Astronomy at Boston University and You!

Find yourself in the cosmos

Become an informed galactic citizen

Pursue any of our three majors:
Astronomy,
Astronomy & Physics,
Geophysics and Planetary Sciences

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725 Commonwealth Ave, Boston University,
Boston, MA, 02215 617-353-2625

Explore the universe

Use the newest large telescope on the planet, the 4.3m Discovery Channel Telescope (Watch the making of the DCT on the Discovery Channel!)

Astronomy Department Web Site:
http://www.bu.edu/astronomy/

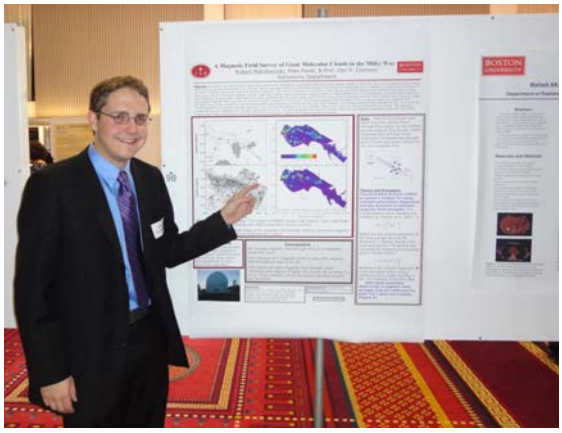
Astronomy Undergraduate Majors and Studies
http://www.bu.edu/astronomy/academics/undergraduate-studies/

Studying Astronomy at Boston University

This is the most exciting time in history to be an astronomer or to study astronomy. Modern observational capabilities on the ground and in space, together with sophisticated data analysis and model calculations, have transformed our understanding of the universe. We now know the precise ages of the universe and of the solar system. Thousands of planets orbiting other stars have been found. We're exploring the massive black hole at the center of our galaxy and how the sun creates magnetic fields. We know that ordinary matter comprises a small fraction of the mass of the universe - the rest is the mysterious dark matter, and even it pales in comparison to dark energy's role. We're exploring new worlds like Mars, Europa and Titan.

Boston University has one of the larger undergraduate programs in astronomy in the US. About 10-14 students graduate each year with degrees in Astronomy, Astronomy and Physics, and Geophysics and Planetary Sciences. Each class forms a small cohesive group during the four years they study and learn together. The astronomy faculty outnumbers the students in each graduating class allowing frequent and often informal contact between students and professors throughout their study at Boston University.

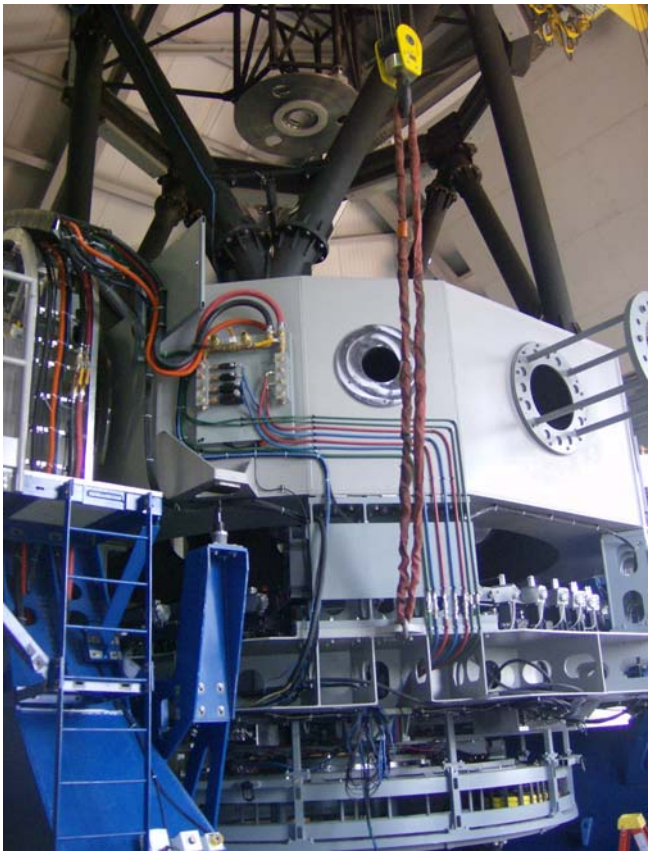
During their first two years, astronomy students gain solid groundings in physics, calculus, and basic astronomy. These courses range in size from 15-30 for the astronomy courses to 30-150 students for some of the physics and calculus courses. In most courses, the class is divided into smaller groups for discussion sections and/or labs. In the astronomy courses, the labs entail night work in the observatory, including telescopic imaging of the moon, planets, and deep-sky objects. After this initial coursework, students take advanced courses in astrophysics, as well as (depending on the concentration they choose) in physics, earth science, and other disciplines. A final advanced observational course is required of astronomy and astronomy-and-physics majors. The sizes of these classes are generally much smaller, ranging from 6-15 students.



The Astronomy Department is strong in research. All astronomy faculty members hold Ph.D. degrees in astronomy or physics and lead active research programs. Faculty research interests include observational and theoretical studies in galactic and extragalactic astrophysics, star formation and galactic structure, variable stars and star clusters, solar, heliospheric and magnetospheric physics, planetary atmospheres and ionospheres, active galaxies and quasars, high-energy astrophysics, cosmology and relativity.

All majors are encouraged to become involved in research through joining faculty-based research groups. This can be done through UROP (Undergraduate Research Opportunities Program), through a directed study course, through work-study, or based on student interest. Most students who take advantage of these opportunities find them to be their most rewarding experiences at Boston University. This provides valuable research

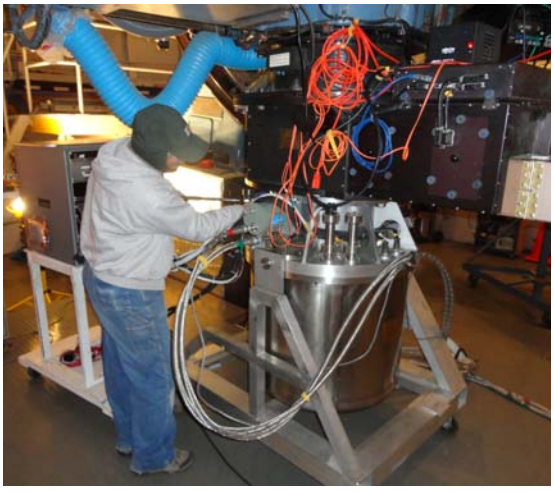
experience, and content for letters of recommendation for graduate studies or postgraduate employment. The most advanced students expand their research experience by completing a Senior Thesis project which earns them a degree *with Honors in Astronomy.*



Facilities for student telescopic observing and instruction are maintained at the Coit Observatory on the roof of the College of Arts and Sciences building and elsewhere within the department. The facilities include a 6½" refractor, a 12" reflector, a robotic 14" Meade telescope, four 8" reflectors, a solar telescope and spectroscope, and several CCD cameras. The Department also maintains a comprehensive astronomical research library that includes many books for research and general reading, sky atlases, and subscriptions to over 50 scientific and popular journals in astronomy and space science.

Boston University continues to utilize the 72-inch Perkins Telescope near Flagstaff, AZ in partnership with Lowell Observatory. This partnership has expanded in 2011 to include a substantial share of the new 4.3 m (170 inch) Discovery Channel Telescope (DCT), also near Flagstaff. Students regularly travel to these telescopes, both for projects in advanced observing classes and for research.

Majors in the astronomy programs and other undergraduate students interested in astronomy are encouraged to join the Boston University Astronomical Society (BUAS). This active student organization engages in a number of academic and social activities, including visits to local observatories, astrophotography contests, observing projects, and lectures on topics of current astronomical interest.



The Department of Astronomy encourages students to become involved in the lively academic, research, and social environments that it and Boston University provide. The relationship between students and professors is close, with small class sizes, many research opportunities, a friendly atmosphere, and tutoring for first-year students needing extra help in physics, calculus, or astronomy courses. Students enjoy a good deal of camaraderie among themselves both through the BUAS and the constant informal contact made possible within the programs of the department.

Courses for Astronomy Majors

CAS AS 202 Principles of Astronomy I Corequisite: CAS MA 123 (or equivalent). Introduction of astronomical observing; The night sky; observing with telescopes; light and optics; spectra and spectroscopy; birth of modern astronomy; theory of orbital motion; overview of the solar system; extra solar system planets. Lectures and laboratories. Intended primarily for physical science concentrators. 4 cr, 1st sem.

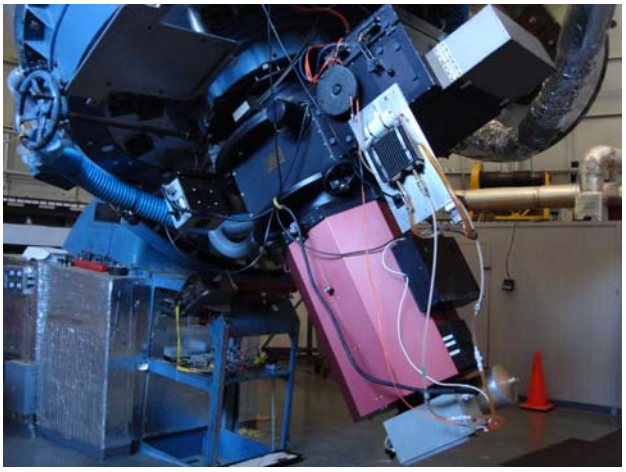
CAS AS 203 Principles of Astronomy II Corequisite: CAS MA 124 (or equivalent). The celestial sphere; time and calendars; astronomical instruments and techniques; telescopes and observatories; stellar properties and stellar evolution; the Milky Way galaxy; galaxies and quasars; the universe. Lectures and laboratories. Intended primarily for physical science concentrators. 4 cr, 2nd sem.

CAS AS 311 Planetary Physics Prerequisite: CAS MA 124 and CAS PY 212 or PY 252. Celestial mechanics, tides, resonances. Physical processes which affect atmospheres, surfaces, interiors of planets, and their satellites. Comets, asteroids, meterorites, and Kuiper belt objects. Formation and evolution of the solar system. Extra-solar planets. 4 cr, 1st sem.

CAS AS 312 Stellar and Galactic Astrophysics Prerequisite: CAS MA 124, CAS PY 212 or PY 252. Basic physics of radiation; spectral analysis; distances, motions, and physical properties of stars; stellar interiors and atmospheres; stellar evolution; clusters of stars; the interstellar medium; content, structure, and rotation of the Milky Way galaxy. 4 cr, 2nd sem.

CAS AS 401, 402 Senior Distinction Work Prerequisite: approval of Director of Undergraduate Studies and Department Chair. 4 cr each, 1st & 2nd sem.

CAS AS 413 Extragalactic Astrophysics and Cosmology Prerequisite: CAS AS 312 and CAS PY 355 or equivalent. Galaxies and galaxy clusters; the extragalactic distance scale and the Hubble Law; quasars and active galactic nuclei; metrics and general relativity; distances and luminosities in cosmology. Origin of the universe: the Big Bang, cosmic background radiation, and inflation. (Offered alternate years.). 4 cr, 1st sem.



CAS AS 414 Solar and Space Physics Prerequisite: CAS PY 355 and CAS PY 212 or 252. The sun and solar wind: solar magnetic fields, sunspot cycle, active sun, corona. Interaction of the solar wind with planets and comets. Planetary magnetospheres and ionospheres. Aeronomy. Solar system plasma physics. Magnetic storms and space weather. 4 cr, 2nd sem.

CAS AS 441 Observational Astronomy Prerequisite: CAS AS 312. Astronomical techniques. Photometry, spectroscopy, photography, CCD imaging, and interferometry. Statistical methods for data reduction and analysis. Strong laboratory component. Use of computers. 4 cr, 2nd sem.

CAS AS 491, 492 Directed Studies in Astronomy Prerequisite: consent of instructor and approval of CAS Academic Advising Office. Devoted to an intensive study of a particular aspect of astronomy, often working with a member of the faculty on a specific research project. Variable cr, 1st & 2nd sem.

Life after Graduation:
What can I do with a Degree in Astronomy?

Many university students are interested in astronomy, but worry about employment. The number of astronomy and space science jobs is limited, but the number of qualified people seeking those jobs is also limited. Additionally, a degree in a physical science means that the graduate has developed the problem

solving skills that high tech companies and others desperately need. Employment prospects vary according to the state of the economy and government funding of research, but historically Boston University astronomy graduates have been successful in obtaining challenging and rewarding positions. Below we discuss the astronomy programs at Boston University, some of the career opportunities available to our graduates, and examples of Boston University alumni who hold jobs in this exciting field and other fields.

The Department of Astronomy provides a range of courses and programs for students planning careers in astronomy, space science, or related fields. The **Astronomy-and-Physics** major involves rigorous study in physics and calculus in addition to astronomy. This prepares a student for graduate study leading to a masters and/or Ph.D. degree in astronomy, astrophysics, physics, or other technical fields. The **Astronomy** major is less intense in physics study, yet still provides students with solid foundations in the physical sciences. The **Geophysics-and-Planetary-Sciences** major is a multidisciplinary program including astronomy, earth science, physics, and calculus. Through this concentration many students have gone on to enroll in graduate programs in planetary studies.

A BA degree in **Astronomy**, **Astronomy-and-Physics**, or **Geophysics-and-Planetary-Sciences** prepares students for careers in science education, management, computing, instrumentation, or science writing (some of which may require more years of graduate study). Qualification for such fields is enhanced when students work in the research groups of astronomy professors as work-study, student employment, and/or directed study participants. The wide range of research being conducted within the department and its allied research centers provides ample opportunity for undergraduates to gain research experience.

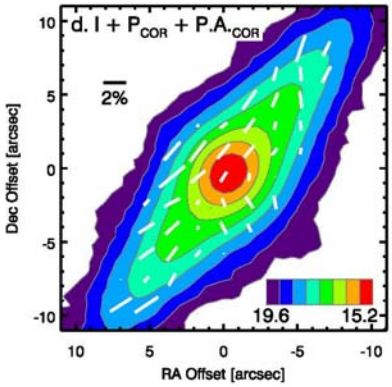
Our many alumni hold a wide variety of professional positions. Several have been data assistants at NASA's Space Telescope Science Institute in Baltimore and at the Harvard-Smithsonian Center for Astronomy in Cambridge; a number were commissioned as officers in the armed services (through ROTC), one of whom obtained an MA degree in oceanography at the Navy's Marine/Oceanography School in Monterey; some switched fields to economics, traffic engineering, and other fields in which they applied the problem solving skills learned as astronomy majors. Others include scientific computer programmers (one of whom started his own business programming and setting up Web pages for companies), a team member on a telescope construction project at the Naval Research Laboratory, an accountant at the Boston Museum of Science, a data analysis and instrument programmer for NASA's AXAF X-ray space observatory, a senior research associate in Boston University's Center for Space Physics.

In addition, there are many examples of graduates who went on to obtain advanced degrees and rewarding careers. Among recent alumni who obtained master's degrees, two are college professors, one is a mission planner at NASA, and another is an education officer at the Hayden Planetarium of the Boston Museum of Science. Many others received Ph.D.'s and are now scientists at observatories or college professors.

Students with B+ or higher averages in their physics, mathematics, and astronomy courses can usually gain admittance into graduate programs in astronomy. Such students nearly always obtain financial assistance in the form of fellowships, or research or teaching assistantships. These financial awards usually amount to

full tuition remission plus a monthly stipend to cover living expenses. As opposed to most forms of undergraduate aid, graduate school assistance is based on merit rather than financial need.

If past experience is a good guide, a degree in **Astronomy**, **Astronomy-and-Physics**, or **Geophysics-and-Planetary-Sciences** from Boston University is very practical indeed.



Further details about undergraduate programs and research in astronomy at Boston University can be found at our web site: http://www.bu.edu/astronomy/

Or contact: Director of Undergraduate Studies Department of Astronomy, Boston University, 725 Commonwealth Avenue, Boston, MA 02215; Tel: (617) 353 2625

Astronomy Faculty and Research Interests

Thomas Bania, Professor: PhD, University of Virginia. Radio spectroscopy; galactic structure and the interstellar medium

Elizabeth Blanton, Associate Professor: PhD, Columbia University. High-energy astrophysics, optical & near IR, clusters of galaxies, radio galaxies

Tereasa Brainerd, Associate Professor: PhD, The Ohio State University. Theoretical astrophysics, cosmology, computational astrophysics, galaxy formation & evolution, gravitational lensing

Kenneth Brecher, Professor: PhD, Massachusetts Institute of Technology. Neutron stars, high-energy astrophysics, cosmology and relativity, historical astronomy

John Clarke, Professor: PhD, Johns Hopkins University. Planetary atmospheres, UV astrophysics, FUV instruments for remote observations

Dan Clemens, Professor: PhD, University of Massachusetts. Galactic structure, interstellar medium, star formation, infrared and optical instrumentation

Nancy Crooker, Research Professor: PhD, University of California, Los Angeles. Solar wind, space weather, and solar wind – magnetosphere coupling

Catherine Espaillat, Assistant Professor: PhD, University of Michigan. Circumstellar disks, planet formation, dust growth, gas dissipation, radiative transfer modeling

Theodore Fritz, Professor: PhD, University of Iowa. Space plasma physics, rocket and satellite experiments, magnetospheric physics, substorms, charged particle composition

W. Jeffrey Hughes, Professor: PhD, Imperial College, University of London. Space physics, solar wind-magnetosphere-ionosphere coupling and dynamics, space weather

James Jackson, Professor: PhD, Massachusetts Institute of Technology. Radio, infrared and submillimeter astronomy, interstellar medium, star formation, the Milky Way

Kenneth Janes, Professor Emeritus: PhD, Yale University. Observational optical astronomy, galactic astronomy and stellar photometry, star clusters, planet searches

Alan Marscher, Professor: PhD, University of Virginia. Quasars, active galaxies, high energy astrophysics, galactic and extragalactic astronomy

Carlos Martinis, Research Assistant Professor: PhD, Boston University. Ionospheric physics, space physics, thermosphere / ionosphere plasmas

Michael Mendillo, Professor: PhD, Boston University. Space physics, planetary atmospheres, observations and models

Philip Muirhead, Assistant Professor: PhD, Cornell University. Experimental astrophysics, infrared astronomy, stars and exoplanets, instrumentation

Merav Opher, Associate Professor: PhD, University of Sao Paulo. Computational and theoretical plasma physics, interaction of the solar system with the interstellar medium, solar wind, shocks in the corona

Meers Oppenheim, Professor: PhD, Cornell University. Computational and theoretical space plasma physics, dynamics of the E-region ionosphere, particle-wave interactions, physics of meteor trails

George Siscoe, Research Professor: PhD, Massachusetts Institute of Technology. Space physics including solar wind, magnetospheres, and space weather

Andrew West, Assistant Professor: PhD, University of Washington. Kinematics, distribution and magnetic activity of low-mass stars, metallicity, Milky Way thin disk, magnetic field generation in M and L dwarfs

Paul Withers, Assistant Professor: PhD, University of Arizona. Behavior of the Martian upper atmosphere and ionosphere, and analysis of accelerometer data.

Example Program "A" for Astronomy Concentrations
for students matriculating with MA123 or AP Calc AB credit

Astronomy Major (1911)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	AS203	AS311	AS312	Required 2	AS441	Required 4	(AS402)
PY251 (211)	PY252 (212)	PY351 (313)	Required 1	Elective	Required 3	(AS401)	Elective
MA124	MA225	Divisional 1	Divisional 2	Divisional 3	Divisional 4	Elective	Elective
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Elective	Elective

Notes: Required 1-4: Four Astronomy or Physics Courses drawn from: AS413, AS414, AS491 or 492 (but not both), PY355, PY405, PY408, PY410, and PY451
Recommended Courses: Any from the above list of required courses not already taken as well as MA 226, MA242, PY406, GE310, CS111, CS112

Astronomy and Physics Major (1965)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	AS203	AS311	AS312	Required 1	PY406	Required 2	AS441(PY581)
PY251 (211)	PY252 (212)	PY351 (313)	PY355	PY405	PY410	(AS401)	(AS402)
MA124	MA225	Divisional 1	Divisional 2	PY408	PY451	Elective	Elective
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Divisional 3	Divisional 4

Notes: Required 1-2: Any two of the Astronomy or Physics Courses AS413, AS414, PY452
Recommended Courses: Any from the above list of required courses not already taken as well as MA 226, MA242, PY371, GE302, GE310, CS111, CS112

Geophysics and Planetary Sciences Major (1932)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	ES1xx	AS311	ES360	Required 1	Required 2	Required 3	Required 4
PY251 (211)	PY252 (212)	CH131 (101)	PY355 (403)	PY405 (408)	Elective	(AS/ES401)	(AS/ES402)
MA124	MA225	Divisional 1	Elective	Elective	Divisional 2	Divisional 3	Divisional 4
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Elective	Elective

Notes: Required 1-4: Four Interdepartment elective courses drawn from: AS312, AS414, AS441, ES222, ES301, ES371, ES483, ES505, ES581, GE302, GE310, GE312, PY313 or 351, PY410, PY405 or 408 if not already taken (not all from same department, at least one at 400 level).
Recommended Courses: Any from the above list of required courses not already taken as well as CH102, CS111, CS112.

Color Key:

Concentration Requirements

- Department of Astronomy Courses
- Department of Physics Courses
- Department of Earth Sciences Courses
- Department of Math and Statistics Courses
- College Elective Courses
- Required concentration electives drawn from lis
- Work for Distinction (Optional) [Elective Otherw

College of Arts and Sciences Requirements

- Breath Requirement
- Foreign Language Requirement
- Writing Requirement

General: "Courses taken to satisfy concentration requirements must receive a grade of at least C"
The one-semester MA127 or 129 courses may replace the two-semester MA123/124 sequence
CC101 and 102 fulfill the WR100 requirement and the humanities divisional course requirement
CC201 and 202 or CC203 and 204 fulfill the WR150 and divisional course requirements

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Example Program "B" for Astronomy Concentrations
for students matriculating without MA123 or AP Calc AB credit, and without a year of high school calculus

Astronomy Major (1911)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	AS203	AS311	AS312	Required 2	AS441	Required 4	(AS402)
Divisional 1	PY211	PY212	PY313	Elective	Required 3	(AS401)	Elective
MA123	MA124	MA225	Required 1	Divisional 2	Divisional 3	Divisional 4	Elective
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Elective	Elective

Notes: Required 1-4: Four Astronomy or Physics Courses drawn from: AS413, AS414, AS491 or 492 (but not both), PY355, PY405, PY408, PY410, and PY451

Recommended Courses: Any from the above list of required courses not already taken as well as MA 226, MA242, PY406, GE310, CS111, CS112

Astronomy and Physics Major (1965)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	AS203	AS311	AS312	PY405	PY406	(AS401)	(AS402)
Divisional 1	PY211	PY212	PY313	PY408	PY451	Elective	AS441(PY581)
MA123	MA124	MA225	PY355	Divisional 2	Required 1	Required 2	PY410
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Divisional 3	Divisional 4

Notes: Required 1-2: Any two of the Astronomy or Physics Courses AS413, AS414, PY452

Recommended Courses: Any from the above list of required courses not already taken as well as MA 226, MA242, PY371, GE302, GE310, CS111, CS112

Geophysics and Planetary Sciences Major (1932)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	ES1xx	AS311	CH131 (101)	PY405 (408)	Required 2	Required 3	Required 4
Divisional 1	PY211	PY212	ES360	Required 1	Divisional 2	(AS/ES401)	(AS/ES402)
MA123	MA124	MA225	PY355 (403)	Divisional 1	Divisional 3	Divisional 4	Elective
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Elective	Elective

Notes: Required 1-4: Four Interdepartment elective courses drawn from: AS312, AS414, ES222, ES301, ES371, ES483, ES505, ES581, GE302, GE310, GE312, PY313 or 351, PY410, PY405 or 408 if not already taken (not all from same department, at least one at 400 level).

Recommended Courses: Any from the above list of required courses not already taken as well as CH102, CS111, CS112.

Color Key:

Concentration Requirements

- Department of Astronomy Courses
- Department of Physics Courses
- Department of Earth Sciences Courses
- Department of Math and Statistics Courses
- College Elective Courses
- Required concentration electives drawn from list
- Work for Distinction (Optional) [Elective Otherwise]

College of Arts and Sciences Requirements

- Breath Requirement
- Foreign Language Requirement
- Writing Requirement

General: "Courses taken to satisfy concentration requirements must receive a grade of at least C"
The one-semester MA127 or 129 courses may replace the two-semester MA123/124 sequence
CC101 and 102 fulfill the WR100 requirement and the humanities divisional course requirement
CC201 and 202 or CC203 and 204 fulfill the WR150 and divisional course requirements

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Example Program "C" for Astronomy Concentrations
for students matriculating without MA123 or AP Calc AB credit, but with a year of high school calculus

Astronomy Major (1911)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	AS203	AS311	AS312	Required 2	AS441	Required 4	(AS402)
PY251 (211)	PY252 (212)	PY351 (313)	Required 1	Elective	Required 3	(AS401)	Elective
MA123	MA124	MA225	Elective	Divisional 1	Divisional 2	Divisional 3	Divisional 4
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Elective	Elective

Notes: Required 1-4: Four Astronomy or Physics Courses drawn from: AS413, AS414, AS491 or 492 (but not both), PY355, PY405, PY408, PY410, and PY451
Recommended Courses: Any from the above list of required courses not already taken as well as MA 226, MA242, PY406, GE310, CS111, CS112

Astronomy and Physics Major (1965)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	AS203	AS311	AS312	PY405	PY406	(AS401)	(AS402)
PY251 (211)	PY252 (212)	PY351 (313)	PY355	PY408	PY451	Elective	AS441(PY581)
MA123	MA124	MA225	Divisional 1	Divisional 2	Required 1	Required 2	PY410
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Divisional 3	Divisional 4

Notes: Required 1-2: Any two of the Astronomy or Physics Courses AS413, AS414, PY452
Recommended Courses: Any from the above list of required courses not already taken as well as MA 226, MA242, PY371, GE302, GE310, CS111, CS112

Geophysics and Planetary Sciences Major (1932)

Freshman Year Fall	Freshman Year Spring	Sophomore Year Fall	Sophomore Year Spring	Junior Year Fall	Junior Year Spring	Senior Year Fall	Senior Year Spring
AS202	ES1xx	AS311	ES360	Required 1	Required 2	Required 3	Required 4
PY251 (211)	PY252 (212)	CH131 (101)	PY355 (403)	PY405 (408)	Elective	(AS/ES401)	(AS/ES402)
MA123	MA124	MA225	Elective	Divisional 1	Divisional 2	Divisional 3	Divisional 4
WR100	WR150	Lx111	Lx112	Lx211	Lx212	Elective	Elective

Notes: Required 1-4: Four Interdepartment elective courses drawn from: AS312, AS414, ES222, ES301, ES371, ES483, ES505, ES581, GE302, GE310, GE312, PY313 or 351, PY410, PY405 or 408 if not already taken (not all from same department, at least one at 400 level).
Recommended Courses: Any from the above list of required courses not already taken as well as CH102, CS111, CS112.

Color Key:

Concentration Requirements
Department of Astronomy Courses
Department of Physics Courses
Department of Earth Sciences Courses
Department of Math and Statistics Courses
College Elective Courses
Required concentration electives drawn from lis
Work for Distinction (Optional) [Elective Otherw

College of Arts and Sciences Requirements
Breath Requirement
Foreign Language Requirement
Writing Requirement

General: "Courses taken to satisfy concentration requirements must receive a grade of at least C"
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