

Department of Mechanical and Energy Engineering

Mechanical Engineering

I. Introduction

Mechanical and Energy Engineering is an engineering discipline to study about industry product innovation design, advanced manufacturing, industrial automation, intelligent machine, energy development and utilization and management science. Mechanical Engineering is a key discipline to realize product function and innovation and to ensure product quality, product cost and manufacturing efficiency. It plays a significant role in national economy. Mechanical Engineering centers on mechanics, involving with theories in electrodynamics, thermodynamics, hydromechanics, material science, sensor and information technology as well as intelligence and control technology. Mechanical Engineering has a wide application in aerospace, automobile, shipping, train, energy and power, engineering machinery, as well as the fields closely related to people's life such as electron, software, business and other industries. Therefore, Mechanical Engineering could fully meet social demand and requirements for personal interest and development.

The Department of Mechanical and Energy Engineering in SUSTech is in planning to include three major directions which involve with Robotics and Automation, Innovative Design and Advanced Manufacturing, and Energy Engineering. At present, we are building the profession and developing research and education programs rapidly. With the support from the government and USUTech, we are confident that the department will surely grow into a top research and teaching center in our university.

II. Objectives

The Mechanical Engineering Program is to cultivate high quality talents with a strong

basis in applied science, cutting-edge professional knowledge, sophisticated English skill and computer technology, working in research and development of innovative product design and interdisciplinary collaborations. Students in Mechanical Engineering should not only have comprehensive ability in research, design and development, teaching and management regarding to subjects in relevant fields, but also have international horizon, innovation spirit, teamwork and leadership capabilities. After graduation, the students would be able to engage in scientific research with engineering applications, development and manufacturing of innovative products, application of new materials and technology as well as engineering management. The students may further their education in the major or other relevant disciplines, or work on scientific research, development, teaching and management in enterprises, scientific institutions, universities and public institutions, as well as creation of their own companies.

III. Period of Study and Degree Requirement

Time length: 4 years

Degree conferred: Bachelor of Science

The minimum credit requirement for graduation: 155.5 credits

IV. Discipline

Mechanical Engineering, which may include directions of Robotics and Automation, Innovative Design and Advanced Manufacturing, and Energy Engineering.

V. Main Courses

Major Foundational Courses: Ordinary Differential Equation, CAD and Engineering Drawing, Manufacturing Processes, Fundamentals of Electric Circuits, Fundamentals of Materials Science and Technology, Theoretical Mechanics, Mechanics of Materials, Fluid Mechanics, Engineering Thermodynamics and/or Heat Transfer, Dynamics and

Vibration, Fundamentals of Control Engineering.

Major Core Courses: Fundamentals of Machine Design, Fundamentals of Manufacturing, Fundamentals of Energy Engineering, Fundamentals of Robotics, Signal Analysis, Intelligent Robot Technology, Walking Robot, Innovative Design Theory and Practice, Precision Machining Technology, Chemical Fuel Cell Technology, New Energy Tehnology.

VI. Practice-Based Courses

Awareness Practice of Manufacturing Engineering, Innovative Design Practice, Advanced Manufacturing Practice, Awareness Practice of Mechanical Engineering, Social Practice, Projects of Innovation and Entrepreneurship, Industrial Practice, Graduation Project.

VII. Course Structure and Credit Requirements

General Education (GE) Required Courses: 66.5 credits;

General Electives (GE) Education Courses: 10 credits;

Major Foundational Courses: 32 credits;

Major Core Courses: 22 credits;

Major Electives Courses: 9 credits;

Undergraduate Thesis/Projects, Research Projects, and Internship: 16 credits;

The minimum credit requirement for graduation: 155.5 credits.

VIII. Course Arrangement

Table 1: Major Required Course (Foundational and Core Courses)

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	4.5	Fall/Spr.	1/Spr.	C	None	ME
EE104	Fundamentals of Electric Circuits	2		2	Spr.	1/Spr.	C/E	MA101b MA102b MA103b	EE
ME103	Awareness Practice of Manufacturing Engineering	3	2	5	Fall/Spr. /Smr.	1/Smr.	C/E	None	ME
MSE201	Fundamentals of Materials Science and Technology	4	1	5	Fall	2/Fall	E	PHY101 PHY102 CH101	MSE
MAE203	Theoretical Mechanics I	3	1	4	Fall	2/Fall			MAE
MA201b	Ordinary Differential Equation B	4		4	Fall/Spr.	2/Spr.	C/E	GE101 GE102 GE103b	MA
MSE305	Mechanics of Materials	2		2	Spr.	2/Spr.	E	MSE201	MSE
ME301	Dynamics and Vibration	2	0.5	2.5	Fall/Spr.	3/Fall	C/E	MAE203 MA201b	ME
MAE303	Fluid Mechanics	4	1	5	Fall	3/Fall			MAE
MAE305	Engineering Thermodynamics	3		3	Fall	3/Fall			MAE
MAE308	Heat Transfer	3		3	Spr.	3/Spr.			MAE
ME307	Fundamentals of Control Engineering	2	0.5	2.5	Fall/Spr.	3/Spr.	C/E	EE104 MA201b	ME
ME303	Fundamentals of Machine Design	3		3	Fall/Spr.	3/Fall	C/E	ME102 MAE203 MSE305	ME
ME305	Innovative Design Practice	2	2	4	Fall/Spr.	3/Spr.	C/E	ME303	ME
ME302	Fundamentals of Manufacturing	3		3	Fall/Spr.	3/Spr.	C/E	ME102 ME103 ME303	ME

								MSE305	
ME304	Fundamentals of Energy Engineering	3	1	4	Fall/Spr.	3/Spr.	C/E	MSE201 MAE303 MAE305 or MAE308	ME
ME306	Fundamentals of Robotics	3	1	4	Fall/Spr.	3/Spr.	C/E	MAE203 ME303 ME307	ME
ME308	Advanced Manufacturing Practice	2	2	4	Spr./ Smr.	3/Spr.	C/E	ME302	ME
ME401	Signal Analysis*	3	1	4	Fall	4/Fall	C/E	ME307	ME
ME403	Intelligent Robot Technology*	3	1	4	Fall	4/Fall	C/E	ME306	ME
ME405	Innovative Design Theory and Practice*	3	1	4	Fall	4/Fall	C/E	ME303 ME305	ME
ME433	Robotics and Biomimetics	3		3	Fall	4/Fall	C/E	MAE203 MA201b	ME
ME434	Walking Robot	3	1	4	Spr.	4/Spr.	C/E	MAE306	ME
ME407	Precision Machining Technology*	3	1	4	Fall	4/Fall	C/E	ME302	ME
ME409	Chemical Fuel Cell Technology*	3	1	4	Fall	4/Fall	C/E	ME304	ME
ME411	New Energy Technology*	3	1	4	Fall	4/Fall	C/E	ME304	ME
ME460	Social Practice	2	2	16	Smr.	2/Smr.	C/E	None	ME
ME470	Projects of Innovation and Entrepreneurship	3	3	6	Fall	4/Fall	C/E	None	ME
ME480	Industrial Practice	3-6	3-6	24-48	Smr.	3/Smr.	C/E	None	ME
ME490	Graduation Project	8	8	16	Spr.	4/Spr.	C/E	None	ME
Total		91	36.5	157.5					

Notes:

- 1、 Must complete one course between MAE305 Engineering Thermodynamics and MAE308 Heat Transfer. If complete two, there three credits for required credits, another three credits for elective credits.
- 2、 Students in the direction of Robotics and Automation must complete two of the following courses, ME401 Signal Analysis*, ME403 Intelligent Robot Technology*, ME433 Robotics and Biomimetics or ME434 Walking Robot. Students in the direction of Innovative design and advanced manufacturing must complete ME405 Innovative Design Theory and Practice* and ME407 Precision Machining Technology*. Students in the direction of Energy Engineering must complete ME409 Chemical Fuel Cell Technology* and ME411 New

Energy Technology*.

3、 * Course name is provisional.

Table 2: Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
ME101	Introduction to Mechanical Engineering	1		1	Spr.	1/Spr.	C/E	None	ME
BIO106	Introductory to Biomedical Engineering	2		2	Spr.	2/Spr.	C	None	BIO
EE201	Analog Circuit	4	1	5	Fall	2/Fall	C	MA103b PHY101a PHY102a EE104	EE
EE202	Digital Circuit	4	1	5	Spr.	2/Spr.	C	PHY101a PHY102a EE203 EE201	EE
EE208	Engineering Electromagnetics	3	1	4	Spr.	2/Spr.	C/E	MA101b MA102b MA103b EE104	EE
EE324	Laser Microfabrication	3		3	Spr.	2/Spr.	C/E	None	EE
EE323	Digital Signal Processing	3	1	4	Fall	4/Fall	E	EE205	EE
Total		20	4	24					
Notes: The minimum requirement for graduation in this module is three credits.									
MES300	Awareness Practice of Mechanical Engineering	1	1	8	Smr.	1/Smr.	C/E	None	ME
EE205	Signals and Systems	3	1	4	Fall	2/Fall	C/E	None	EE
MSE307	Comprehensive Experiments of Materials I	4	4	8	Fall	3/Fall	C	MSE203 MSE301 MSE305 MSE313	MSE
IDD001	Design Engineering	2	1	3	Fall	3/Fall	C	None	IDD
CS303	Artificial Intelligence	3	1	4	Fall	3/Fall	C/E	CS102 CS203	CS

CS308	Computer Vision	3	1	4	Spr.	3/Spr.	C/E	None	CS
ME310	Fundamentals of Measurement Technology	3		3	Spr.	3/Spr.	C/E	ME307 EE205	ME
ME462	Additive Manufacturing and Design	3		3	Fall	4/Fall	C/E	ME302	ME
ME463	Failure Analysis and Fracture Mechanics of Engineering Materials	3		3	Fall	4/Fall	C/E	ME103、 MSE305、 ME303、 ME302	ME
MSE413	3D Printing and Laser-based Advanced Manufacturing	3		3	Fall	4/Fall	E	GE101 GE102 PHY311	MSE
CS401	Intelligent Robot	3	1	4	Fall	4/Fall	C/E	None	CS
CS405	Machine Learning	3	1	4	Fall	4/Fall	C/E	MA21 MA103B	CS
MAE401	Solid Mechanics Lab	3	3	6	Fall	4/Fall			MAE
ME425	Sensing Technology	3	1	4	Spr.	4/Spr.	E	ME306	ME
Total		40	15	61					
Notes: The minimum requirement for graduation in this module is six credits.									

Table 3 Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	4.5	Fall/Spr.	1/Spr.	C	None	ME
ME103	Awareness Practice of Manufacturing Engineering	3	2	5	Fall/Spr. /Smr.	1/Smr.	C/E	None	ME
MSE201	Fundamentals of Materials Science and Technology	4	1	5	Fall	2/Fall	E	PHY101 PHY102 CH101	MSE
MAE203	Theoretical Mechanics I	3	1	4	Fall	2/Fall			MAE

ME301	Dynamics and Vibration	2	0.5	2.5	Fall/Spr.	3/Fall	C/E	MAE203 MA201b	ME
MAE303	Fluid Mechanics	4	1	5	Fall	3/Fall			MAE
ME307	Fundamentals of Control Engineering	2	0.5	2.5	Fall/ Spr.	3/Spr.	C/E	EE104 MA201b	ME
ME305	Innovative Design Practice	2	2	4	Fall/ Spr.	3/Spr.	C/E	ME303	ME
ME304	Fundamentals of Energy Engineering	3	1	4	Fall/ Spr.	3/Spr.	C/E	MSE201 MAE303 MAE305 or MAE308	ME
ME306	Fundamentals of Robotics	3	1	4	Fall/Spr.	3/Spr.	C/E	MAE203 ME303 ME307	ME
ME308	Advanced Manufacturing Practice	2	2	4	Spr./ Smr.	3/Spr.	C/E	ME302	ME
ME401	Signal Analysis*	3	1	4	Fall	4/Fall	C/E	ME307	ME
ME403	Intelligent Robot Technology*	3	1	4	Fall	4/Fall	C/E	ME306	ME
ME434	Walking Robot	3	1	4	Spr.	4/Spr.	C/E	MAE306	ME
ME405	Innovative Design Theory and Practice*	3	1	4	Fall	4/Fall	C/E	ME303 ME305	ME
ME407	Precision Machining Technology*	3	1	4	Fall	4/Fall	C/E	ME302	ME
ME409	Chemical Fuel Cell Technology*	3	1	4	Fall	4/ Fall	C/E	ME304	ME
ME411	New Energy Technology*	3	1	4	Fall	4/Fall	C/E	ME304	ME
EE201	Analog Circuit	4	1	5	Fall	2/Fall	C	MA103b PHY101a PHY102a EE104	EE
EE202	Digital Circuit	4	1	5	Spr.	2/Spr.	C	PHY101a PHY102a EE203 EE201	EE
EE208	Engineering Electromagnetics	3	1	4	Spr.	2/Spr.	C/E	MA101b MA102b MA103b EE104	EE
EE323	Digital Signal	3	1	4	Fall	4/Fall	E	EE205	EE

	Processing								
MES300	Awareness Practice of Mechanical Engineering	1	1	8	Smr.	1/Smr.	C/E	None	ME
EE205	Signals and Systems	3	1	4	Fall	2/Fall	C/E	None	EE
MSE307	Comprehensive Experiments of Materials I	4	4	8	Fall	3/Fall	C	MSE203 MSE301 MSE305 MSE313	MSE
IDD001	Design Engineering	2	1	3	Fall	3/Fall	C	None	IDD
CS303	Artificial Intelligence	3	1	4	Fall	3/Fall	C/E	CS102 CS203	CS
CS308	Computer Vision	3	1	4	Spr.	3/Spr.	C/E	None	CS
CS401	Intelligent Robot	3	1	4	Fall	4/Fall	C/E	None	CS
CS405	Machine Learning	3	1	4	Fall	4/Fall	C/E	MA21 MA103B	CS
MAE401	Solid Mechanics Lab	3	3	6	Fall	4/Fall			MAE
ME425	Sensing Technology	3	1	4	Spr.	4/Spr.	E	ME306	ME
ME460	Social Practice	2	2	16	Smr.	2/Smr.	C/E	None	ME
ME470	Research Projects	3	3	6	Fall	2/Fall	C/E	None	ME
ME480	Industrial Practice	3-6	3-6	24-48	Smr.	3/Smr.	C/E	None	ME
ME490	Undergraduate Project	8	8	16	Spr.	4/Spr.	C/E	None	ME
Total		110	55.5	201.5					

Table 4 Overview of Course Hours and Credits

Course Category	Total Course Hours	Total Credits	The Minimum Credit Requirement
General Education (GE) Required Courses	1168	66.5	66.5
General Education (GE) Elective Courses	3144	182.5	10
Major Foundational Courses	680	35	32
Major Core Courses	848	40	22
Major Elective Courses	1264	60	9
Graduation Thesis/Projects, Research Projects, Internship	512	16	16
Total	7616	400	155.5