FACULTY CURRICULUM COMMITTEE
SIGNATURE PAGE

• In section A, list ALL of the forms covered by this signature page. If you submit a form that is not listed in A, your proposal will be held back until we receive a new, updated signature page.
• You must obtain the signature of your department chair and dean before submitting your proposal.

A. FORMS COVERED BY THIS SIGNATURE PAGE. List each form you are submitting—for instance, PSYC 383, Course Form; PSYC, Change of Major Form; PSYC, Change of Minor Form.

B. APPROVAL AND SIGNATURES.

1. Signature of Department Chair or Program Director:
   [Signature]
   Date: 12/2/15

2. Signature of Academic Dean:
   [Signature]
   Date: 12/7/15

3. Signature of Provost:
   [Signature]
   Date: 2/15/16

4. Signature of Business Affairs (only for course fees):
   [Signature]
   Date: ____________
   □ fee approved on ____________
   □ BOT approval pending

5. Signature of Curriculum Committee Chair:
   [Signature]
   Date: ____________

6. Signature of Budget Committee Chair (only for new programs):
   [Signature]
   Date: ____________

7. Signature of Academic Planning Committee Chair (only for new programs):
   [Signature]
   Date: ____________

8. Signature of Faculty Senate Secretary:
   [Signature]
   Date: ____________

Date Approved by Faculty Senate: ____________
Instructions:
- Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the detailed instructions on the website.
- Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Jaap Hillenius  Phone: 3-5504  Email: hilleniusw@cofc.edu

School: SSM  Department or Program: Biology

Name and Acronym of Major: Biology B.S. (BIOL)

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☐ Change Request (fill out all sections)
  ☐ Add an existing course to requirements or electives
  ☑ Add a new course to requirements or electives (attach completed course form for each)
  ☐ Delete courses from requirements or electives
  ☐ Add or modify concentration*
  ☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
  ☐ Terminate degree
  ☐ Terminate major
  ☐ Terminate concentration
  ☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 65
Number of Proposed Credit Hours (for changed program): 62
Catalog Year in which changes will take effect: FALL 2016

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (https://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, corequisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee's Course Form and a sample syllabus.

This form was last updated on 11/24/2015 and replaces all others.
Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L

OR

Honors students can take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L, and CHEM 112/CHEM 112L.

AND

Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L

We would also like to remove the HONS 153/153L and HONS 154/154L options for CHEM 111 and CHEM 112 as these courses have been deactivated.

Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)

Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L

The rest of the curriculum remains unchanged. In a few years, the HONS 191/294 option can be dropped.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The Chemistry Department will no longer be offering HONS 191 or HONS 194. Instead, they will be offering an accelerated chemistry course called HONS 190, which will be more appropriate for many of our incoming honors students who have already completed advanced chemistry in high school. By adding this alternative sequence for the biology majors, they will be able to take advantage of the accelerated option.

HONS 153/153L and HONS 154/154L have been previously deactivated and should be removed.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the major or program?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. Ability to apply quantitative reasoning to biological data</td>
<td>All biology students are required to take Biology 305, Genetics. This subject material provides a good opportunity for students to apply quantitative reasoning to biological datasets. In the case of genetics, such data often are in the form of counts of offspring phenotypes that result from a planned cross. We will use a question on the final exam in Biology 305 that requires students to calculate probabilities of particular outcomes resulting from a cross and, furthermore, use statistical tests to determine if the results of an experiment are consistent with these probabilities.</td>
</tr>
</tbody>
</table>

This form was last updated on 11/24/2015 and replaces all others.
2. Ability to apply the process of science

This learning outcome will be assessed with one or more questions on the Biology 211 final exam. These question(s) will propose a scientific question, describe the resources available to the student, and ask the student to develop a manipulative experimental design for problems that allow experimentation.

3. Ability to communicate scientific results

This learning outcome can also be assessed in Biology 211. In this course all students present results of some type of analysis in the form of posters and talks. Currently, the exact form of the communication (presentations, postering and/or papers) required of students varies by instructor. As a result, we propose to assess this outcome in the second year of our assessment efforts.

4.

Additional Outcomes or Comments:

1) Biology currently conducts senior surveys of all graduates (implemented in Qualtrics)

2) We are currently examining alternative approaches to use direct assessment that include multiple time points in students' careers.

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

Addressed in Chemistry proposal and copied here for convenience:

Biology honors students are often in the chemistry honors sequence instead of the biology honors sequence. This depends on many factors, the primary being that Honors science students can only enroll in one honors science sequence (Physics, Chemistry or Biology). Since enrollment is sometimes problematic in Honors biology, many biology majors end up taking Honors Chemistry instead (most students are undeclared at this point). The current chemistry requirement for a BS major in Biology is Chem 111/Chem 112/Chem 231/Chem 232. For Honors Biology majors, the chemistry requirement is sometimes met by completing Hons 191/Hons 192/Hons 293/Hons 294. The new course also allows honors biology majors to finish their chemistry more quickly. For those majors completing the new sequence, they will have 3 fewer credits in Chemistry when they graduate. This could be problematic for biology students who intend to enroll in graduate programs that count the number of chemistry courses taken, rather than look at the content of those courses. Such students might need to supplement their chemistry with an additional course, with a logical option being biochemistry.

Another consideration is how to tally science general education courses for students in this sequence. The vast majority of students in this sequence will likely be taking biology, physics and more chemistry courses, so there are any number of possibly sequences that fulfill general education in the sciences. We would request that HONS 190 plus HONS 192 count for general education in the natural sciences (this would replace the current HONS 191-HONS 192 general education sequence). The main complication arises if a student completed HONS 190, but then chose not to pursue more science; they will have completed two courses worth of lecture material in the natural sciences, but only one lab course. For such
students, we would recommend that they accept whatever advanced placement credit they received (usually Chem 111 and Chem 112 for a score of 4 or 5 on the AP test) so that their science general education is fulfilled. If they only received AP credit for Chem 111 (an AP score of 3), that student could pursue a different natural science or petition for Chem 111 (AP credit) plus HONS 190 to count for their general education. Alternatively, we could request that Chem 111 (AP credit) + HONS 190 be considered a valid general education sequence in the natural sciences.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

There will be no addition or reduction of costs for the Biology Department due to these changes.

I. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Biology Major Requirements
Catalog Year: 2015-16
Degree: Bachelor of Science
Credit Hours: 65+

"PR" indicates a pre-requisite. "CO" indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Required Courses
☐ BIOL 111 Introduction to Cell and Molecular Biology (3) PR: None; CO: BIOL 111L
☐ BIOL 111L Introduction to Cell and Molecular Biology Lab (1) CO: BIOL 111
OR
☐ HONS 151 Honors Biology I (3) PR: None; CO: HONS 151L
☐ HONS 151L Honors Biology I Lab (1) CO: HONS 151

☐ BIOL 112 Evolution, Form, and Function of Organisms (3) PR: BIOL 111 and 111L; CO: BIOL 112L
☐ BIOL 112L Evolution, Form, and Function of Organisms Lab (1) CO: BIOL 112
OR
☐ HONS 152 Honors Biology II (3) PR: HONS 151 and 151L; CO: HONS 152L
☐ HONS 152L Honors Biology II Lab (1) CO: HONS 152

☐ BIOL 211 Biodiversity, Ecology, and Conservation Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; CO: BIOL 211D
☐ BIOL 211D Biodiversity, Ecology, and Conservation Biology Discussion (0) CO: BIOL 211

☐ BIOL 305 Genetics (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D and MATH 250 or instructor permission

☐ Complete 19 credit hours of 300-level or above BIOL courses including at least four courses with labs from the BIOL 300-LEVEL AND ABOVE ELECTIVES LIST. Note: Independent study, tutorial, Bachelor’s Essay, or BIOL 450 and 451 with labs do not fulfill the lab requirement.

BIOL 300 Botany (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 301 Plant Taxonomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 302 Plant Anatomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 303 Phycology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 304 Plant Physiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 305L Genetics Lab (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D, BIOL 305 and MATH 250

BIOL 310 General Microbiology (4) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L, PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

BIOL 312 Molecular Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250

BIOL 312L Molecular Biology Laboratory (1) PR or CO: BIOL 312 and MATH 250. Students cannot use both BIOL 412 and BIOL 312L towards their major requirements.
Cell Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

Cell Biology Laboratory (1) PR or CO: BIOL 313 and MATH 250

Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and one year of Chemistry; PR or CO: MATH 250

Histology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

General and Comparative Physiology PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250 or equivalent course in statistics or instructor permission

Developmental Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

Comparative Anatomy of Vertebrates (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Vertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Ornithology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Herpetology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Biology of Fishes (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Parasitology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

Invertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Entomology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Dinosaur Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Zoogeography (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

General Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

Oceanography (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250; one year of college-level Math and one year of college-level Chemistry

Animal Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

Animal Behavior (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: BIOL 343, and MATH 250

Evolution (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250
BIOL 351 Principles of Neurobiology (3) PR: PSYC 103 and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D or PSYC 214; PR or CO: MATH 250

BIOL 352 Neurobiology and Behavior (3) PR: BIOL 351 or PSYC 351 or PSYC 214; PR or CO: MATH 250

BIOL 353 Hormones and Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 354 Techniques in Neuroscience (4) PR: BIOL 351 or PSYC 351; MAIH 250 or PSYC 211 and PSYC 220 or PSYC 250; and instructor permission

BIOL 356 Comparative Biomechanics (4) PR: BIOL 111/111L or HONS 151/151L and BIOL 112/112L or HONS 152/152L, and BIOL 211; PR or CO: BIOL 305, MATH 250 and PHYS 101/101L or 111/111L; or instructor permission.

BIOL 357 Oceanographic Research (4) PR: BIOL 342 and instructor permission; PR or CO: MATH 250

BIOL 359 Study Abroad in Neuroscience (4) PR: Permission of instructor

BIOL 360 Introduction to Biometry (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 396 Biophysical Modeling of Excitable Cells (3) PR: BIOL 211 and PHYS 102/102L or PHYS 112/112L or HONS 158/158L or permission of instructor

BIOL 399 Tutorial (1-3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL; junior standing and tutor and department chair permission; PR or CO: MATH 250

BIOL 406 Conservation Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and BIOL 341 or permission of instructor; PR or CO: MATH 250

BIOL 410 Applied and Environmental Microbiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; BIOL 310 and one year of Chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 411 Microtechnique and Cytochemistry (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of Chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 412 Capstone in Molecular Biology (3) PR: BIOL 111/111L or HONS 151/151L, BIOL 112/112L or HONS 152/152L, BIOL 211/211D, BIOL 305, BIOL 312, MATH 111 PR or CO: CHEM 351, MATH 250. Students cannot use both BIOL 412 and BIOL 312 towards their major requirements.

BIOL 414 Environmental Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of Chemistry; PR or CO: BIOL 305 and BIOL 312 or BIOL 313 or CHEM 351 and MATH 250

BIOL 420 General and Comparative Endocrinology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250 and a course in physiology or instructor permission

BIOL 421 Topics in Physiology, Cell, and Molecular Biology of Marine Organisms (3) PR: BIOL 312 or 313; BIOL 321 and instructor permission; PR or CO: MATH 250

BIOL 423 Genomics (4) PR: BIOL 305; BIOL 312 or BIOL 313; MATH 250

BIOL 444 Plant Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 341 or instructor permission; PR or CO: BIOL 305 and MATH 250

BIOL 445 Systematic Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; junior standing and at least one upper division course in organismal Biology; PR or CO: MATH 250

BIOL 446 Special Topics in Neuroscience (3) PR: Junior or senior standing and instructor permission; PR or CO: MATH 250

BIOL 447 Seminar in Neuroscience (3) PR: BIOL 351 or PSYC 351 and BIOL 352 or PSYC 352; CO: BIOL 448 or PSYC 448; PR or CO: MATH 250

BIOL 448 Bachelor's Essay in Neuroscience (6) PR: BIOL 351 or PSYC 351 and BIOL 352 or PSYC 352 and permission of student's major department and the neuroscience program director; PR or CO: MATH 250
BIOL 449  Biology of Coral Reefs (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.00 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 450  Problems in Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

BIOL 451  Problems in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

BIOL 452  Seminar (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; 2.50 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed; PR or CO: BIOL 305 and MATH 250

BIOL 453  Special Topics (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and instructor permission; PR or CO: BIOL 305 and MATH 250

BIOL 455  Seminar in Molecular Biology (2) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305, 312 and 313; PR or CO: MATH 250

BIOL 499  Bachelor's Essay (6) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL; instructor and department chair permission; PR or CO: MATH 250

BIOL 501  Biology of the Crustacea (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 337; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 502  Special Topics in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 503  Special Topics in Ecology (3-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

Chemistry Requirement

☐ CHEM 111  Principles of Chemistry (3) PR or CO: unless students exempt MATH 111 (via diagnostic testing) or have completed this course as a pre-requisite, they are required to take MATH 111 as a co-requisite; CO: CHEM 111

☐ CHEM 111L  Principles of Chemistry Lab (1) CO: CHEM 111

☐ CHEM 112  Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)

☐ CHEM 112L  Principles of Chemistry Lab (1) CO: CHEM 112

☐ CHEM 231  Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L

☐ CHEM 231L  Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

☐ CHEM 232  Organic Chemistry (3) PR: CHEM 231 and CHEM 231L; CO: CHEM 232L

☐ CHEM 232L  Organic Synthesis and Analysis (1) CO: CHEM 232

Physics Requirement

☐ PHYS 101  Introductory Physics (3) PR: None; CO or PR: PHYS 101L

☐ PHYS 101L  Introductory Physics Lab (1) CO: PHYS 101

AND

☐ PHYS 102  Introductory Physics II (3) PR: PHYS 101 or PHYS 111 or HONS 157; CO: PHYS 102L

☐ PHYS 102L  Introductory Physics Lab (1) CO: PHYS 102

OR
PHYS 111  General Physics I (3) PR or CO: MATH 120 or equivalent or instructor permission; CO: PHYS 111L
PHYS 111L  General Physics I Lab (1) CO: PHYS 111

AND

PHYS 112  General Physics II (3) PR: PHYS 111 or HONS 157; CO or PR: MATH 220 or equivalent or instructor permission; CO: PHYS 112L
PHYS 112L  General Physics II Lab (1) CO: PHYS 112

Mathematics Requirement

MATH 120  Introductory Calculus (4) PR: Placement or C or better in MATH 111
MATH 250  Statistical Methods I (3) PR: MATH 105 with a C grade or better or MATH 111 or MATH 120 or permission of instructor

Notes:

- MATH 250 is a prerequisite for all 300-level BIOL courses.
- CHEM 220/CHEM 220L are recommended courses.
- Honors students can take the alternative sequence of HONS191/HONS191L, HONS 192/HONS192L, HONS293/HONS293L, and HONS294/HONS294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L
- Honors students can take the alternative sequence of HONS 157/HONS 157L and HONS 158/HONS 158L in lieu of PHYS 111/111L and PHYS 112/112L
- Honors students may take the alternative course, HONS 190/HONS190L in lieu of CHEM 111/CHEM 111L and CHEM 112/CHEM 112L
- Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L
FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
• Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
• Remember that your changes will not be implemented until the next catalog year at the earliest.
• If you have questions, please start by checking the detailed instructions on the website.
• Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Jaap Hillenius Phone: 3-5504 Email: hilleniusw@cofc.edu

School: SSM Department or Program: Biology

Name and Acronym of Major: Biology B.A. (BIOL)

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☐ Change Request (fill out all sections)
  ☐ Add an existing course to requirements or electives
  ☒ Add a new course to requirements or electives (attach completed course form for each)
  ☐ Delete courses from requirements or electives
  ☐ Add or modify concentration*
  ☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
  ☐ Terminate degree
  ☐ Terminate major
  ☐ Terminate concentration
  ☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 39+
Number of Proposed Credit Hours (for changed program): 36+ 2A or 30
Catalog Year in which changes will take effect: FALL 2016

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (http://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, corequisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee's Course Form and a sample syllabus.

This form was last updated on 11/24/2015 and replaces all others. Page 1 of 4
Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L

OR

Honors students can take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L, and CHEM 112/CHEM 112L.

AND

Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L

We would also like to remove the HONS 153/153L and HONS 154/154L options for CHEM 111 and CHEM 112 as these courses have been deactivated.

Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)

Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L

The rest of the curriculum remains unchanged. In a few years, the HONS 191/294 option can be dropped.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The Chemistry Department will no longer be offering HONS 191 or HONS 194. Instead, they will be offering an accelerated chemistry course called HONS 190, which will be more appropriate for many of our incoming honors students who have already completed advanced chemistry in high school. By adding this alternative sequence for the biology majors, they will be able to take advantage of the accelerated option.

HONS 153/153L and HONS154/154L have been previously deactivated and should be removed.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the major or program?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. Ability to apply quantitative reasoning to biological data</td>
<td>All biology students are required to take Biology 305, Genetics. This subject material provides a good opportunity for students to apply quantitative reasoning to biological datasets. In the case of genetics, such data often are in the form of counts of offspring phenotypes that result from a planned cross. We will use a question on the final exam in Biology 305 that requires students to calculate probabilities of particular outcomes resulting from a cross and, furthermore, use statistical tests to determine if the results of an experiment are consistent with these probabilities.</td>
</tr>
</tbody>
</table>
2. Ability to apply the process of science
   
   This learning outcome will be assessed with one or more questions on the Biology 211 final exam. These question(s) will propose a scientific question, describe the resources available to the student, and ask the student to develop a manipulative experimental design for problems that allow experimentation.

3. Ability to communicate scientific results
   
   This learning outcome can also be assessed in Biology 211; in this course all students present results of some type of analysis in the form of posters and talks. Currently, the exact form of the communication (presentations, posters and/or papers) required of students varies by instructor. As a result, we propose to assess this outcome in the second year of our assessment efforts.

4. Additional Outcomes or Comments:
   
   1) Biology currently conducts senior surveys of all graduates (implemented in Qualtrics)
   2) We are currently examining alternative approaches to use direct assessment that include multiple time points in students' careers.

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

Addressed in Chemistry proposal and copied here for conveniences

Biology honors students are often in the chemistry honors sequence instead of the biology honors sequence. This depends on many factors, the primary one being that Honors science students can only enroll in one Honors science sequence (Physics, Chemistry or Biology). Since enrollment is sometimes problematic in Honors biology, many biology majors end up taking Honors Chemistry instead (most students are undeclared at this point). The current chemistry requirement for a BS major in Biology is Chem 111/Chem 112/Chem 231/Chem 232. For Honors Biology majors, the chemistry requirement is sometimes met by completing Hons 191/Hons 192/Hons 293/Hons 294. The new course also allows honors biology majors to finish their chemistry more quickly. For those majors completing the new sequence, they will have 3 fewer credits in Chemistry when they graduate. This could be problematic for biology students who intend to enroll in graduate programs that count the number of chemistry courses taken, rather than look at the content of those courses. Such students might need to supplement their chemistry with an additional course, with a logical option being biochemistry.

Another consideration is how to tally science general education courses for students in this sequence. The vast majority of students in this sequence will likely be taking biology, physics and more chemistry courses, so there are any number of possibly sequences that fulfill general education in the sciences. We would request that HONS 190 plus HONS 192 count for general education in the natural sciences (this would replace the current HONS 191-HONS 192 general education sequence). The main complication arises if a student completed HONS 190, but then chose not to pursue more science; they will have completed two courses worth of lecture material in the natural sciences, but only one lab course. For such
students, we would recommend that they accept whatever advanced placement credit they received (usually Chem 111 and Chem 112 for a score of 4 or 5 on the AP test) so that their science general education is fulfilled. If they only received AP credit for Chem 111 (an AP score of 3), that student could pursue a different natural science or petition for Chem 111 (AP credit) plus HONS 190 to count for their general education. Alternatively, we could request that Chem 111 (AP credit) + HONS 190 be considered a valid general education sequence in the natural sciences.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

There will be no addition or reduction of costs for the Biology Department due to these changes.

I. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Biology Major Requirements
Catalog Year: 2015-16
Degree: Bachelor of Arts
Credit Hours: 39+

*PR* indicates a pre-requisite. *CO* indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult [http://registrar.cofc.edu/general-edu](http://registrar.cofc.edu/general-edu) for more information.

**Required Courses**

- [ ] BIOL 111 Introduction to Cell and Molecular Biology (3) PR: None; CO: BIOL 111L
- [ ] BIOL 111L Introduction to Cell and Molecular Biology Lab (1) CO: BIOL 111
- [ ] OR
  - [ ] HONS 151 Honors Biology I (3) PR: None; CO: HONS 151L
  - [ ] HONS 151L Honors Biology I Lab (1) CO: HONS 151
- [ ] BIOL 112 Evolution, Form, and Function of Organisms (3) PR: BIOL 111 and 111L; CO: BIOL 112L
- [ ] OR
  - [ ] HONS 152 Honors Biology II (3) PR: HONS 151 and 151L; CO: HONS 152L
  - [ ] HONS 152L Honors Biology II Lab (1) CO: HONS 152
- [ ] BIOL 211 Biodiversity, Ecology, and Conservation Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; CO: BIOL 211D
- [ ] BIOL 211D Biodiversity, Ecology, and Conservation Biology Discussion (0) CO: BIOL 211
- [ ] BIOL 305 Genetics (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D and MATH 250 or instructor permission

☐ Complete 13 credit hours of BIOL courses from the following, including 9 credit hours at the 300-level or above; three courses must be taken with labs; two of the courses with labs must be at the 300-level or above. Labs may carry separate credit or be part of a 4 credit course. (Independent study, tutorial, Bachelor's Essay, or BIOL 450 and 451 with labs do not fulfill the lab requirement).

- [ ] BIOL 201 Human Physiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L
- [ ] BIOL 202 Human Anatomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L
- [ ] BIOL 204 Man and the Environment (3) PR: None
- [ ] BIOL 209 Marine Biology (4) PR: None
- [ ] BIOL 250 Special Topics in Biology (1-4) PR: One year of biology or instructor permission
- [ ] BIOL 300 Botany (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
- [ ] BIOL 301 Plant Taxonomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
- [ ] BIOL 302 Plant Anatomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
- [ ] BIOL 303 Phycology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
- [ ] BIOL 304 Plant Physiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of chemistry; PR or CO: BIOL 305 and MATH 250
BIOL 305L Genetics Lab (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D; BIOL 305 and MATH 250

BIOL 310 General Microbiology (4) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

BIOL 312 Molecular Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250

BIOL 312L Molecular Biology Laboratory (1) PR or CO: BIOL 312 and MATH 250. Students cannot use both BIOL 412 and BIOL 312L towards their major requirements.

BIOL 313 Cell Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

BIOL 313L Cell Biology Laboratory (1) PR or CO: BIOL 313 and MATH 250

BIOL 314 Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and one year of Chemistry; PR or CO: MATH 250

BIOL 320 Histology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 321 General and Comparative Physiology (4) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250 or equivalent course in statistics or instructor permission

BIOL 322 Developmental Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 323 Comparative Anatomy of Vertebrates (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 332 Vertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 333 Ornithology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 334 Herpetology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 335 Biology of Fishes (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 336 Parasitology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 365; PR or CO: MATH 250

BIOL 337 Invertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 338 Entomology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 339 Dinosaur Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 340 Zoogeography (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 341 General Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
BIOL 342  Oceanography (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250, one year of college-level Math and one year of college-level Chemistry.

BIOL 343  Animal Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250.

BIOL 343L  Animal Behavior (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: BIOL 343, and MATH 250.

BIOL 350  Evolution (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250.

BIOL 351  Principles of Neurobiology (3) PR: PSYC 103 and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D or PSYC 214; PR or CO: MATH 250.

BIOL 352  Neurobiology and Behavior (3) PR: BIOL 351 or PSYC 351 or PSYC 214; PR or CO: MATH 250.

BIOL 353  Hormones and Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250.

BIOL 354  Techniques in Neuroscience (4) PR: BIOL 351 or PSYC 351; MATH 250 or PSYC 211 and PSYC 220 or PSYC 250; and Instructor permission.

BIOL 356  Comparative Biomechanics (4) PR: BIOL 111/111L or HONS 151/151L and BIOL 112/112L or HONS 152/152L and BIOL 211; PR or CO: BIOL 305, MATH 250 and PHYS 101/101L or 111/111L; or instructor permission.

BIOL 357  Oceanographic Research (4) PR: BIOL 342 and instructor permission; PR or CO: MATH 250.

BIOL 359  Study Abroad in Neuroscience (4) PR: Permission of instructor.

BIOL 360  Introduction to Biometry (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250.

BIOL 396  Biophysical Modeling of Excitable Cells (3) PR: BIOL 211 and PHYS 102/102L or PHYS 112/112L or HONS 158/158L or permission of instructor.

BIOL 399  Tutorial (1-3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL; junior standing and tutor and department chair permission; PR or CO: MATH 250.

BIOL 406  Conservation Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and BIOL 341 or permission of instructor; PR or CO: MATH 250.

BIOL 410  Applied and Environmental Microbiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; BIOL 310 and one year of Chemistry; PR or CO: BIOL 305 and MATH 250.

BIOL 411  Microtechnique and Cytochemistry (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of Chemistry; PR or CO: BIOL 305 and MATH 250.

BIOL 412  Capstone in Molecular Biology (3) PR: BIOL 111/111L or HONS 151/151L, BIOL 112/112L or HONS 152/152L, BIOL 211/211D, BIOL 305, BIOL 312, MATH 111 PR or CO: CHEM 351, MATH 250. Students cannot use both BIOL 412 and BIOL 312L towards their major requirements.

BIOL 414  Environmental Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of Chemistry; PR or CO: BIOL 305 and BIOL 312 or BIOL 313 or CHEM 351 and MATH 250.

BIOL 420  General and Comparative Endocrinology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250 and a course in physiology or instructor permission.

BIOL 421  Topics in Physiology, Cell, and Molecular Biology of Marine Organisms (3) PR: BIOL 312 or 313; BIOL 321 and instructor permission; PR or CO: MATH 250.

BIOL 423  Genomics (4) PR: BIOL 305; BIOL 312 or BIOL 313; MATH 250.
BIOL 444  Plant Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 341 or instructor permission; PR or CO: BIOL 305 and MATH 250

BIOL 445  Systematic Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; junior standing and at least one upper division course in organismal Biology; PR or CO: MATH 250

BIOL 446  Special Topics in Neuroscience (3) PR: Junior or senior standing and instructor permission; PR or CO: MATH 250

BIOL 447  Seminar in Neuroscience (3) PR: BIOL 351 or PSYC 351 and BIOL 352 or PSYC 352; CO: BIOL 448 or PSYC 448; PR or CO: MATH 250

BIOL 448  Bachelor's Essay in Neuroscience (6) PR: BIOL 351 or PSYC 351 and BIOL 352 or PSYC 352 and permission of student's major department and the neuroscience program director; PR or CO: MATH 250

BIOL 449  Biology of Coral Reefs (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.000 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 450  Problems in Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.000 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

BIOL 451  Problems in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.000 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

BIOL 452  Seminar (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; 2.500 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed; PR or CO: BIOL 305 and MATH 250

BIOL 453  Special Topics (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and instructor permission; PR or CO: BIOL 305 and MATH 250

BIOL 455  Seminar in Molecular Biology (2) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305, 312 and 313; PR or CO: MATH 250

BIOL 499  Bachelor's Essay (6) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.000 GPA or higher in BIOL; instructor and department chair permission; PR or CO: MATH 250

BIOL 501  Biology of the Crustacea (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 337; 3.000 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 502  Special Topics in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.000 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 503  Special Topics in Ecology (3-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.000 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

Chemistry Requirement

☐ CHEM 101  General Chemistry (3) PR: None; CO: CHEM 101L
☐ CHEM 101L  General Chemistry Lab (1) CO: CHEM 101

AND

☐ CHEM 102  Organic and Biological Chemistry (3) PR: CHEM 101 and 101L or CHEM 111 and 111L; CO: CHEM 102L
☐ CHEM 102L  Organic and Biological Chemistry Lab (1) CO: CHEM 102

OR

☐ CHEM 111  Principles of Chemistry (3) PR or CO: unless students exempt MATH 111 (via diagnostic testing) or have completed this course as a prerequisite, they are required to take MATH 111 as a co-requisite; CO: CHEM 111L
☐ CHEM 111L  Principles of Chemistry Lab (1) CO: CHEM 111
AND
☐ CHEM 112  Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)
☐ CHEM 112L Principles of Chemistry Lab (1) CO: CHEM 112

Mathematics Requirement
☐ MATH 250 Statistical Methods I (3) PR: MATH 105 with a C- grade or better or MATH 111 or MATH 120 or permission of instructor

Notes:
- MATH 250 is a prerequisite for all 300-level BIOL courses.
- CHEM 220/CHEM 220L are recommended courses.
- Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L.
- Honors students can take the alternative sequence of HONS 157/HONS 157L and HONS 158/HONS 158L in lieu of PHYS 111/PHYS 111L and PHYS 112/PHYS 112L.
- Honors students may take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L and CHEM 112/CHEM 112L.
- Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L.
FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
- Please fill out all of the portions of the form that are specified in section B. **You must do this before your request can move forward!**
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the detailed instructions on the website.
- Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Jaap Hillenius                  Phone: 3-5504                Email: hilleniusw@cofc.edu

School: SSM                           Department or Program: Biology

Name and Acronym of Major: Biology B.S. (BIOL) with Molecular Concentration

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☒ Change Request (fill out all sections)
  ☒ Add an existing course to requirements or electives
  ☒ Add a new course to requirements or electives (attach completed course form for each)
  ☒ Delete courses from requirements or electives
  ☒ Add or modify concentration*
  ☒ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
  ☐ Terminate degree
  ☐ Terminate major
  ☐ Terminate concentration
  ☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 72+

Number of Proposed Credit Hours (for changed program): 69+ 72+ or 69+

Catalog Year in which changes will take effect: FALL 2016

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major ([http://registrar.cofc.edu/program-of-study-worksheets/index.php](http://registrar.cofc.edu/program-of-study-worksheets/index.php)) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, co-

This form was last updated on 11/24/2015 and replaces all others.
Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L.

OR

Honors students can take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L, and CHEM 112/CHEM 112L.

AND

Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM231L, and CHEM 232/CHEM 232L

We would also like to remove the HONS 153/153L and HONS 154/154L options for CHEM 111 and CHEM 112 as these courses have been deactivated.

Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)

Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L

The rest of the curriculum remains unchanged. In a few years, the HONS 191/294 option can be dropped.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The Chemistry Department will no longer be offering HONS 191 or HONS 194. Instead, they will be offering an accelerated chemistry course called HONS 190, which will be more appropriate for many of our incoming honors students who have already completed advanced chemistry in high school. By adding this alternative sequence for the biology majors, they will be able to take advantage of the accelerated option.

HONS 153/153L and HONS154/154L have been previously deactivated and should be removed.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the major or program?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
</tbody>
</table>

1. Ability to apply quantitative reasoning to biological data

   All biology students are required to take Biology 305, Genetics. This subject material provides a good opportunity for students to apply quantitative reasoning to biological datasets. In the case of genetics, such data often are in the form of counts of offspring phenotypes that result from a planned cross. We will use a question on the final exam in Biology 305 that requires students to calculate probabilities of particular outcomes resulting from a cross and, furthermore, use statistical tests to determine if the results of an experiment are consistent with these probabilities.
2. Ability to apply the process of science

This learning outcome will be assessed with one or more questions on the Biology 211 final exam. These question(s) will propose a scientific question, describe the resources available to the student, and ask the student to develop a manipulative experimental design for problems that allow experimentation.

3. Ability to communicate scientific results

This learning outcome can also be assessed in Biology 211; in this course all students present results of some type of analysis in the form of posters and talks. Currently, the exact form of the communication (presentations, posters and/or papers) required of students varies by instructor. As a result, we propose to assess this outcome in the second year of our assessment efforts.

4. Additional Outcomes or Comments:

1) Biology currently conducts senior surveys of all graduates (implemented in Qualtrics)

2) We are currently examining alternative approaches to use direct assessment that include multiple time points in students' careers.

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

Addressed in Chemistry proposal and copied here for convenience:

Biology honors students are often in the chemistry honors sequence instead of the biology honors sequence. This depends on many factors, the primary one being that Honors science students can only enroll in one Honors science sequence (Physics, Chemistry or Biology). Since enrollment is sometimes problematic in Honors biology, many biology majors end up taking Honors Chemistry instead (most students are undeclared at this point). The current chemistry requirement for a BS major in Biology is Chem 111/Chem 112/Chem 231/Chem 232. For Honors Biology majors, the chemistry requirement is sometimes met by completing Hons 191/Hons 192/Hons 293/Hons 294. The new course also allows honors biology majors to finish their chemistry more quickly. For those majors completing the new sequence, they will have 3 fewer credits in Chemistry when they graduate. This could be problematic for biology students who intend to enroll in graduate programs that count the number of chemistry courses taken, rather than look at the content of those courses. Such students might need to supplement their chemistry with an additional course, with a logical option being biochemistry.

Another consideration is how to tally science general education courses for students in this sequence. The vast majority of students in this sequence will likely be taking biology, physics and more chemistry courses, so there are any number of possibly sequences that fulfill general education in the sciences. We would request that HONS 190 plus HONS 192 count for general education in the natural sciences (this would replace the current HONS 191-HONS 192 general education sequence). The main complication arises if a student completed HONS 190, but then chose not to pursue more science; they will have completed two courses worth of lecture material in the natural sciences, but only one lab course. For such
students, we would recommend that they accept whatever advanced placement credit they received (usually Chem 111 and Chem 112 for a score of 4 or 5 on the AP test) so that their science general education is fulfilled. If they only received AP credit for Chem 111 (an AP score of 3), that student could pursue a different natural science or petition for Chem 111 (AP credit) plus HONS 190 to count for their general education. Alternatively, we could request that Chem 111 (AP credit) + HONS 190 be considered a valid general education sequence in the natural sciences.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

There will be no addition or reduction of costs for the Biology Department due to these changes.

I. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Biology Major with Concentration in Molecular Biology Requirements
Catalog Year: 2015-16
Degree: Bachelor of Science
Credit Hours: 72+

"PR" Indicates a pre-requisite, "CO" indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Required Courses

- BIOL 111 Introduction to Cell and Molecular Biology (3) PR: None; CO: BIOL 111L
- BIOL 111L Introduction to Cell and Molecular Biology Lab (1) CO: BIOL 111

OR

- HONS 151 Honors Biology I (3) PR: None; CO: HONS 151L
- HONS 151L Honors Biology Lab (1) CO: HONS 151

- BIOL 112 Evolution, Form, and Function of Organisms (3) PR: BIOL 111 and 111L; CO: BIOL 112L
- BIOL 112L Evolution, Form, and Function of Organisms Lab (1) CO: BIOL 112L

OR

- HONS 152 Honors Biology II (3) PR: HONS 151 and 151L; CO: HONS 152L
- HONS 152L Honors Biology II Lab (1) CO: HONS 152

- BIOL 211 Biodiversity, Ecology, and Conservation Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; CO: BIOL 211D
- BIOL 211D Biodiversity, Ecology, and Conservation Biology Discussion (0) CO: BIOL 211

- BIOL 305 Genetics (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D and MATH 250 or instructor permission
- BIOL 305L Genetics Lab (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D, BIOL 305 and MATH 250

- BIOL 312 Molecular Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250

- BIOL 313 Cell Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

- BIOL 313L Cell Biology Laboratory (1) PR or CO: BIOL 313 and MATH 250

- BIOL 412 Capstone in Molecular Biology (3) PR: BIOL 111/111L or HONS 151/151L, BIOL 112/112L or HONS 152/152L, BIOL 211/211D, BIOL 305, BIOL 312, MATH 111 PR or CO: CHEM 351, MATH 250. Students cannot use both BIOL 412 and BIOL 312L towards their major requirements.

Complete 8 credit hours of 300-level or above BIOL courses from the BIOLOGY 300-LEVEL AND ABOVE ELECTIVES LIST for a total of four courses with labs (Independent study, tutorial, Bachelor's Essay, or BIOL 450 and 451 with labs do not fulfill the lab requirement).

BIOLOGY 300-LEVEL AND ABOVE ELECTIVES LIST

- BIOL 300 Botany (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

- BIOL 301 Plant Taxonomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

- BIOL 302 Plant Anatomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

- BIOL 303 Phyology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
BIOL 304  Plant Physiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 310  General Microbiology (4) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

BIOL 314  Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and one year of Chemistry; PR or CO: MATH 250

BIOL 320  Histology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 321  General and Comparative Physiology PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250 or equivalent course in statistics or instructor permission

BIOL 322  Developmental Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 323  Comparative Anatomy of Vertebrates (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 332  Vertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 333  Ornithology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 334  Herpetology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 335  Biology of Fishes (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 336  Parasitology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 337  Invertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 338  Entomology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 339  Dinosaur Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 340  Zoogeography (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 341  General Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 342  Oceanography (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250; one year of college-level Math and one year of college-level Chemistry

BIOL 343  Animal Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 343L  Animal Behavior (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: BIOL 343, and MATH 250

BIOL 350  Evolution (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250
BIOL 351  Principles of Neurobiology (3) PR: PSYC 103 and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D or PSYC 214; PR or CO: MATH 250

BIOL 352  Neurobiology and Behavior (3) PR: BIOL 351 or PSYC 351 or PSYC 214; PR or CO: MATH 250

BIOL 353  Hormones and Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 354  Techniques in Neuroscience (4) PR: BIOL 351 or PSYC 351; MATH 250 or PSYC 211 and PSYC 220 or PSYC 250; and instructor permission

BIOL 356  Comparative Biomechanics (4) PR: BIOL 111/111L or HONS 151/151L and BIOL 112/112L or HONS 152/152L, and BIOL 211; PR or CO: BIOL 305, MATH 250 and PHYS 101/101L or 111/111L; or instructor permission.

BIOL 357  Oceanographic Research (4) PR: BIOL 342 and instructor permission; PR or CO: MATH 250

BIOL 359  Study Abroad in Neuroscience (4) PR: Permission of instructor

BIOL 360  Introduction to Biometry (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 396  Biophysical Modeling of Excitable Cells (3) PR: BIOL 211 and PHYS 102/102L or PHYS 112/112L or HONS 158/158L or permission of instructor

BIOL 399  Tutorial (1-3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL; junior standing and tutor and department chair permission; PR or CO: MATH 250

BIOL 406  Conservation Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and BIOL 341 or permission of instructor; PR or CO: MATH 250

BIOL 410  Applied and Environmental Microbiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; BIOL 310 and one year of Chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 411  Microtechnique and Cytochemistry (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of Chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 414  Environmental Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of Chemistry; PR or CO: BIOL 305 or BIOL 312 or BIOL 313 or CHEM 351 and MATH 250

BIOL 420  General and Comparative Endocrinology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250 and a course in physiology or instructor permission

BIOL 421  Topics in Physiology, Cell, and Molecular Biology of Marine Organisms (3) PR: BIOL 312 or 313; BIOL 321 and instructor permission; PR or CO: MATH 250

BIOL 423  Genomics (4) PR: BIOL 305; BIOL 312 or BIOL 313; MATH 250

BIOL 444  Plant Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 341 or instructor permission; PR or CO: BIOL 305 and MATH 250

BIOL 445  Systematic Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; junior standing and at least one upper division course in organismal biology; PR or CO: MATH 250

BIOL 446  Special Topics in Neuroscience (3) PR: Junior or senior standing and instructor permission; PR or CO: MATH 250

BIOL 447  Seminar in Neuroscience (3) PR: BIOL 351 or PSYC 351 and BIOL 352 or PSYC 352; CO: BIOL 448 or PSYC 448; PR or CO: MATH 250

BIOL 448  Bachelor's Essay in Neuroscience (6) PR: BIOL 351 or PSYC 351 and BIOL 352 or PSYC 352 and permission of student's major department and the neuroscience program director; PR or CO: MATH 250

BIOL 449  Biology of Coral Reefs (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.00 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250
**BIOL 450**  Problems in Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

**BIOL 451**  Problems in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

**BIOL 452**  Seminar (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; 2.50 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed; PR or CO: BIOL 305 and MATH 250

**BIOL 453**  Special Topics (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and instructor permission; PR or CO: BIOL 305 and MATH 250

**BIOL 499**  Bachelor's Essay (6) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

**BIOL 501**  Biology of the Crustacea (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 337; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

**BIOL 502**  Special Topics in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

**BIOL 503**  Special Topics in Ecology (3-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

**Chemistry Requirement**

- **CHEM 111**  Principles of Chemistry (3) PR or CO: unless students exempt MATH 111 (via diagnostic testing) or have completed this course as a prerequisite, they are required to take MATH 111 as a corequisite; CO: CHEM 111

- **CHEM 111L**  Principles of Chemistry Lab (1) CO: CHEM 111

- **CHEM 112**  Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 151 and 151L; CO: CHEM 112L (MATH 120 strongly recommended)

- **CHEM 112L**  Principles of Chemistry Lab (1) CO: CHEM 112

- **CHEM 231**  Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L

- **CHEM 231L**  Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

- **CHEM 232**  Organic Chemistry (3) PR: CHEM 231 and CHEM 231L; CO: CHEM 232L

- **CHEM 232L**  Organic Synthesis and Analysis (1) CO: CHEM 232

- **CHEM 351**  Biochemistry (3) PR: CHEM 232, CHEM 232L

- **CHEM 352**  Biochemistry II (3) PR: CHEM 351

- **CHEM 354L**  Biochemistry II Laboratory (1) PR: CHEM 351

**Physics Requirement**

- **PHYS 101**  Introductory Physics (3) PR: None; CO or PR: PHYS 101L

- **PHYS 101L**  Introductory Physics Lab (1) CO: PHYS 101

**AND**

- **PHYS 102**  Introductory Physics II (3) PR: PHYS 101 or PHYS 111 or HONS 157; CO: PHYS 102L

- **PHYS 102L**  Introductory Physics Lab (1) CO: PHYS 102

**OR**

- **PHYS 111**  General Physics I (3) PR or CO: MATH 120 or equivalent or instructor permission; CO: PHYS 111L

- **PHYS 111L**  General Physics I Lab (1) CO: PHYS 111
AND

☐ PHYS 112  General Physics II (3) PR: PHYS 111 or HONS 157; CO or PR: MATH 220 or equivalent or instructor permission; CO: PHYS 112L

☐ PHYS 112L General Physics II Lab (1) CO: PHYS 112

Mathematics Requirement

☐ MATH 120 Introductory Calculus (4) PR: Placement or C- or better in MATH 111

☐ MATH 250 Statistical Methods I (3) PR: MATH 105 with a C- grade or better or MATH 111 or MATH 120 or permission of instructor

Notes:

- MATH 250 is a prerequisite for all 300-level BIOL courses.
- CHEM 220/CHEM 220L are recommended courses.
- Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L.
- Honors students can take the alternative sequence of HONS 157/HONS 157L and HONS 158/HONS 158L in lieu of PHYS 111/PHYS 111L and PHYS 112/PHYS 112L.
- Honors students may take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L and CHEM 112/CHEM 112L.
- Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L.
FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
• Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
• Remember that your changes will not be implemented until the next catalog year at the earliest.
• If you have questions, please start by checking the detailed instructions on the website.
• Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Jaap Hillenius        Phone: 3-5504        Email: hilleniusw@cofc.edu

School: SSM                  Department or Program: Biology

Name and Acronym of Major: Marine Biology B.S. (MBIO)

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☒ Change Request (fill out all sections)
☐ Add an existing course to requirements or electives
☒ Add a new course to requirements or electives (attach completed course form for each)
☒ Delete courses from requirements or electives
☐ Add or modify concentration*
☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
☐ Terminate degree
☐ Terminate major
☐ Terminate concentration
☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): _64+
Number of Proposed Credit Hours (for changed program): _61+
Catalog Year in which changes will take effect: FALL _2016_

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (https://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, corequisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee's Course Form and a sample syllabus.

This form was last updated on 11/24/2015 and replaces all others.
Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L

OR

Honors students can take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L, and CHEM 112/CHEM 112L.

AND

Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM231L, and CHEM 232/CHEM 232L

We would also like to remove the HONS 153/153L and HONS 154/154L options for CHEM 111 and CHEM 112 as these courses have been deactivated.

Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)

Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L

The rest of the curriculum remains unchanged. In a few years, the HONS 191/294 option can be dropped.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The Chemistry Department will no longer be offering HONS 191 or HONS 194. Instead, they will be offering an accelerated chemistry course called HONS 190, which will be more appropriate for many of our incoming honors students who have already completed advanced chemistry in high school. By adding this alternative sequence for the biology majors, they will be able to take advantage of the accelerated option.

HONS 153/153L and HONS154/154L have been previously deactivated and should be removed.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the major or program?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. Ability to apply quantitative reasoning to biological data</td>
<td>All biology students are required to take Biology 305, Genetics. This subject material provides a good opportunity for students to apply quantitative reasoning to biological datasets. In the case of genetics, such data often are in the form of counts of offspring phenotypes that result from a planned cross. We will use a question on the final exam in Biology 305 that requires students to calculate probabilities of particular outcomes resulting from a cross and, furthermore, use statistical tests to determine if the results of an experiment are consistent with these probabilities.</td>
</tr>
</tbody>
</table>
2. Ability to apply the process of science

This learning outcome will be assessed with one or more questions on the Biology 211 final exam. These question(s) will propose a scientific question, describe the resources available to the student, and ask the student to develop a manipulative experimental design for problems that allow experimentation.

3. Ability to communicate scientific results

This learning outcome can also be assessed in Biology 211; in this course all students present results of some type of analysis in the form of posters and talks. Currently, the exact form of the communication (presentations, posters and/or papers) required of students varies by instructor. As a result, we propose to assess this outcome in the second year of our assessment efforts.

4. Additional Outcomes or Comments:

1) Biology currently conducts senior surveys of all graduates (implemented in Qualtrics)

2) We are currently examining alternative approaches to use direct assessment that include multiple time points in students’ careers.

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

Addressed in Chemistry proposal and copied here for convenience:

Biology honors students are often in the chemistry honors sequence instead of the biology honors sequence. This depends on many factors, the primary one being that Honors science students can only enroll in one Honors science sequence (Physics, Chemistry or Biology). Since enrollment is sometimes problematic in Honors biology, many biology majors end up taking Honors Chemistry instead (most students are undeclared at this point). The current chemistry requirement for a BS major in Biology is Chem 111/Chem 112/Chem 231/Chem 232. For Honors Biology majors, the chemistry requirement is sometimes met by completing Hons 191/Hons 192/Hons 293/Hons 294. The new course also allows honors biology majors to finish their chemistry more quickly. For those majors completing the new sequence, they will have 3 fewer credits in Chemistry when they graduate. This could be problematic for biology students who intend to enroll in graduate programs that count the number of chemistry courses taken, rather than look at the content of those courses. Such students might need to supplement their chemistry with an additional course, with a logical option being biochemistry.

Another consideration is how to tally science general education courses for students in this sequence. The vast majority of students in this sequence will likely be taking biology, physics and more chemistry courses, so there are any number of possibly sequences that fulfill general education in the sciences. We would request that HONS 190 plus HONS 192 count for general education in the natural sciences (this would replace the current HONS 191-HONS 192 general education sequence). The main complication arises if a student completed HONS 190, but then chose not to pursue more science; they will have completed two courses worth of lecture material in the natural sciences, but only one lab course. For such
students, we would recommend that they accept whatever advanced placement credit they received (usually Chem 111 and Chem 112 for a score of 4 or 5 on the AP test) so that their science general education is fulfilled. If they only received AP credit for Chem 111 (an AP score of 3), that student could pursue a different natural science or petition for Chem 111 (AP credit) plus HONS 190 to count for their general education. Alternatively, we could request that Chem 111 (AP credit) + HONS 190 be considered a valid general education sequence in the natural sciences.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

There will be no addition or reduction of costs for the Biology Department due to these changes.

1. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Marine Biology Major Requirements
Catalog Year: 2015-16
Degree: Bachelor of Science
Credit Hours: 64+

*PR* indicates a pre-requisite. *CO* indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Required Courses

☐ BIOL 111 Introduction to Cell and Molecular Biology (3) PR: None; CO: BIOL 111L
☐ BIOL 111L Introduction to Cell and Molecular Biology Lab (1) CO: BIOL 111

OR

☐ HONS 151 Honors Biology I (3) PR: None; CO: HONS 151L
☐ HONS 151L Honors Biology I Lab (1) CO: HONS 151

☐ BIOL 112 Evolution, Form, and Function of Organisms (3) PR: BIOL 111 and 111L; CO: BIOL 112L
☐ BIOL 112L Evolution, Form, and Function of Organisms Lab (1) CO: BIOL 112L

OR

☐ HONS 152 Honors Biology II (3) PR: HONS 151 and 151L; CO: HONS 152L
☐ HONS 152L Honors Biology II Lab (1) CO: HONS 152

☐ BIOL 211 Biodiversity, Ecology, and Conservation Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; CO: BIOL 211D

☐ BIOL 211D Biodiversity, Ecology, and Conservation Biology Discussion (0) CO: BIOL 211

☐ BIOL 305 Genetics (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D and MATH 250 or instructor permission

☐ BIOL 335 Biology of Fishes (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

☐ BIOL 337 Invertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

☐ BIOL 341 General Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

☐ BIOL 347 Oceanography (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250; one year of college-level Math and one year of college-level Chemistry

Complete 3 credit hours of 300-level or above Biology courses from the BIOLOGY 300-LEVEL AND ABOVE ELECTIVES LIST.

☐ ______________

BIOLOGY 300-LEVEL AND ABOVE ELECTIVES LIST

BIOL 300 Botany (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 301 Plant Taxonomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 302 Plant Anatomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 303 Phycology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
BIOL 304  Plant Physiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of Chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 305L  Genetics Lab (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D, BIOL 305 and MATH 250

BIOL 310  General Microbiology (4) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

BIOL 312  Molecular Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250

BIOL 312L  Molecular Biology Laboratory (1) PR or CO: BIOL 312 and MATH 250. Students cannot use both BIOL 412 and BIOL 312L towards their major requirements.

BIOL 313  Cell Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

BIOL 313L  Cell Biology Laboratory (1) PR or CO: BIOL 313 and MATH 250

BIOL 314  Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and one year of Chemistry; PR or CO: MATH 250

BIOL 320  Histology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 321  General and Comparative Physiology PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250 or equivalent course in statistics or instructor permission

BIOL 322  Developmental Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 323  Comparative Anatomy of Vertebrates (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 332  Vertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 333  Ornithology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 334  Herpetology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 336  Parasitology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 338  Entomology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 339  Dinosaur Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 340  Zoogeography (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 343  Animal Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 343L  Animal Behavior (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: BIOL 343, and MATH 250
BIOL 448 Bachelor’s Essay in Neuroscience (6) PR: BIOL 351 or PSYC 351 and BIOL 352 or PSYC 352 and permission of student’s major department and the neuroscience program director; PR or CO: MATH 250

BIOL 449 Biology of Coral Reefs (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.00 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 450 Problems in Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

BIOL 451 Problems in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250

BIOL 452 Seminar (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; 2.50 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed; PR or CO: BIOL 305 and MATH 250

BIOL 453 Special Topics (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and instructor permission; PR or CO: BIOL 305 and MATH 250

BIOL 455 Seminar in Molecular Biology (2) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305, 312 and 313; PR or CO: MATH 250

BIOL 499 Bachelor’s Essay (6) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL; instructor and department chair permission; PR or CO: MATH 250

BIOL 501 Biology of the Crustacea (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 337; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 502 Special Topics in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

BIOL 503 Special Topics in Ecology (3-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and 341; 3.00 GPA or higher in BIOL and junior standing and 15 credit hours of BIOL completed or instructor and department chair permission; PR or CO: MATH 250

Chemistry Requirement

- CHEM 111 Principles of Chemistry (3) PR or CO: unless students exempt MATH 111 (via diagnostic testing) or have completed this course as a prerequisite, they are required to take MATH 111 as a co-requisite; CO: CHEM 111
- CHEM 111L Principles of Chemistry Lab (1) CO: CHEM 111

AND

- CHEM 112 Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)
- CHEM 112L Principles of Chemistry Lab (1) CO: CHEM 112

AND

- CHEM 220 Fundamentals of Analytical Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 220L
- CHEM 220L Fundamentals of Analytical Chemistry Lab (2) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 220

OR

- CHEM 231 Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L
- CHEM 231L Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

AND

- CHEM 232 Organic Chemistry (3) PR: CHEM 231 and CHEM 231L; CO: CHEM 232L
- CHEM 232L Organic Synthesis and Analysis (1) CO: CHEM 232

Physics Requirement

- PHYS 101 Introductory Physics (3) PR: None; CO or PR: PHYS 101L
FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
* Please fill out all of the portions of the form that are specified in section B. **You must do this before your request can move forward!**
* Remember that your changes will not be implemented until the next catalog year at the earliest.
* If you have questions, please start by checking the detailed instructions on the website.
* Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Jaap Hillenius          Phone: 3-5504          Email: hilleniusw@cofc.edu

School: SSM                 Department or Program: Biology

Name and Acronym of Major: Biology B.S. and Secondary Ed

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

- [X] Change Request (fill out all sections)
  - [ ] Add an existing course to requirements or electives
  - [X] Add a new course to requirements or electives (attach completed course form for each)
  - [X] Delete courses from requirements or electives
  - [ ] Add or modify concentration*
  - [ ] Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

- [ ] Terminate Program (fill out E, G, H, and I)
  - [ ] Terminate degree
  - [ ] Terminate major
  - [ ] Terminate concentration
  - [ ] Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 97+ (Biology 61+; Secondary Cognate 36)
Number of Proposed Credit Hours (for changed program): 94+ (Biology 58+; Secondary Cognate 36)
Catalog Year in which changes will take effect: FALL 2016

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (https://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, corequisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee's Course Form and a sample syllabus.

This form was last updated on 11/24/2015 and replaces all others. Page 1 of 4
Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L

OR

Honors students can take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L, and CHEM 112/CHEM 112L.

AND

Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM231L, and CHEM 232/CHEM 232L

We would also like to remove the HONS 153/153L and HONS 154/154L options for CHEM 111 and CHEM 112 as these courses have been deactivated.

Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)

Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L

The rest of the curriculum remains unchanged. In a few years, the HONS 191/294 option can be dropped.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The Chemistry Department will no longer be offering HONS 191 or HONS 194. Instead, they will be offering an accelerated chemistry course called HONS 190, which will be more appropriate for many of our incoming honors students who have already completed advanced chemistry in high school. By adding this alternative sequence for the biology majors, they will be able to take advantage of the accelerated option.

HONS 153/153L and HONS154/154L have been previously deactivated and should be removed.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the major or program?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. Ability to apply quantitative reasoning to biological data</td>
<td>All biology students are required to take Biology 305, Genetics. This subject material provides a good opportunity for students to apply quantitative reasoning to biological datasets. In the case of genetics, such data often are in the form of counts of offspring phenotypes that result from a planned cross. We will use a question on the final exam in Biology 305 that requires students to calculate probabilities of particular outcomes resulting from a cross and, furthermore, use statistical tests to determine if the results of an experiment are consistent with these probabilities.</td>
</tr>
</tbody>
</table>

This form was last updated on 11/24/2015 and replaces all others.  Page 2 of 4
2. Ability to apply the process of science

This learning outcome will be assessed with one or more questions on the Biology 211 final exam. These question(s) will propose a scientific question, describe the resources available to the student, and ask the student to develop a manipulative experimental design for problems that allow experimentation.

3. Ability to communicate scientific results

This learning outcome can also be assessed in Biology 211; in this course all students present results of some type of analysis in the form of posters and talks. Currently, the exact form of the communication (presentations, posters and/or papers) required of students varies by instructor. As a result, we propose to assess this outcome in the second year of our assessment efforts.

4.

Additional Outcomes or Comments:

1) Biology currently conducts senior surveys of all graduates (implemented in Qualtrics)

2) We are currently examining alternative approaches to use direct assessment that include multiple time points in students' careers.

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

Addressed in Chemistry proposal and copied here for convenience:

Biology honors students are often in the chemistry honors sequence instead of the biology honors sequence. This depends on many factors, the primary one being that Honors science students can only enroll in one Honors science sequence (Physics, Chemistry or Biology). Since enrollment is sometimes problematic in Honors biology, many biology majors end up taking Honors Chemistry instead (most students are undeclared at this point). The current chemistry requirement for a BS major in Biology is Chem 111/Chem 112/Chem 231/Chem 232. For Honors Biology majors, the chemistry requirement is sometimes met by completing Hons 191/Hons 192/Hons 293/Hons 294. The new course also allows honors biology majors to finish their chemistry more quickly. For those majors completing the new sequence, they will have 3 fewer credits in Chemistry when they graduate. This could be problematic for biology students who intend to enroll in graduate programs that count the number of chemistry courses taken, rather than look at the content of those courses. Such students might need to supplement their chemistry with an additional course, with a logical option being biochemistry.

Another consideration is how to tally science general education courses for students in this sequence. The vast majority of students in this sequence will likely be taking biology, physics and more chemistry courses, so there are any number of possibly sequences that fulfill general education in the sciences. We would request that HONS 190 plus HONS 192 count for general education in the natural sciences (this would replace the current HONS 191-HONS 192 general education sequence). The main complication arises if a student completed HONS 190, but then chose not to pursue more science; they will have completed two courses worth of lecture material in the natural sciences, but only one lab course. For such
students, we would recommend that they accept whatever advanced placement credit they received (usually Chem 111 and Chem 112 for a score of 4 or 5 on the AP test) so that their science general education is fulfilled. If they only received AP credit for Chem 111 (an AP score of 3), that student could pursue a different natural science or petition for Chem 111 (AP credit) plus HONS 190 to count for their general education. Alternatively, we could request that Chem 111 (AP credit) + HONS 190 be considered a valid general education sequence in the natural sciences.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

There will be no addition or reduction of costs for the Biology Department due to these changes.

I. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Biology Major and Secondary Education Cognate Major Requirements
Catalog Year: 2015-16
Degree: Bachelor of Science
Credit Hours: 97+ (Biology 61+; Secondary Cognate 36)

Teacher Education Track (Grades 9-12)

Students interested in teacher certification in biology must complete the following courses and the secondary education cognate major requirements. See the School of Education, Health and Human Performance section of the undergraduate catalog for a listing of the required secondary education cognate major courses. Students should apply for acceptance to this program no later than the second semester of their sophomore year. Requirements for this program include admission to and successful completion of the approved teacher education program. Students must successfully complete all requirements for certification in secondary education.

Notes: When declaring teacher certification in biology through the Program of Study Management System (POSM), students must first select “Declare or Add a Major” and then “Secondary Education Cognate” from the major list. Once this selection is made, a second menu box will appear with a list of the associated majors. Select the biology major and follow the on-screen instructions.

“PR” indicates a pre-requisite. “CO” indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Required Courses:

- [ ] BIOL 111 Introduction to Cell and Molecular Biology (3) PR: None; CO: BIOL 111L
- [ ] BIOL 111L Introduction to Cell and Molecular Biology Lab (1) CO: BIOL 111
- [ ] HONS 151 Honors Biology I (3) PR: None; CO: HONS 151L
- [ ] HONS 151L Honors Biology I Lab (1) CO: HONS 151

- [ ] BIOL 112 Evolution, Form, and Function of Organisms (3) PR: BIOL 111 and 111L; CO: BIOL 112L
- [ ] BIOL 112L Evolution, Form, and Function of Organisms Lab (1) CO: BIOL 112L

- [ ] HONS 152 Honors Biology II (3) PR: HONS 151 and 151L; CO: HONS 152L
- [ ] HONS 152L Honors Biology II Lab (1) CO: HONS 152

- [ ] BIOL 211 Biodiversity, Ecology, and Conservation Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; CC: BIOL 211D
- [ ] BIOL 211D Biodiversity, Ecology, and Conservation Biology Discussion (0) CO: BIOL 211
- [ ] BIOL 305 Genetics (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D and MATH 250 or instructor permission

19 additional credit hours in courses at the 300-level or above including:

Complete one of the following courses:

- [ ] 

BIOL 312 Molecular Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250

BIOL 313 Cell Biology (3) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; and BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250, BIOL 305 or CHEM 232 and 232L

Complete one of the following laboratories

- [ ]
BIOL 305L – Genetics Lab (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; PR or CO: BIOL 211 and 211D, BIOL 305 and MATH 250

BIOL 312L – Molecular Biology Laboratory (1) PR or CO: BIOL 312 and MATH 250. Students cannot use both BIOL 412 and BIOL 312L towards their major requirements.

BIOL 313L – Cell Biology Laboratory (1) PR or CO: BIOL 313 and MATH 250

Complete one of the following courses:

☐ □ □ □ □

BIOL 304 – Plant Physiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 321 – General and Comparative Physiology (4) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; PR or CO: MATH 250 or equivalent course in statistics or instructor permission

Complete at least one course from the following:

☐ □ □ □ □

BIOL 300 – Botany (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 302 – Plant Anatomy (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 303 – Phycology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 304* – Plant Physiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and one year of chemistry; PR or CO: BIOL 305 and MATH 250

Note: *BIOL 304 may be used to fulfill the other above requirements.

Complete at least four credit hours from the following:

☐ □ □ □ □

BIOL 310 – General Microbiology (4) PR: One year of Chemistry and BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D or CHEM 232 and 232L; PR or CO: MATH 250; BIOL 305 or CHEM 232 and 232L

BIOL 322 – Developmental Biology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 323 – Comparative Anatomy of Vertebrates (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 332 – Vertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 333 – Ornithology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 334 – Herpetology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 335 – Biology of Fishes (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250
BIOL 336 Parasitology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 337 Invertebrate Zoology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 338 Entomology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 343 Animal Behavior (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 343L Animal Behavior (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: BIOL 343, and MATH 250

☐ Select 3-7 credit hours of any 300-level course listed above or from the following:

BIOL 314 Immunology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and one year of Chemistry; PR or CO: MATH 250

BIOL 340 Zoogeography (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 341 General Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250

BIOL 342 Oceanography (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250; one year of college-level Math and one year of college-level Chemistry

BIOL 350 Evolution (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; PR or CO: MATH 250

BIOL 354 Techniques in Neuroscience (4) PR: BIOL 351 or PSYC 351; MATH 250 or PSYC 211 and PSYC 220 or PSYC 250; and instructor permission

BIOL 356 Comparative Biomechanics (4) PR: BIOL 111/111L or HONS 151/151L and BIOL 112/112L or HONS 152/152L, and BIOL 211; PR or CO: BIOL 305, MATH 250 and PHYS 101/101L or 111/111L; or instructor permission.

BIOL 359 Study Abroad in Neuroscience (4) PR: Permission of instructor

BIOL 406 Conservation Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305 and BIOL 341 or permission of instructor; PR or CO: MATH 250

BIOL 410 Applied and Environmental Microbiology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; BIOL 310 and one year of Chemistry; PR or CO: BIOL 305 and MATH 250

BIOL 420 General and Comparative Endocrinology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; PR or CO: BIOL 305 and MATH 250 and a course in physiology or instructor permission

BIOL 421 Topics in Physiology, Cell, and Molecular Biology of Marine Organisms (3) PR: BIOL 312 or 313; BIOL 321 and instructor permission; PR or CO: MATH 250

BIOL 423 Genomics (4) PR: BIOL 305; BIOL 312 or BIOL 313; MATH 250

BIOL 444 Plant Ecology (4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 341 or instructor permission; PR or CO: BIOL 305 and MATH 250

BIOL 445 Systematic Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; junior standing and at least one upper division course in organismal Biology; PR or CO: MATH 250

BIOL 450 Problems in Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor and department chair permission; PR or CO: MATH 250
BIOL 451 Problems in Marine Biology (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and BIOL 305; 3.00 GPA or higher in science courses; junior standing and instructor permission; PR or CO: MATH 250

BIOL 452 Seminar (1) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D; 2.50 GPA or higher in BIOL; junior standing and 15 credit hours of BIOL completed; PR or CO: BIOL 305 and MATH 250

BIOL 453 Special Topics (1-4) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L and BIOL 211 and 211D and instructor permission; PR or CO: BIOL 305 and MATH 250

Mathematics Requirement
- [ ] MATH 120 Introductory Calculus (4) PR: Placement or C- or better in MATH 111
- [ ] MATH 250 Statistics I Methods (3) PR: MATH 105 with a C- grade or better or MATH 111 or MATH 120 or permission of instructor

Physics Requirement
- [ ] PHYS 101 Introductory Physics (3) PR: None; CO or PR: PHYS 101L
- [ ] PHYS 101L Introductory Physics Lab (1) CO: PHYS 101

AND
- [ ] PHYS 102 Introductory Physics II (3) PR: PHYS 101 or PHYS 111 or HONS 157; CO: PHYS 102L
- [ ] PHYS 102L Introductory Physics Lab (1) CO: PHYS 102

OR
- [ ] PHYS 111 General Physics I (3) PR or CO: MATH 120 or equivalent or instructor permission; CO: PHYS 111L
- [ ] PHYS 111L General Physics I Lab (1) CO: PHYS 111

AND
- [ ] PHYS 112 General Physics II (3) PR: PHYS 111 or HONS 157; CO or PR: MATH 220 or equivalent or instructor permission; CO: PHYS 112L
- [ ] PHYS 112L General Physics II Lab (1) CO: PHYS 112

Chemistry Requirement
- [ ] CIEM 111 Principles of Chemistry (3) PR or CO: unless students exempt MATH 111 (via diagnostic testing) or have completed this course as a prerequisite, they are required to take MATH 111 as a co-requisite; CO: CHEM 111L

AND
- [ ] CHEM 111L Principles of Chemistry Lab (1) CO: CHEM 111

AND
- [ ] CHEM 112 Principles of Chemistry (3) PR: CHEM 111 and 111L or HONS 153 and 153L; CO: CHEM 112L (MATH 120 strongly recommended)
- [ ] CHEM 112L Principles of Chemistry Lab (1) CO: CHEM 112

AND
- [ ] CHEM 102 Organic and Biological Chemistry (3) PR: CHEM 101 and 101L or CHEM 111 and 111L; CO: CHEM 102L
- [ ] CHEM 102L Organic and Biological Chemistry Lab (1) CO: CHEM 102

OR
- [ ] CHEM 231 Organic Chemistry (3) PR: CHEM 112 and CHEM 112L or HONS 154 and HONS 154L; CO: CHEM 231L
- [ ] CHEM 231L Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

Notes:
- MATH 250 is a pre-requisite for all 300-level BIOL courses.
- CHEM 220/CHM 220L are recommended courses.
- Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/CHEM 111L, CHEM 112/CHEM 112L, CHEM 112L/CHEM 231L, and CHEM 232/CHEM 232L.
- Honors students can take the alternative sequence of HONS 157/HONS 157L and HONS 158/HONS 158L in lieu of PHYS 111/PHYS 111L and PHYS112/PHYS 112L.
- Honors students may take the alternative course, HONS 190/HONS 190L in lieu of CHEM 111/CHEM 111L and CHEM 112/CHEM 112L.
- Honors students can take the alternative sequence of HONS 192/HONS 192L, and HONS 293/HONS 293L, in lieu of CHEM 231/CHEM 231L, and CHEM 232/CHEM 232L.
Secondary Cognate Major Requirements

“PR” indicates a pre-requisite. “CO” indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Students interested in teacher certification in secondary education must complete a content major, additional coursework required for certification (if applicable), and the secondary education cognate major requirements. Content majors are available in biology (Bachelor of Science Teaching Option), chemistry (Bachelor of Arts), English (Bachelor of Arts), history (Bachelor of Arts, for certification in social studies), mathematics (Bachelor of Science teacher education track), and physics (Bachelor of Arts). Students must successfully complete all requirements for certification in secondary education.

Required Courses

☐ COMM 104  Public Speaking (3) PR: None
☐ EDFS 201*  Foundations of Education (3) PR: Sophomore standing.

Note: *EDFS 201 is prerequisite to all other education courses with a grade of C or better.

☐ EDFS 303  Human Growth and Development and the Educational Process (3) PR: None
☐ EDFS 326*  Integrating Technology Into Teaching (3) PR: None
☐ EDFS 330*  Classroom and Behavior Management (3) PR: junior or above
☐ EDFS 345  Introduction to the Education of Exceptional Children and Youth (3) PR: EDFS 303.
☐ EDFS 455  Literacy and Assessment in the Content Areas (3)
☐ EDFS 456  Teaching Strategies in the Content Areas (English, Math, Science, Social Studies) (3)

Note: *Students must enroll in the Secondary sections for each of the courses marked with an asterisk. (See associate department chair to register for courses.) Each course requires a school-based field experience. Students will need a 3-hour block of time per week between the hours of 7 a.m. and 2 p.m. Monday through Friday, to complete each school-based experience.

Clinical Practice Internship Requirement

☐ EDFS 460*  Clinical Practice in the Content Area (12) PR: Admission to a teacher education program and completion of all education requirements. This course is graded pass-fail. A grade of “P” carries only earned hours. It does not carry quality hours or quality points.

Note: *Students seeking recommendation for South Carolina certification in Secondary Education must complete the program of study above and meet the admission, retention, and exit requirements of the program and the School of Education, Health, and Human Performance. Recommendation to the South Carolina Department of Education for certification in South Carolina is contingent upon successful completion of Clinical Practice, and achievement of passing scores on the necessary Praxis II test(s) for recommendation. Students who do not take Clinical Practice may not earn a degree in Secondary Education and will not be recommended for certification. See your faculty advisor for additional information.

Notes:

- You should apply for admission (this is NOT declaring your major) to the Teacher Education Program the semester you are enrolled in EDFS 201 Foundations of Education. Requirements for admission:
  - Minimum overall GPA of 2.75 and 60 earned credit hours.
  - Passing score on the 3 components of the PRAXIS 1: Pre-Professional Skills Test (Reading, Writing, and Mathematics) as designated by the South Carolina Department of Education OR qualifying SAT or ACT scores.
  - Disposition forms from (a) a general education faculty member, (b) your EDFS 201 professor, and (c) someone who has observed you working with children.
- If a student has transfer credit for a course that is equivalent to EDFS 201, they must meet with the Teacher Education department chair and complete 1 hour of work.

- A grade of C or better in EDFS 201 Foundations of Education.

- Your admission process must be completed before beginning the professional program.

- You must complete a major in the content area and the cognate major to be forwarded to the State Department of Education for certification.