

# Department of Physics

The Department of Physics offers programs of study leading to the Bachelor of Science degree. Students may major in physics or in physics with secondary education teacher certification.

The Department of Physics also offers a dual degree program which allows students to receive both a bachelor's degree in physics from NGCSU and a bachelor's degree in engineering from Georgia Tech, Clemson University, or Mercer University.

Students seeking a bachelor of engineering degree may begin their college studies at NGCSU through the Regents Engineering Transfer Program (RETP) or may take a pre-engineering curriculum. Upon successful completion of the pre-engineering curriculum, RETP students transfer to the Georgia Institute of Technology to complete the degree requirements. Non-RETP pre-engineering students take the pre-engineering curriculum and then apply for transfer to the engineering school of their choice. For details see the Engineering Programs section of this Undergraduate Bulletin.

The department also provides students with the opportunity to minor in physics.

## MAJOR IN PHYSICS

### Core Curriculum Requirements

**60 hours**

All baccalaureate degree programs at NGCSU have as a requirement the satisfactory completion of at least 60 semester credit hours comprising the six areas of the core curriculum. A complete description of Areas A-E of the core curriculum can be found on page 105. Individual degree programs may specify exceptions and/or particular courses which must be taken within each Area A-E of the core curriculum. Those exceptions and/or course requirements and Area F of the core curriculum are shown below.

Area A	MATH 1113 or MATH 2450
Area B	no exceptions
Area C	no exceptions
Area D	MATH 2450 or MATH 2460. Physics majors may not count PHYS 2211, 2211L, 2212, 2212L in Area D.
Area E	no exceptions

### Area F. Courses Related to Program of Study

For students starting with MATH 1113 in Area A:

PHYS 2211, 2211L, 2212, 2212L	8 hours
MATH 2460, 2470 (2450 taken in Area D)	8 hours

CSCI 1301 (3 hours) or CSCI 1371 (4 hours)	3 or 4 hours
For students starting with MATH 2450 in Area A:	
PHYS 2211, 2211L, 2212, 2212L	8 hours
MATH 2470 (2450 taken in Area A; 2460 in Area D)	4 hours
2 hour carryover from Areas A and D	2 hours
CSCI 1301 (3 hours) or CSCI 1371 (4 hours)	3 or 4 hours
1 elective hour	1 hour

#### COURSES REQUIRED FOR THE MAJOR

PHYS	3310, 3310L, 3111, 3411, 3610, 3710 or 3720, 4350, 4011L, 4012L, 4990	22 hours
CHEM	1211, 1211L, 1212, 1212L (may be taken to fulfill part of Area D)	8 hours
MATH	3000	3 hours

Additional 9 hours of upper-level physics or astronomy or engineering courses  
 Additional 9 hours technical electives (computer science, math, chemistry, engineering, or upper-level geography)

Foreign language (1002 or higher) (If not taken in Area B)	3 hours
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Basic Physical Education requirement (This is outside the 120 hour graduation requirement.)	3 hours
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Electives to bring the total number of credit hours to 120 (exclusive of the Physical Education requirement). The 120 credit hours must include at least 39 upper-level credit hours.

#### OTHER REQUIREMENTS

Senior Assessment — Non-dual-degree physics majors must take a national, standardized physics achievement test before graduation, usually in their last semester.

Regents' Skills Test or exemption (must be taken during the first semester)  
 U.S. and Georgia Constitution & History Requirement

## DUAL DEGREE PROGRAM IN PHYSICS/ENGINEERING

North Georgia College & State University offers a dual degree program which allows students to receive a bachelor's degree in physics from NGCSU and a bachelor's degree in engineering from the Georgia Institute of Technology in Atlanta, Clemson University in South Carolina, or Mercer University in Macon. The dual degree program gives students the opportunity to develop a strong liberal arts background before completing academic coursework in engineering at another institution. Typically, dual degree students attend NGCSU for three years, then attend Georgia Tech, Clemson, or Mercer for an additional two to three years.

### DUAL DEGREE REQUIREMENTS

1. Complete credit hours at North Georgia College & State University as outlined in the requirements listed below (exclusive of basic physical education and military courses).
2. Receive a recommendation from NGCSU's dual degree coordinator.
3. Earn a college grade point average which indicates the student could satisfactorily complete degree requirements at Georgia Tech, Clemson University, or Mercer University.
4. Complete a study program for the standard curriculum of the engineering degree being sought.
5. If the official study program at Georgia Tech, Clemson, or Mercer includes electives and the candidate has excessive hours at NGCSU, he/she may petition that these excess hours be used as transfer credits. Transfer credits shall not amount to more than one half of the official study program.

### Core Curriculum Requirements

**60 hours**

All baccalaureate degree programs at NGCSU have as a requirement the satisfactory completion of at least 60 semester credit hours comprising the six areas of the core curriculum. A complete description of Areas A-E of the core curriculum can be found on page 105. Individual degree programs may specify exceptions and/or particular courses which must be taken within each Area A-E of the core curriculum. Those exceptions and/or course requirements and Area F of the core curriculum are shown below.

Area A        MATH 1113 or MATH 2450

Area B        no exceptions

Area C        no exceptions

Area D        MATH 2450 or MATH 2460. Physics dual degree majors may not count PHYS 2211, 2211L, 2212, 2212L in area D.

Area E        no exceptions

### Area F. Courses Related to Program of Study

For students starting with MATH 1113 in Area A:

PHYS    2211, 2211L, 2212, 2212L

8 hours

MATH 2460, 2470 (2450 taken in Area D)	8 hours
CSCI 1301 (3 hours) or CSCI 1371 (4 hours)	3 or 4 hours

For students starting with MATH 2450 in Area A:

PHYS 2211, 2211L, 2212, 2212L	8 hours
MATH 2470 (2450 taken in Area A; 2460 in Area D)	4 hours
2 hour carryover from Areas A and D	2 hours
CSCI 1301 (3 hours) or CSCI 1371 (4 hours)	3 or 4 hours
1 elective hour	1 hour

#### COURSES REQUIRED FOR THE MAJOR

PHYS 3310, 3310L, 3111, 3411, 3610	13 hours
CHEM 1211, 1211L, 1212, 1212L (may be part of Area D)	8 hours
MATH 3000	3 hours
Electives to bring the total number of NGCSU hours to 90	

#### Recommended Courses

Before transferring to the engineering school, it is recommended that dual-degree students take introductory engineering courses offered at NGCSU, such as Statics, Dynamics, Visual Communications and Engineering Design if their engineering field is aerospace, civil, or mechanical.

#### MINOR IN PHYSICS

A minor in physics requires 8 hours of introductory physics, PHYS 3310 and 3310L, and a minimum of 6 more hours of 3000-4000-level physics or astronomy courses.

**FOR COURSES OFFERED IN THE  
DEPARTMENT OF PHYSICS  
SEE COURSE DESCRIPTIONS  
Pages 249-394**