MATERIALS SCIENCE, M.S.

The requirements for the M.S. in Materials Science have been merged with Materials Engineering. See “Materials Science & Engineering”. Admission to the program has been suspended. The information that appears in this entry is provided for the benefit of students currently admitted to the program.

Administrative Unit: Material Sciences Program
College/School: College of Engineering
Admitting Plans: M.S., Ph.D.
Degrees Offered: M.S., M.Eng., Ph.D.
Minors and Certificates: Doctoral Minor

OVERVIEW

Society’s demand for a rapid and diverse succession of new, specialized materials requires a flexible and interdisciplinary approach to materials research and education. In the past, specialized materials were developed through a trial-and-error process. Today, the tools and expertise of scientists are being combined with those of engineers resulting in productive cooperation in both applied and theoretical areas.

Our search for new materials and the need to make better use of old ones continues to broaden the field of materials science. Creating the next generation of advanced materials—polymers, ceramics, metals, semiconductors or biomaterials—and advanced devices—such as lasers, micromotors, nanoscale technology or engineered tissues—requires a mastery of materials and interfaces with atomic to macroscopic level understanding. This is the challenging and exciting domain of materials science.

The Materials Science Program at UW–Madison is nationally recognized and is committed to providing leadership in research, education and outreach services. Graduate studies in our program at UW–Madison can lead to the M.S. and Ph.D. degrees in materials science.

The Materials Science Program provides excellent opportunities for interdisciplinary research through its faculty advisory committee made up of many faculty from departments throughout the UW–Madison campus. Represented in the MSP are virtually all of the engineering departments, as well as chemistry, physics, geology, human ecology, biological systems engineering, as well as several of the biological and medical sciences. Graduate students select their thesis research topics based on materials and interfaces that involve polymers, superconductors, semiconductors, advanced metals, composites, biological materials, or ceramics. Degree requirements are extremely flexible, permitting the student and advisor to formulate an educational plan that is optimal for the student’s educational and professional objectives.

The Materials Science Center (MSC) has state-of-the-art electron microscopes, X-ray diffractometers, atomic force microscopes, surface analysis equipment, and advanced light microscopes available for hands-on use by materials science students. Augmenting the Center’s capabilities is an impressive array of dedicated campus facilities, including the Synchrotron Radiation Center, and the Wisconsin Center for Applied Microelectronics. Kurt F. Wendt Library houses a comprehensive collection of reference material in engineering and the physical sciences. The MSC and MSP offices are located on the engineering campus, near Union South, a student center with a snack bar, cafeteria, and social, game, and activity areas.

A weekly seminar program provides students with an opportunity to hear and meet outstanding materials scientists and engineers from around the world.

Research assistantships generally are available to qualified applicants. Opportunities to obtain teaching assistantships are available directly with the departments of our faculty and not through the Materials Science Program office. Exceptionally well-qualified applicants are eligible for graduate fellowships.

REQUIREMENTS

MINIMUM DEGREE REQUIREMENTS AND SATISFACTORY PROGRESS

To make progress toward a graduate degree, students must meet the Graduate School Minimum Degree Requirements and Satisfactory Progress (http://guide.wisc.edu/graduate/#policiesandrequirementstext) in addition to the requirements of the program.

MINIMUM GRADUATE DEGREE CREDIT REQUIREMENT

30 credits

MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT

16 credits

MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT

At least 15 of the required 30 credits must be in courses designed for graduate work, which may include graduate-level math (EP 547), any courses taken at the 700 level or above (including classroom courses and master’s research, thesis, and seminar courses), and those courses that have been identified as graduate level by the courses’ subject owner. All courses must be approved by advisor and the MSP and must be relevant to the student’s scientific/engineering goals.

PRIOR COURSEWORK REQUIREMENTS: GRADUATE WORK FROM OTHER INSTITUTIONS

With program approval, students are allowed to count up to two graduate courses from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNDERGRADUATE

When rigorous and consistent with expectations of graduate work, up to 7 credits numbered 300 and above may be counted toward the minimum graduate degree credit requirement; if those courses are numbered 500 or above, they may be counted toward the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned five or more
years prior to admission to a master’s degree is not allowed to satisfy requirements.

**PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNIVERSITY SPECIAL**

With program approval and payment of the difference in tuition (between Special and graduate tuition), students are allowed to count up to 15 credits of coursework taken as a UW–Madison Special student numbered 300 or above toward the minimum graduate residence credit requirement and the minimum graduate degree credit requirement; if the coursework is numbered 700 or above, it may count toward the minimum graduate coursework (50%) requirement. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

**CREDITS PER TERM ALLOWED**

15 credits

**PROGRAM–SPECIFIC COURSES REQUIRED**

Contact the program for information on any additional required courses.

**DOCTORAL MINOR/BREADTH REQUIREMENTS**

All doctoral students are required to complete a minor.

**OVERALL GRADUATE GPA REQUIREMENT**

3.00 GPA required

**OTHER GRADE REQUIREMENTS**

The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.

**PROBATION POLICY**

The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

**ADVISOR / COMMITTEE**

Every graduate student is required to have an advisor. To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.

An advisor generally serves as the thesis advisor. In many cases, an advisor is assigned to incoming students. Students can be suspended from the Graduate School if they do not have an advisor. An advisor is a faculty member, or sometimes a committee, from the major department responsible for providing advice regarding graduate studies.

A committee often accomplishes advising for the students in the early stages of their studies.

**ASSESSMENTS AND EXAMINATIONS**

Contact the program for information on required assessments and examinations.

**TIME CONSTRAINTS**

Master’s degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

**LANGUAGE REQUIREMENTS**

Contact the program for information on any language requirements.

**ADMISSIONS**

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Admission to the Materials Science Program (MSP) is evaluated by the program’s admissions committee. The evaluation is based on the applicant’s previous academic record(s), Graduate Record Exam (GRE) scores, TOEFL or IELTS (if applicable), letters of recommendation, and a personal statement. Admission is competitive. Applicants are normally expected to have a bachelor’s degree in engineering or the sciences, with courses in mathematics through differential equations, at least one year each of physics and chemistry, and a course in physical chemistry and/or modern physics.

**For more information:** Diana Rhoads, 1509 University Avenue 
#276, Madison, WI 53706; 608-263-1795; matsciad@engr.wisc.edu; www.engr.wisc.edu/interd/msp.

**PEOPLE**

**Faculty:** Professor Vanderby (director) (BME/Ortho); Associate Professor Stone (associate director) (Materials Science and Engineering); Professors Abbott (Chemical and Biological Engineering), Anderson (Civil and Environmental Engineering), Babcock (Materials Science and Engineering), Beebe (Biomedical Engineering), Blick (Electrical and Computer Engineering), Booske (Electrical and Computer Engineering), Botz (Electrical and Computer Engineering), Coppersmith (Physics), Cramer (Civil and Environmental Engineering), Drugan (Engineering Physics), Eom (Materials Science and Engineering), Eriksson (Physics), Giacomini (Mechanical Engineering), Gilbert (Physics), Hamers (Chemistry), Hitchon (Electrical and Computer Engineering), Keely (Cell and Regenerative Biology), Klingenberg (Chemical and Biological Engineering), Kou (Materials Science and Engineering), Kuech (Chemical and Biological Engineering), Legally (Materials Science and Engineering), Lakes (Engineering Physics/Biomedical Engineering), Martin (Mechanical Engineering), Mawst (Electrical and Computer Engineering), McCaughan (Electrical and Computer Engineering), Nealey (Chemical and Biological Engineering), Onellion (Physics), Oswald (Mechanical Engineering), Perepezko (Materials Science and Engineering), Rowlands (Mechanical Engineering), Sarmadi (Human Ecology), Shoet (Electrical and Computer Engineering), Tikoff (Geology and Geophysics), Tunng (Mechanical Engineering), Vanderweide (Electrical and Computer Engineering), Wendt (Electrical and Computer Engineering), Winokur (Physics), Wong (Bacteriology); Associate Professors Allen (Engineering Physics), Block (Medical Physics), Chesler (Biomedical Engineering), Crone (Engineering Physics), Evans (Materials Science and Engineering), Gopalan (Materials
Science and Engineering), Gong (Biomedical Engineering), Jiang (Electrical and Computer Engineering), Jin (Chemistry), Li (Mechanical Engineering), Lynn (Chemical and Biological Engineering), Ma (Electrical and Computer Engineering), Masters (Biomedical Engineering), Morgan (Materials Science and Engineering), Murphy (Biomedical Engineering), Negrut (Mechanical Engineering), Palecek (Chemical and Biological Engineering), Pfefferkorn (Mechanical Engineering), Ploeg (Mechanical Engineering), Root (Chemical and Biological Engineering), Rzchowski (Physics), Szlufarska (Materials Science and Engineering), Thelen (Mechanical Engineering), Voyles (Materials Science and Engineering), Williams (Biomedical Engineering), Xu (Geology and Geophysics); Assistant Professors Arnold (Materials Science and Engineering), Cai (Radiology/Medical Physics), Li (BME/Ortho), Mahanthappa (Chemistry), McDermott (Physics), Ogle (Biomedical Engineering), Sheinis (Astromony), Wang (Materials Science and Engineering), Weibel (Biochemistry)