

Course Listings

P100	Perspectives in Physics	3 Cr. Hr.
P125	Introductory Physics I	4 Cr. Hr.
P126	Introductory Physics II	4 Cr. Hr.
P130	Intro to Astronomy	3 Cr. Hr.
P131	Intro Astronomy Laboratory	1 Cr. Hr.
P150	General Physics I	4 Cr. Hr.
P151	General Physics II	4 Cr. Hr.
P305	Contemporary Physics for Scientists and Engineers	3 Cr. Hr.
P320	Environmental Physics	3 Cr. Hr.
P360	Instrumentation for Scientists	4 Cr. Hr.
P370	Intro to Mathematical Physics	3 Cr. Hr.
P390	Current Topics in Physics	3 Cr. Hr.
P401	Mechanics	3 Cr. Hr.
P403	Electricity and Magnetism	3 Cr. Hr.
P405	Optics	3 Cr. Hr.
P406	Thermal and Statistical Physics	4 Cr. Hr.
P416	Biological Physics	3 Cr. Hr.
P421	Astrophysics	3 Cr. Hr.
P453	Quantum Mechanics	3 Cr. Hr.
P457	Atomic and Nuclear Physics	3 Cr. Hr.
P460	Advanced Physics Laboratory	3 Cr. Hr.

P463	Solid State Physics	3 Cr. Hr.
P490	Current Topics in Physics	1-3 Cr. Hr.
P495	Off-campus Research Participation	1-3 Cr. Hr. per term
P497	Seminar in Physics.	1-3 Cr. Hr.
P498	Directed Studies in Physics	1-3 Cr. Hr. per term
P499	Laboratory Studies in Physics	1-3 Cr. Hr. per term

PHYSICS FACULTY

Donald J. Bord, Professor of Physics

B.A. 1970, Hamilton College; M.S. 1972, Clarkson College; Ph.D. 1976, Dartmouth College.

Research interests: Stellar spectroscopy of chemically peculiar stars, ultraviolet observations of stars, photometric measurements of long-period variable stars. Physics discipline chair.

John F. Devlin, Associate Professor of Physics

B.A. 1966, Harpur College, SUNY at Binghamton; M.S. 1968, Ph.D. 1970, Michigan State University.

Research interests: Theoretical solid state physics, especially structural properties of metals. Physics concentration advisor.

David C. Matzke, Senior Lecturer in Physics;

B.S. 1972, University of Detroit; M.S. (Physics) 1973, M.S. (Astronomy) 1975, University of Michigan-Ann Arbor.

Research interests: Studies of Jupiter's magnetic fields at radio frequencies, quasi-stellar objects, Seyfert galaxies, non-solar X-ray and gamma ray astronomy.

Arunajallam Nadasen, Professor of Physics

M.S. 1967, Rhodes University; M.S. 1971, Ph.D. 1977, Indiana University.

Research interests: Experimental nuclear physics; elastic scattering, knockout reactions, heavy-ion collisions.

Vaman M. Naik, Professor of Physics

B.S. 1972, M.S. 1973, Karnata University (India); D.I.I.Sc. Indian Institute of Science; Ph.D. 1984, University of Michigan-Ann Arbor.

Research interests: Experimental condensed matter physics and biophysics; Raman spectroscopy and molecular structure.

Henry Povolny, Senior Lecturer in Physics and Coordinator of Physics Laboratories

B.S. 1972, M.S. 1974, Ohio State University.

Research interests: Physics education; use of computers in introductory laboratories.

Jeffrey J. Prentis, Professor of Physics

B.S. 1977, Ph.D. 1982, University of Michigan-Ann Arbor.

Research interests: Statistical physics, complexity, fractals, physics history and education.

Paul W. Zitzewitz, Professor of Physics

B.A. 1964, Carelton College; M.A. 1965, Ph.D. 1970, Harvard University.

Research Interests: Use of positrons and positronium to test fundamental theories of physics, physics education. Natural Sciences Department Chair.

Physics

A Guide ToThe Concentration At The University Of Michigan-Dearborn

For additional information contact:

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PHILOSOPHY OF THE PHYSICS PROGRAM

Physics is the study of the most fundamental properties of matter and energy. The physics program has been designed with the recognition that a student might choose to concentrate in physics for a variety of reasons. In addition to meeting the needs of those planning to continue their physics education in graduate school, the program serves students planning to pursue technical careers immediately after graduation, those seeking to enter medical, dental or other professional schools, and those planning to earn certification as teachers. After completing a core curriculum in physics and mathematics and an introduction to the life and other physical sciences, students have the opportunity to gain first-hand experience in basic and applied physics research. Most advanced students are able to participate in the research projects of faculty members during any of the four University terms. Similar experiences may be arranged in hospital, industrial, or government facilities in the area. The physics faculty have concentrated their efforts in atomic and nuclear physics, condensed matter physics, biophysics, and astrophysics. Physics concentrators have worked on problems in these areas, and also on projects in the interdisciplinary application of physics to medicine and problems of the environment.

THE PHYSICS CONCENTRATION PROGRAM

I. Prerequisites to the Concentration (38 credit hours)

1. General Physics I and II (Physics 150 and 151 or equivalents)
2. Calculus I, II, and III (Mathematics 115, 116 and 215 or equivalents)
3. General Chemistry I (Chemistry 134 or 144 or equivalents)
4. Differential Equations (Mathematics 216 or equivalent)
5. Linear Algebra (Mathematics 227 or equivalent)
6. Two other Natural Sciences courses chosen from Chemistry 136 or 146, Biology 130 or 140, and Geology 118.

NOTE: Students entering in the fall should take Chemistry 134/144 and mathematics 115 during their first term and Physics 150 during their second (winter) term.

II. Concentration Requirements (32 credit hours)

The required core of physics courses includes Physics 305, 360, 401, 403, 406, 453, and 460. An additional six credit hours of lecture courses in physics, chosen from Physics 320, 370, 390, 405, 416, 421, 457, and 463 and three credit hours of laboratory courses, chosen from Physics 460, 495, or 499 are also required.

III. Cognates (6 credit hours)

The physics cognate requirement is 6 credit hours, which must be upper level courses selected from mathematics, statistics, natural sciences (other than physics), computer science, engineering, or other areas intimately related to science and approved by the physics concentration advisor.

IV. Electives (minimum 12 credit hours)

All physics concentrators, especially those interested in pursuing graduate work are advised to take additional course work in mathematics and computer science. Fourier Series and Boundary Value Problems (Math 454), Numerical Analysis (Math 472), Advanced Calculus (Math 451), Complex Variables (Math 555), and Computer Programming are suggested.

Students should be aware that certain graduate schools require a reading knowledge of at least one foreign language (French, Russian, or German) for an advanced degree. Note the minimum competency in a foreign language is a component of CAS&L and campus distribution requirements.

V. Independent Study

Students interested in independent study or research in physics may enroll in Physics 495, 498, and/or 499. No more than a total of 6 credit hours of 495, 498, and 499 courses in all Natural Sciences programs may be applied to the 120 credit hours required for graduation.

VI. CAS&L Distribution and Graduation Requirements

The CAS&L distribution requirements may be obtained through the CAS&L Office of Advising and Student Records. Courses used to satisfy distribution requirements may not be used to satisfy concentration requirements. Upon reaching 85 credit hours, a CAS&L student will automatically receive a senior audit from the CAS&L Office of Advising and Student Records. Once the audit has been received the student should meet with the concentration advisor to review the audit.

SAMPLE SEQUENCE OF COURSES FOR A PHYSICS CONCENTRATOR

The CAS&L graduation requirements:

1. Demand a minimum of 120 credit hours of courses with a cumulative grade point average of 2.00 or better.
2. Demand a minimum, cumulative grade point average of 2.00 in all upper division courses in physics.
3. Demand a minimum of 48 credit hours of upper division courses (numbered 300 or above). Note that 38 credit hours of this 48 are satisfied by the physics concentration and cognate requirements.
4. Permit a maximum of 44 credit hours total of courses in physics.

CAS&L and campus distribution for science students

	32 Cr. Hrs.
(excluding math and science)	
Physics prerequisites	38
Physics concentration requirements	32
Physics cognates	6
Electives (including 10 upper level credit hours)	<u>12</u>
TOTAL REQUIRED FOR GRADUATION	120 Cr. Hrs.

REQUIREMENTS FOR A MINOR IN PHYSICS

Students not concentrating in physics may obtain a minor in physics by taking twelve credit hours in upper level physics courses. No more than three credit hours of field placements, internships, or co-op courses may be applied toward a minor. Students must specifically petition the CAS&L Office of Student Records for the minor to be recorded on their transcript.

The University of Michigan, as an Equal Opportunity Affirmative Action employer, complies with applicable federal and state laws prohibiting discrimination, including Title IX of the Education Amendments of 1972 and Section 504 of the rehabilitation Act of 1973. It is the policy of the University of Michigan that no person, on the basis of race, sex, color, religion, national origin or ancestry, age, marital status, handicap, or Vietnam-era educational programs and activities, or admissions. Inquiries or complaints may be addressed to the University's Director of Affirmative Action. Title IX and Section 504 Compliance, 2012 Fleming Administration Building, Ann Arbor, Michigan 48109-1340. (734) 764-3423 (TDD 747-1388)

FALL	CREDIT HOURS	WINTER	CREDIT HOURS
FRESHMAN			
Chemistry 134 or 136	4	Chemistry 144 or 146	4
Mathematics 115	4	Mathematics 116	4
Composition 105	3	Composition 106	3
Distribution	<u>6</u>	Physics 150	<u>4</u>
TOTAL	17	TOTAL	15
SOPHOMORE			
Physics 151	4	Physics 305	3
Mathematics 215	4	Mathematics 216	3
Foreign Language	4	Math 227	3
Distribution	<u>3</u>	Foreign Language	4
		Biol. 130 or 140	<u>4</u>
TOTAL	15	TOTAL	17
JUNIOR			
Physics 360	4	Physics 403	3
Physics 401	3	Physics 460	3
Physics Elective	3-4	Physics Elective	3
Distribution	<u>6</u>	Cognate	4
		Distribution	<u>3</u>
TOTAL	16-17	TOTAL	16
SENIOR			
Physics 406	4	Physics 460, 495 or 499	3
Physics 453	3	Physics Elective	3
Physics Elective	3-4	Electives	<u>2</u>
Cognate	3		
Electives	<u>3</u>		
TOTAL	16-17	TOTAL	15

This booklet is intended solely as a summary of the degree requirements in physics. It is the responsibility of the students to familiarize themselves with any and all CAS&L and campus regulations and requirements.