

## Required Course List for BS Astronomy - Physical Science Specialization (Oct. 8, 2025)

### Required Basic Astronomy Courses (14 credits):

ASTR 130	Astrophysics 1 - Foundations (3 cr)
ASTR 131	Astrophysics 2 - Planets and Stars (3 cr)
ASTR 232	Astrophysics 3 - Milky Way and Beyond (4 cr)
ASTR 310	Observational Astronomy (4 cr)

### Advanced Astronomy Courses (9 credits; any three 400-level Astronomy courses):

ASTR 320	Theoretical Astrophysics (3 cr)
ASTR 406	Stellar Structure and Evolution (3 cr)
ASTR 410	Radio Astronomy (3 cr)
ASTR 415	Computational Astrophysics (3 cr)
ASTR 421	Galaxies (3 cr)
ASTR 422	Cosmology (3 cr)
ASTR 430	The Solar System (3 cr)
ASTR 435	Astrophysics of Exoplanets (3 cr)
ASTR 450	Orbital Dynamics (3 cr)
ASTR 480	High Energy Astrophysics (3 cr)

### Required Introductory Physics Courses (16 credits):

PHYS 171	Introductory Physics: Mechanics (3 cr)
PHYS 265	Introduction to Scientific Programming (3 cr) <i>(Students with significant computer programming experience may replace this course with PHYS 474: Computational Physics (3 cr) or ASTR 415: Computational Astrophysics (3 cr); students completing ASTR 415 for this requirement may not count it toward the 400-level Astronomy course requirement.)</i>
PHYS 272	Introductory Physics: Fields (3 cr)
PHYS 273	Intermediate Oscillations and Waves (3 cr)
PHYS 275	Experimental Physics I: Mechanics and Waves (2 cr)
PHYS 276	Experimental Physics II: Electricity and Magnetism (2 cr)

### Supporting Mathematics Courses (16 credits):

MATH 140	Calculus I (4 cr)
MATH 141	Calculus II (4 cr)
MATH 241	Calculus III (4 cr)
MATH 243	Introduction to Linear Algebra and Differential Equations (4 cr) <i>(MATH 246 and MATH 240/461 will be accepted for MATH 243.)</i>

### Complementary Science Courses (at least 9 credits):

Three of the following:

AOSC 360	How to solve the climate change problem? (3 cr)
AOSC 375	Introduction to the Blue Ocean (3 cr)
AOSC 401	Climate Dynamics and Earth System Science (3 cr)

AOSC 431	Atmospheric Thermodynamics (3 cr)
AOSC 432	Dynamics of the Atmosphere and Ocean (3 cr)
AOSC 433	Atmospheric Chemistry and Climate (3 cr)
AOSC 434	Air Pollution and Environmental Justice (3 cr)
AOSC 475	Carbon Cycle and Climate: Past, Present, and Future (3 cr)
BSCI 331	Cell Biology and Physiology (3 cr)
BSCI 361	Principles of Ecology (4 cr)
BSCI 464	Microbial Ecology (3 cr)
ENST 333	Ecosystem Health and Protection (3 cr)
ENST 360	Ecosystem Ecology (4 cr)
ENST 405	Energy and Environment (3 cr)
ENST 415	Renewable Energy (3 cr)
ENST 436	Emerging Environmental Threats (3 cr)
ENST 485	Water Management in Urban Environment (3 cr)
GEOG 301	Advanced Geographical Environmental Systems (3 cr)
GEOG 373	Geographic Information Systems (3 cr)
GEOG 415	Land Use, Climate Change, and Sustainability (3 cr)
GEOG 417	Land Cover Characterization Using Multi-Spectral Remotely Sensed Data Sets (3 cr)
GEOL 322	Mineralogy (4 cr)
GEOL 340	Geomorphology (4 cr)
GEOL 341	Structural Geology (4 cr)
GEOL 412	Geology of the Terrestrial Planets (3 cr)
GEOL 446	Geophysics (3 cr)
GEOL 457	Seismology (3 cr)
GEOL 472	Active Tectonics (3 cr)

**Societal Implications/Communication/Science Applications (at least 6 credits):**

*Choose one course from two of the following three groups (two courses total).*

**Societal Implications**

AREC 345	Global Poverty and Economic Development (3 cr)
AREC 365	World Hunger, Population, and Food Supplies (3 cr)
ENSP 360	Every Drop Counts: Water, Food and Global Public Health (3 cr)
GVPT 273	Introduction to Environmental Politics (3 cr)
GVPT 373	Geographic Information Systems for Redistricting (3 cr)
GVPT 392	Introduction to Geographic Information Systems for Social Science Research (3 cr)
GVPT 393	Intermediate Geographic Information Systems (3 cr)
LARC 461	People and the Environment (3 cr)
PLCY 301	Sustainability (3 cr)
PLCY 380	Innovation and Social Change: Do Good Now (3 cr)

**Communication**

COMM 341	Environmental Communication (3 cr)
COMM 345	Foundations of Public Dialogue and Deliberation (3 cr)

COMM 365	Social Media & Digital Culture (3 cr)
COMM 385	Influence (3 cr)
COMM 359C	Special Topics in Science Communication: Misinformation, Society, and Science Communication (3 cr)
COMM 498R	Risk Communication (3 cr)
ENGL 387	Visual Rhetoric (3 cr)
ENGL 388C	Writing for Change (3 cr)
ENGL 398N	Writing for Non-Profit Organizations (3 cr)
ENGL 398R	Writing Non-Fictional Narratives (3 cr)
ENGL 398V	Writing about the Environment (3 cr)
ENGL 491	Digital Rhetoric (3 cr)
ENGL 493	Writing Genres as Social Action (3 cr)

#### **Science Applications**

AOSC 424	Remote Sensing of the Atmosphere and Ocean (3 cr)
AOSC 447	Machine Learning in Earth Science (3 cr)
BSCI 374	Mathematical Modeling in Biology (4 cr)
GEOG 377	Artificial Intelligence for Spatial Data (3 cr)
GEOG 440	Polar Remote Sensing (3 cr)
GEOG 472	Remote Sensing: Digital Processing and Analysis (3 cr)
GEOG 473	Geographic Information Systems and Spatial Analysis (3 cr)
GEOG 475	Geographic Visualization and Digital Mapping (3 cr)
GEOL 447	Observational Geophysics (3 cr)
MATH 401	Applications of Linear Algebra (3 cr)
MATH 462	Partial Differential Equations (3 cr)
STAT 426	Introduction to Data Science and Machine Learning (3 cr)

**Total credits required for the BS Astronomy - Physical Science Specialization = minimum 70 cr.**

- All of the above courses must be completed with a C- or better.
- Astronomy majors may not minor in Physics. Astronomy majors who choose the BS Astrophysics Specialization may double-major in one of the Physics specializations.
- Astronomy majors who choose the BS Astrophysics or BS Astronomy - Physical Science Specializations may double-major in Computer Science.
- Once a student has begun the Astronomy major at the University of Maryland, no more than one course at the 300/400-level from a “study abroad” type program may be used in place of an ASTR-prefix course required for the major.
- Highlighted courses are required for all Astronomy major specializations.

## Four-year Plan for BS Astronomy - Physical Science Specialization

### FIRST-YEAR

ASTR 130	3
ENGL 101 (FSAW)	3
MATH 140 (FSMA/AR)	4
GenEd (SCIS/DSHU)	3
GenEd (SCIS)	3
Total =	16 cr

ASTR 131 (DSNS)	3
MATH 141	4
PHYS 171	3
PHYS 275	2
GenEd (DSHS)	3
Total =	15 cr

### SECOND YEAR

ASTR 232 (DSNL)	4
MATH 241	4
PHYS 272	3
PHYS 265	3
GenEd (FSOC)	3
Total =	17 cr

PHYS 273	3
PHYS 276	2
MATH 243	4
Complementary Sci	3/4
GenEd (DVUP)	3
Total =	15/16 cr

### THIRD YEAR

ASTR 310 (DSSP)	4
Comm/Societal/Applications	3
GenEd (DSHU)	3
GenEd (DVUP)	3
Elective	3
Total =	16 cr

ASTR 3/4**	3
Complementary Sci	3/4
ENGL 390 or 393 (FSPW)	3
GenEd (DSSP)	3
Elective	3
Total =	15/16 cr

### FOURTH-YEAR

ASTR 3/4**	3
Complementary Sci	3/4
GenEd (DSHS)	3
GenEd (DSHU)	3
Elective	3
Total =	15/16cr

ASTR 3/4**	3
Comm/Societal/Applications	3
Elective	3
Elective	3
Total =	12 cr

Total: minimum 121 cr