

# MAJOR IN INTERDISCIPLINARY PHYSICS - PLANETARY SCIENCE CONCENTRATION

## Requirements

(Beginning Spring 2025)

The Interdisciplinary Physics major is designed for students with an interest in physics and its applications in other fields with high potential for employment and postgraduate opportunities. The program provides students with a strong foundation in physics along with the freedom to develop a coherent academic program across other disciplines such as computer science, mathematics, astronomy, geology, marketing, and entrepreneurship through concentrations in Computational Physics, Planetary Science and Physics Innovation and Entrepreneurship. The curricular pathways offered through the concentrations in the Interdisciplinary Physics major prepare students for careers in an increasingly technical workforce that values skills across many disciplines.

All Interdisciplinary Physics majors take a core set of physics courses, including a three-course sequence in fundamental classical physics and courses in computational methods, modern physics, and laboratory techniques. Students will be assigned an adviser in the Department of Physics, Astronomy, and Geosciences who will assist them in selecting elective courses within their program to best meet their career goals.

## Required Courses for B.S. in Interdisciplinary Physics

| Code                            | Title   | Units     |
|---------------------------------|---|-----------|
| <b>Required Physics Courses</b> |   |           |
| PHYS 185                        | INTRODUCTORY SEMINAR IN PHYSICS   | 1         |
| PHYS 241                        | GENERAL PHYSICS I CALCULUS-BASED<br>A grade of B or better in PHYS 211 is required to substitute for PHYS 241 | 4         |
| or PHYS 211                     | GENERAL PHYSICS I; NON CALCULUS-BASED   |           |
| PHYS 242                        | GENERAL PHYSICS II CALCULUS-BASED   | 4         |
| PHYS 243                        | GENERAL PHYSICS III   | 4         |
| PHYS 305                        | COMPUTERS IN PHYSICS  | 4         |
| PHYS 311                        | MODERN PHYSICS I  | 3         |
| PHYS 341                        | INTERMEDIATE PHYSICS LABORATORY   | 3         |
| PHYS 385                        | PHYSICS SEMINAR   | 1         |
| or ASTR 385                     | ASTROPHYSICS SEMINAR  |           |
| or EPHY 385                     | ENGINEERING PHYSICS SEMINAR   |           |
| PHYS 486                        | PHYSICS SEMINAR II  | 1         |
| <b>Non-Physics Requirements</b> |   |           |
| MATH 273                        | CALCULUS I  | 4         |
| MATH 274                        | CALCULUS II   | 4         |
| <b>Total Units</b>              |   | <b>33</b> |

The Planetary Science concentration is appropriate for students considering employment in scientific data analysis or postgraduate

studies in the field. This concentration combines physics with astronomy and astrophysics as well as necessary background in geology in preparation for employment or advanced degrees. Course requirements in geography build skills in analysis of mapping and remote sensing data.

| Code   | Title  | Units     |
|--|--|-----------|
| <b>Additional Physics and Astronomy Content Requirements</b> |  |           |
| ASTR 261   | INTRODUCTION TO ASTROPHYSICS                                   | 4         |
| ASTR 371   | PLANETARY ASTRONOMY  | 3         |
| <b>Additional Non-Physics Content Requirements</b>           |  |           |
| COSC 175   | GEN COMPUTER SCI   | 4         |
| CHEM 131 & 131L  | GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY | 4         |
| GEOL 121   | PHYSICAL GEOLOGY   | 4         |
| GEOL 331   | MINERALOGY   | 4         |
| GEOL 333   | PETROLOGY OF IGNEOUS AND METAMORPHIC ROCKS                     | 4         |
| GEOG 221   | INTRODUCTION TO GEOSPATIAL TECHNOLOGY                          | 3         |
| GEOG 321   | INTRODUCTION TO REMOTE SENSING AND PHOTOGRAMMETRY              | 3         |
| ELECTIVES  | 300-or 400- level from ASTR, PHYS, CHEM, GEOG, or GEOL         | 15        |
| <b>Total Units</b>   |  | <b>48</b> |

## Four-Year Plan of Study

### Sample Four-Year Plan

The selected course sequence below is an example of the simplest path to degree completion. Based on course schedules, student needs, and student choice, individual plans may vary. Students should consult with their adviser to make the most appropriate elective choices and to ensure that they have completed the required number of units (120) to graduate.

#### Freshman

| Term 1             | Units     | Term 2               | Units     |
|--------------------|-----------|----------------------|-----------|
| PHYS 185           |           | 1 PHYS 241 (Core 7)  | 4         |
| CHEM 131           |           | 3 GEOL 121           | 4         |
| CHEM 131L          |           | 1 Elective           | 3         |
| MATH 273 (Core 3)  |           | 4 Core 2 (or Core 1) | 3         |
| Core 1 (or Core 2) |           | 3                    |           |
| Elective           |           | 3                    |           |
|                    | <b>15</b> |                      | <b>14</b> |

#### Sophomore

| Term 1   | Units     | Term 2     | Units     |
|----------|-----------|------------|-----------|
| COSC 175 |           | 4 PHYS 242 | 4         |
| MATH 274 |           | 4 GEOG 221 | 3         |
| GEOL 331 |           | 4 Elective | 3         |
| Core 4   |           | 3 Core 5   | 3         |
|          |           | Core 6     | 3         |
|          | <b>15</b> |            | <b>16</b> |

#### Junior

| Term 1   | Units | Term 2     | Units |
|----------|-------|------------|-------|
| ASTR 261 |       | 4 ASTR 385 | 1     |
| PHYS 305 |       | 4 PHYS 243 | 4     |
| Elective |       | 3 GEOG 321 | 3     |

|          |              |          |       |
|----------|--------------|----------|-------|
| Core 9   | 3            | Core 10  | 3     |
|          |              | Core 11  | 3     |
| 14       |              | 14       |       |
| Senior   |              |          |       |
| Term 1   | Units Term 2 |          | Units |
| ASTR 371 | 3            | GEOL 333 | 4     |
| PHYS 311 | 3            | Elective | 3     |
| PHYS 341 | 3            | Elective | 3     |
| PHYS 486 | 1            | Core 13  | 3     |
| Elective | 3            | Core 14  | 3     |
| Core 12  | 3            |          |       |
| 16       |              | 16       |       |

**Total Units 120**

## Learning Outcomes

The IP program has two overarching student learning outcomes. Upon successful completion of the degree, students in all IP concentrations will be able to:

1. Demonstrate an understanding of fundamental principles of physics and major concepts in a student's chosen concentration and be able to apply these principles to solve quantitative problems.
2. Communicate scientific information effectively in both oral and written formats.
3. Demonstrate an understanding of the interdisciplinary nature of scientific research and theory as they apply to the fields of astronomy, geology, and physics.