

# ENGINEERING PARTNERSHIP PROGRAM

## MECHANICAL ENGINEERING

2022 – 2023

[coloradomesa.edu/engineering](http://coloradomesa.edu/engineering)

The Bachelor of Science Degree in Mechanical Engineering obtained through the Engineering Partnership Program is conferred by the University of Colorado Boulder. Lower-division coursework is completed through Colorado Mesa University before applying for admission to the University of Colorado Boulder. The entire program is completed on the campus of Colorado Mesa University. A student may apply for admission to the University of Colorado Boulder through the Engineering Partnership Program when they have satisfied all criteria of one of the following scenarios:

### Scenario 1

- Complete a college-level, two-course sequence in calculus with a grade of B– or higher
- Complete one college-level physical science course (calculus-based physics and/or college-level chemistry) with a grade of B– or higher
- Maintain a college-level cumulative GPA of 3.0 or higher

### Scenario 2

- Complete the first- and second-year course sequence listed on the current Program Sheet or Degree Plan for the Engineering Partnership Program
- Maintain a college-level cumulative GPA of 3.0 or higher

### Student Outcomes. Graduates of this program will have...

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. 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
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. 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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### Program Objectives

Mechanical engineering is a broad engineering discipline that incorporates skills and expertise in the areas of design, manufacturing, mechanics and thermal sciences that are essential to most sectors of industry.

Within the first three years after graduation, our alumni will have built on the educational foundation gained through our program by establishing themselves in professional careers and/or pursuing a graduate degree. In addition, within these three years, our alumni should have begun to generate new knowledge and/or exercise leadership in their positions.

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### The Bachelor of Science Degree in Mechanical Engineering requires:

- [Transfer](#) to the University of Colorado Boulder of all coursework listed on the plan of study
- At least 45 credits earned from the University of Colorado Boulder ([residency requirement](#))
- A minimum of 128 credits earned to graduate
- A cumulative and major [GPA of at least 2.000](#) (from entirely CU Boulder coursework as a student's GPA does not transfer from non-CU institutions)
- Satisfactory completion of all [Minimum Academic Preparation Standards](#) (MAPS) requirements
- Taking the [FE Exam](#)

### AP & IB Credit

Engineering Partnership students must achieve [scores required of CU Boulder](#) for AP and IB credit. An AP score of 5 is required on Physics C: Mechanics to receive credit for PHYS 131 & 131L. This score is higher than the score required for credit at CMU.

English Language and Composition Scores of 4 or 5, despite transferring to CMU as ENGL 111 and 112, do not count toward CEAS humanities and social science requirements (as it is not under the arts and humanities distribution). However, a score of 3, 4, or 5 on the English Literature and Composition exam will count towards CEAS humanities and social science requirement (as it is under the arts and humanities distribution).

### MAPS (Minimum Academic Preparation Standards)

MAPS content areas are typically fulfilled by high school coursework, but sometimes students must address "MAPS deficiencies" with college coursework. Typically, one unit equals one year of high school coursework or one semester of college coursework. For engineering students, those who experience a MAPS deficiency most often need to take additional foreign language and/or social science courses. The good news is that these courses can do "double duty" by fulfilling MAPS as well as CEAS humanities and social science requirements. The MAPS requirement for **foreign language is 2 units in a single foreign language.**

What this requirement means is that a student must demonstrate written and oral language proficiency through the *second-level* of a single foreign language, where *second-level* means a second full year of high school or a second semester college-level course that will transfer to CU Boulder.

The MAPS requirement for **social science is 3 units** (at least one of which must be US or world history).

MAPS policies can be found on the [CEAS Degree Requirement website](#).

### Academic Calendar

The Engineering Partnership Program follows the calendar of Colorado Mesa University for semester start and end dates as well as breaks. Add, drop, and withdrawal dates may differ and can be found on the [CU Boulder Registrar's Website](#).

### Petitions

Students seeking an exception to a [policy or practice](#) (including transfer coursework policies) should first talk to the Partnership Program Director and then [submit a petition](#).

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### COURSES

<b>Mathematics &amp; Basic Sciences:</b>	<b>34 semester hours</b>	<b>Basic Engineering:</b>	<b>19 semester hours</b>		
MATH 135	Engineering Calculus I	4	ENGR 101	Introduction to Engineering	1
MATH 136	Engineering Calculus II	4	ENGR 125	CAD and Fabrication	3
MATH 253	Calculus III	4	ENGR 140	1st-Year Engineering Projects	3
MATH 236	Differential Equations & Linear Algebra	4	ENGR 224	Materials Science	2
PHYS 131	Fundamental Mechanics	4	ENGR 224L	Materials Science Lab	1
PHYS 131L	Fundamental Mechanics Lab	1	ENGR 261	Statics & Structures	3
PHYS 132	Electromagnetism & Optics	4	ENGR 263	Mechanics of Solids	3
PHYS 132L	Electromagnetism & Optics Lab	1	ENGR 343	Dynamics	3
CHEM 151	Engineering Chemistry	4			
CHEM 151L	Engineering Chemistry Lab	1	<b>Core Engineering:</b>	<b>39 semester hours</b>	
	Basic Science Elective:	3	MCEN 2000	Mechanical Engineering as a Profession	1
	BIOL 105 & BIOL 105L Attributes of Living Systems and Lab (4-cr)		MCEN 3012	Thermodynamics	3
	BIOL 209 Human Anatomy and Physiology (3-cr)		ECEN 3010	Circuits & Electronics	3
	CHEM 132 General Chemistry II (4-cr)		MCEN 3021	Fluid Mechanics	3
	CHEM 311 Organic Chemistry I (4-cr)		MCEN 3022	Heat Transfer	3
	CSCI 112 CS2: Data Structures (4-cr) or CSCI 250 CS3: Introduction to Algorithms (3-cr)		MCEN 3025	Component Design	3
	PHYS 230 Intern Dynamics (3-cr)		MCEN 3030	Computational Methods	3
	PHYS 231 Modern Physics (3-cr)		MCEN 3032	Thermodynamics 2	3
	EECE 226 & 226L Circuits as Systems and Lab (4-cr)		MCEN 3047	Data Analysis & Experimental Methods	4
	GEOL 111 & 111L Attributes of Living Systems and Lab (4-cr)		MCEN 4026	Manufacturing Processes & Systems	3
	GEOL 105 Geology of Colorado (3-cr)		MCEN 4043	System Dynamics	3
	MATH 240 Introduction to Advanced Mathematics (4-cr)		MCEN 4045	ME Design Project 1	3
	STAT 200 Probability and Statistics (3-cr) or STAT 311 Statistical Methods (3-cr)		MCEN 4085	ME Design Project 2	3
			MCEN 4086	Writing for Design Projects	1
<b>Computer Science:</b>	<b>4 semester hours</b>	<b>Technical Electives:</b>	<b>12 semester hours</b>		
CSCI 130	Introduction to Engineering Computing	4	Gen Tech	Upper-Division Engineering, Computer Science, Math, and Science	6
<b>Writing:</b>	<b>3 semester hours</b>	MCEN ???? Mechanical Engineering Electives (one EMEN course may count as an MCEN technical elective)	6		
ENGL 325	Writing for Engineers	3			
<b>Machining:</b>	<b>1 semester hour</b>	<b>Humanities &amp; Social Science Elect:</b>	<b>15 semester hours</b>		
MAMT 102	Machining Fundamentals	1	Humanities & Social Sciences	9	
			Upper-Division Humanities & Social Sciences	6	
			<b>Free Elective:</b>	<b>1 semester hour</b>	
			<b>TOTAL CREDITS</b>	<b>128</b>	

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### Acceptable Course Substitutions

MAMT 115 Introduction to Machine Shop (3-credits) for MAMT 102 Machining Fundamentals (1-credit)

MATH 151 Calculus I (5-credits) for MATH 135 Engineering Calculus I (4-credits)

MATH 152 Calculus II (5-credits) for MATH 136 Engineering Calculus II (4-credits)

CHEM 131 General Chemistry I (4-credits) for CHEM 151 Engineering Chemistry (4-credits)

CHEM 131L General Chemistry Laboratory I (1-credit) for CHEM 151L Engineering Chemistry Laboratory (1-credit)

### Humanities & Social Science Electives

See: <https://www.coloradomesa.edu/engineering/documents/hssacceptableclasses20220328.pdf>

### General Technical Electives

CMU 300- and 400-level courses in the following subjects are considered General Technical Electives: CHEM, CSCI, ENGR, MATH, and PHYS. CU Boulder 3000- and 4000-level courses in the following subjects are considered General Technical Electives: CVEN, ECEN, EMEN, and MCEN.

### MCEN Technical Electives

4000-level MCEN courses not otherwise required for the major are considered MCEN Technical Electives. One EMEN 3000- or 4000-level course can apply towards an MCEN Technical Elective.

### Free Electives

College-level coursework accepted by CU Boulder not used otherwise to satisfy BSME degree requirements. Mechanical engineering does allow courses counting as free electives to be taken on a pass/fail basis ([however the college limits use to 6 per semester and 16 cumulative](#) and a student must first [submit a petition](#) prior to choosing this option). Use [www.transferology.com](http://www.transferology.com) to verify that courses will transfer to CU Boulder as appropriate equivalencies.

### Grade Requirements

The minimum passing grade for prerequisite and co-requisite classes is a C. This includes courses completed outside the program. The minimum passing grade for standalone classes is a D-. [College of Engineering and Applied Science Academic Expectations and Policies](#) state that if a minimum required grade in a prerequisite course is not achieved, a student is required to repeat a course until the minimum acceptable grade has been earned (maximum of 3 attempts total). If a student takes the advanced (post-requisite) course, this does not remove the obligation to meet the prerequisite course minimum grade requirement, even if the grade earned in the advanced course is acceptable.

### Academic Standing

To remain in good academic standing with the College of Engineering and Applied Science, a student must maintain satisfactory academic performance as measured by GPA and progress toward completion of a Bachelor of Science degree. Students must maintain both a cumulative and major CU Boulder GPA of at least 2.000 based entirely on CU Boulder coursework. Courses taken at CMU do not count toward CU Boulder GPA. Failure to meet these requirements results in a student being placed on Academic Alert, Academic Recovery, and/or Academic Suspension. Students in this situation should consult the Partnership Program Director and review the Academic Standing Policies:

<https://www.colorado.edu/engineering-advising/academic-standing>

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### Fundamentals of Engineering (FE) Exam

Taking the [Fundamentals of Engineering \(FE\) Examination](#), fall or spring of the student's senior year (including both the general portion in the morning and the Mechanical Engineering Subject-Specific Section in the afternoon) is required for this catalog year. Graduation is not contingent upon passing. However, it is beneficial to pass because this exam is the first step toward a Professional Engineer's certification.

### Coursework Not Accepted for Transfer Credit

All courses not taken through the University of Colorado will undergo a transfer evaluation and credit will be transferred to CU Boulder as applicable. The following coursework will not be accepted for transfer credit and will not count toward a degree at CU Boulder, as described in the [Campus Transfer Credit Policy](#):

- any courses in which the grade earned is below a C- (1.70)
- courses identified by CU Boulder as remedial, such as remedial English, mathematics, science and developmental reading
- vocational-technical courses that are offered at two-year and proprietary institutions (exceptions may be granted only by the CU Boulder dean responsible for the student's curriculum)
- courses in religion that constitute specialized religious training or that are doctrinal in nature
- credits earned for work experience or through a cooperative education program
- outdoor leadership education coursework
- credits earned in physical education activity courses
- courses or programs identified as college orientation

Credit hours required for graduation that were earned more than ten years prior to transferring into an undergraduate degree program at CU Boulder may not apply to the completion of a student's graduation requirements.

Students are responsible for making up any difference in credit hours between the transfer credit received and the CU Boulder course. This can happen when students transfer in coursework from an institution on a quarter-system, for example. Furthermore, students must have their Academic Advisor approve how the credit shortfall is made up (based on ABET and other program requirements). Students must have a minimum of 128 unique non-duplicative, degree applicable credit hours, along with meeting the specified course and other requirements for a specific bachelor's degree program per [CEAS Transfer Credit Policy](#).