

# PHYSICS - ASTRONOMY

The astronomy concentration provides a thorough study of astronomy and astrophysics as well as a solid background in physics and mathematics. Graduates from this program have gone on to graduate programs in astronomy and astrophysics while others have found career opportunities at national astronomical observatories.

## Bachelor of Arts - Physics; Astronomy Concentration

### College Humanities & Sciences

Degree Specific Credits: 69

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

### 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

Lower Division Physics Core	10
College Physics	
Physics with Calculus	
Lower Division Astronomy Core	4
Upper Division Physics Core	12
Upper Division Astronomy Core	9
Major Electives	12
Physics Electives	
Physics Laboratory Electives	
Math Requirements	16
Computer Science Electives	3
Advanced College Writing Requirement	3
<b>Total Hours</b>	<b>69</b>

### Lower Division Physics Core

**Rule:** Must complete all of the courses in one of the two sequences:

10 Total Credits Required

#### Physics

Select one of the following Physics sequences: 10

Algebra- and Trigonometry-based:

PHSX 205N College Physics I  
& PHSX 206N and College Physics I Laboratory

PHSX 207N College Physics II  
& PHSX 208N and College Physics II Laboratory

Calculus-based (strongly recommended):

PHSX 215N Fund of Physics w/Calc I  
& PHSX 216N and Physics Laboratory I w/Calc

PHSX 217N Fund of Physics w/Calc II  
& PHSX 218N and Physics Laboratory II w/Calc

Total Hours 10

Minimum Required Grade: C-

### Lower Division Astronomy Core

**Rule:** Must complete all of the courses in one of the two options:

4 Total Credits Required

#### Astronomy Core: Option 1

**Rule:** May complete all of the following courses

ASTR 132N Stars, Galaxies, and the Universe 3

ASTR 135N Stars, Galaxies, and the Universe Lab 1

Total Hours 4

Minimum Required Grade: C-

#### Astronomy Core: Option 2

**Rule:** May complete the following course

ASTR 142N The Evolving Universe 4

Total Hours 4

Minimum Required Grade: C-

### Upper Division Physics Core

**Rule:** Must complete the following courses

PHSX 301 Intro Theoretical Physics 3

PHSX 311 Oscillations and Waves 2

PHSX 343 Modern Physics 3

PHSX 461 Quantum Mechanics I 3

PHSX 499 Senior Capstone Seminar 1

Total Hours 12

Minimum Required Grade: C-

### Upper Division Astronomy Core

**Rule:** Must complete the following courses

**Note:** ASTR 351 and ASTR 362 are recommended as well

ASTR 353 Galactic Astrophysics 3

ASTR 363 Stellar Astr & Astrophys I 3

ASTR 365 Stellar Ast & Astrophys II 3

Total Hours 9

Minimum Required Grade: C-

### Major Electives

**Rule:** Complete the following subcategories of courses

12 Total Credits Required

**Physics Electives**

Select three of the following: 9

ASTR 351	Planetary Science
PHSX 320	Classical Mechanics
PHSX 327	Optics
PHSX 333	Computational Physics
PHSX 423	Electricity & Magnetism I
PHSX 425	Electricity & Magnetism II
PHSX 446	Thermodyn & Stat Mech
PHSX 451	Elementary Particle Physics
PHSX 462	Quantum Mechanics II
PHSX 491	Special Topics

Total Hours 9

Minimum Required Grade: C-

**Physics Laboratory Electives**

Select one of the following laboratory courses: 3

ASTR 362	Observational Astronomy
PHSX 323	Intermediate Physics Lab
PHSX 444	Advanced Physics Lab

Total Hours 3

Minimum Required Grade: C-

**Math Requirements****Rule:** Complete the following courses**Note:** M 317, M 412, and M 418 are recommended as well

M 171	Calculus I	4
M 172	Calculus II	4
M 221	Introduction to Linear Algebra	4
M 273	Multivariable Calculus	4

Total Hours 16

Minimum Required Grade: C-

**Computer Science Electives**

Select one of the following: 3

CSCI 100	Intro to Programming
CSCI 135	Fund of Computer Science I
CSCI 250	Computer Mdlng/Science Majors (strongly recommended)
PHSX 333	Computational Physics (strongly recommended)

Total Hours 3

Minimum Required Grade: C-

**Advanced College Writing Requirement****Rule:** Must take the following course**Note:** May substitute another advanced writing course as approved by the department chair.

PHSX 330 Communicating Physics 3

Total Hours 3

Minimum Required Grade: C-