

BS Mech Engr

Bachelor of Science in Mechanical Engineering

Under Review | Fall 2024

Proposal Information

<div>Status</div> <div>Active</div>	<div>Workflow Status</div> <div>In Progress</div> <div>Faculty Senate Approval, Faculty Senate</div> <div>Waiting for Approval Faculty Senate Approval</div> <div>Rick Holmes</div> <div>Nancy Middlebrook</div> <div>expand ▲</div>
	<div>Changes</div> <div><div>• Emphasis required</div><div>• Requirements</div><div>• participants</div><div>• Proposed Effective Term and Year</div><div>• Sponsoring faculty/staff member</div></div> <div>Show All ▼</div>

Proposal Information

Proposed	Proposed
Sponsoring faculty/staff member	Sponsoring faculty/staff email
Tariq Khraishi	khraishi@unm.edu
Existing	Existing
Sponsoring faculty/staff member	Sponsoring faculty/staff email
Yu-Lin Shen	shenyl@unm.edu
College	Department
School of Engineering	Mechanical Engineering
	Campus
	Main Campus

Effective Term and Year

Proposed
Proposed Effective Term and Year
Fall 2024

Existing
Proposed Effective Term and Year
Fall 2023

Justification

Proposed

Program Justification

Update of language for clarity regarding ME Electives- no curriculum changes made to that section. Additionally, we have updated the Technical Electives to include more courses that meet this requirement. This is not a new program.

Existing

Program Justification

Catalog edit- Updating program objectives, update program admission criteria, and correct typographical errors

Program Category and Level

Program Category

Program

Program Level

Undergraduate

Degree, Minor, or Certificate Name

Bachelor of Science in Mechanical
Engineering

Degree Type

Bachelor of Science

Degree/Certificate Level

Undergraduate

Proposed

Is this program also offered online?

No

Existing

Is this program also offered online?

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Associated Forms

Select any associated course forms that exist

Select any associated program forms that exist

Shared Credit and Dual Degree information

Interdepartmental Program

No

Catalog Information

Program Description

Introduction

In order to meet the challenge of today's rapidly changing technologies, mechanical engineering students are well-grounded in the basic principles of analysis, design, experimentation and computer utilization. A range of technical electives enables students to develop and specialize in their fields of interest. After graduation, mechanical engineers conceive, plan and design a wide variety of devices, machines and systems for energy conversion and utilization, automation and robotics, environmental control, material processing and handling, manufacturing and CAD/CAM, dynamical systems, fluid flow and other purposes. They are active in creative design, applied research and development and management.

Degree Offered

- Bachelor of Science in Mechanical Engineering (B.S.M.E.)
 - Concentration: Microsystems Engineering

Program Goals

The principal goal of the Bachelor of Science in Mechanical Engineering (B.S.M.E.) program is to provide students with the fundamentals of mechanical engineering so that they have a solid base for an engineering career. This includes building a sufficient knowledge base, exercising creative and analytical capability, and developing communication skills so that the graduates can continue to expand their learning as their fields of interest and the scope of mechanical engineering evolve. The program's core courses are intended to provide a broad base so that those who terminate their formal education with the B.S.M.E. degree can continue to grow intellectually. Likewise, the base provides insight into fields that students may choose to study at the graduate level.

This goal is met by a curriculum in which fundamental knowledge of earlier years is applied in later engineering courses. Specifically, the goals for the B.S.M.E. program at the University of New Mexico are closely linked to the criteria set forth by ABET. The following statement has been adopted by the Mechanical Engineering Faculty to represent the department's educational goals.

Outcomes

The Department of Mechanical Engineering at the University provides students with a quality mechanical engineering education. Each Mechanical Engineering student will demonstrate the following by the time of graduation:

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
- an ability to communicate effectively with a range of audiences;
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;

- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Objectives

The Mechanical Engineering graduates will:

- Meet or exceed the expectations of employers of mechanical engineers
- Continue their professional development by pursuing advanced study if qualified and desired
- Continue their professional development by pursuing leadership roles in their profession and/or communities

Cooperative Education and Internships

To complement their formal course work with practical experience, mechanical engineering students may elect a cooperative education program in which they are employed full time by an industrial or governmental agency for a part of the year. They are full-time students for the remaining part of the year. Students who need financial aid or who wish to gain engineering experience will find this program attractive. The Department of Mechanical Engineering does not offer technical elective credit for cooperative education.

Many Mechanical Engineering undergraduate students participate in paid or unpaid internships. While a co-op program is full-time, an internship is typically part-time, especially in the Fall or Spring semesters. In the summer, internships can be full-time. As in co-ops, internships are a great way to link practice to the curriculum, to network and build a resume for future employment, and to possibly generate more revenue for a student.

Advisement

Pre-major engineering students who have indicated Mechanical Engineering as their intended major are advised by the department's academic advisors each semester. Upon admission to the program (until graduation), each student is assigned to one of the faculty members for advisement. Students in the program are required to seek advisement from their designated faculty advisor each semester during the pre-registration period. The purpose of this session is to help the student with any problems he/she may have in his/her program of studies. Students will have an advisement hold and not be allowed to register until they have consulted with their advisor.

Policy on Passing Grades

Effective Fall 2016, students admitted or readmitted to the department's baccalaureate program may not apply a course toward the Bachelor of Science in Mechanical Engineering degree if the grade earned in the course is not a "C" or better, regardless of where that grade was earned.

Students are not permitted to enroll in an undergraduate Mechanical Engineering course without first earning a grade of "C" or better in all prerequisites for the course.

Department Honors

Students with a Mechanical Engineering major GPA average of at least 3.50 are encouraged to enroll in the Honors Program. Undergraduate students may graduate with General Honors or with Department Honors or both. Information is available from the department's academic advisors, the B.S. in Mechanical Engineering Program Handbook, the Department's

website, and from the University Honors Center.

Planning for Graduate Studies

The Mechanical Engineering Department offers programs of study towards the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. Consult the graduate program section of this Catalog and contact the departmental Graduate Advisor for more detailed information.

Senior students with a GPA of 3.0 or greater who are within 10 credit hours of completing the B.S.M.E. may obtain graduate credit (in graduate courses) for a maximum of nine (9) credit hours, provided they meet the requirements specified in the graduate program section of this Catalog.

The B.S.M.E. has proven to be excellent preparation for graduate engineering programs as well as for other professional programs such as law, business administration, medicine and dentistry.

Shared-Credit Undergraduate/Graduate Degree Program

The School of Engineering offers a Shared-Credit Degrees Program designed to allow students to complete B.S.M.E. and the Master of Science (M.S.) in Mechanical Engineering in five years (depending on the student's mathematics preparation upon entering UNM as a first-year undergraduate student). To accomplish this, some courses are counted towards both the Bachelor's and Master's degrees.

The Mechanical Engineering department allows up to 12 credit hours of undergraduate electives to be replaced by 500-level graduate courses that count towards both degrees.

Eligibility: Students may apply to the Shared-Credit Undergraduate/Graduate Degrees Program during their undergraduate junior year, after completing 75 credit hours applicable to the B.S.M.E. degree. At least 64 credit hours need to be mathematics, science, and engineering courses (ME, CE, ECE, CBME, NE, CS, MATH, STAT, CHEM, PHYS, BIOL) applicable to the B.S.M.E. degree. A cumulative GPA of at least 3.50 is normally required, counting only the completed courses applicable to B.S.M.E. at the time of application. For those students with a cumulative GPA between 3.0-3.49, please inquire with the department directly concerning eligibility for this program.

The application deadline is November 30 in the Fall semester and April 30 in the Spring semester. The departmental decision will be made by the beginning of the following semester. Admission to the graduate portion of this program is provisional and is not finalized until the student satisfactorily completes the requirements for the B.S.M.E. degree.

Students in the B.S.M.E. program may seek admission to the Master of Engineering in Manufacturing Engineering (M.E.M.E.) under the Shared-Credit Undergraduate/Graduate Degrees Program. Interested students should contact the Director of the Manufacturing Engineering program.

Admissions Requirements

Admission

Students must be admitted for study at the University of New Mexico and must have completed approximately one year of the freshman year subjects before applications are processed for admission to the Baccalaureate Program in Mechanical Engineering. Approval from the Mechanical Engineering Department is required. Applicants must consult the appropriate departmental advisor for evaluation of academic work before admission can be completed.

Students must complete the following courses with a minimum GPA of 2.75 in these courses, in order to be accepted into the Mechanical Engineering degree program.

MATH 1512 Calculus I (4);
MATH 1522 Calculus II (4);
ME 160L Mechanical Engineering Design I (3);
PHYS 1310 Calculus-Based Physics I (3);
PHYS 1310L Calculus-Based Physics I Laboratory (1);
CHEM 1215 General Chemistry I for STEM Majors (3);
CHEM 1215L General Chemistry I for STEM Majors Laboratory (1);
ENG 130L Introduction to Engineering Computing (3).

A cumulative GPA of at least 2.30 (in technical plus non-technical courses) is also required for admission to the program. All applicants must have completed ENGL 1110 or the equivalent before admission. As of Fall 2016, all courses listed in the B.S.M.E. curriculum program must have grades of "C" or better for satisfying both admission and graduation requirements. The same applies to required General Education curriculum courses.

Students transferring to the undergraduate program (from any institution, including UNM) must also meet the GPA and admission course requirements stated above.

Starting in Fall 2016 and for admission into the program, any course specifically listed in the B.S.M.E. curriculum cannot have been attempted more than three times. An attempt includes receiving any letter grade ("A" through "F"), W, CR, NC, I or AUDIT. For the purposes of this requirement, coursework taken at other institutions is treated the same as coursework at UNM.

Graduation Requirements

Professional Credential/Licensure Program Information

Proposed

License/Certification associated with program

No

Existing

License/Certification associated with program

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Degree Information

Degree Hours

121

Minimum Major Hours

Professional Accrediting Bodies

The Bachelor of Science in Mechanical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Degree Requirements

Requirements

- Complete all of the following
 - Complete the following:
 - ME160L - Mechanical Engineering Design I (3)
 - CHEM1215 - General Chemistry I for STEM Majors (3)
 - CHEM1215L - General Chemistry I for STEM Majors Laboratory (1)
 - ENGL1120 - Composition II (3)
 - MATH1512 - Calculus I (4)
 - ENG130L - Introduction to Engineering Computing (3)
 - MATH1522 - Calculus II (4)
 - PHYS1310 - Calculus-Based Physics I (3)
 - PHYS1310L - Calculus-Based Physics I Laboratory (1)
 - ME217 - Energy, Environment and Society (3)
 - ME260L - Mechanical Engineering Design II (3)
 - CE202 - Engineering Statics (3)
 - MATH2531 - Calculus III (4)
 - PHYS1320 - Calculus-Based Physics II (3)
 - ME306 - Dynamics (3)
 - ME318L - Mechanical Engineering Laboratory (4)
 - ECE203 - Circuit Analysis I (3)
 - MATH316 - Applied Ordinary Differential Equations (3)
 - ME301 - Thermodynamics (3)
 - ME317L - Fluid Mechanics (4)
 - ME357 - Introduction to Mechanical Vibrations (3)
 - CE302 - Mechanics of Materials (3)
 - ME360L - Mechanical Engineering Design III (3)
 - ME370L - Engineering Materials Science (4)
 - ME380 - Analysis and Design of Mechanical Control Systems (3)
 - ME320L - Heat Transfer (4)
 - ME459 - Mechanical Engineering Design IV (3)
 - ME460 - Mechanical Engineering Design V (4)
 - Earned at least ~~12~~ **15** credits from **ME 300 - 499**
 - ~~Complete 1 of the following~~
 - ~~Earn at least 3 credits from the following types of courses:~~
~~Mechanical Engineering Elective~~
 - ~~Complete the following:~~
 - ~~ME150—Introduction to Modern Mechanical Engineering- (3)~~
 - Earn at least 3 credits from the following types of courses:
Technical Electives may be selected from ~~Mechanical~~ **1.) EngineeringME Electives150 or** **OR 2)** from approved upper-division (300-level and above) courses from Mathematics/Statistics, Chemistry, Physics, Computer Science, and Engineering **courses OR 3) a combination of the following courses PHYS 2310 (Physics III, 3 credit hours), PHYS 2310L (Physics III Lab, 1 credit hour), ECE 206L (Instrumentation, 2 credit hours), PHYS 1320L (Physics II Lab, 1 credit hour)** . Technical Electives may not be taken with the Credit/No Credit "CR/NC" grading option.
 - Complete at least 1 of the following:
 - MATH311 - Vector Analysis (3)
 - MATH312 - Partial Differential Equations for Engineering (3)
 - MATH313 - Complex Variables (3)
 - MATH314 - Linear Algebra with Applications (3)

- MATH321 - Linear Algebra (3)
- STAT345 - Elements of Mathematical Statistics and Probability Theory (3)

General Education Requirement

- Earn at least 12 credits from the following types of courses:
Additional courses to fulfill UNM's General Education Program requirements. In some instances, courses included in an undergraduate degree program's requirement may also fulfill a General Education requirement. Please review the General Education Program in this Catalog for General Education information.

FSAE Option

- Formula Society of Automotive Engineers (FSAE) is a program in which the students design, build, and test a racing car. Students who pursue the Formula SAE option substitute the following from the original curriculum plan: ME 406L for the ME Elective in the second semester of their junior year, ME407 for one of the ME Electives in the first semester of their senior year, and ME 408 for ME 460 in the second semester of their senior year. All three FSAE courses (ME 406L, ME 407, and ME 408) must be completed for this option.

Grand Total Credits: 121

Concentrations

Program Concentrations

Code

Title

CON Microsys Engr BSME

Concentration in Microsystems Engineering

Concentration Required

No

Emphases

Proposed

Emphasis required

No

Emphasis Hours

Existing

Emphasis required

N/A

Emphasis Rules

No Rules

Sample Degree Plan

Sample Degree Plan Upload

Program Learning Outcomes

Learning Outcomes

Outcomes

The Department of Mechanical Engineering at the University provides students with a quality mechanical engineering education. Each Mechanical Engineering student will demonstrate the following by the time of graduation:

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
- an ability to communicate effectively with a range of audiences;
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.