

Program of Study

The graduate certificate requires a minimum of 12 credit hours, including the capstone course BSC 580 (3 cr) and at least 9 credit hours of Electives chosen by the certificate student. No more than one 400 level course may be applied to the certificate.

Electives (minimum 9 cr): *NOTE to committee – BSC 514, 516, 546, and 580 are in the approval process; 520, 544, and 548 are in development, as are other courses to be added later. If we can code the applicable electives as BSC 5**, that would be most efficient. But we understand that courses that are currently (or soon to be) available need to be listed here."

- **BSC 514** Studying Animal Behavior (3 cr)
- **BSC 516** Toxics, Human Health and the Environment (3 cr)
- **BSC 520** Model Organisms in Cellular and Molecular Biology (3 cr)
- **BSC 527** Biological Illustration: Learning Through Close Observation (3 cr)
- **BSC 544** Cancer Biology (3 cr)
- **BSC 546** Humans and Disease: Communicable Diseases (3 cr)
- **BSC 548** Humans and Disease: Non-Communicable Diseases (3 cr)
400-level option (only one 400-level course can count towards the certificate):
- BIO 405 - Functional Histology
- BIO 424 - Endocrinology
- MB 411 - Medical Microbiology
- MB 441 - Immunology
- MB 451 - Microbial Diversity
- TOX 401 - Principles of Toxicology
- TOX 415 - Environmental Toxicology and Chemistry

Capstone Course (Required):
- BSC 580 Neurobiology of Learning (3 cr) will be taken as the final course in the certificate program.

Table 1. Previous Enrollments in BSC courses currently in the approval process

<table>
<thead>
<tr>
<th>Course</th>
<th>Summer I 2015</th>
<th>Summer I 2016</th>
<th>Summer II 2016</th>
<th>Summer I 2017</th>
<th>Summer II 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSC 514 Animal Behavior (ZO 592 601)</td>
<td>X</td>
<td>X</td>
<td></td>
<td>20</td>
<td>X</td>
</tr>
<tr>
<td>BSC 516 Toxics, Health and the Environment (ZO 592 651)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>8</td>
<td>X</td>
</tr>
<tr>
<td>BSC 546 Humans and Disease: Communicable Diseases (ZO 592 603)</td>
<td>X</td>
<td>X</td>
<td>13</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>BSC 580 Neurobiology of Learning</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

X = Not offered

Academic Performance

1. Award of a Graduate Certificate requires a GPA of at least 3.0 on all courses completed as part of the certificate program
2. The minimum grade to receive certificate credit for any course is “C-”
3. None of the required 12 hours may be taken S/U or “credit only”
4. A maximum of 6 credits of previous relevant NC State coursework may be transferred into the certificate
5. Transfer credits from other institutions are not allowed for the certificate
6. All students must be registered through NC State University
7. All Graduate Certificate requirements must be completed within 4 calendar years from the date the student begins coursework for the certificate, and includes any semesters in which transferred credits were taken.
Application and Completion Process

1. All new applicants must submit a certificate application for acceptance. The applicant must apply via the Graduate School application, found at: https://projects.ncsu.edu/grad/applygrad.htm
2. Those applicants who are enrolled in other graduate programs at NC State must provide the Graduate Student Certificate Plan Data Entry form, found at: https://grad.ncsu.edu/faculty-and-staff/forms/graduate-school-forms/

We will encourage all students participating in the certificate program to contact the Certificate Coordinator to determine registration procedures, course availability and registration dates.

Once all certificate requirements have been met, the Certificate Coordinator will notify the Dean of the Graduate School that the student has successfully completed the certificate program.

Responsibility for Administration and Resources
This certificate program will be offered by the Department of Biological Sciences. It will be administered by the Assistant Department Head for Biological Sciences (Jane Lubischer, PhD) and the Certificate Coordinator (Elizabeth Thompson, PhD). The Certificate Coordinator will perform the following:

- Make admission decisions to the certificate program
- Notify the Dean of the Graduate School of the student’s completion of certificate requirements
- Update program website as needed
- Coordinate the scheduling of courses
- Function as a liaison between the Department of Biological Sciences and the College of Education
- Seek, and oversee spending of, funds in support of course development, marketing, etc.

Program or Policy Changes for this Certificate
All changes in the Graduate Certificate in Biology for Educators or its policies will be discussed and determined amongst participating faculty and the Certificate Coordinator, and will be channeled through all appropriate college committees and the Administrative Board of the Graduate School.

Outcomes Assessment Plan
Objectives

1. In this certificate program, students will expand their knowledge of the biological sciences so that they can then apply that knowledge to develop or improve activities and strategies used in their own teaching.
2. The certificate program will provide an educational experience that satisfies the expectations of its graduates.
Learning Outcomes

1. After completing this certificate program, graduates will be able to:
   
   a. Identify three areas within the biological sciences in which their knowledge has been improved by courses taken for the certificate.
   
   b. Describe how they have used (or plan to use) what they have learned from certificate courses to improve their own teaching.
   
   c. Explain fundamental principles in the neurobiology of learning and relate them to our understanding of how people learn.
   
   d. Describe how they have used (or plan to use) an understanding of the science of learning to improve their own teaching.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Evidence to be Collected</th>
<th>Source of Evidence</th>
<th>Frequency of Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a (biological knowledge)</td>
<td>Assignments in BSC 580 and assessments completed in other certificate courses</td>
<td>Students</td>
<td>At completion of certificate (when the student enrolls in BSC 580) and at completion of each course taken.</td>
</tr>
<tr>
<td>1b (use of biological knowledge)</td>
<td>Assignments in BSC 580</td>
<td>Students</td>
<td>At completion of certificate (when the student enrolls in BSC 580).</td>
</tr>
<tr>
<td>1c (science of learning)</td>
<td>Assignments in BSC 580</td>
<td>Students</td>
<td>At completion of certificate (when the student enrolls in BSC 580).</td>
</tr>
<tr>
<td>1d (use of their understanding of the science of learning)</td>
<td>Assignments in BSC 580</td>
<td>Students</td>
<td>At completion of certificate (when the student enrolls in BSC 580).</td>
</tr>
</tbody>
</table>

2. After completing this certificate program, graduates are expected to:

   • Be satisfied with the usefulness of the certificate program in enabling them to achieve their personal or professional goals
   
   • Be sufficiently satisfied with the certificate program to recommend it to others with similar goals
   
   • Be satisfied with the appropriateness of the courses available through the program.
   
   • Be satisfied with the frequency and timeliness of courses offered for the certificate
   
   • Be satisfied with the quality of teaching in certificate courses

All of these outcomes will be assessment through an exit survey administered by the Graduate School annually.
Online Graduate Certificate in Biology for Educators
North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:

[Signature]
Head, Department/Director of Graduate Program (Printed Name and Signature) Date

Recommended By:

[Signature]
Chair, College Graduate Studies Committee (Printed Name and Signature) Date

Endorsed By:

[Signature]
College Dean (Printed Name and Signature) Date

Recommended By:

[Signature]
Vice Provost, DELTA (if DE degree) (Printed Name and Signature) Date

Approved By:

[Signature]
Dean of the Graduate School (Printed Name and Signature) Date

Recommended By:

[Signature]
Dean's Council (Printed Name and Signature) Date

Approved By:

[Signature]
Executive Vice Chancellor and Provost (Printed Name and Signature) Date

Approved By:

[Signature]
Chancellor (Printed Name and Signature) Date

(revised August 2015)