

California State Polytechnic University, Pomona

Master of Science Degree in Mechanical Engineering

Program Characteristics

The Master of Science in Mechanical Engineering (MSME) program is a response to the increasing demand of mechanical engineers in the more advanced and rapidly developing fields such as Computer Aided Design using finite element methods, Computational Thermal and Fluid Sciences and the area of MEMS (MicroElectroMechanicalSystems). This program is more structured in terms of degree completion requirements than the existing generic Master of Science in Engineering (MSE) program (with Mechanical Engineering Emphasis). Specifically, in this program an individual student's study plan is closely monitored so that the plan conveys a designated specialized area. This situation allows students to acquire specialized knowledge and research skills for the advanced work in their chosen area of concentration. Also, this program requires a student to complete an engineering project or a thesis that would demonstrate their capability to perform an independent research work. Thus, this requirement instills a great practical value into a student's graduate work at Cal Poly Pomona.

Admission to the Program

An applicant for admission to the program or Master of Science in Mechanical Engineering must meet university criteria as specified in the Admission section of this catalog as well as the criteria outlined below. Applicants are advised that a reasonable proficiency in computer programming is necessary for successful completion. If the student is deficient in this area, he or she will be expected to remove the deficiency early in the program.

Successful applicants will be admitted to the program either unconditionally or with conditions imposed on them. To receive unconditional admission, an applicant must satisfy these criteria:

1. The applicant must hold a baccalaureate degree Mechanical Engineering from a program that has been accredited by the Accreditation Board for Engineering and Technology (ABET) and for which the accreditation was in effect at the time of award of the degree. The degree must have been granted within five years prior to the proposed beginning of the graduate program.
2. The applicant must have achieved a grade point average of at least 3.00 in all undergraduate upper division coursework in mathematics, science and engineering and, additionally, in all coursework attempted with graduate standing.
3. The applicant must receive positive recommendations from the Director of Engineering Graduate Studies and the Chair of the Department of Mechanical Engineering and approval by the Dean of the College of Engineering.

Conditional admission may be granted in cases in which the applicant's academic preparation for graduate study is such that criteria 1) and/or 2) above are not satisfied. In such cases, the applicant is required to submit recent test scores of the Graduate Record Examination, letters of recommendation, and other documents attesting to the applicant's aptitude for graduate studies. Applicants who do not satisfy criterion 1) may be required to take a limited number of preparatory courses with no degree credit. Criterion 3) above must be met. When an applicant is admitted conditionally, the conditions to be met and the time allowed for meeting them are stated in the letter of admission. If these conditions are not satisfied, the student may be disqualified from the program

Program Requirements

Admission to the program does not admit a student to candidacy for the degree. Advancement to Candidacy is granted a student upon the recommendation of the graduate faculty and implies a readiness to attempt the thesis or comprehensive examination. Students who are not candidates are not eligible to register for EGR 696 or 697.

In order to advance to candidacy for the Master of Science in Mechanical Engineering, the student must:

1. Satisfy **all** admissions conditions, if any;
2. complete at least **24** quarter units of graduate coursework with a grade point average of 3.00 or better;
3. pass the Graduation Writing Test; and
4. with the assigned advisor, develop and file a program of study and have it approved by the Mechanical Engineering Graduate Studies Committee, by the Graduate Studies Analyst, and by the Director of Engineering Graduate Studies.

A program of study must be submitted for approval before the end of the second quarter of attendance. At the time of filing of the program of study, the student must opt for publishing a thesis or conducting an independent study and passing a comprehensive examination as a culminating experience of his/her graduate education after completing the required coursework. The thesis effort is intended to involve independent research by the student with the goal of advancing knowledge in a specialized area. The thesis effort includes a defense of the effort by the student before a committee of faculty members. The independent study provides the student an opportunity to explore a practical and realistic industrial problem in his/her chosen field of specialization. The accompanying comprehensive examination is a test of the student's expertise in his/her areas of coursework concentration. Information regarding the thesis and the independent study with a comprehensive examination is available at the Graduate Studies Office.

In addition, each student is responsible for satisfying all university requirements specified elsewhere in the catalog.

Curricular Requirements

General requirements for advanced degrees are found in the Graduate Scholastic Requirements section of this catalog. No more than **13** units of acceptable graduate credit may be transferred from another graduate institution. No more than **13** units taken through Extension may be used on the program of study. No more than **13** units of acceptable graduate credit may be petitioned by an undergraduate student. A total of **13** transfer, extension, or units petitioned for graduate credit, or any combination of **13** units, may be included on the program of study.

The curriculum for the Master of Science in Mechanical Engineering requires a minimum of 45 units of coursework, of which at least **36** units must be in **500** and **600** level courses. Each program of study consists of at least **12** units of breadth courses, at least **12** units of technical emphasis courses, at least **12** units of elective courses, and either EGR 696, thesis (**4-9** units) or EGR 692, independent study with a comprehensive examination (4 units). The breadth courses must be chosen from the sequence EGR 509 through 515. These courses are intended to insure that the student acquires a fundamental knowledge in advanced mathematics. A minimum of **12** units of technical emphasis courses must be selected from an approved course list for the MSME program. No 400-level course may be included in this category of technical emphasis, and a maximum of 4 transfer units can be used to **satisfy** the **12** unit requirement. The rest of the emphasis courses and electives may be chosen from an extensive list of courses in engineering and related areas of mathematics and sciences. They should be chosen in collaboration with an advisor to insure consistency with graduate goals and to assure an integrated educational experience. A course in the program of study may be taken only after the student has satisfied the course prerequisites for enrolling in the course. It is the student's responsibility to satisfy all prerequisites for a course before enrolling in the course.

Engineering graduate students may be granted graduate credit only for courses numbered 400 and above. A grade point average of **3.0** (B) or better must be maintained in all upper-division and all graduate courses. Candidates must be enrolled in the university during the quarter of graduation

Proposed Master of Science in Mechanical Engineering (MSME) Curriculum

Breadth (12 Units Minimum)			
EGR 509 Adv. Differential Equations	4		
EGR 510 Engr. Prob. and Statistics	4		
EGR 511 Numerical Modeling	4		
EGR 512 Vector Analysis and Complex Variables	4		
EGR 513 Engineering Tensor Analysis	4		
EGR 514 Variational Methods in Engineering	4		
EGR 515 Matrix Methods in Engr.	4		
Technical Emphasis (12 Units Minimum)[These courses may be chosen as Technical Electives, but no double count]			
EGR 520 Elasticity	4		
EGR 521 Structural Dynamics	4		
EGR 532 Conduction Heat Transfer	4		
EGR 533 Mechanical Metallurgy	4		
EGR 535 Advanced Fluid Dynamics	4		
EGR 536 Advanced Classical Dynamics	4		
EGR 545 Advanced Engineering Thermodynamics	4		
EGR 556 Advanced Mechanics of Materials	4		
EGR 564 Radiation Heat Transfer	4		
EGR 584 Convective Heat Transfer	4		
Technical Electives			
EGR 516 Advanced Indeterminate Structures	4		
EGR 534 Fracture of Solids	4		
EGR 537 Polymer Fluid Dynamics	4		
EGR 540 Systems Theory	4		
EGR 550 Advanced Transport Phenomena	4		
EGR 553 Computer Simulation of Engineering Systems	4		
EGR 557 Analysis of Mechanical Design	4		
EGR 570 Nonlinear Dynamics	4		
EGR 576 Combustion Theory	4		
EGR 579 Vibration and Flutter	4		
EGR 580 Materials for Electronics	4		
EGR 590 Solar Energy Systems	4		
EGR 591 Direct Energy Conversion	4		
EGR 595 Boundary Layer Concepts	4		
EGR 596 Research Methods	2		
EGR 599 Special Topics for Graduate Students	2-4		
EGR 618 Stability of Structures	4		
EGR 632 Computational Fluid Dynamics	4		
EGR 640 Systems Theory	4		
EGR 642 Digital Control Systems	4		
EGR 643 Optimal Control Systems	4		
EGR 652 Nonlinear Control Systems	4		
EGR 691 Directed Study	1		
xxx 4xx Any 400-level engineering course			To be approved by ME Dept. Grad Committee
Thesis (4-9 Units) or Ind. Study with Comprehensive Exam (4 Units)			
EGR 692 Ind. Study with Comp. Exam	2		
EGR 696 Master's Degree Thesis	2		
EGR 699 Master's Degree Continuation	0		
Total Thesis / Comp. Exam			
Program Total (Min. 45)			

