

Bachelor of Science in Mechanical Engineering

Program Description

The Bachelor of Science degree in mechanical engineering requires a minimum of 134 credit hours of coursework. Mechanical engineering is one of the largest, broadest, and oldest engineering disciplines. Mechanical engineers use the principles of energy, materials, and mechanics to design and manufacture machines and devices of all types. They create the processes and systems that drive technology and industry.

The key characteristics of the profession are its breadth, flexibility, and individuality. The career paths of mechanical engineers are largely determined by individual choices, a decided advantage in a changing world.

Mechanics, energy and heat, mathematics, engineering sciences, design and manufacturing form the foundation of mechanical engineering. Mechanics includes fluids, ranging from still water to hypersonic gases flowing around a space vehicle; it involves the motion of anything from a particle to a machine or complex structure.

The Bachelor of Science in Mechanical Engineering is overseen by the School of Engineering and Computing and is designed to satisfy QF Emirates Level 7 requirements.

Program Mission

The Bachelor of Science in the mechanical engineering program at the American University of Ras Al Khaimah (AURAK) educates students to become qualified engineers who are capable of generating effective solutions by using engineering approaches in the field of mechanical engineering. The graduates of the program will be well versed in technology and in social and environmental issues.

To fulfill this mission, the program provides the undergraduate student with a thorough foundation in the basic tenets of mechanical engineering and technologies, and a broad introduction into machine design, engineering materials, thermal sciences, energy and environment protection and mechanical systems. The program provides a strong background for graduate study in the diverse areas branching out of the mechanical engineering field. The technical focus is complemented with topics in general education leading to a well-rounded member of the global society.

Program Educational Objectives

A few years after earning their degree, our graduates will:

1. Take leadership positions in energy and industrial sectors in response to regional and global market needs.
2. Pursue higher education, research and development, and/or other creative and innovative efforts in science, engineering and technology.
3. Create start-up companies that provide creative products and services for industry and society.

Program Learning Outcomes

Graduates of the program will have the ability to:

- 1 Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

- 2 Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- 3 Communicate effectively with a range of audiences
- 4 Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- 5 Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- 6 Develop and conduct appropriate experimentation, analyze and interpretation of data, and use engineering judgment to draw conclusions
- 7 Acquire and apply new knowledge as needed, using appropriate learning strategies

Degree Requirements

The BS in Mechanical Engineering (MENG) requires the completion of 134 credits in the following areas:

Area	Credit
University General Education Requirements	32
School of Engineering and Computing Requirements	32
Mechanical Engineering Department Requirements	64
Technical Electives	6

University General Education Requirements

32 credit hours

The program requires completion of the General Education Component. For information relating directly to the General Education requirements, please review the catalog section entitled, "General Education Component." You must speak with your advisor to ensure that the General Education Component requirements are satisfied. **The fifth writing intensive course for the BS in Mechanical Engineering is MENG 313 Manufacturing Processes Lab.**

Course Code	Title	Credits
ARAB 101 or ARAB 110	Arabic Language and Culture for Non-Native Learners I OR Arabic Language and Culture for Native Arabic Speakers I	3
ENGL 101	Composition (Writing Intensive)	3
CSCI 114	Applied Computational Thinking	3
CSCI 115	Applied Computational Tools	1
UNIV 100	University First-Year Transition	1
UNIV 200	Innovation, Entrepreneurship, and Sustainability (Writing Intensive)	3
PHIL 100 or ENGL 200	Critical Thinking and Reasoning (Writing Intensive) OR Advanced Composition (Writing Intensive)	3
MEST 100	Introduction to Islam in World Culture (Writing)	3
ECON 103	Principles of Microeconomics	3

UAES 200	Survey of United Arab Emirates Studies	3
MATH 113	Calculus I	3
CHEM 211	General Chemistry I	3

School of Engineering and Computing Requirements

32 Credit Hours

Course Code	Course Title	Credits
ENGR 107	Introduction to Engineering	2
PHYS 110	University Physics I	3
PHYS 111	University Physics I Lab	1
MATH 114	Calculus II	3
MATH 213	Calculus III	3
MATH 214	Elementary Differential Equations	3
MATH 203	Linear Algebra	3
PHYS 220	University Physics II	3
PHYS 221	University Physics II Lab	1
ENGR 210	Sustainability in Engineering	2
ENGR 450	Engineering Seminar	1
ENGR 390	Internship I	3
ENGR 391	Internship II	3
CHEM 212	General Chemistry I Lab	1

MENG Program Requirements

70 Credit Hours

Core Courses

64 Credit Hours

Course Code	Course Title	Credits
CIEN 211	Statics	3
CIEN 212	Mechanics of Materials	3
CIEN 251	Fluid Mechanics	3
CIEN 301	Numerical Analysis	3
EEEN 280	Electric Circuits Analysis I	3
EEEN 281	Electric Circuits Analysis Lab.	1
MENG 241	Engineering Materials	3
MENG 242	Engineering Materials Lab.	1
ENGR 200	Engineering Statistics	3
MENG 312	Manufacturing Processes	3
MENG 313	Manufacturing Processes Lab.	1
MENG 201	Mechanical Engineering Drawing	3
MENG 211	Thermodynamics I	3
MENG 212	Thermodynamics II	3
MENG 221	Dynamics	3
MENG 231	Engineering Measurements	2
MENG 321	Vibration and Control	3
MENG 342	Fluid Mechanics Lab.	1
MENG 361	Heat Transfer	3
MENG 362	Thermal Sciences Lab.	1
MENG 421	Theory of Machines	3

Course Code	Course Title	Credits
MENG 451	Mechanical Design I	3
MENG 452	Mechanical Design II	3
MENG 491	Senior Design Project I	2
MENG 492	Senior Design Project II	4

Technical Electives

6 Credit Hours

Course Code	Course Title	Credits
MENG 311	Internal Combustion Engines	3
MENG 323	Engineering Economy	3
MENG 441	Turbo Machinery	3
MENG 453	Computer Aided Design	3
MENG 455	Finite Elements in Machine Design	3
MENG 461	HVAC and Refrigeration Systems	3
MENG 462	Design of Thermal System	3
MENG 463	Energy Conversion and Management	3
MENG 471	Sustainable Product Design	3
MENG 493	Special Topics in Mechanical Engineering	3
ENGR 399	Undergraduate Research Project	3
ENGR 420	Life Cycle Assessment	3
EEEN 426	Renewable Energy Systems	3
EEEN 451	Control Theory	3

BS in Mechanical Engineering Four-Year Sample Schedule

First Year, First Semester			First Year, Second Semester		
Course Code	Course Title	Credits	Course Code	Course Title	Credits
PHYS 110	University Physics I	3	ARAB 101 Or ARAB 110	Arabic Language and Culture for Non-Native Learners I OR Arabic Language and Culture for Native Arabic Speakers I	3
PHYS 111	University Physics I Lab	1	CSCI 114	Applied Computational Thinking	3
ENGL 101	Composition	3	CSCI 115	Applied Computational Tools	1
ENGR 107	Introduction to Engineering	2	MATH 114	Calculus II	3
MATH 113	Calculus I	3	PHYS 220	University Physics II	3
CHEM 211	General Chemistry I	3	PHYS 221	University Physics II Lab	1
CHEM 212	General Chemistry I Lab	1	MEST 100	Introduction to Islam in World Culture	3
UNIV 100	University First-Year Transition	1			
Subtotal =		17	Subtotal =		17
Second Year, First Semester			Second Year, Second Semester		
Course Code	Course Title	Credits	Course Code	Course Title	Credits
MENG 201	Mechanical Engineering Drawing	3	CIEN 212	Mechanics of Materials	3
CIEN 211	Statics	3	MENG 221	Dynamics	3
ENGR 210	Sustainability in Engineering	2	CIEN 251	Fluid Mechanics	3
MATH 213	Calculus III	3	MATH 214	Elementary Differential Equations	3
MENG 211	Thermodynamics I	3	MENG 212	Thermodynamics II	3
MENG 231	Engineering Measurements	2	PHIL 100 Or ENGL 200	Critical Thinking and Reasoning Or Advanced Composition	3
Subtotal =		16	Subtotal =		18
Second Year, Summer Session					
Course Code	Course Title	Credit			
ENGR 390	Internship I	3			
Third Year, First Semester			Third Year, Second Semester		
Course Code	Course Title	Credits	Course Code	Course Title	Credits
MENG 241	Engineering Materials	3	MENG 361	Heat Transfer	3
MENG 242	Engineering Materials Lab.	1	MENG 362	Thermal Sciences Lab	1
MATH 203	Linear Algebra	3	MENG 321	Vibration and Control	3
ECON 103	Principles of Microeconomics	3	ENGR 200	Engineering Statistics	3
MENG 342	Fluid Mechanics Lab	1	MENG 312	Manufacturing Processes	3
UAES 200	Survey of United Arab Emirates Studies	3	MENG 313	Manufacturing Processes Lab.	1
			EEEN 280	Electric Circuit Analysis	3
			EEEN 281	Electric Circuit Analysis Lab	1
Subtotal =		14	Subtotal =		18
Third Year, Summer Session					
Course Code	Course Title	Credits			
ENGR 391	Internship II	3			
Fouthr Year, First Semester			Fourth Year, Second Semester		
Course Code	Course Title	Credits	Course Code	Course Title	Credits
MENG 451	Mechanical Design I	3	MENG 452	Mechanical Design II	3
MENG 421	Theory of Machines	3		ME Technical Elective 2	3
	ME Technical Elective I	3	ENGR 450	Engineering Seminar	1
CIEN 301	Numerical Analysis	3	UNIV 200	Innovation, Entrepreneurship & Sustainability	3
MENG 491	Senior Design Project I	2	MENG 492	Senior Design Project II	4
Subtotal =		14	Subtotal =		14
Total 134 Credits					