



# Physics

Department of Natural Sciences  
College of Arts, Sciences, and Letters

## The Program

Physics is the study of the most fundamental properties of matter and energy. All the other sciences and engineering depend to some extent on physics and the knowledge it provides. The program at UM-Dearborn produces well-educated physicists who are capable of applying physics principles to a wide array of systems and circumstances. After completing a core curriculum in physics and mathematics and an introduction to the life and other physical sciences, students are prepared to engage in basic and applied physics research. Many students are able to participate in the research projects of faculty members both on and off campus during their studies at the University.

## Career Opportunities

Physics students find employment in a wide variety of subject areas. Examples include education (high school, college and university teaching), industry (design, materials fabrication, computer applications), the law (patent law, product safety), health sciences (pre-med, pre-dental, radiation physics) and basic research (government and industrial laboratories). Students who anticipate entering one of these fields will have the opportunity to take related courses on our campus.

UM-Dearborn offers secondary education certification for those wishing to enter into high school teaching. Career opportunities are expected to expand greatly over the coming decade in this most respected of high school teaching areas.

Those wishing to enter the industrial sector have access to the engineering programs offered at UM-Dearborn (electrical and computer, mechanical, industrial systems and manufacturing).

The pre-law program at UM-Dearborn will assist those wishing to apply their physics knowledge to the legal profession, while the pre-med program offers advice and guidance concerning entry into medical or other health-related professional schools.

UM-Dearborn graduates an average of about 5 students per year in physics, of whom one-third to one-half are women. (We were ranked among the top 20 physics programs in the country with more than 40% female bachelor's degree recipients for 1994-98.) Approximately 50% of our majors continue their education by enrolling in graduate or professional programs; the remainder enter directly into the workforce. The UM-Dearborn physics degree program insures that those who choose to advance their formal education are competitive to enter into the best graduate schools in the country. Nearly a third of our students have obtained Ph.D. degrees in physics or related fields from such institutions as Michigan, Michigan State, Illinois, Purdue, Arizona, Wisconsin, and UCLA.

## The Faculty

**Donald J. Bord, Ph.D.** Professor. (Dartmouth College): stellar astronomy

**John F. Devlin, Ph.D.** Associate Professor (Michigan State University): solid state physics

**James M. Hetrick, Ph.D.,** Lecturer (University of Illinois): physics education

**David C. Matzke, M.S.** Senior Lecturer (The University of Michigan): physics and astronomy education

**Arunajallam Nadasen, Ph.D.** Professor Emeritus (Indiana University): experimental nuclear physics

**Vaman M. Naik, Ph.D.** Professor. (The University of Michigan): condensed matter physics and biophysics

**Jeffrey J. Prentis, Ph.D.** Professor. (The University of Michigan): statistical physics and history of physics

**Carrie M. Swift, Ph.D.** Assistant Professor. (The University of Michigan): computational astrophysics

**Jin Wang, Ph.D.** Assistant Professor. (The University of Queensland): quantum optics and quantum computing

**Paul W. Zitzewitz, Ph.D.** Professor Emeritus. (Harvard University): atomic physics and physics education

## Foundation Course Requirements

- General Physics I and II (Physics 150 and 151 or equivalent)
- Calculus I, II and III (Mathematics 115, 116, and 215 or equivalents)
- General Chemistry I (Chemistry 134 or equivalent)
- Differential Equations (Mathematics 216 or equivalent)
- Linear Algebra (Mathematics 217 or equivalent)
- Two other natural sciences courses chosen from Chemistry 136 or 146, Biology 130 or 140, and Geology 118.

## Concentration Requirements

### General Information

*Degree-seeking students are required to fulfill the required courses in effect at the time admitted or readmitted to the program. Since these are subject to change, students should see an advisor for current requirements.*

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.

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## Cognate Requirement

The physics cognate requirement is six 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.

## Elective Requirements

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 Problems (Math 454), Numerical Analysis (Math 472), Advanced Calculus (Math 451), and Complex Variables (Math 555) are suggested. Courses leading to knowledge of a modern computer language (e.g., C++, Java) are also recommended.

## A Minor in Physics

Students not concentrating in physics may obtain a minor in physics by taking twelve credit hours of upper-level physics courses.

## Advanced Courses Offered

Physics 305	Contemporary Physics
Physics 320	Environmental Physics
Physics 360	Instrumentation for Scientists
Physics 370	Introduction to Mathematical Physics
Physics 390	Current Topics in Physics
Physics 401	Classical Mechanics
Physics 403	Electricity and Magnetism
Physics 405	Optics
Physics 406	Statistical and Thermal Physics
Physics 416	Biological Physics
Physics 421	Astrophysics
Physics 453	Quantum Mechanics
Physics 457	Atomic and Nuclear Physics
Physics 460	Advanced Laboratory
Physics 463	Solid State Physics
Physics 495	Off-campus Research
Physics 497	Seminar in Physics
Physics 498	Directed Studies in Physics
Physics 499	Laboratory Studies in Physics

## Facilities

Major facilities in physics include a scanning tunneling microscope, an observatory, a 7.5-foot radio telescope, an optics lab with air table and modular design components, extensive alpha and gamma-ray spectroscopy equipment, x-ray diffraction apparatus, and computer-based introductory and electronics laboratories.

## For More Information

For more information concerning the physics program:

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To request an application or obtain more information about admission:

Office of Admissions and Orientation

University of Michigan-Dearborn

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