



جامعة الفيصل
Alfaisal University

Bachelor of Mechanical Engineering

College of Engineering, Alfaisal University

Effective: Fall 2019

Curriculum Structure and Study Plan

The Bachelor of Mechanical Engineering curriculum is composed of **134** Credit Hours (CRHs) divided as follows:

- I. General Education Requirements (50 CRHs)**
 1. Mathematics & Statistics (21 CRHs)
 2. Basic Sciences (12 CRHs)
 3. Humanities (17 CRHs)
- II. Core Requirements (84 CRHs)**
 1. Mechanical Engineering Courses (67 CRHs)
 2. College of Engineering Courses (11 CRHs)
 3. Technical Electives (6 CRHs)
 4. Summer Internship (0 CRHs)

I. General Education Requirements (50 CRHs)

1. Mathematics & Statistics (21 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect.	Lab	Tut		
MAT 101	Calculus I	3	3	0	0		
MAT 112	Calculus II	3	3	0	0	MAT 101	
MAT 211	Calculus III	3	3	0	0	MAT 112	
MAT 212	Linear Algebra	3	3	0	0	MAT 112	
MAT 224	Numerical Methods	3	3	0	0	MAT 212	
MAT 213	Differential Equations	3	3	0	0	MAT 112	MAT 212
STA 212	Probability and Statistics for Engineers	3	3	0	0	MAT 112	

2. Basic Sciences (12 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	Lab	Tut		
CHM 102	Introduction to Chemistry	3	3	0	1		
CHM 102 L	Introduction to Chemistry Lab	1	0	2	0		CHEM 102
PHU 103	Mechanics and Waves for Engineers	3	3	0	1		MAT 101
PHU 103 L	Mechanics and Waves for Engineers Lab	1	0	2	0		PHU 103
PHU 124	Electromagnetism and Optics for Engineers	3	3	0	1	PHU 103, MAT 101	
PHU 124 L	Electromagnetism and Optics for Engineers Lab	1	0	2	0	PHU 103, MAT 101	PHU 124

3. Humanities (17 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	Lab	Tut		
ENG 101	Freshman English I	3	3	0	0		
ENG 112	Freshman English II	3	3	0	0	ENG 101	
ENG 222	Technical Writing	3	3	0	0	ENG 112	
ISL 101	Islamic Studies I	2	2	0	0		
ISL 112	Islamic Studies II	2	2	0	0	ISL 101	
ARB 101	Arabic Language and Literature I	2	2	0	0		
ARB 112	Arabic Language and Literature II	2	2	0	0	ARB 101	

II. Core Requirements (84 CRHs)

1. Mechanical Engineering Courses (67 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	Lab	Tut		
ME 201	Materials Science and Engineering	3	3	0	0	CHM 102	
ME 201 L	Materials Science and Engineering Lab	1	0	2	0	CHM 102	ME 201
ME 203	Applied Mechanics I: Statics	3	3	0	0	PHU 103, MAT 112	
ME 205	Introduction to Computer Aided Design	3	3	0	0	-	
ME 206	Thermal Fluids Engineering I	3	3	0	0	PHU 103	
ME 206 L	Thermal Fluids Engineering I Lab	1	0	2	0	PHU 103	ME 206
ME 208	Mechanics of Materials I	3	3	0	0	ME 201, ME 203	
ME 208 L	Mechanics of Materials I Lab	1	0	2	0	ME 201, ME 203	ME 208
ME 305	Manufacturing and Workshop Training	3	3	0	0	ME 201	
ME 305 L	Manufacturing and Workshop Training Lab	1	0	2	0	ME 201	ME 305
ME 306	Instrumentation and Control Engineering	3	3	0	0	EE 207	
ME 306 L	Instrumentation and Control Engineering Lab	1	0	2	0	EE 207	ME 306
ME 307	Thermal Fluids Engineering II	3	3	0	0	ME 206	
ME 307 L	Thermal Fluids Engineering II Lab	1	0	2	0	ME 206	ME 307
ME 308	Advanced Manufacturing Processes	3	3	0	0	ME 305	



Mechanical Engineering Program

ME 308 L	Advanced Manufacturing Processes Lab	1	0	2	0	ME 305	ME 308
ME 310	Mechanical Component Design	3	3	0	0	ME 311, ME 312	
ME 310 L	Mechanical Component Design Lab	1	0	2	0	ME 311, ME 312	ME 310
ME 311	Applied Mechanics II: Dynamics	3	3	0	0	ME 203	
ME 312	Mechanics of Materials II	3	3	0	0	ME 208	
ME 312 L	Mechanics of Materials II Lab	1	0	2	0	ME 208	ME 312
ME 314	Vibration and Damping	3	3	0	0	ME 311	
ME 315	Machine Design	3	3	0	0	ME 208	
ME 403	Finite Element Methods	3	3	0	0	ME 311, ME 312	
ME 403 L	Finite Element Methods Lab	1	0	2	0	ME 311, ME 312	ME 403
ME 405	Engineering Safety and Risk Analysis	3	3	0	0	STA 212	
ME 407	Heating, Ventilation, and Air-Conditioning	3	3	0	0	ME 206	
ME 495	Mechanical Engineering Capstone Project I	3	0	6	0	ME 307, ME 310	
ME 496	Mechanical Engineering Capstone Project II	3	0	6	0	ME 495	

2. College of Engineering Courses (11 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	Lab	Tut		
SE 100	Programming for Engineers	3	3	0	0	-	
SE 100 L	Programming for Engineers Lab	1	0	2	0	-	SE 100
IE 315	Engineering Economy and Cost Analysis	3	3	0	0	STA 212	
EE 207	Foundations of Electrical Engineering	3	3	0	1	PHU 124	MAT 213
EE 207 L	Foundations of Electrical Engineering Lab	1	0	2	0	PHU 124	MAT 213

3. Technical Electives* (6 CRHs)

Select from the following courses:

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	La b	Tut		
ME 400	Special Topics in Mechanical Engineering	3	3	0	0	Department approval	
ME 401	Computational Fluid Dynamics and Heat Transfer	3	3	0	0	ME 307	
ME 406	Mechatronics	3	3	0	0	ME 306	
ME 410	Energy Conversion and Cogeneration Systems	3	3	0	0	ME 307	
ME 412	Renewable Energy Systems	3	3	0	0	ME 307	
ME 414	Introduction to Compressible Flow Turbomachinery	3	3	0	0	ME 307	
ME 415	Incompressible Flow Machines	3	3	0	0	ME 206	
ME 416	Automotive Engineering	3	3	0	0	ME 307	



Mechanical Engineering Program

ME 418	Water Desalination	3	3	0	0	ME 307	
ME 435	Undergraduate Research in Mechanical Engineering	3	0	6	0	Department Approval. A GPA of at least 3.0/4.0, and a signed research contract	

*Electives are offered subject to availability of academics in the department with relevant expertise.

4. Summer Internship (0 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)	Pre-Requisite Course Code	Co-Requisite Course Code
ME 390	Mechanical Engineering Summer Internship	0	Department Approval	



Typical Study Plan-Mechanical Engineering Program

4-Year Curriculum: 134 Credit Hours Total

Each course below follows the following format:

Course code, Course Title, and Course Credit Hours (Lecture contact hours – Lab contact hours – Tutorial contact hours)

<i>1st Year</i>			
Fall	Course Code	Course-Title	CRHs
	SE 100	Programming for Engineers	3 (3-0-0)
	SE 100 L	Programming for Engineers Lab	1 (0-2-0)
	CHM 102	Introduction to Chemistry	3 (3-0-1)
	CHM 102 L	Introduction to Chemistry Lab	1 (0-2-0)
	MAT 101	Calculus I	3 (3-0-0)
	PHU 103	Mechanics and Waves for Engineers	3 (3-0-1)
	PHU 103 L	Mechanics and Waves for Engineers Lab	1 (0-2-0)
	ENG 101	Freshman English I	3 (3-0-0)
Total			18
Spring	Course Code	Course-Title	CRHs
	ME 201	Materials Science and Engineering	3 (3-1-0)
	ME 201 L	Materials Science and Engineering Lab	1 (0-2-0)
	MAT 112	Calculus II	3 (3-0-0)
	PHU 124	Electromagnetism and Optics for Engineers	3 (3-2-1)
	PHU 124 L	Electromagnetism and Optics for Engineers Lab	1 (0-2-0)
	ARB 101	Arabic Language and Literature I	2 (3-0-0)
	ENG 112	Freshman English II	3 (3-0-0)
Total			16

<i>2nd Year</i>			
Fall	Course Code	Course-Title	CRHs
	ME 203	Applied Mechanics I: Statics	3 (3-0-0)
	ME 205	Introduction to Computer Aided Design	3 (3-0-0)
	ME 305	Manufacturing and Workshop Training	3 (3-0-0)
	ME 305 L	Manufacturing and Workshop Training Lab	1 (0-2-0)
	MAT 211	Calculus III	3 (3-0-0)
	MAT 212	Linear Algebra	3 (3-0-0)
MAT 213	Differential Equations	3 (3-0-0)	
Total			19
Spring	Course Code	Course-Title	CRHs
	ME 206	Thermal Fluids Engineering I	3 (3-0-0)
	ME 206 L	Thermal Fluids Engineering I Lab	1 (0-2-0)
	ME 208	Mechanics of Materials I	3 (3-0-1)
	ME 208 L	Mechanics of Materials I Lab	1 (0-2-0)
	EE 207	Foundations of Electrical Engineering	3 (3-0-1)
	EE 207 L	Foundations of Electrical Engineering Lab	1 (0-2-0)
	MAT 224	Numerical Methods	3 (3-0-0)
STA 212	Probability and Statistics for Engineers	3 (3-0-0)	
Total			18

3rd Year			
Fall	Course Code	Course-Title	CRHs
	ME 307	Thermal Fluids Engineering II	3 (3-0-0)
	ME 307 L	Thermal Fluids Engineering II Lab	1 (0-2-0)
	ME 311	Applied Mechanics II: Dynamics	3 (3-0-0)
	ME 312	Mechanics of Materials II	3 (3-0-0)
	ME 312 L	Mechanics of Materials II Lab	1 (0-2-0)
	ME 315	Machine Design	3 (3-0-0)
	ENG 222	Technical Writing	3 (3-0-0)
Total			17
Spring	Course Code	Course-Title	CRHs
	ME 306	Instrumentation and Control Engineering	3 (3-0-0)
	ME 306 L	Instrumentation and Control Engineering Lab	1 (0-2-0)
	ME 308	Advanced Manufacturing Processes	3 (3-0-0)
	ME 308 L	Advanced Manufacturing Processes Lab	1 (0-2-0)
	ME 310	Mechanical Component Design	3 (3-0-0)
	ME 310 L	Mechanical Component Design Lab	1 (0-2-0)
	ISL 101	Islamic Studies I	2 (2-0-0)
ARB 112	Arabic Language and Literature II	2 (2-0-0)	
Total			16
Summer	Course Code	Course-Title	CRHs
	ME 390	Mechanical Engineering Summer Internship	0 (0-0-0)
Total			0

<i>4th Year</i>			
Fall	Course Code	Course-Title	CRHs
	ME 403	Finite Element Methods	3 (3-0-0)
	ME 403 L	Finite Element Methods Lab	1 (0-2-0)
	ME 405	Engineering Safety and Risk Analysis	3 (3-0-0)
	ME 407	Heating, Ventilation, and Air-Conditioning	3 (3-0-0)
	ME 495	Mechanical Engineering Capstone Project I	3 (0-6-0)
	ISL 112	Islamic Studies II	2 (2-0-0)
Total			15
Spring	Course Code	Course-Title	CRHs
	ME 314	Vibration and Damping	3 (3-0-0)
	ME 4**	Technical Elective	3 (3-0-0)
	ME 4**	Technical Elective	3 (3-0-0)
	ME 496	Mechanical Engineering Capstone Project II	3 (0-6-0)
	IE 315	Engineering Economy and Cost Analysis	3 (3-0-0)
Total			15



ME 206 L Thermal Fluids Engineering I Lab

1 (0-2-0)

Laboratory experiments dealing with thermodynamics, pressure, temperature, heat and work, properties of pure materials, first law, closed and open system, second law, heat engines and cycles, including fluid mechanics, conservation laws, boundary layers, laminar and turbulent flows, pipe flows, incompressible one-dimensional flow, external flows, ideal flows, compressible flows, heat transfer, conduction, convection and radiation.

Pre-requisites: PHU 103

Co-requisites: ME 206

ME 208 Mechanics of Materials I

3 (3-0-0)

The course teaches mechanics of deformable bodies. Topics covered include concepts of stress and strain, classification of materials behaviour, stress-strain relations, generalized Hook's law. It also covers applications to engineering problems: members under axial loads, torsion of circular rods and tubes, bending and shear stresses in beams, combined stresses in beams, transformations of stresses, deflection of beams, buckling and thin-walled pressure vessels.

Pre-requisites: ME 201, ME 203

Co-requisites: none

ME 208 L Mechanics of Materials I Lab

1 (0-2-0)

Laboratory experiments dealing with materials and structures, beam bending, buckling and torsion, material and structural failure, stress, strain, and heating effects.

Pre-requisites: ME 201

Co-requisites: ME 208

ME 305 Manufacturing and Workshop Training

3 (3-0-0)

The course teaches an overview of modern manufacturing technology, materials and their manufacturing characteristics, Casting, Mould design Tools and fixtures, Cutting machine tools (turning, milling, drilling, broaching etc., abrasive machining processes), Joining, assembly, Manufacturing costs, design for manufacturing, Welding, EDM, Laser Machining, Industrial Manufacturing processes (metal forming, forging, extrusion, rolling), Metrology, Inspection methods and quality control.

Pre-requisites: ME 201

Co-requisites: none

ME 305 L Manufacturing and Workshop Training Lab

1 (0-2-0)

Laboratory experiments dealing with modern manufacturing technology, materials and their manufacturing characteristics, Casting, Mould design Tools and fixtures, Cutting machine tools (turning, milling, drilling, broaching etc., abrasive machining processes), Joining, assembly, Manufacturing costs, design for manufacturing, Welding, EDM, Laser Machining, Industrial Manufacturing processes (metal forming, forging, extrusion, rolling), Metrology, Inspection methods and quality control.

Pre-requisites: ME 201

Co-requisites: ME 305

ME 306 Instrumentation and Control Engineering

3 (3-0-0)

The course teaches an introduction to the design of feedback control systems. Topics include the properties of feedback systems, time-domain and frequency-domain performance measures, stability and degree of stability, the root locus method, Nyquist criterion, frequency-domain design, and state space methods. These concepts will be applied to a variety of mechanical and aerospace systems throughout the course.

Pre-requisites: EE 207

Co-requisites: none

ME 306 L Instrumentation and Control Engineering Lab 1 (0-2-0)

Laboratory experiments dealing with feedback control systems, time-domain and frequency-domain performance measures, stability and degree of stability, the root locus method, Nyquist criterion, frequency-domain design, and state space methods.

Pre-requisites: EE 207

Co-requisites: ME 306

ME 307 Thermal Fluids Engineering II 3 (3-0-0)

The course teaches applications of thermodynamics, heat transfer and fluid mechanics to the design and analysis of energy systems. Topics include energy analysis, power and refrigeration cycles, studies of laminar and turbulent flow including heat transfer in free and forced convection, in channels, and over surfaces, heat transfer, including fins, forced and free convection, boiling and condensation, radiation heat transfer, heat exchangers, multi-mode heat transfer, compressible flows in pipes, ducts, divergent and convergent flows, sonic and supersonic flows.

Pre-requisites: ME 206

Co-requisites: none

ME 307 L Thermal Fluids Engineering II Lab 1 (0-2-0)

Laboratory experiments dealing with applications of thermodynamics, heat transfer and fluid mechanics to the design and analysis of energy systems. This includes energy analysis, studies of laminar and turbulent flow, heat transfer in free and forced convection, in channels, and over surfaces, fins, forced and free convection, boiling and condensation, radiation heat transfer, heat exchangers, compressible flows in pipes, ducts, divergent and convergent flows, sonic and supersonic flows.

Pre-requisites: ME 206

Co-requisites: ME 307

ME 308 Advanced Manufacturing Processes 3 (3-0-0)

The course teaches the integration of design, engineering and management disciplines and practices for analysis and design of manufacturing enterprises. The course emphasizes the physics and stochastic nature of manufacturing processes and systems, and their effects on quality, rate, cost and flexibility, process physics and control, design for manufacturing and manufacturing systems and a team project where the students design and build elements using mass-production methods to produce a product in quantity.

Pre-requisites: ME 305

Co-requisites: none

ME 308 L Advanced Manufacturing Processes Lab 1 (0-2-0)

Laboratory experiments dealing with integration of design, engineering and management disciplines and practices for analysis and design of manufacturing enterprises, the physics and stochastic nature of manufacturing processes and systems, and their effects on quality, rate, cost and flexibility, process physics and control, design for manufacturing and manufacturing systems and a team project where the students design and build elements using mass-production methods to produce a product in quantity.

Pre-requisites: ME 305

Co-requisites: ME 308

ME 310 Mechanical Component Design 3 (3-0-0)

The course teaches the creative design process via the application of appropriate physical laws and learning to complete projects on schedule. Topics include synthesis, analysis, design robustness, machine elements, manufacturability, idea generation, estimation, concept selection, visual thinking, communication, design and analysis, design for manufacturing, professional responsibilities and ethics.

Pre-requisites: ME 311, ME 312

Co-requisites: none



ME 310 L Mechanical Component Design Lab

1 (3-0-0)

The course teaches the creative design process via the application of physical laws and learning to complete projects on schedule. Topics include synthesis, analysis, design robustness, machine elements, manufacturability, idea generation, estimation, concept selection, visual thinking, communication, design and analysis, design for manufacturing, professional responsibilities and ethics.

Pre-requisites: ME 311, ME 312

Co-requisites: ME 310

ME 311 Applied Mechanics II: Dynamics

3 (3-0-0)

This course teaches basic principles of kinematics and kinetics of 3D particles and planer rigid bodies. It establishes and develops the analytical skills to solve dynamics problems based on application of basic principles such as Newton's laws of motion, concepts of work and energy as well as impulse and momentum, and force and acceleration.

Pre-requisites: ME 203

Co-requisites: none

ME 312 Mechanics of Materials II

3 (3-0-0)

The course teaches an introduction to mechanical behaviour of engineering materials and the use of materials in mechanical design. The course emphasizes the fundamentals of mechanical behaviour of isotropic and anisotropic materials, as well as design with materials, including elasticity, plasticity, limit analysis, fatigue, fracture, creep, three-dimensional stress and strain problems and the selection of materials for engineering design.

Pre-requisites: ME 208

Co-requisites: none

ME 312 L Mechanics of Materials II Lab

1 (0-2-0)

The course focuses on experiments reinforcing concepts in mechanical behavior of engineering materials and the use of materials in mechanical design, including elasticity, plasticity, limit analysis, fatigue, fracture, creep, and deformation in pressurized cylinder.

Pre-requisites: ME 208

Co-requisites: ME 312

ME 314 Vibration and Damping

3 (3-0-0)

The course teaches single-degree and multi-degree of freedom systems. Topics covered include undamped and damped free and forced vibrations, impulse and arbitrary force response vibration, absorbers and isolators, rotating machinery fault diagnosis, modal analysis and mode shapes.

Pre-requisites: ME 311

Co-requisites: none

ME 315 Machine Design

3 (3-0-0)

This course teaches the function, design and performance of basic machine elements commonly used by mechanical engineers, such as shaft, temporary and permanent fasteners, key, thick wall vessel, etc. Students will develop skills in designing and analysing performance capabilities of these elements based on static and dynamic combined loading. The course will also cover potential topics such as part geometry, material choice, loading and environmental conditions, static and fatigue failure theories, factor of safety concept.

Pre-requisites: ME 208

Co-requisites: none



- ME 400 Special Topics in Mechanical Engineering 3 (3-0-0)**
The course will focus on advanced topics and recent developments in one or more of areas: control and robotics, dynamic systems, fluid mechanics, materials science and engineering, solid mechanics and structures, thermal sciences or other areas in mechanical engineering.
Pre-requisites: Department Approval
Co-requisites: none
- ME 401 Computational Fluid Dynamics and Heat Transfer 3 (3-0-0)**
The course teaches the working principles of computational fluid dynamics and heat transfer and applies these concepts using commercially available software packages used in industry. Topics include the application, analysis and limitations of design evaluation using CFD approach. The course will equip students to model real engineering problems and correlate the working principles of fluid dynamics and heat transfer using numerical techniques.
Pre-requisites: ME 307
Co-requisites: none
- ME 403 Finite Element Elements 3 (3-0-0)**
The course teaches the working principles of the non-linear finite element method (FEM) and applies the concepts involved using commercially available software packages used in industry. Topics include the application, analysis and limitations of design evaluation using FEM approach. The course will equip students to model real engineering problems and correlate the working principles of Mechanics and Dynamics using numerical methods.
Pre-requisites: ME 311, ME 312
Co-requisites: none
- ME 403 L Finite Element Elements Lab 1 (0-2-0)**
Laboratory experiments dealing with the working principles of the non-linear finite element method (FEM) and apply the concepts involved using commercially available software packages used in industry, the application, analysis and limitations of design evaluation using FEM approach. The course will equip students to model real engineering problems and correlate the working principles of mechanics and dynamics using numerical methods.
Pre-requisites: ME 312, ME 311
Co-requisites: ME 403
- ME 405 Engineering Safety and Risk Analysis 3 (3-0-0)**
The course aims to introduce students to hazard identification, risk assessment, risk control in industrial or commercial workplace. The course will also equip students with knowledge on health, and safe work practices, recognition and elimination of health hazards, design material handling and emergency treatment for industrial accidents. Students are expected to understand different hazard identification and control methods and able to develop risk management systems.
Pre-requisites: STA 212
Co-requisites: none
- ME 406 Mechatronics 3 (3-0-0)**
The course teaches the acquisition of the knowledge and skills required to design and control electromechanical systems. The basic material will be covered in classroom lectures and discussions. Much of the learning will take place in the laboratory where students will learn to build and operate representative electromechanical systems. The class includes a final project.
Pre-requisites: ME 306
Co-requisites: none



ME 407 Heating, Ventilation, and Air-Conditioning 3 (3-0-0)

The course introduces basic concepts of heating, ventilation, and air conditioning systems (HVAC). These include: HVAC components and distribution systems, moist air properties and conditioning processes, indoor comfort conditions, heat transmission in building structures, calculation of heating loads, cooling load, duct design, fans and building air distribution, and the performance of refrigeration systems.

Pre-requisites: ME 206

Co-requisites: none

ME 410 Energy Conversion and Cogeneration Systems 3 (3-0-0)

The course introduces various types of energy conversion and cogeneration systems. These include; advanced steam power plants, gas turbine power plants, nuclear power plants, co-generation and tri-generation, internal combustion engine, and renewable energy conversion systems. The student will learn how to do an analysis for any energy conversion system. Moreover, students will learn about the regeneration, binary, supercritical, and other advanced steam power cycles. In addition, this course teaches student how to design components of the power conversion system such as boilers, condensers, steam turbines, compressors, combustors, gas turbines, and others. The knowledge about the nuclear power plants and recent technologies is covered as well in this course. Furthermore, the course gives an introduction to the power generation using the new and renewable energy sources as well as energy storage and economy of energy.

Pre-requisites: ME 307

Co-requisites: none

ME 412 Renewable Energy Systems 3 (3-0-0)

The course gives an overview of renewable energy sources including biomass, hydroelectricity, geothermal, tidal, wave, wind and solar power. And it also presents the fundamentals of different renewable energy systems with a main focus on technologies with high development potential. Furthermore, it integrates maths, engineering, climate studies and economics, and enabling students to gain a broad understanding of renewable energy technologies and their potential.

Pre-requisites: ME 307

Co-requisites: none

ME 414 Introduction to Compressible Flow Turbomachinery 3 (3-0-0)

The course introduces various types of compressible flow turbomachineries and describes their fundamental working and design concepts. This includes; turbomachinery classification, apply dimensional analysis and similitude to turbomachines, basic governing equations for turbomachines, Euler equation, centrifugal compressors, axial flow compressors and fans, radial and axial flow turbines.

Pre-requisites: ME 307

Co-requisites: none

ME 416 Automotive Engineering 3 (3-0-0)

This course teaches the fundamentals of Internal Combustion engines, its classifications and applications, as well as design and operating parameters. Topics include the thermodynamic analysis of fuel-air cycle, firing order, concept of combustion process in SI engines, Scavenging and design aspects of SI engines, supercharging and turbocharging, lubrication system, engine cooling system and engine heat transfer, fuel injection system in SI engines, Compression Ignition (CI) engines, conventional and non-conventional fuels in SI and CI engines.

Pre-requisites: ME 307

Co-requisites: none



- ME 418 Water Desalination 3 (3-0-0)**
The course aims to introduce students to fundamentals of water desalination. The course provides an overview and classification of desalination techniques such as single and multiple effect evaporation, vapor compression, single and multi-stage flash distillation, reverse osmosis, hybrid processes. It will also cover potential topics such as resources and needs for desalination, dual purpose power and desalination plants, desalination powered by renewable energy sources. Other topics such as economic analysis and brine discharge management may also be presented.
Pre-requisites: ME 307
Co-requisites: none
- ME 435 Undergraduate Research in Mechanical Engineering 3 (0-6-0)**
Students participate in supervised research with a faculty member. Supervised research can be: 1) independent research undertaken by the student (thesis, independent study), or 2) assistance on a faculty member's research project. Students must find a faculty member who is willing to supervise him/her as an assistant on an existing project or as the author of an individual project. The student and the faculty supervisor will complete and sign a research contract which will be turned in to the chair of the Industrial and Mechanical Engineering Department. Drafting the contract will allow the student to develop ideas about what should be accomplished and what the faculty supervisor's expectations are. All academic requirements are at the discretion of the supervising faculty member. Students should agree on a plan for the semester with the faculty mentor before the research begins. The plan should include academic requirements, the basis for grading the experience, and a plan for student/professor meetings for the semester. It is the student's responsibility to report progress and seek guidance when needed. Students are expected to be active and reliable participants in the research experience.
Pre-requisites: Department Approval
Co-requisites: none
- ME 495 Mechanical Engineering Capstone Project I 3 (0-6-0)**
This capstone course is a semester-long design project, undertaken individually or in a small team under supervision of an academic staff. The project involves an introduction to the life cycle of a project from a technical and management perspective and is based on extensive oral and written communication. The capstone project is typically the foundation of the student's engineering portfolio for application to industry or graduate school.
Pre-requisites: ME 307, ME 310
Co-requisites: none
- ME 496 Mechanical Engineering Capstone Project II 3 (0-6-0)**
This capstone course is the continuation of ME 495. Students working individually or in a small team under supervision of an academic staff will be expected to continue and complete prior work initiated in ME 495. The project involves an introduction to the life cycle of a project from a technical and management perspective and is based on extensive oral and written communication. The capstone project is typically the foundation of the student's engineering portfolio for application to industry or graduate school.
Pre-requisites: ME 495
Co-requisites: none



Student:	ID#:	Email:
Advisor:	Starting Semester:	Expected Graduation:

4-Year Curriculum: 134 Credit Hours Total

Freshman Year - Fall Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
SE 100	Programming for Engineers	3		
SE 100 L	Programming for Engineers Lab	1		
CHM 102	Introduction to Chemistry	3		
CHM 102 L	Introduction to Chemistry Lab	1		
MAT 101	Calculus I	3		
PHU 103	Mechanics and Waves for Engineers	3		
PHU 103 L	Mechanics and Waves for Engineers Lab	1		
ENG 101	Freshman English I	3		
Total		18		

Freshman Year - Spring Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 201	Material Science and Engineering	3		
ME 201 L	Material Science and Engineering Lab	1		
MAT 112	Calculus II	3		
PHU 124	Electromagnetism and Optics for Engineers	3		
PHU 124 L	Electromagnetism and Optics for Engineers Lab	1		
ARB 101	Arabic Language and Literature I	2		
ENG 112	Freshman English II	3		
Total		16		

Sophomore Year - Fall Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 203	Applied Mechanics I: Statics	3		
ME 205	Introduction to Computer Aided Design	3		
ME 305	Manufacturing and Workshop Training	3		
ME 305 L	Manufacturing and Workshop Training Lab	1		
MAT 211	Calculus III	3		
MAT 212	Linear Algebra	3		
MAT 213	Differential Equations	3		
Total		19		

Sophomore Year - Spring Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 206	Thermal Fluids Engineering I	3		
ME 206 L	Thermal Fluids Engineering I Lab	1		
ME 208	Mechanics of Materials I	3		
ME 208 L	Mechanics of Materials I Lab	1		
EE 207	Foundations of Electrical Engineering	3		
EE 207 L	Foundations of Electrical Engineering Lab	1		
MAT 224	Numerical Methods	3		
STA 212	Probability and Statistics for Engineers	3		
Total		18		

Junior Year - Fall Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 307	Thermal Fluids Engineering II	3		
ME 307 L	Thermal Fluids Engineering II Lab	1		
ME 311	Applied Mechanics II: Dynamics	3		
ME 312	Mechanics of Materials II	3		
ME 312 L	Mechanics of Materials II Lab	1		
ME 315	Machine Design	3		
ENG 222	Technical Writing	3		
Total		17		

Junior Year - Spring Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 306	Instrumentation and Control Engineering	3		
ME 306 L	Instrumentation and Control Engineering Lab	1		
ME 308	Advanced Manufacturing Processes	3		
ME 308 L	Advanced Manufacturing Processes Lab	1		
ME 310	Mechanical Component Design	3		
ME 310 L	Mechanical Component Design Lab	1		
ISL 101	Islamic Studies I	2		
ARB 112	Arabic Language and Literature II	2		
Total		16		

Junior Year - Summer Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 390	Mechanical Engineering Summer Internship	0		
Total		0		

Senior Year - Fall Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 403	Finite Element Methods	3		
ME 403 L	Finite Element Methods Lab	1		
ME 405	Engineering Safety and Risk Analysis	3		
ME 407	Heating, Ventilation, and Air-Conditioning	3		
ME 495	Mechanical Engineering Capstone Project I	3		
ISL 112	Islamic Studies II	2		
Total		15		

Senior Year - Spring Semester				
Course Code	Course-Title	CRHs	Semester Taken	Retake/Transfer
ME 314	Vibration and Damping	3		
ME 4 _ _	Technical Elective	3		
ME 4 _ _	Technical Elective	3		
ME 496	Mechanical Engineering Capstone Project II	3		
IE 315	Engineering Economy and Cost Analysis	3		
Total		15		

Alfaisal University – Bachelor of Mechanical Engineering Prerequisites Chart (Effective Fall 2019)

