

Physics Major and Secondary Education Cognate Major Requirements

Catalog Year: 2015-16

Degree: Bachelor of Arts

Physics Major Credit Hours: 82+ (Physics 42+; Secondary Cognate 40)

"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.

Physics Teacher Education Program (Grades 9-12)

Students interested in teacher certification in physics must complete both the physics major 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 include admission to and successful completion of the approved teacher education program. Students must successfully complete all requirements for certification in secondary education.

When declaring teacher certification in physics 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 physics major and follow the on-screen instructions.

Required Courses

- 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

 - 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

 - PHYS 230 Introduction to Modern Physics I (3) PR: PHYS 112 or HONS 158; CO or PR: MATH 211 or instructor permission

 - PHYS 370 Experimental Physics (4) PR: PHYS 230 or instructor permission

 - PHYS 419 Research Seminar (1) PR or CO: PHYS 370 or ASTR 377 or instructor and department chair permission

 - PHYS 420** Senior Research (3) PR: PHYS 419 and instructor and department chair permission
- OR**
- PHYS 499** Bachelor's Essay (1-6) Bachelor's Essay (6) PR: PHYS 419 or department chair permission; credit will not be awarded for both PHYS 420 and PHYS 499

Notes: * Upon completion of PHYS 101 with a grade of B or better and successful completion of MATH 120, a student may transfer to PHYS 112. **Credit will not be awarded for both PHYS 420 and PHYS 499.

Select 11 credit hours from the following electives with department approval. Please note a maximum of 3 credit hours from each of the following groups are allowed (PHYS 381, PHYS 390 and PHYS 399) and (PHYS 260, PHYS 260L, PHYS 460L).

Physics Electives List

- PHYS 203 Physics and Medicine (3) PR: PHYS 102, PHYS 102L or PHYS 112, PHYS 112L or HONS 158

- PHYS 260 NASA Space Mission Design (2) PR: ASTR 130 or ASTR 306 or HONS 160 or GEOL 206 or PHYS 102 or PHYS 112 or HONS 158 or instructor permission; CO: PHYS 260L or 460 L

- PHYS 260L NASA Space Mission Design Laboratory (1) CO: PHYS 260

PHYS 296	Biophysics Model and Excitable Cells (3) <i>PR: (BIOL 111 or HONS 152 or PHYS 112 or HONS 158) OR (BIOL 211 and BIOL 305 and PHYS 102) or instructor permission</i>
PHYS 298	Special Topics (1-3) <i>PR: Instructor permission</i>
PHYS 301	Classical Mechanics (3) <i>PR: PHYS 112 or HONS 158 and MATH 323 or PHYS 272 or permission of instructor</i>
PHYS 302	Classical Mechanics (3) <i>PR: PHYS 301</i>
PHYS 308	Atmospheric Physics (3) <i>PR: PHYS 112, PHYS 112L or HONS 158 or instructor permission</i>
PHYS 320	Intro to Electronics (4) <i>PR: PHYS 102 and MATH 120 or PHYS 112 or HONS 158 or instructor permission</i>
PHYS 331	Intro to Modern Physics II (3) <i>PR: PHYS 230</i>
PHYS 340	Photonics (4) <i>PR: PHYS 112, PHYS 112L or HONS 158</i>
PHYS 350	Energy Production (4) <i>PR: CHEM 111, CHEM 111L; (PHYS 112, 112L or HONS 158) or (PHYS 102, 102L and MATH 120)</i>
PHYS 381	Internship (1-4) <i>PR: Coordinator and department chair permission</i>
PHYS 390	Research (1-3; repeatable up to 6) <i>PR: Department chair and instructor permission</i>
PHYS 394	Digital Signal and Image Processing with Biomedical Applications (3) <i>PR: PHYS 112 and 112L or HONS 158 and 158L; CO: PHYS 394L</i>
PHYS 394L	Digital Signal and Image Processing with Biomedical Applications Laboratory (1) <i>PR: PHYS 112 and 112L or HONS 158 and 158L; CO: PHYS 394</i>
PHYS 397	Research Experience Physics and Astronomy (0) <i>PR: Only declared majors can take a Zero Credit Research course. Instructor and department chair permission required.</i>
PHYS 399	Tutorial (3; repeatable up to 12) <i>PR: Junior standing and department chair and instructor permission</i>
PHYS 403	Introductory Quantum Mechanics (3) <i>PR: PHYS 230 and MATH 323 or PHYS 272, or instructor permission</i>
PHYS 405	Thermal Physics (3) <i>PR: PHYS 230 and MATH 323 or PHYS 272, or instructor permission</i>
PHYS 407	Introduction to Nuclear Physics (3) <i>PR: PHYS 230 or instructor permission</i>
PHYS 408	Introduction to Solid State Physics (3) <i>PR: PHYS 230 and MATH 323 or PHYS 272, or instructor permission</i>
PHYS 409	Electricity and Magnetism (3) <i>PR: PHYS 112 or HONS 158 and MATH 323 or PHYS 272 or permission of instructor</i>
PHYS 410	Electricity and Magnetism (3) <i>PR: PHYS 409</i>
PHYS 412	Special Topics (1-3) <i>PR: Instructor permission</i>
PHYS 415	Fluid Mechanics (3) <i>PR: MATH 323 and PHYS 301 or instructor permission</i>
PHYS 456	Air Pollution Meteorology (4) <i>PR: PHYS 112, PHYS 112L or (PHYS 102, PHYS 102L and MATH 120) or HONS 158; CHEM 112, CHEM 112L or instructor permission</i>

PHYS 457 Satellite Meteorology (3) *PR: PHYS 308 or PHYS 456 or (PHYS 105 and PHYS 112, PHYS 112L) or (PHYS 105 and PHYS 102, PHYS 102L and MATH 120) or (PHYS 105 and HONS 158)*

PHYS 458 Climate Change (4) *PR: PHYS 112, PHYS 112L or HONS 158*

PHYS 460L NASA Space Mission Design Leadership Lab (1) *PR: Instructor permission; CO: PHYS 260*

Mathematics Requirement

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

MATH 220 Calculus II (4) *PR: MATH 120 or HONS 115*

MATH 221 Calculus III (4) *PR: MATH 220 or equivalent*

Notes:

- With department approval, completion with grades of at least "B" in PHYS 101/101L and PHYS 102/102L, together with MATH 120 and MATH 220 may be substituted for PHYS 111/111L and PHYS 112/112L.
- Suggested programs of study leading to graduate school in physics, astronomy, astrophysics, meteorology and engineering are available from the department.

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)

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.

Additional Coursework required beyond Content major (Physics, BA) for Physics Certification:

- BIOL 101 Concepts and Applications in Biology I (4) *PR: None; CO: BIOL 101L*
- BIOL 101L Concepts and Applications in Biology I Lab (0) *CO: BIOL 101*

OR

- 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*

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.