

1. History 245 or 246: East Asia
2. Philosophy 225: Chinese Thought and Culture
3. Religion 255: World Religions
4. Five culture classes from the list below, three of which must be at the 300 level.
5. Four language courses, in the same language, from the list below.

Art 241: Asian Art

Chinese 101/102: Elementary Chinese I, II

Chinese 201/202: Intermediate Chinese I, II

Chinese 215/216: Advanced Chinese I, II

Chinese 217/218: Modern Chinese Literature I, II

Japanese 101/102: Elementary Japanese I, II

Japanese 201/202: Intermediate Japanese I, II

Japanese 215/216: Advanced Japanese I, II

Japanese 217/218: Modern Japanese Literature I, II

History 235: India and its World

History 245: East Asia to 1800

History 246: East Asia since 1800

History 272: The Contemporary World: The Korean War and the Cold War

History 346: Modern China

History 371: Asia and the Pacific Since 1850

Political Science 277: Asian Politics

Religion 354: Hinduism

Religion 355: Buddhism

Interim Courses: In Asia or on Asian Topics

STCH 203: Traditional Chinese Civilization

STCH 204: Modern China

STCH 210: Emerging China

CHIN 390 (In Beijing)

JCMU courses

No more than two interims may count toward the Area Studies Track.

No interims can count toward the language tracks.

The Minor in Asian Studies consists of six courses, three required and three electives. The Semester in China (Semester in China 203 and 204) may substitute for History 245 or 246 and Philosophy 225. Courses taken at the Japan Center for Michigan Universities may substitute for required and/or elective requirements. No more than one interim course is allowed in the minor. D. Bays, of the History Department, serves as Chair of the Committee for the Asian Studies Minor; K. Clark, of the Philosophy Department, L. Herzberg, of the Foreign Languages Department, and D. Obenchain of the Religion Department, serve on the Ad Hoc Committee for the Asian Studies Minor, as well.

ASIAN STUDIES MINOR

Three required courses:

History 245 or 246

Philosophy 225

Religion 255

Three elective courses:

Art 241

Chinese 101-218

Japanese 101-218

JCMU courses

History 235, 245, 246, 272, 346, 371

Political Science 277

Religion 354, 355

STCH 203, 204, 210

Approved interim courses

Astronomy

Professors L. Molnar, S. Steenwyk (chair)

Associate Professor D. Haarsma

Students interested in a career in astronomy or astrophysics should major in physics, minor in astronomy, and plan their program with D. Haarsma or L. Molnar. The local and remote telescopes and cameras of the Calvin Observatory are available for student use through the director of the observatory, L. Molnar.

The Physical World core requirement may be met by Astronomy 110, 111, 112, 211, or 212.

ASTRONOMY MINOR

At least 21 hours, including:

Physics 133 or approved Astronomy interim
Physics 134
Physics 246
Astronomy 211
Astronomy 212
Astronomy 384 or 395

Students pursuing a Physics Major and Astronomy Minor must follow college guidelines for overlap between a major and a minor; this is facilitated by the option in the Physics Major of substituting upper-level courses for introductory ones.

HONORS

The requirements for graduation with honors in astronomy are:

1. Minimum cumulative GPA of 3.3 and total of six honors courses (18 hours minimum) overall, including two honors courses outside the major;
2. At least three honors courses (of 3 or more semester hours each) in physics or astronomy; at least one of the three must be an advanced theory course from 335-376, excluding 347 and 359;
3. Cumulative GPA of at least 3.3 in physics, astronomy, and mathematics collectively;
4. Completion of an approved physics major, with at least 40 semester hours of physics or the secondary education physics major;
5. Regular participation in the departmental seminar program; and
6. Successful completion of a departmentally approved research project in physics or astronomy (typically through summer research) and Physics or Astronomy 395.

To obtain honors credit in any physics or astronomy course, a student can make a contract with the course instructor regarding a special project. Alternatively, a student in an Introductory level physics course up through Physics 235 or in a 100 - 200 level astronomy course may earn honors in that course by concurrently taking the seminar course, Physics 195, and completing its requirements. A student must earn a grade of "B" or better in a course to receive honors designation for that course.

COURSES

110 Planets, Stars, and Galaxies (4). F and S. A survey of the major astronomical objects, including planets, stars, and galaxies; a study of their characteristics and their organization into a dynamic, structured universe; an investigation of the processes now occurring in the universe and the methods used to study them; a presentation of the history and development of the universe. The course examines scientific perspectives on the natural world, various relationships between science and culture, the role of Christianity in the development of science, and relationships between Christianity and current scientific findings. Not open to students who have taken, or wish to take, Astronomy 111 or 112. Students who meet the prerequisites of Astronomy 211 or 212 are encouraged to take one of those courses instead. Laboratory. Prerequisites: Interdisciplinary W50/150 or sophomore standing.

111 The Solar System (4). S. This course is similar to Astronomy 110 in providing an introduction to astronomy from a Christian perspective, but emphasizes the contents of our solar system (ranging from planets and satellites down to meteorites and dust), their interrelatedness, and their development over time. Not open to students who have taken Astronomy 110, but open to students who have taken or plan to take Astronomy 112. Students who meet the prerequisites of Astronomy 211 or 212 are encouraged to take one of those courses instead. Laboratory. Prerequisites: IDIS 150 or sophomore standing. Not offered 2007-2008.

112 Stars, Galaxies, and the Universe (4). F. This course is similar to Astronomy 110 in providing an introduction to astronomy from a Christian perspective, but emphasizes objects beyond our solar system (including stars, black holes, and galaxies), their function and development, and how they fit into the structure and development of the universe as a whole. Not open to students who have taken Astronomy 110, but open to students who have taken or plan to take Astronomy 111. Students who meet the prerequisites of Astronomy 211 or 212 are encouraged to take one of these courses instead. Laboratory. Prerequisites: Interdisciplinary W50/150 or sophomore standing.

211 Planetary and Stellar Astronomy (4). S, alternate years. This course is an introduction to modern astronomy and astrophysics for students with some science and mathematics preparation. The first portion of the course includes a study of the planets and other objects in the solar system, including their physical processes and development and the formation of the solar system as a whole. The second portion of the course emphasizes the physical structure of stars, their origin and development, and their end results (white dwarfs, neutron stars, black holes). Students may take both Astronomy 211 and 212, but one is not a prerequisite for the other. Laboratory. Prerequisites: One course in college calculus (such as Mathematics 132 or 161) and one course in high school or college physics, or permission of the instructor.

212 Galactic Astronomy and Cosmology (4). S, alternate years. This course is an introduction to modern astronomy and astrophysics for students with some science and mathematics preparation. The first portion of the course includes a study of our own Galaxy, its structure, its contents (including the interstellar medium and dark matter), and its formation and development. The second portion of the course covers other galaxies, including their classification, clustering, and development, as well as active galaxies and quasars. The final portion of the course covers physical cosmology, including expansion of the universe, its age and ultimate fate, and the formation of elements. Students may take both Astronomy 211 and 212, but one

is not a prerequisite for the other. Laboratory. Prerequisites: One course in college calculus (such as Mathematics 132 or 161) and one course in high school or college physics, or permission of the instructor. Not offered 2007-2008.

384 Modern Observational Astronomy (2). S, alternate years. Students will learn techniques of modern observational astronomy by doing observing projects in each of three wavelength regimes: optical, radio, and one other (e.g., X-ray). Optical observations will use CCD detectors to do multi-color photography, photometry, astrometry, and spectroscopy. Radio observations made with the Very Large Array will be used for interferometric imaging. NASA archival data will be used for other wavelengths. Prerequisite: Concurrent registration in or completion of Astronomy 211 or 212.

390 Independent Study. F, I, and S. Independent readings and research in astronomy. Prerequisite: Permission of the chair.

395 Astronomy Research, Writing, and Presentation (0-3). * F, I, and S. Completion of an approved experimental or theoretical research with presentation of results. The research may be done entirely as part of this course or through another avenue (e.g., summer research with a faculty member). Normally, each student is required to submit a formal, written report and to present results in a department seminar and/or poster presentation. This course may be taken up to three times. Prerequisites: A faculty sponsor and approval of the department.

Biochemistry

See the Department of Chemistry and Biochemistry for a description of the biochemistry major and specific biochemistry courses.