APPLIED PHYSICS M.S.

Degree: Master of Science
https://www.towson.edu/fcsm/departments/physics/grad/applied/

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Towson University's Master of Science in Applied Physics is designed to prepare its graduates for leadership positions in a wide range of science and technology careers in industry and academics. The program has components designed for students who intend to embark on a career immediately upon graduation, as well as for those who are seeking to enhance their prospects for admission to doctoral programs. The program has been certified by the Council of Graduate Schools as a Professional Science Master's program (PSM), a graduate degree that represents an innovation in response to the workforce needs in science and technology sectors. The program delivers a strong graduate education in applied physics, together with skills related to project management, team work, advanced communication and interdisciplinary problem solving. Additionally, thesis and non-thesis research courses are available for students who plan to pursue a doctoral program.

The physics content of the program aims to impart specialized knowledge in several areas of applied physics, while also emphasizing a broad set of skills which include laboratory techniques involving fabrication and characterization of advanced materials and devices, physical measurements employing advanced instrumentation, computational modeling and simulations, data analysis and laboratory automation. The program imparts knowledge and skills associated with teamwork, project management, communication and leadership through courses in project management and technical writing. In addition, there are internship and research components that allow students to acquire real-life problem-solving experience by working on site at technology enterprises or by participating in faculty-led research projects in applied physics.

Accelerated Bachelor's-Master's Program

Students may also earn an M.S. in Applied Physics through the Department of Physics accelerated bachelor's and master's program. Qualifying undergraduate students are screened into the accelerated BS-MS program in their junior or senior year. The accelerated program allows students to complete the master's degree in a shorter time frame by taking up to 9 units of graduate level courses as undergraduates, with these courses satisfying both the undergraduate and master's degree curriculum requirements. Prospective applicants should contact the program director for details.

Please see the Undergraduate Catalog for more information on the accelerated bachelor's-master's program.

Admission Requirements

This program admits fall and spring terms only.

- A baccalaureate degree in physics or a related field such as chemistry, mathematics or engineering from a regionally accredited college or university.* Students who have not majored in physics will qualify for admission if their undergraduate education included two calculus-based courses in physics and at least two upper-level physics courses. Students without a degree in physics and/or adequate preparation may be required to take remedial courses **and/or additional courses** from the curriculum, based on a case-by-case analysis.
- An undergraduate GPA of at least 3.00 is required for full admission and at least 2.75 for conditional admission.

Non-immigrant International Students

Program Enrollment: F-1 and J-1 students are required to be enrolled full-time. The majority of their classes must be in-person and on campus. See the list of programs that satisfy these requirements, and contact the International Student and Scholars Office with questions.

Admission Procedures: See additional information regarding Graduate Admission policies and International Graduate Application online.

See **Exceptions to Policy in Graduate Admissions.

Application Requirements

Required documents for application:

- A résumé including names and contact information for three references;
- Official transcripts;
- One recommendation on the Official Recommendation Form;
- Brief statement of purpose indicating academic and professional objectives.

Degree Requirements

The degree will require completion of a minimum of 37 total units of course work. Students with inadequate undergraduate preparation in physics may be required to take more than 37 units due to additional courses that may be needed to remedy deficiencies in undergraduate course work. 19 of the 37 units of course work will consist of the physics content courses, split between 10 units of core courses from Group A and 9 units of electives from Group B. Another 9 units are assigned for courses in Group C which belong to the 'plus' category. **The remaining 9 units are distributed among the Group D courses that comprise of a research course, thesis, research project and/or internship.**

Code	Title	Units
Group A: Core Courses		
PHYS 685	PROFESSIONAL SCIENCE MASTERS SEMINAR	1
Select 9 units from the list below:		9
PHYS 555	INTRODUCTORY QUANTUM MECHANICS	
PHYS 557	SOLID STATE PHYSICS	
PHYS 641	LABORATORY TECHNIQUES AND INSTRUMENTATION	
PHYS 670	COMPUTATIONAL PHYSICS	
ASTR 503	ASTROPHYSICAL TECHNIQUES	
ASTR 632	GALAXIES AND COSMOLOGY	
ASTR 652	HIGH ENERGY ASTROPHYSICS	
Group B: Electives		**9**
A minimum of 9 units are required, of which at least 6 units must be from 600-level courses.		
PHYS 512	MODERN PHYSICS II	

PHYS 533	BASIC ELECTRONICS	
PHYS 534	DIGITAL ELECTRONICS	
PHYS 550	MECHANICS	
PHYS 552	THERMODYNAMICS AND KINETIC THEORY	
PHYS 554	ELECTRICITY AND MAGNETISM	
PHYS 559	NUCLEAR PHYSICS	
PHYS 561	OPTICS FUNDAMENTALS	
PHYS 570	SPECIAL TOPICS IN PHYSICS	
PHYS 658	MAGNETISM AND MAGNETIC MATERIALS	
PHYS 662	SPECTROSCOPIC AND MICROSCOPIC TECHNIQUES	
PHYS 663	FUNCTIONAL ELECTRONIC MATERIALS	
PHYS 664	NANOTECHNOLOGY	
PHYS 680	SPECIAL TOPICS IN PHYSICS	
Group C: 'Plus' Courses		**9**
A minimum of 9 units are required. Graduate Courses from other disciplines may be taken with advance permission.		
EBTM 604	INTRODUCTION TO PROJECT MANAGEMENT	
EBTM 625	PROJECT LEADERSHIP AND COMMUNICATION	
EBTM 750	PROGRAM AND PORTFOLIO MANAGEMENT	
ENCE 662	Introduction to Project Management [1]	
ENCE 688	Global Project Management [1]	
ENCE 665	Management of Project Teams [1]	
PHYS 795	APPLIED PHYSICS RESEARCH [2]	
PRWR 621	BUSINESS WRITING	
PRWR 623	TECHNICAL WRITING AND INFORMATION DESIGN	
Group D: Thesis/Internship		**9**
A minimum of 9 units are required.		
PHYS 795	APPLIED PHYSICS RESEARCH [2]	
PHYS 799	PHYSICS MASTER'S INTERNSHIP	
PHYS 896	MASTER'S RESEARCH PROJECT	
PHYS 897	PHYSICS THESIS	
or PHYS 898	PHYSICS THESIS	
Total Units		**37**

[1] These courses are offered online by the Department of Project Management at the Clark School of Engineering, University of Maryland, and are available to students enrolled in this program. Please inquire with the program director on processes to enroll and/or transfer the courses to the TU record.

[2] It is recommended that a minimum of 3 units be taken as a group C course before taking additional units towards group D requirement.

Description of thesis and/or non-thesis option for graduate programs

Thesis

Subsequent to successful completion of a 3 unit research course, students will successfully complete 6 units of thesis under the supervision of a faculty member who will serve as the chair of the master's thesis committee.

Research Practicum

Subsequent to successful completion of a 3 units research course, students will enroll in 6 units of research practicum which involves successful completion of a research project under the supervision of a faculty member.

Internship

Students will successfully complete 6 units of internship at an employer facility. The internship component will require the students to work on site at a potential work place for a total minimum duration of 300 hours. Students are expected to take the initiative in proactively seeking internship opportunities, utilizing available resources. The program faculty will assist students in finding internships whenever possible.

a. Demonstrate content knowledge in areas of applied physics that are relevant to the current scientific and technology enterprises.
b. Demonstrate knowledge and skills for the measurement and control of physical variables as well as transduction of changes in these variables through physical phenomena.
c. Demonstrate knowledge of using and/or developing computer models and simulations of physical phenomena and processes; acquire and analyze data from experiments.
d. Acquire advanced skills related to scientific and technical communication and presentation in a variety of formats including seminars, project proposals, instruction documents etc. Design and deliver oral and written presentations employing scientific and professional formats such as technical seminars, project proposals and instructional documents using appropriate advanced technology and communication modes.