

Physics Major with Concentration in Meteorology Concentration Requirements

Catalog Year: 2014-15

Degree: Bachelor of Science

Physics Major Credit Hours: 76+

"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

- 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 301 Classical Mechanics (3) PR: PHYS 112 or HONS 158 and MATH 323 or PHYS 272 or permission of instructor

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

 - PHYS 403 Introductory Quantum Mechanics (3) PR: PHYS 230 and MATH 323 or PHYS 272, or instructor permission

 - PHYS 409 Electricity and Magnetism (3) PR: PHYS 112 or HONS 158 and MATH 323 or PHYS 272 or permission of instructor

 - 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) 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 15 credit hours from the following electives with department approval. Please note a maximum of 6 credit hours are allowed from PHYS 381, 390 and 399.

- ASTR 306 Planetary Astronomy (3) PR: ASTR 231
- ASTR 311 Stellar Astronomy and Astrophysics (3) PR: ASTR 231 and MATH 221
- ASTR 312 Galactic and Extragalactic Astronomy (3) PR: ASTR 231 and MATH 221
- ASTR 377 Experimental Astronomy (4) PR: ASTR 231
- ASTR 410 Black Holes: Advanced Topics (1) PR: PHYS 112, PHYS 112L or instructor permission; PR or CO: ASTR 210
- ASTR 413 Astrophysics (3) PR: PHYS 301 and MATH 323 or instructor permission
- ASTR 460L NASA Space Mission Design Leadership Lab (1) PR: Instructor permission; PR or CO: ASTR 260
- PHYS 296 Biophysics Model and Excitable Cells (3) PR: (BIOL 111 or HONS 152 or PHYS 112 or HONS 158) OR (BIOL 211 and BIOL 305 and PHYS 102) or instructor permission
- PHYS 302 Classical Mechanics (3) PR: PHYS 301

PHYS 308	Atmospheric Physics (3) PR: PHYS 112, PHYS 112L or HONS 158 or instructor permission
PHYS 320	Intro to Electronics (4) PR: PHYS 102 and MATH 120 or PHYS 112 or HONS 158 or instructor permission
PHYS 331	Intro to Modern Physics II (3) PR: PHYS 230
PHYS 340	Photonics (4) PR: PHYS 112, PHYS 112L or HONS 158
PHYS 350	Energy Production (4) PR: CHEM 111, CHEM 111L; (PHYS 112, 112L or HONS 158) or (PHYS 102, 102L and MATH 120)
PHYS 381	Internship (1-4) PR: Declared PHYS major, PHYS 370, and coordinator permission
PHYS 390	Research (1-3; repeatable up to 6) PR: Department chair and instructor permission
PHYS 394	Digital Signal and Image Processing with Biomedical Applications (3) PR: PHYS 112 and 112L or HONS 158 and 158L; CO: PHYS 394L
PHYS 394L	Digital Signal and Image Processing with Biomedical Applications Laboratory (1) PR: PHYS 112 and 112L or HONS 158 and 158L; CO: PHYS 394
PHYS 397	Research Experience Physics and Astronomy (0) PR: Only declared majors can take a Zero Credit Research course. Instructor and department chair permission required.
PHYS 399	Tutorial (3, repeatable up to 12) PR: Junior standing and department chair and instructor permission
PHYS 405	Thermal Physics (3) PR: PHYS 230 and MATH 323 or PHYS 272, or instructor permission
PHYS 407	Introduction to Nuclear Physics (3) PR: PHYS 230 or instructor permission
PHYS 408	Introduction to Solid State Physics (3) PR: PHYS 230 and MATH 323 or PHYS 272, or instructor permission
PHYS 410	Electricity and Magnetism (3) PR: PHYS 409
PHYS 412	Special Topics (1-3) PR: Instructor permission
PHYS 415	Fluid Mechanics (3) PR: MATH 323 and PHYS 301 or instructor permission
PHYS 456	Air Pollution Meteorology (4) PR: PHYS 112, PHYS 112L or (PHYS 102, PHYS 102L and MATH 120) or HONS 158; CHEM 112, CHEM 112L or instructor permission
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
- MATH 323 Differential Equations (3) PR: MATH 221 and MATH 203 or equivalent or permission of instructor

Optional: Students may also select a concentration in [Computational Neuroscience](#), [Energy Production](#) or [Meteorology](#).

Meteorology Concentration (Credit Hours: 18+)

Complete 6 credit hours from the following:

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- PHYS 105* Introduction to Meteorology (3) PR: A working knowledge of high school algebra is assumed.
- PHYS 308 Atmospheric Physics (3) PR: PHYS 112, PHYS 112L or HONS 158
- PHYS 456* Air Pollution Meteorology (4) PR: PHYS 102, PHYS 102L and MATH 120 or CHEM 112, CHEM 112L and PHYS 112, PHYS 112L or HONS 158
- 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, 112L or HONS 158

Notes: *A student will not receive credit for both PHYS 105 and PHYS 456

Complete an additional 12 credit hours from the following. Courses do not count if already chosen for major core course requirements.

- ASTR 306 Planetary Astronomy (3) PR: PHYS 111, PHYS 111L or PHYS 101, PHYS 101L or HONS 157 or instructor permission
- BIOL 204 Man and the Environment (3) PR: None
- BIOL 342 Oceanography (4) PR: BIOL 211, 211D; CO or PR: BIOL 305
- CHEM 111 Principles of Chemistry (3) PR: MATH 111 or equivalent; CO: CHEM 111L
- CHEM 111L Principles of Chemistry Lab (1) CO: CHEM 111
- ENVT 200 Environmental Studies (3) PR: Sophomore standing
- GEOL 103 Environmental Geology (3) PR: None; CO: GEOL 103L
- GEOL 103L Environmental Geology Lab (1) CO: GEOL 103
- GEOL 240* Special Topics in Geology (1-4) PR: GEOL 101 and 101L or GEOL 103 and 103L and GEOL 105 and 105L or HONS 155 and 155L and HONS 156 and 156L or instructor permission
- GEOL 314 Introduction to Remote Sensing (4) PR: GEOL 101 and 101L or GEOL 103 and 103L and GEOL 105 and 105L or HONS 155 and 155L and HONS 156 and 156L or instructor permission
- GEOL 438 Hydrogeology (4) PR: GEOL 101 and 101L or GEOL 103 and 103L and GEOL 105 and 105L or HONS 155 and 155L and HONS 156 and 156L and MATH 111 or 120 or instructor permission
- GEOL 442 Remote Sensing (4) PR: GEOL 101 and 101L or GEOL 103 and 103L and GEOL 105 and 105L or HONS 156 and 156L and MATH 111 or 120 or instructor permission
- HONS 390* Special Topics (3-6) PR: None
- PHYS 298* Special Topics (1-3) PR: Instructor and department chair permission
- PHYS 308 Atmospheric Physics (3) PR: PHYS 112, PHYS 112L or HONS 158 or instructor permission
- PHYS 340 Photonics (4) PR: PHYS 112, PHYS 112L or HONS 158

PHYS 390*	Research (1-3; repeatable up to 6) <i>PR: Department chair and instructor permission</i>
PHYS 399	Tutorial (3, repeatable up to 12) <i>PR: Junior standing and department chair and instructor permission</i>
PHYS 405	Thermal Physics (3) <i>PR: PHYS 230</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 or instructor permission</i>
PHYS 412*	Special Topics (1-3) <i>PR: Instructor permission; topic must be meteorology related</i>
PHYS 415	Fluid Mechanics (3) <i>PR: MATH 323 and PHYS 301 or instructor permission</i>
PHYS 420*	Senior Research (3) <i>PR: PHYS 419 and instructor and department chair permission</i>
PHYS 456	Air Pollution Meteorology (4) <i>PR: PHYS 102, PHYS 102L and MATH 120 or CHEM 112, CHEM 112L and PHYS 112, PHYS 112L or HONS 158</i>
PHYS 457	Satellite Meteorology (3) <i>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)</i>
PHYS 458	Climate Change (4) <i>PR: PHYS 112, PHYS 112L or HONS 158</i>
PHYS 499*	Bachelor's Essay (6) <i>PR: Department approval; credit will not be awarded for both PHYS 420 and PHYS 499</i>

Note: * These courses must involve meteorology and be approved by the Program Director. *Credit will not be awarded for both PHYS 420 and PHYS 499.

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.