Umm Al-Qura University

College of Engineering and Islamic Architecture

Mechanical Engineering Department

B.Sc. Mechanical Engineering Program

Plan 44

Program Mission:
Providing highly qualified mechanical engineers, inspired by Islamic ethical values and capable of playing major roles in industry and conducting advanced research, in addition to creating an environment in which faculty guide the students to develop their research capabilities and serve the community.

Vision:
Generate and promote knowledge and learning nucleus for the mechanical engineering discipline to contribute in the development nationally and internationally.

Program Educational Objectives:

1. Produce mechanical engineers with a breadth of knowledge, skills, values, and confidence to fulfill major roles in the industry.
2. Provide mechanical engineers who demonstrate professionalism and a sense of societal and ethical responsibility in their endeavors.
3. Provide graduates who continually improve their skills through professional and post-graduate education.
4. Encourage interaction of the graduates with the community to solve its engineering-related problems.

Graduate Attributes:
The ME graduates have several distinguishing features:

1. Acquisition of a comprehensive, coherent, and organized body of knowledge in the Mechanical Engineering discipline.
2. Ability to conduct research, solve complex problems, and produce innovative engineering solutions.
3. Ability to identify and use appropriate mathematical and statistical methods; and to select and utilize proper mechanisms to present and communicate results.
4. Ability to demonstrate leadership, take responsibility, and positively cooperate in teamwork.
5. Gaining knowledge and skills that enable them to effectively execute tasks in a professional manner as mechanical engineers.
6. Ability to communicate effectively both in written and oral with a diverse audience.
7. Demonstrate a high level of commitment to Islamic and professional ethics and values.

Program learning Outcomes:

Knowledge and Understanding	
Upon completion of the Mechanical Engineering program, the graduates will be able to:	
K1	Demonstrate a comprehensive coherent theory-based and integrated body of knowledge and understanding of mathematics, science, numerical analysis, statistics, and mechanical engineering fundamentals.
K2	Explain the principles of mechanical engineering in solving complex engineering problems.
K3	Describe the impact of professional engineering solutions in societal, safety, legal and cultural issues, and environmental contexts and consequent responsibilities relevant to their engineering practice.
K4	Display advanced knowledge and understanding of processes, materials, techniques, conventions and terminology associated with mechanical engineering
Skills	
S1	Conduct mechanical engineering experiments and analyze, evaluate and present information, ideas, concepts and data, as well as considering uncertainties and draw valid conclusions.
S2	Design systems, components or processes that meet specified needs with appropriate consideration of functionality, health and safety, economic design, cultural, societal and environmental considerations.
S3	Apply techniques, skills, and modern engineering tools necessary for engineering practice to solve open-ended engineering problems.
S4	Communicate both in written and oral forms with a diverse audience.
Values	
V1	Display autonomy and take initiatives in activities at a professional level.
V2	Function effectively as an individual as well as a member or leader in teams.
V3	Use basic skills in self-learning as a base for lifelong learning.
V4	Commit to professional ethics, responsibilities and norms of engineering practice.

Mechanical Engineering Department
Collage of Engineering and Islamic Architecture
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Preparatory Year — First Year

Level 1

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ELCE 1201	English Language 1	-	-	4	16	
MTH 1106	Calculus (1) for Engineering	-	-	4	4	
PHY 1110	Physics (1) for Engineering	-	-	4	2	3
CHM 1106	Chemistry (1) for Engineering	-	-	3	2	1
DS 1101	Digital Technology	-	-	2	2	
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Level 2

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ELCE 1202	English Language 2	English Language 1		4	16	
MTH 1107	Calculus (2) for Engineering	Calculus (1) for Engineering		4	4	
PHY 1111	Physics (2) for Engineering	Calculus (1) for Engineering	Physics (1) for Engineering	4	2	3
CHM 1107	Chemistry (2) for Engineering	Chemistry (1) for Engineering		3	3	
QR 1101	The Holy Quraan (1)			2	2	
				17		

Level 3

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ELCE 1203	English Language 3	English Language 2		4	16	
MTH 1108	Calculus (3) for Engineering	Calculus (2) for Engineering		4	4	
CS 1011	Computer Programming for Engineering	-		4	3	3
EE 1000	Introduction to Engineering	Calculus (2) for Engineering	Physics (2) for Engineering	3	2	
ICC 1201	Islamic Culture (1)	-		2	2	
				17		

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Year 1 — Second Year

Level 4

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
PHY 1112	Physics (3) for Engineering	Calculus (3) for Engineering	Physics (2) for Engineering	3	2	3
ME2001	Engineering Analysis (1)	Calculus (3) for Engineering	-	4	4	-
QR2102	The Holy Quraan (2)	The Holy Quraan (1)	-	2	2	-
ME3900	Engineering Design		-	4	4	-
	University Elective 1		-	2	2	-
ME2101	Engineering Graphics		-	3		6
				18		

Level 5

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME2201	Thermodynamics (1)	Engineering Analysis (1)	-	4	4	
ME2002	Engineering Analysis (2)	Engineering Analysis (1)		4	4	-
ICC2202	Islamic Culture (2)	Islamic Culture (1)	-	2	2	-
ME2100	Fundamentals of Manufacturing Technology	Engineering Graphics	-	3	2	3
ME3000	Engineering Statistics and Probability	Calculus (3) for Engineering		4	4	
			-			
				17		

Level 6

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME1001	Technical Report writing for Engineering		-	2	2	
ME2003	Engineering Analysis (3)	Engineering Analysis (2)	-	4	4	-
ARS1601	Arabic writing and editing		-	2	2	
ME2202	Thermodynamics (2)	Thermodynamics (1)	-	4	4	
ME2120	Materials Science (1)	General Chemistry (2)		3	2	3
ME2102	Mechanical Drawing	Engineering Graphics	-	3		6
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Year 2 — Third Year

Level 7

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME3100	Casting and Welding Processes	Materials Science (1)	Fundamentals of Manufacturing	3	2	3
ME3120	Materials Science (2)	Materials Science (1)	-	3	2	3
	Electric Circuits	General Physics (3)	-	3	2	3
CE1402	Statics	General Physics (2)	Calculus (3) for Engineering	3	3	
ME3121	Material Testing	Materials Science (1)	-	3	2	3
ME2000	Engineering Economy		-	3	3	-
				18		

Level 8

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME3122	Dynamics	Statics	-	4	4	
ME3123	Mechanics of Materials	Statics	-	4	4	
ME3211	Fluid Mechanics (1)	Thermodynamics (2)	-	4	2	3
ME3001	Engineering Numerical Methods	Engineering Analysis (3)	Computer Programming	4	3	3
QR3103	The Holy Quraan (3)	The Holy Quraan (2)		2	2	-
				18		

Level 9

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME3130	Engineering Measurements (1)	Fundamentals of Manufacturing Technology	Engineering Statistics and Probability	3	2	3
ME3212	Fluid Mechanics (2)	Fluid Mechanics (1)	-	3	2	3
ICC3203	Islamic Culture (3)	Islamic Culture (2)	-	2	2	-
ME3101	Forming Processes	Material Testing	-	3	2	3
ME3110	Machine Design (1)	Mechanics of Materials	Mechanical Drawing	3	2	3
ME3201	Heat Transfer (1)	Thermodynamics 1	-	3	2	3
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Year 3 — Forth Year

Level 10

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4230	Theory of Machinery	Dynamics		3	2	3
ME4200	Engineering Measurements (2)	Engineering Measurements (1)		3	2	3
ME4201	Hydraulics and Pumps	Fluid Mechanics (2)	-	3	2	3
	Heat Transfer (2)	Heat Transfer (1)	-	3	2	3
QR4104	Programmable Logic Controllers (PLC)	Computer Programming for Engineering	-	3	2	3
	The Holy Quraan (4)	The Holy Quraan (3)	-	2	2	
	University Elective 2	-		2	2	
				19		

Level 11

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME3901	Engineering Standards and Ethics	-	-	2	2	-
ME4121	Mechanical Vibration	Dynamics		4	3	3
ME3003	Engineering Management	Engineering Economy	-	3	3	
ME4100	Machining Processes	Forming Processes		3	2	3
ME4110	Machine Design (2)	Machine Design (1)		3	2	3
	University Elective 3		-	2	2	
ME4202	Introduction to Thermal Systems Design	Heat Transfer (2)		2	2	
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Level 12

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4900	Coop Training			8		30
				8		

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Year 4

Fifth Year (Mechanical Engineering - General Track)

Level 13

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4901	Project (1)	Department Approval		2		2
ME4203	Automotive Engines	Thermodynamics (2)		3	2	3
ME4210	Refrigeration and Air-Conditioning(1)	Heat Transfer (2)	-	3	2	3
ME4122	Industrial Quality Control	Engineering Measurements (1)	-	4	4	
ME4910	Elective Course	180 hrs		3	2	3
ME4920	Elective Course	180 hrs		3	2	3
				18		

Level 14

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4902	Project (2)	Graduation Project (1)	-	3	-	3
ICC4204	Islamic Culture (4)	Islamic Culture (3)		2	2	
ME4204	Power Plants	Heat Transfer (2)	-	4	3	3
ME4205	Renewable Energy	Fluid Mechanics (2)	-	3	2	3
ME4930	Elective Course	200 hrs	-	3	2	3
ME4940	Elective Course	200 hrs	-	3	2	3
				18		

Level 15

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4903	Project (3)	Project (2)	-	3	-	3
ME4206	Energy Management and Efficiency		-	2	2	-
ME4220	Refrigeration and Air-Conditioning(2)	Refrigeration and Air-Conditioning(1)	-	2	2	-
ME4123	Polymers and Composite Materials	Materials Science (2)		4	3	3
ME4124	Automatic Control	Electric Circuits	-	4	3	3
ME4950	Elective Course	200 hrs		3	2	3
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Year 4

Fifth Year (Mechanical Engineering - Production Track)

Level 13

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4901	Project (1)	Department Approval		2	-	2
ME4124	Automatic Control	Electric Circuits		4	3	3
ME4101	Composite Materials	Materials Science (2)		3	2	3
ME4102	Material Selection	Machine Design (2)	-	3	2	3
ME4910	Elective Course	180 hrs		3	2	3
ME4920	Elective Course	180 hrs		3	2	3
				18		

Level 14

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4902	Project (2)	Graduation Project (1)	-	3	-	3
ICC4204	Islamic Culture (4)	Islamic Culture (3)		2	2	
ME4122	Industrial Quality Control	Engineering Measurements (1)		4	4	
ME4103	CAD / CAM	Machining Processes	Machine Design (2)	3	2	3
ME4104	Robotic	Automatic Control		3	2	3
ME4930	Elective Course	200 hrs		3	2	3
				18		

Level 15

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4903	Project (3)	Project (2)	-	3	-	3
ME4105	Additive Manufacturing	CAD / CAM	-	3	2	3
ME4106	Fault Diagnostics	Mechanical Vibration	Material Science (2)	3	2	3
ME4017	Jigs and Fixtures	Machine Design (2)		3	2	3
ME4940	Elective Course	200 hrs	-	3	2	3
ME4950	Elective Course	200 hrs	-	3	2	3
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Year 4

Fifth Year (Mechanical Engineering - Energy Track)

Level 13

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4901	Project (1)	Department Approval		2		2
ME4203	Automotive Engines	Thermodynamics (2)		3	2	3
ME4207	Heat Exchangers	Heat Transfer (2)		3	2	3
ME4124	Automatic Control	Electric Circuits	-	4	3	3
ME4910	Elective Course	180 hrs		3	2	3
ME4920	Elective Course	180 hrs	-	3	2	3
				18		

Level 14

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4902	Project (2)	Graduation Project (1)	-	3	-	3
ICC4204	Islamic Culture (4)	Islamic Culture (3)	-	2	2	
ME4204	Power Plants	Heat Transfer (2)	-	4	3	3
ME4210	Refrigeration and Air-Conditioning(1)	Heat Transfer (2)	-	3	2	3
ME4930	Elective Course	200 hrs	-	3	2	3
ME4940	Elective Course	200 hrs	-	3	2	3
				18		

Level 15

Course Code	Course Name	Prerequisite 1	Prerequisite 2	Cr Hrs	Lec	Lab
ME4903	Project (3)	Project (2)	-	3	-	3
ME4208	Design of Thermal Systems	Fluid Mechanics (2)	Heat Transfer (2)	4	3	3
ME4205	Renewable Energy	Fluid Mechanics (2)		3	2	3
ME4209	Turbomachinery	Heat Transfer (2)		3	3	3
ME4220	Refrigeration and Air-Conditioning(2)	Refrigeration and Air-Conditioning(1)		2	2	-
ME4950	Elective Course	200 hrs	-	3	2	3
				18		

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