

**MATERIALS SCIENCE AND ENGINEERING  
MASTER OF ENGINEERING  
DEGREE REQUIREMENTS**

Revised: November 13, 2009

Graduate Council Approval: December 14, 2009

**MASTER'S PROGRAM**

**1) Admissions Requirements**

An undergraduate major in materials science, most engineering disciplines (e.g. chemical or mechanical engineering), physics, materials physics, applied physics or chemistry is typical for materials science and engineering graduate students, but is not required. The minimal background for entrance into the master of engineering program is a bachelor's degree with 3.0 overall grade-point average.

a) **Prerequisites:** Not Applicable

b) **Deficiencies:** Not Applicable

**2) Master of Engineering in Materials Science and Engineering (M.Engr.)**

This degree requires completion of all Plan II requirements, including a total of 36 units, of which 20 units must be graduate courses in the major field. Not more than 9 units of research (299 or equivalent) may be used to satisfy the 36-unit requirement. A comprehensive final exam in the form of a capstone written engineering report is also required. A minimum of three quarters of academic residence is required. One opportunity to complete this degree is in collaboration with a foreign University. Current possibilities are available on the Department web site.

**3) Course Requirements - Required and Electives (36 units)**

Twenty –four units of formal engineering courses are required.

a) **Required Courses, 29 units:**

**Core Courses, 20 units:**

The five core courses in Materials Science will constitute the requirement for 20 units of graduate courses in the major field:

EMS 260, Advanced Thermodynamics of Solids (4 units)

EMS 262, Advanced Topics in Structure of Materials (4 units)

EMS 264, Advanced Materials Kinetics (4 units)

EMS 272, Advanced Functional Properties of Materials (4 units)

EMS 274, Advanced Mechanical Properties of Materials (4 units)

**EMS 299 Research Project, 9 units:**

Research conducted as part of EMS 299 units should be related to the analysis, design, or feasibility evaluation of applied engineering problems and will be submitted in the form of a capstone written engineering report.

- b) **Elective Courses, 7 units:**  
Elective courses can be upper division undergraduate or graduate level engineering courses. In consultation with the Graduate Adviser, science courses (such as physics and chemistry) may be substituted for these engineering units. No more than three units of electives can be ECH290, EMS 290C, or EMS 294 units. Four elective units must be formal engineering courses.
- c) **Summary:**  
This degree requires completion of a total of 36 units—20 units of core courses (graduate courses in the major field), nine units of EMS 299 Research Project and seven units of electives. Twenty-four units of formal engineering courses are required (exclusive of 299, 294, and 290 courses). A minimum course load is 12 units each academic quarter.
- d) **Transfer Credit:**  
Students seeking the master's degree may request to transfer course work to their graduate transcript. Course work requested for transfer must have been taken at an accredited institution. Some work taken elsewhere may be credited toward degree requirements with the consent of the Graduate Adviser and the Dean of Graduate Studies. If the units were earned at another campus of the University, they may fulfill up to one-half of a student's unit requirement. This may be done as long as the units have not already been used to satisfy the requirements for another degree. The *Petition to Transfer Coursework* must be approved by the Graduate Adviser and forwarded to the Office of Graduate Studies. The Dean of Graduate Studies determines final approval. The *Petition to Transfer Coursework* can be found online at <http://gradstudies.ucdavis.edu/forms>. Guidelines for statute of limitations for transfer units and types of transfer credits can be found on line on page 40-42, at: <http://www.gradstudies.ucdavis.edu/publications/>
- 4) **Special requirements:** Not Applicable
- 5) **Committees**
- a) **Admission Committee:**  
Once the completed application, all supporting material, and the application fee have been received, the application will be submitted to the Graduate Affairs Committee. The Graduate Affairs Committee consists of six graduate program faculty. Based on a review of the entire application, a recommendation is made to accept or decline an applicant's request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by Graduate Studies. Applications are accepted through January 15, for the following fall quarter.

b) **Course Guidance:**

Each student's course study plan can be discussed with the Graduate Adviser and/or the major professor. Full-time graduate students must register for a minimum of 12 units each academic quarter; these 12 units can be made up of required courses, electives, and 299s.

c) **Comprehensive Exam Committee:**

The Comprehensive Exam Committee will consist of three faculty members. The major professor serves as Chair of the committee. The student, in consultation with the Chair of the committee will choose two other faculty members, based on the faculty research experience. If this Master of Engineering degree is in collaboration with a foreign University, it is encouraged that the foreign adviser serves on the Exam Committee. The committee membership is nominated by the Graduate Adviser and approved by the Dean of Graduate Studies.

6) **Advising Structure and Mentoring**

The **Major Professor** is the faculty member who assists the student in preparing a detailed program of study and supervises the student's research. Masters students must select their Major Professor from among the faculty members of the graduate program in Materials Science. The Materials Science graduate program consists of all faculty of the Department of Chemical Engineering and Materials Science and select faculty members from other departments.

The **Graduate Advisers**, who are nominated by the Chair of the Department of Chemical Engineering and Materials Science and appointed by the Dean of Graduate Studies, are a resource for all graduate students in materials science and engineering to provide information and advising on academic requirements, policies and procedures (Graduate Studies, College, and Departmental), and registration. A Materials Science and Engineering Graduate Adviser's signature is required on a number of important documents such as the student's Program of Study, petitions related to course work, Planned Educational Leave Program (PELP), annual student progress reports, and Advancement to Candidacy. The Graduate Advisers also serve as intermediaries in issues related to student progress. Each incoming graduate class is assigned a Materials Science and Engineering Graduate Adviser who shall serve in that capacity for the class until the last student graduates.

The **Mentoring Guidelines** can be found on the department's Web Site at: <http://www.chms.ucdavis.edu/students/graduates/>

7) **Advancement to Candidacy**

Every student must file an official application for Candidacy for the Degree of Master of Engineering after completing one-half of their course requirements and at least one quarter before completing all degree requirements. Students are expected to submit their application to candidacy by the end of the Winter quarter of Year 1.

The Candidacy for the Degree of Master form can be found online at: <http://www.gradstudies.ucdavis.edu/forms/>. A completed form includes a list of courses the student will take to complete degree requirements. If changes must be made to the student's course plan after s/he has advanced to candidacy, the Graduate Adviser must recommend these changes to Graduate Studies. Students must have their Graduate Adviser sign the candidacy form before it can be submitted to Graduate Studies. If the candidacy is approved, the Office of Graduate Studies will send a copy to the appropriate graduate staff person and the student. If the Office of Graduate Studies determines that a student is not eligible for advancement, the department and the student will be told the reasons for the application's deferral. Some reasons for deferring an application include: grade point average below 3.25, outstanding "I" grades in required courses, or insufficient units.

**8) Comprehensive Exam Requirement**

Students are expected to complete the exam in the form of a comprehensive report after advancing to candidacy and near the end of all coursework for the degree. The Master of Engineering comprehensive report is based on all coursework and how it relates to the research carried out for credit under the 290C and 299 course numbers. The study may comprise experimental or theoretical work, and is directed toward the solution of a specific scientific or engineering problem. Examples of appropriate report activities are the design of components or systems, the synthesis and characterization of new materials, the critical studies of existing systems, and the analysis and theoretical modeling of experimental data. The quality and formatting of the report must conform to the standards for publication in a scientific or engineering journal. The selection of the journal is based on the focus and scope of the results. The minimum length is 10 pages double spaced with a 12 point font size, and 1" margins. No maximum length is specified. The report should be completed by the end of the Spring quarter of Year 2.

The comprehensive exam committee will critically judge the report based on the description of the motivation and scientific basis for the project, as well as the quality and thoroughness of the results, the engineering analysis, and the conclusions drawn from them. The report will be graded on a pass/not pass/fail basis. Students given a 'not pass' will be given a chance to edit the report in consultation with, and to the satisfaction of, the committee members. Students must submit the edited version no later than one quarter after receiving the "not pass". Students given a 'fail' will be recommended to the Office of Graduate Studies for disqualification from the program; disqualified students will not be granted a degree.

**9) Normative Time to Degree**

Although work for the Master of Engineering degree can be completed in three quarters of full-time study, at least one calendar year to six quarters of full-time study is usually required to complete the Master of Engineering coursework and report.

**10) Typical Time Line and Sequence of Events**

**Year 1:**

<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
EMS 260	EMS 264	EMS 290C/299
EMS 262	EMS 274	Elective Course
EMS 272	EMS 290C/299 Elective Course Submit application for Candidacy for the Degree of M.E.	

**Year 2:**

<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
EMS 290C/299	EMS 290C/299	EMS 290C/299 Submit M.E. Report

**11) Sources of funding**

The department does not guarantee funding for students seeking the Master of Engineering degree.

**12) PELP, *In Absentia* and Filing Fee status.**

Information about PELP (Planned Educational Leave), *In Absentia* (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: <http://www.gradstudies.ucdavis.edu/publications/>.

If you are considering PELP, *In Absentia* or Filing Fee status, please contact the graduate program coordinator.

**Materials Science and Engineering M.E. Degree Requirements**

**M.E. Program of Study:**

