MAJOR REQUIREMENTS

Credit Hours: 58+
In addition to completing the requirements for this major, students must also complete the degree requirements specified in the Academic Regulations section of this catalog. Courses within this major may also satisfy general education requirements. Please consult the Liberal Arts and Sciences General Education Requirements for more information.

REQUIRED COURSES

Complete one of the following options:

OPTION 1 (3 CREDIT HOURS)
PHYS 420 Senior Research (3) (3)

OPTION 2 (6 CREDIT HOURS)
PHYS 499A Bachelor's Essay (3) (3)
PHYS 499B Bachelor's Essay (3) (3)

NOTES:

- Credit may not be applied for both the Senior Seminar and the Bachelor's Essay.

Select 15 credit hours from the following electives with department approval

Please note a maximum of 6 credit hours are allowed from PHYS 381, PHYS 390 and PHYS 399.

ASTR 306 Planetary Astronomy (3) (3)
ASTR 311 Stellar Astronomy and Astrophysics (3) (3)

ASTR 312 Galactic and Extragalactic Astronomy (3) (3)
ASTR 377 Experimental Astronomy (4) (4)
ASTR 410 Black Holes; Advanced Topics (1) (1)
ASTR 413 Astrophysics (3) (3)
ASTR 460L NASA Space Mission Design Leadership Lab (1) (1)
PHYS 302 Classical Mechanics (3) (3)
PHYS 320 Intro to Electronics (4) (4)
PHYS 331 Introduction to Modern Physics II (3) (3)
PHYS 340 Photonics (4) (4)
PHYS 350 Energy Production (4) (4)
PHYS 381 Internship (1-4) (1-4)
PHYS 390 Research (1-3) (1-3)
PHYS 394 Digital Signal and Image Processing with Biomedical Applications (3) (3)
PHYS 396 Biophysical Modeling of Excitable Cells (3) (3)
PHYS 397 Research Experience Physics/Astronomy (0) (0)
PHYS 399 Tutorial (3) (3)
PHYS 405 Thermal Physics (3) (3)
PHYS 407 Introduction to Nuclear Physics (3) (3)
PHYS 408 Introduction to Solid State Physics (3) (3)
PHYS 410 Electromagnetism II (3) (3)
PHYS 412 Special Topics (1-3) (1-3)
PHYS 415 Fluid Mechanics (3) (3)
PHYS 425 Mesoscale Meteorology (3) (3)
PHYS 457 Satellite Meteorology (3) (3)
PHYS 459 Cloud and Precipitation Physics (3) (3)
PHYS 460L NASA Space Mission Design Leadership Lab (1) (1)
PHYS 481 Physics Problem Solving (1) (1)

Mathematics Requirement:

MATH 120 Introductory Calculus (4) (4)
MATH 220 Calculus II (4) (4)
MATH 221 Calculus III (4) (4)
COMPUTATIONAL NEUROSCIENCE
CONCENTRATION (18+ CREDIT HOURS)

Required Courses:

CSCI 220 Computer Programming I (3) (3)
CSCI 220L Programming I Laboratory (1) (1)
BIOL 396 Biophysical Modeling of Excitable Cells (3) (3)
OR
PHYS 396 Biophysical Modeling of Excitable Cells (3) (3)
PHYS 394 Digital Signal and Image Processing with Biomedical Applications (3) (3)
PHYS 394L Digital Signal and Image Processing with Biomedical Applications Laboratory (1) (1)

COMPLETE A MINIMUM OF 7 CREDIT HOURS FROM THE FOLLOWING ELECTIVES:

Each elective must be from a different group.

Group I

BIOL 305 Genetics (3) (3)
BIOL 312 Molecular Biology (3) (3)
BIOL 313 Cell Biology (3) (3)
BIOL 321 General and Comparative Physiology (4) (4)
BIOL 343 Animal Behavior (3) (3)
BIOL 351 Principles of Neurobiology (3) (3)
PSYC 351 Principles of Neurobiology (3) (3)
PSYC 352 Neurobiology and Behavior (3) (3)
BIOL 352 Neurobiology and Behavior (3) (3)
BIOL 446 Special Topics in Neuroscience (3) (3)
PSYC 446 Special Topics in Neuroscience (3) (3)
BIOL 447 Seminar in Neuroscience (3) (3)
PSYC 447 Seminar in Neuroscience (3) (3)
PSYC 213 Conditioning and Learning (3) (3)
PSYC 214 Behavioral Neuroscience (3) (3)
PSYC 215 Cognitive Psychology (3) (3)
PSYC 216 Sensation and Perception (3) (3)
PSYC 221 Abnormal Psychology (3) (3)
PSYC 318 Comparative Animal Psychology (3) (3)
PSYC 353 Hormones and Behavior (3) (3)
PSYC 386 Behavioral Pharmacology (3) (3)
PSYC 387 Neuropsychology (3) (3)

PSYC 464 Advanced Behavioral Neuroscience with Lab (3) (3)
PSYC 466 Advanced Sensation and Perception with Lab (3) (3)
PSYC 468 Advanced Cognitive Psychology with Lab (3) (3)

Group II

CSCI 221 Computer Programming II (3) (3)
CSCI 230 Data Structures and Algorithms (3) (3)
CSCI 334 Data Mining (3) (3)
CSCI 360 Software Architecture, Security, and Testing (3) (3)
CSCI 362 Software Engineering (3) (3)
CSCI 380 User Interface Development (3) (3)
CSCI 470 Principles of Artificial Intelligence (3) (3)
CSCI 480 Principles of Computer Graphics (3) (3)
MATH 207 Discrete Structures I (3) (3)
MATH 245 Numerical Methods and Mathematical Computing (3) (3)
MATH 246 Mathematical Computing and Programming Laboratory (1) (1)
MATH 307 Discrete Structures II (3) (3)
MATH 440 Statistical Learning I (3) (3)
MATH 441 Statistical Learning II (3) (3)
MATH 445 Numerical Analysis (3) (3)
MATH 451 Linear Programming and Optimization (3) (3)
MATH 452 Operations Research (3) (3)
MATH 470 Mathematical Modeling (3) (3)

Group III

PHYS 203 Physics and Medicine (3) (3)
PHYS 270 Nanotechnology in Medicine (3) (3)
PHYS 298 Special Topics (1-3) (1-3)
PHYS 320 Intro to Electronics (4) (4)
PHYS 340 Photonics (4) (4)
PHYS 381 Internship (1-4) * (1-4)
PHYS 390 Research (1-3) * (1-3)
PHYS 399 Tutorial (3) (3)
PHYS 405 Thermal Physics (3) (3)
PHYS 407 Introduction to Nuclear Physics (3) (3)
PHYS 408 Introduction to Solid State Physics (3) (3)
PHYS 412 Special Topics (1-3) * (1-3)
PHYS 415 Fluid Mechanics (3) (3)
PHYS 420 Senior Research (3) ** (3)

Note:

*Must be computational neuroscience related and conducted under the mentorship of a neuroscience faculty member from CofC or co-mentorship with MUSC faculty. Prior
written approval must be obtained from the coordinator of the Computational Neuroscience concentration.

**Credit may not be applied for both the Senior Seminar and the Bachelor's Essay.**

NOTES:

- With department approval, completion with grades of at least "B" in PHYS 101/PHYS 101L and PHYS 102/PHYS 102L, together with MATH 120 and MATH 220 may be substituted for PHYS 111/PHYS 111L and PHYS 112/PHYS 112L.
- Suggested programs of study leading to graduate school in physics, astronomy, astrophysics, meteorology and engineering are available from the department.
- No more than 10 credit hours from PHYS 298 may be applied towards the program requirements.

COURSEWORK MEETING MAJOR REQUIREMENTS EXCLUDED FROM THE MAJOR GPA CALCULATION

None. All courses that may apply toward completion of course requirements within the major apply toward the major GPA calculation.