COLLEGE OF ARTS AND SCIENCES

PHYSICS

Faculty

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Program Goals

- Students should develop a good functional understanding of physics, including mechanics, electricity & magnetism, quantum physics, statistical mechanics, thermodynamics, optics, and relativity.
- Students should develop expert-like problem solving skills.
- Students should develop critical thinking and reasoning skills.
- Students should develop laboratory skills.
- Students should develop technology skills.
- Students should improve their communication, interpersonal, and questioning skills.
- Students should develop and/or retain student cognitive attitudes and beliefs (expectations) that are favorable for learning physics with deep understanding.

Objectives

The Physics Program offers an academic major leading to the Bachelor of Science degree. In addition, the program offers an academic minor in physics. The program is designed to meet the needs of (1) students intending to specialize in physics and pursue graduate work in physics, engineering, material science, or biophysics; (2) students preparing for a professional career in science and engineering; (3) students desiring to broaden their knowledge of the natural world; and (4) students who wish to teach at the secondary level.

Program Requirements

Students choosing a double major or minor within the science program may not apply electives to more than one major or minor. Only classes listed under "required courses" that coincide between both majors/minors may be applied to both.

Students must maintain a cumulative 2.3 GPA or better in courses required in the academic majors.

Students must meet the university-wide graduation requirements in addition to the Physics major:

- 124 total hours
- 30 upper division hours
- WCore or Honors College requirements

Physics Major

To fulfill the requirements for a major in Physics, students must complete the following as well as demonstrate competency in MATH 144 and CMPT 190:

Requirement Description	Credit Hours	Prerequisites
I. World Language Requirement	**8**	
Physics majors must complete **eight** credit hours in a single world language.		
II. Lower Division Physics Courses	**8**	
PHYS 211 Physics for Scientists and Engineers I and Lab	4	MATH 144, co-requisite: MATH 201
PHYS 212 Physics for Scientists and Engineers II and Lab	4	PHYS 211, co-requisite: MATH 202
III. Upper Division Physics Courses	**28**	
PHYS 301 Introduction to Modern Physics	4	PHYS 152 or PHYS 212; MATH 202
PHYS 309 Mathematical Methods for Physics	4	MATH 202, PHYS 211
PHYS 311 Analytical Mechanics	4	MATH 203, PHYS 212, PHYS 309
PHYS 370 Scientific Computing	4	CMPT 190, PHYS 211, or PHYS 151

Requirement Description	Credit Hours	Prerequisites
PHYS 411 Thermodynamics and Statistical Mechanics	4	CHEM 112, MATH 202, PHYS 212
PHYS 425 Quantum Physics	4	MATH 203, MATH 211, PHYS 212, PHYS 301, PHYS 309
PHYS 431 Electrodynamics	4	MATH 203, PHYS 212, PHYS 309
IV. Electives	**4**	
Take one of the following courses:		
PHYS 305 Optics	4	PHYS 152 or PHYS 212; MATH 202
PHYS 325 Astrophysics	4	PHYS 151 or PHYS 212; MATH 202
PHYS 410 Quantum Chemistry	4	CHEM 112, MATH 202, PHYS 212
V. Required Courses from Other Programs	**26**	
CHEM 111 Principles of Chemistry I and Lab	4	Pre- or co-requisite MATH 144
CHEM 112 Principles of Chemistry II and Lab	4	CHEM 111
MATH 201 Calculus I	4	MATH 144 or placement test
MATH 202 Calculus II	4	MATH 201 or placement test
MATH 203 Multivariate Calculus	4	MATH 202
MATH 211 Linear Algebra	4	
WCSAM 400 Science Capstone	2	
Total Hours for the Physics Major	**74**	

***Note:** MATH 311 and 363 are highly recommended.

Recommended Plan of Study for Physics

Listed below is a suggested plan of study for completing the physics requirements. Students should check with their advisors at least once a year as course offerings may change from what is listed. Students must also meet university wide requirements for graduation.

	Fall Semester	Spring Semester
Year 1	MATH 201* PHYS 211**	MATH 202* PHYS 212
Year 2	MATH 203 CHEM 111**	MATH 211 CHEM 112 PHYS 309
Year 3	**Odd-numbered Fall:** PHYS 301 Elective choices: PHYS 325† **Even-numbered Fall:** PHYS 311† Elective choice: PHYS 305†	**Even-numbered Spring:** PHYS 411† PHYS 425† **Odd-numbered Spring:** PHYS 431† PHYS 370† Elective choices: PHYS 410†
Year 4	**Odd-numbered Fall:** PHYS 301 Elective choice: PHYS 325† **Even-numbered Fall:** PHYS 311† Elective choice: PHYS 305†	**Even-numbered Spring:** PHYS 411† PHYS 425† WCSAM 400 **Odd-numbered Spring:** PHYS 431† PHYS 370† Elective choice: PHYS 410† WCSAM 400

*Assumes student already has credit for MATH 144. Student may also begin in a higher level calculus course their first year if appropriate.

**Student may also begin in the CHEM111/112 sequence first year and complete the PHYS211/212 sequence in the second year. Students interested in the Engineering 3+2 program should complete *both* sequences the first year.

†Courses offered every other year. Students completing all pre-requisites in the first year may be able to take Years 3 or 4 upper-level courses in Year 2.

Physics Minor

Requirement Description	Credit Hours	Prerequisites
I. Required Courses	20	
CHEM 111 Principles of Chemistry I and Lab	4	Pre- or co-requisite MATH 144
CHEM 112 Principles of Chemistry II and Lab	4	CHEM 111
PHYS 211 Physics for Scientists and Engineers I and Lab	4	MATH 144, co-requisite: MATH 201
PHYS 212 Physics for Scientists and Engineers II and Lab	4	PHYS 211, co-requisite: MATH 202
PHYS 301 Introduction to Modern Physics	4	PHYS 151 or PHYS 212; MATH 202
II. Electives	**4**	
Additional coursework in Physics selected from courses numbered 300 or above		
Total Hours for the Physics Minor	**24**	