

Nanoscale Physics

The Wiess School of Natural Sciences

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Degrees Offered: M.S.

Rice University introduced a professional master's degree in Nanoscale Physics in fall 2002. This program combines a strong component in quantum theory, which governs the behavior of systems at the nanoscale, with the study of practical nano- and mesoscale devices. The program provides the student with the knowledge required to successfully navigate the emerging field of nanotechnology. New courses cover cutting-edge areas such as quantum behavior of nanostructures, quantum nanotechnology, nanoscale imaging, and the fabrication of nanostructures. In addition, a year-long course in methods of experimental physics ensures that students obtain the advanced practical skills valuable to industry.

The Nanoscale Physics degree is one of three tracks in the new Professional Master's Program at Rice housed in the Wiess School of Natural Sciences. These master's degrees are designed for students seeking to gain further scientific core expertise coupled with enhanced management and communication skills. These degrees instill a level of scholastic proficiency that exceeds that of the bachelor's level and creates the cross-functional aptitudes needed in modern industry. This will allow students to move more easily into management careers in consulting or research and development, design, and marketing of new science-based products.

Degree Requirements for the M.S. in Nanoscale Physics

The 21-month professional master's program begins with two semesters of course work at Rice followed by a six-month industrial internship. After the internship, students return to Rice for a final semester of course work. In addition to taking technical courses, students in the Nanoscale Physics program will take management courses, a science policy and ethics course, and a seminar jointly with the students involved in the other professional master's tracks. No thesis is required; however, students are required to present their internship projects in both oral and written form in the Professional Master's Seminar. Students also are required to attend events organized by the Rice Alliance for Technology and Entrepreneurship and will be guided in courses by the efforts of the Cain Project in Engineering and Professional Communication. Working professionals may be considered for part-time enrollment.

For general university requirements for graduate studies, see pages 65–70, and see also Professional Degrees, page 66.

To ensure that all students obtain an excellent quantitative background, each student will be required to take the core courses listed below. If a student can demonstrate that s/he has learned the material elsewhere, s/he may be exempted. Students pursuing this degree part-time will meet with their assigned adviser to determine their coursework schedule.

Year 1

Fall Semester

NSCI 501 *Professional Master's Seminar*
 MGMT 750 *Management for Science and Engineering*
 PHYS 533 *Nanostructures and Nanotechnology I*
 PHYS 537 *Methods of Experimental Physics I*
 PHYS 539 *Characterization and Fabrication at the Nanoscale*

Spring Semester

Elective
 NSCI 501 *Professional Master's Seminar*
 PHYS 534 *Nanostructures and Nanotechnology II*
 PHYS 538 *Methods of Experimental Physics II*
 PHYS 416 *Numerical Methods and Modeling*

Summer

Industrial Internship

Year 2

Fall Semester

NSCI 510 *Industrial Internship*

Spring Semester

3 electives
 NSCI 511 *Science Policy and Ethics*
 NSCI 501 *Professional Master's Seminar*

Elective Courses: In addition to taking the core courses, the student will choose 4 electives from the list below. We recommend that at least 2 of the electives be science or engineering courses at the 500 level or above.

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| CAAM 378 <i>Introduction to Operations Research</i> | MGMT 636 <i>Systems Analysis and Database Design</i> |
| CHEM 630 <i>Molecular Spectroscopy and Group Theory</i> | MGMT 661 <i>International Business Law</i> |
| ELEC 568 <i>Laser Spectroscopy</i> | MGMT 674 <i>Production and Operations Management</i> |
| ELEC 595 <i>Microolithography</i> | MGMT 676 <i>Project Management/Project Finance</i> |
| ELEC 603 <i>Nano-Optics and Nanophotonics</i> | MGMT 721 <i>General Business Law</i> |
| ELEC 645 <i>Thin Films</i> | MGMT 751 <i>New Venture Creation in Science and Engineering</i> |
| ELEC 685 <i>Fundamentals of Medical Imaging</i> | PHYS 569 <i>Ultrafast Optical Phenomena</i> |
| ENGI 303 <i>Engineering Economics and Management</i> | or other courses as specified by the program director and approved by the Oversight Committee |
| MGMT 617 <i>Managerial Decision Making</i> | |