

University of Wisconsin – Milwaukee
College of Engineering and Applied Science
MECHANICAL ENGINEERING CURRICULUM

The minimum number of credits required to complete the Bachelor of Science in Engineering with a major in Mechanical Engineering is **128** credits. Students who need background preparation courses may need additional credits. See information below regarding placement examinations.

Engineering Core Courses (35 credits)

	Credits	Prerequisite
EAS 100/MechEng 150 Freshman Orientation or How Things Work (recommended only)	1-3	none
EAS 200 Professional Seminar	1	none
CompSci 151/201 Intro. to Scientific Programming or Intro.Computer Programming	3	Math 105 (P)
Civ Eng 201 Statics	3	Math 232
Civ Eng 202 Dynamics	3	Civ Eng 201, Math 233 (C)
Civ Eng 303 Strength of Materials	4	Civ Eng 201, Math 233 (C)
MatlEng 201 Engineering Materials	4	Chem 105 or 102 or 117
ElecEng 301 Electrical Circuits I	3	Physics 210 (C), ElecEng 234(C)
MechEng 110 Engineering Fundamentals I	4	Math 231 (C)
MechEng 111 Engineering Fundamentals II	4	Math 232 (C), MechEng 110 (P)
MechEng 301 Basic Engineering Thermodynamics	3	Math 233, Physics 209
MechEng 320 Introduction to Fluid Mechanics	3	Jr St, MechEng 301 (C), ElecEng 234, Civ Eng 202

Mechanical Engineering Major (33 credits)

MechEng 321 Basic Heat Transfer	4	Jr St, MechEng 301
MechEng 323 Fluid Mechanics Laboratory	1	Jr St, MechEng 320
Matl Eng 330 Materials and Processes in Manufacturing	3	Matl Eng 201
MechEng 360 Mechanical Design I	3	Ind Eng 101 or MechEng 111, CompSci 151/153/201, Civ Eng 202
MechEng 366 Design of Machine Elements	4	IndEng 210 or MechEng 111, Civ Eng 303, MatlEng 201
MechEng 370 Computer Aided Engineering Laboratory	2	MechEng 111 or MechEng 101 & Ind Eng 210, Comp151/153/201 CivEng 202,303, Elec234
MechEng 438 Mechanical Engineering Experimentation	3	Sr St, ElecEng 301, MechEng 321, 360, 366, IE 467
Ind Eng 467 Intro. Statistics for Physical Science and Eng. Students	3	Jr St, Math 233
Mech Eng 474 Introduction to Control Systems	4	Sr St, Elec Eng 234, 301, Civ Eng 202
Mech Eng 479 Control and Design of Mechatronic Systems	3	Sr St, Mech Eng 474 or ElecEng 402
Mech Eng 496 Senior Design Project	3	MechEng 321, 360, 366, 370

***Mathematics (14 - 16 credits)**

One of the following Calculus sequences must be completed:		(16 credits typical: Math 231,232,233, ElecEng 234)
Math 231-232-233	12	Math placement score, or previous course with at least "C" grade.
Or Math 221- 222 (Honors)	10	
And ElecEng 234 Analytical Methods in Engineering	4	Math 233

***Chemistry (5-10 credits)**

One of the following courses must be completed:		
Chem 105 (Suggested) or Chem 102-104	5	Chem 100 with "C" grade or Chemistry placement test

Physics (10 credits)

Physics 209 - 214, and Physics 210 - 215	10	Math 232 (C)
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General Education Requirements

Distribution Requirements (15 credits)

Art	3	none
Humanities	6	none
Social Science	6	none

One of the arts, humanities, or social science courses selected must also meet the UWM cultural diversity requirement.

(Commun 103 Public Speaking or Commun 105 Business and Professional Communication are recommended as part of the distribution requirements)

Competency Requirements

***English Composition (0-6 credits)**

The English Composition requirement is satisfied by:

1. Earning a satisfactory score on the English placement test, or
2. Earning a grade of C or higher in English 102
3. Transferring a grade of C or better in a course equivalent to English 102 or higher level expository writing course

Foreign Language (0-8 credits) (for new freshman starting fall 1999)

The foreign language requirement can be completed with one of these options:

1. Two years of a single foreign language in high school
2. Two semesters of a single foreign language in college
3. Demonstrate ability by examination

***Placement Examinations**

Once admitted to UWM, most engineering students are required to take placement examinations in mathematics, English and chemistry. Students with previous college level credits in these areas may not be required to take placement exams. The placement exams are administered by the UWM Testing Center, Melencamp Hall, room B28, (414) 229-4689. The results of these tests help students determine the appropriate course in which to register. Background prerequisite courses may be required in addition to the courses listed above. Possible Math placements for engineering students are Math 090-095-105-116-117-231-221. Possible English placements are English 090-095-101-102. Possible Chemistry placements are Chemistry 100,102 or 105.

Technical Electives--Mechanical Engineering Major (14 credits)

Mechanical engineering students are required to select a minimum of 14 credits of technical electives, from Restricted and Free Electives, as indicated below.

Students interested in **Thermal Sciences** are recommended to take Mech Eng 402 and two course selected from MechEng 415, 423, 432, 434, 435, 451, or 463.

Students interested in **Mechanical Systems** are recommended to take Mech Eng 463 and two courses from MechEng 461, 475, 476 or 478.

Students interested in **General Mechanical Engineering** are recommended to take at least two courses from Mech Eng 402, 463 and 475.

Students interested in **dual Mechanical Engineering and Physics major** must take Mech Eng 475, Math 321, Physics 309, 408, 421, 441 and 498, and meet the Restricted Technical Elective requirements.

Restricted Technical Electives: Select at least 6 credits from this list.

EAS 001	Co-op Work Period	3 ¹	none
Mech Eng 402	Thermal-Fluid Engineering	3	MechEng 320, MechEng 321
Mech Eng 463	Introduction to Finite Elements	3	ElecEng 234, Civ Eng 303, MechEng 320 (C), 321 (C)
Mech Eng 475	Vibrations in Mechanical Design	3	Sr St, Civ Eng 202, ElecEng 234

¹Students who earn **3 or more** credits of Co-op may use 3 of those credits as approved technical electives.

Free Technical Electives: Select no more than 9 credits from this list.²

		<u>Credits</u>	<u>Prerequisite</u>
Chem 104	General Chemistry and Qualitative Analysis	5 ³	C or better in Chem 102 or 117
Civ Eng 401	Intermediate Strength of Materials	3	Jr St, Civ Eng 303
Civ Eng 502	Experimental Stress Analysis	3	Jr St, Civ Eng 303
Ind Eng 360	Engineering Economic Analysis	3	Jr St
Ind Eng 455	Basic Optimization Techniques	3	Jr St, ElecEng 234
MatlEng 410	Mechanical Behavior of Materials	3	Jr St, MatlEng 201
Math 413	Introduction to Numerical Analysis	3	Jr St, Math 233 (C), 234 (C)
Math 601	Advanced Engineering Mathematics	3	Jr St, ElecEng 234 or Math 234
MechEng 415	Modern Thermo Manufacturing Processes	3	Jr St, Mech Eng 321, Civ Eng 303
MechEng 423	Applied Fluid Mechanics	3	Jr St, MechEng 320
MechEng 432	Internal Combustion Engines	3	Jr St, MechEng 301
MechEng 434	Air Conditioning System Design	3	Jr St, MechEng 321, Ind Eng 210
MechEng 435	Power Plant Theory and Design	3	Jr St, MechEng 301
MechEng 451	Applied Optics in Engineering	3	Sr St, Physics 210 or Cons Instr
MechEng 455	Processing of Plastics	3	MechEng 320,321
MechEng 461	Intermediate Kinematics and Dynamics	3	Jr St, MechEng 360
MechEng 462	Intermediate Design of Machinery	3	Jr St, MechEng 365
MechEng 465/ MatlEng 465	Friction and Wear	3	Jr St, MatlEng 201
MechEng 469	Introduction to Biomechanical Engineering	3	Sr St, CivEng 202
MechEng 476	Introduction to Robotics	3	ElecEng 234, MechEng 360
MechEng 477	Introduction to Automobile Dynamics	3	Jr St, ElecEng 234, MechEng 360
MechEng 478	Intermediate Control Systems	3	Sr St, MechEng 474
MechEng 490	Topics in Mechanical Engineering	1-3	Jr St, Cons Instr
MechEng 699	Independent Study	1-3 ⁴	

²Dual Mechanical Engineering and Physics Major students should see the table below.

³Students who take Chem 102 (or 117) may use up to three credits of Chem 104 (or 118) as Free Technical Electives.

⁴Students who earn **3 or more** credits of MechEng 699 may use only 3 of those credits as approved Free Technical Electives.

Physics Dual Major Requirements: Students interested in a dual major must take the following courses. A maximum of 9 credits from the following list may be used to offset the Free Technical Elective requirements.

Math 321	Vector Analysis	3	Jr St, Math 233, Math 234 or Elec Eng 234
Physics 309	Modern Physics	3	Physics 210 or 220, Math 233 (C)
Physics 408	Experiments in Linear Electronics	3	Jr St, PHY 210 or 220
Physics 421	Electricity and Magnetism	4	Physics 210 or 220, Math 321
Physics 441	Quantum Physics I	4	Physics 309, Math 321 (C)
Physics 498	Undergraduate Physics Seminar	1	Sr St

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