# PHYSICS B.A. - COMPUTATIONAL PHYSICS

The computational physics concentration provides a thorough study of computer science and computational physics as well as a solid background in physics and mathematics. Graduates from this program have gone on to graduate programs in physics and computer science while others have found career opportunities in technical fields.

## Bachelor of Arts - Physics; Computational Physics Concentration

## General Education Requirements

Information regarding these requirements can be found in the General Education Section (http://catalog.umt.edu/academics/general-education-requirements/) of the catalog.

## Summary

| Code | Title | Hours |
|------|-------|-------|
| Lower-Division Physics Core | | 10 |
| Upper-Division Physics Core | | 18 |
| Physics Elective | | 3 |
| Math Requirements | | 19 |
| Computer Science Requirements | | 20 |
| Computer Science Core Courses | | |
| Computer Science Electives | | |
| Advanced College Writing Requirement | | 3 |
| **Total Hours** | | **73** |

**Degree Specific Credits:** 73

**Required Cumulative GPA:** 2.0

## Lower-Division Physics Core

| Code | Title | Hours |
|------|-------|-------|
| **Complete one of the following Physics sequences:** | | **10** |
| **Algebra- and Trigonometry-based Physics:** | | |
| PHSX 205N & PHSX 206N | College Physics I and College Physics I Laboratory | |
| PHSX 207N & PHSX 208N | College Physics II and College Physics II Laboratory | |
| **Calculus-based Physics (strongly recommended):** | | |
| PHSX 215N & PHSX 216N | Fundamentals of Physics with Calculus I and Physics Laboratory I with Calculus | |
| PHSX 217N & PHSX 218N | Fundamentals of Physics with Calculus II and Physics Laboratory II with Calculus | |
| **Total Hours** | | **10** |

Minimum Required Grade: C-

## Upper-Division Physics Core

| Code | Title | Hours |
|------|-------|-------|
| **Complete all of the following courses:** | | |
| PHSX 301 | Intro Theoretical Physics | 3 |
| PHSX 311 | Oscillations and Waves | 2 |
| PHSX 320 | Classical Mechanics | 3 |
| PHSX 333 | Computational Physics | 3 |
| PHSX 343 | Modern Physics | 3 |
| PHSX 423 | Electricity & Magnetism I | 3 |
| PHSX 499 | Senior Capstone Seminar | 1 |
| **Total Hours** | | **18** |

Minimum Required Grade: C-

## Physics Elective

| Code | Title | Hours |
|------|-------|-------|
| **Complete one of the following courses:** | | **3** |
| PHSX 141N | Einstein's Relativity | |
| PHSX 323 | Intermediate Physics Lab | |
| PHSX 327 | Optics | |
| PHSX 330 | Communicating Physics | |
| PHSX 425 | Electricity & Magnetism II (strongly recommended) | |
| PHSX 444 | Advanced Physics Lab | |
| PHSX 446 | Thermodynamics & Statistical Mechanics | |
| PHSX 461 | Quantum Mechanics I (strongly recommended) | |
| PHSX 462 | Quantum Mechanics II | |
| **Total Hours** | | **3** |

Minimum Required Grade: C-

## Math Requirements

**Note:** In addition, M 307, STAT 341, and STAT 458 are recommended.

| Code | Title | Hours |
|------|-------|-------|
| **Complete all of the following courses:** | | |
| M 171 | Calculus I | 4 |
| M 172 | Calculus II | 4 |
| M 221 | Introduction to Linear Algebra | 4 |
| M 225 | Introduction to Discrete Mathematics | 3 |
| M 273 | Multivariable Calculus | 4 |
| **Total Hours** | | **19** |

Minimum Required Grade: C-

## Computer Science Requirements

**Rule:** Complete the following subcategories of courses. 20 total credits required.

**Computer Science Core Courses**

| Code | Title | Hours |
|------|-------|-------|
| **Complete all of the following courses:** | | |
| CSCI 151 | Interdisciplinary Computer Science I | 3 |
| CSCI 152 | Interdisciplinary Computer Science II | 3 |
| CSCI 232 | Intermediate Data Structures and Algorithms | 4 |
| CSCI 332 | Advanced Data Structures and Algorithms | 3 |
| **Total Hours** | | **13** |

Minimum Required Grade: C-

**Computer Science Electives**

| Code | Title | Hours |
|------|-------|-------|
| **Complete 7 credits from any CSCI course numbered 200 and above. The following courses are recommended:** | | **7** |
| CSCI 205 | Programming with C/C++ | |
| CSCI 361 | Computer Architecture | |
| CSCI 477 | Simulation | |
| **Total Hours** | | **7** |

Minimum Required Grade: C-

# Advanced College Writing Requirement

**Note:** May substitute another advanced writing course as approved by the department chair.

| Code | Title | Hours |
|------|-------|-------|
| **Complete the following course:** | | |
| PHSX 330 | Communicating Physics | 3 |
| **Total Hours** | | **3** |

Minimum Required Grade: C-