MECHANICAL ENGINEERING MAJOR

Major Requirements

Bachelor of Science in Mechanical Engineering

134 credits

Natural Science and Math Requirements

Code	Title	Credits
CHEM 1171 & 1171L	General Chemistry I and General Chemistry I Lab	4
MATH 1141	Calculus I for Chemistry, Engineering, and Physics Majors [1]	4
MATH 1142	Calculus II for Chemistry, Engineering, and Physics Majors [1]	4
MATH 2243	Calculus III for Chemistry, Engineering, and Physics Majors	4
MATH 2251	Ordinary Differential Equations	3
MATH 3332	Partial Differential Equations	3
PHYS 1171 & 1171L	General Physics I and General Physics I Lab [1]	4
PHYS 1172 & 1172L	General Physics II and General Physics II Lab [1]	4
Total Credits		**30**

[1] Fulfills *Magis* Core requirement

Major Requirements

For a major in mechanical engineering, students complete the following:

Code	Title	Credits
Engineering Foundation		
ELEG 2213 & 2213L	Introduction to Electric Circuits and Electric Circuits Lab	4
ENGR 1031	Fundamentals of Engineering	3
ENGR 2130	Engineering Graphics I	3
ENGR 2145	Mathematical Analysis	3
ENGR 4961	Senior Design Project I	3
ENGR 4962	Senior Design Project II	3
Mechanical Engineering Depth		
MEEG 2201	Engineering Statics	3
MEEG 2203	Kinematics and Dynamics	3
MEEG 2206L	Mechanics Lab	1
MEEG 2207	Materials Science	3
MEEG 2307L	Dynamics Systems Lab	1
MEEG 3241	Principles of Thermodynamics	3
MEEG 3308	Strength of Materials	3
MEEG 3311	Machine Design	3
MEEG 3318	Finite Element Analysis	3
MEEG 3342	Applications of Thermodynamics	3
MEEG 3347	Fluid Mechanics	3
MEEG 3348L	Thermal and Fluids Lab	1
MEEG 4325	Engineering Systems Dynamics	3
MEEG 4349	Heat Transfer	3
MEEG 4350L	Energy Transfer Lab	1
Select five electives in Mechanical Engineering		15
Total Credits		**71**

Mechanical Engineering Electives

Possible electives may include:

Code	Title	Credits
Thermal Systems		
MEEG 4346	Energy Conversion	3
MEEG 4353	Computational Fluid Dynamics	3
MEEG 4354	Heat and Mass Transfer	3
MEEG 4356	Renewable Wind Energy	3
MEEG 4358	Heating, Ventilation, and Air Conditioning Systems Design	3
MEEG 4362	Gas Turbine Aerodynamics	3
MEEG 4364	Combustion	3
Mechanical Systems		
ENGR 3260	Robots	3
ENGR 4301	Feedback Control Systems	3
ENGR 4303	Industrial Automation	3
ENGR 4305	Design of Mechatronics Systems	3
ENGR 4308	Autonomous Mobile Robots	3
MEEG 4310L	Product Manufacturing Lab	1
MEEG 4312	Advanced Product Design and Manufacturing	3
MEEG 4319	Applications of Finite Element Analysis	3
MEEG 4321	Theory and Applications of Robot Kinematics	3
MEEG 4322	Advanced Dynamics	3
MEEG 4324	Micro and Nano Manufacturing	3
MEEG 4327	Fracture Mechanics	3
MEEG 4330	Mechanics of Composite Materials	3
MEEG 4372	Applications of Theory of Elasticity	3
MEEG 4376	Stability of Structures	3
MEEG 4990	Independent Study	1-3

Note: In addition to the undergraduate courses listed, juniors and seniors may take appropriate graduate-level courses as electives with the permission of the department chair and the instructor.

Concentrations

Students in the Mechanical Engineering program may earn an **Aerospace Engineering Concentration** or **Automation, Robotics and Manufacturing Concentration** by fulfilling the major elective requirement with the 5 courses identified below.

Aerospace Engineering Concentration

Code	Title	Credits
MEEG 3347	Fluid Mechanics (required course)	3
Select four courses from the following: [1]		12

MEEG 4362	Gas Turbine Aerodynamics	
MEEG 4353	Computational Fluid Dynamics	
MEEG 4364	Combustion	
MEEG 4330	Mechanics of Composite Materials	
MEEG 4319	Applications of Finite Element Analysis	
MEEG 4327	Fracture Mechanics	
MEEG 4372	Applications of Theory of Elasticity	
MEEG 4376	Stability of Structures	
Total Credits		**15**

[1] Students in the 5-year BS/MS program may select the equivalent 5000 level major elective (if available) in support of their program requirement.

Automation, Robotics and Manufacturing (ARM) Concentration

Code	Title	Credits
MEEG 4325	Engineering Systems Dynamics (required course)	3
Select four courses from the following: [1]		12-13
ENGR 4303	Industrial Automation	
ENGR 4308	Autonomous Mobile Robots	
ENGR 3260	Robots	
ENGR 4305	Design of Mechatronics Systems	
MEEG 4321	Theory and Applications of Robot Kinematics	
MEEG 4312 & MEEG 4310L	Advanced Product Design and Manufacturing and Product Manufacturing Lab	
MEEG 4322	Advanced Dynamics	
MEEG 4319	Applications of Finite Element Analysis	
ENGR 4301	Feedback Control Systems	
MEEG 4324	Micro and Nano Manufacturing	
Total Credits		**15-16**

[1] Students in the 5-year BS/MS program may select the equivalent 5000 level major elective (if available) in support of their program requirement.

Magis Core Requirements

Magis Core Relationship to the Mechanical Engineering Major

In addition to the engineering-specific major requirements, students are required to fulfill the University's *Magis* Core requirements. The following table relates the *Magis* Core requirements to the Mechanical Engineering program.

Tier I: Orientation

Code	Title	Credits
English		
ENGL 1001	Introduction to Rhetoric and Composition	3
History		
Select one HIST 1000-level course		3
or CLST 1115 or CLST 1116		
Mathematics		
MATH 1141	Calculus I for Chemistry, Engineering, and Physics Majors	4
Modern or Classical Language		
Select one language course based on placement [1]		3
Philosophy		
PHIL 1101	Introduction to Philosophy	3
Religious Studies		
Select one RLST 1000-level course		3
Modern/Classical Language or Mathematics		
MATH 1142	Calculus II for Chemistry, Engineering, and Physics Majors	4
Total Credits		**23**

[1] If starting a new language, a placement exam is not necessary.

Tier II: Exploration

Code	Title	Credits
Behavioral and Social Sciences		
Select two courses from the following fields:		6
Communication		
Economics		
Politics		
Psychology (except PSYC 1610)		
Sociology and Anthropology (except ANTH 1200 and ANTH 1210)		
History, Philosophy, Religious Studies		
Select two 2000- or 3000-level courses from two different disciplines		6
Literature		
Select one course from the following fields:		3
Classics		
English		
Modern Languages and Literatures		
Natural Sciences		
PHYS 1171 & 1171L	General Physics I and General Physics I Lab	4
PHYS 1172 & 1172L	General Physics II and General Physics II Lab	4
Visual and Performing Arts		
Select one 1000-level course from the following fields in Visual and Performing Arts:		3
Art History and Visual Culture		
Film, Television, and Media Arts		
Music		
Studio Art		
Theatre		
Total Credits		**26**

Plan of Study

A typical, full-time, four-year plan of study appears below. Some variation may be possible. Students should always discuss their individual plan of study with their advisor prior to registering for courses.

Course	Title	Credits
First Year		
Fall		
ENGR 1031	Fundamentals of Engineering	3
MATH 1141	Calculus I for Chemistry, Engineering, and Physics Majors	4
PHYS 1171	General Physics I	3
PHYS 1171L	General Physics I Lab	1
History Orientation Level [1]		3
Modern/Classical Language Orientation Level [5]		3
	Credits	**17**
Spring		
ENGL 1001	Introduction to Rhetoric and Composition	3
ENGR 2130	Engineering Graphics I	3
MATH 1142	Calculus II for Chemistry, Engineering, and Physics Majors	4
PHYS 1172	General Physics II	3
PHYS 1172L	General Physics II Lab	1
Religious Studies Orientation Level [1]		3
	Credits	**17**
Second Year		
Fall		
CHEM 1171	General Chemistry I	3
CHEM 1171L	General Chemistry I Lab	1
MATH 2243	Calculus III for Chemistry, Engineering, and Physics Majors	4
MEEG 2201	Engineering Statics	3
MEEG 2206L	Mechanics Lab	1
MEEG 2207	Materials Science	3
Visual and Performing Arts Exploration Tier [6]		3
	Credits	**18**
Spring		
ENGR 2145	Mathematical Analysis	3
ENGR 2145P	Mathematical Analysis PLG	0
MATH 2251	Ordinary Differential Equations	3
MEEG 2203	Kinematics and Dynamics	3
MEEG 2307L	Dynamics Systems Lab	1
MEEG 3308	Strength of Materials	3
PHIL 1101	Introduction to Philosophy	3
	Credits	**16**
Third Year		
Fall		
ELEG 2213	Introduction to Electric Circuits	3
ELEG 2213L	Electric Circuits Lab	1
MEEG 3241	Principles of Thermodynamics	3
MEEG 3311	Machine Design	3
Behavioral and Social Sciences Exploration Tier [3]		3
MATH 3332	Partial Differential Equations	3
	Credits	**16**
Spring		
History or Philosophy or Religious Studies Exploration Tier [2]		3
MEEG 3318	Finite Element Analysis	3
MEEG 3342	Applications of Thermodynamics	3
MEEG 3347	Fluid Mechanics	3
MEEG 3348L	Thermal and Fluids Lab	1
Behavioral and Social Sciences Exploration Tier [3]		3
	Credits	**16**
Fourth Year		
Fall		
ENGR 4961	Senior Design Project I	3
MEEG 4325	Engineering Systems Dynamics	3
MEEG 4349	Heat Transfer	3
MEEG 4350L	Energy Transfer Lab	1
Major Elective [4]		3
Major Elective [4]		3
	Credits	**16**
Spring		
ENGR 4962	Senior Design Project II	3
Major Elective [4]		3
Major Elective [4]		3
Major Elective [4]		3
History or Philosophy or Religious Studies Exploration Tier [2]		3
Literature Exploration Tier [7]		3
	Credits	**18**
	Total Credits	**134**

1. Choose an appropriate History or Religious Studies course at the 1000 level.
2. Choose any appropriate Religious Studies, History, or Philosophy core course.
3. Core Social Science course may be fulfilled by appropriate courses in Communication, Economics, Psychology, Politics, or Sociology and Anthropology.
4. Major electives are chosen from the department, but may be chosen with approval of advisor and Department Chair from among other courses offered in the School of Engineering and Computing.
5. Choose any language offered by the Department of Modern Languages and Literatures, based on a placement exam.
6. Visual and Performing Arts courses may be chosen from Art History, Music, Film, Television, and Media Arts, Studio Art, or Theatre.
7. Approved English, Modern Languages and Literatures, or Classics courses.