Program Viewbook

Bachelor of Science in Mechatronics Engineering (BScME)

Program Description

The Bachelor of Science in Mechatronics Engineering (BScME) prepares students with a solid foundation in mechanical, electrical, and software engineering to design and implement intelligent mechatronic systems. This interdisciplinary program blends advanced knowledge in robotics, artificial intelligence, automation, industrial control, and engineering management, equipping graduates with the skills needed to drive innovation in smart manufacturing, autonomous systems, and Industry 5.0. The program offers two elective focuses:

Robotics AI: Focusing on robotic system design, machine learning, intelligent control, and human-robot interaction for cutting-edge automation solutions.

Industrial Management: Emphasizing smart manufacturing, supply chain optimization, digital transformation, and process automation for operational excellence.

Through rigorous theoretical coursework, hands-on laboratory experiences, and real-world internships, students gain practical skills in robotic system design, industrial automation, control engineering, and AI-driven decision-making. The program emphasizes innovation, problem-solving, and sustainable technology development to address the evolving challenges of modern industries.

Graduates of the BSc in Mechatronics Engineering are equipped for roles in robotics, automation, AI-driven systems, and industrial management. They can work as Robotics Engineers, Automation Engineers, or AI-Driven Control Engineers, designing intelligent systems for industrial processes. They also specialize in optimizing production systems, supply chains, and industrial IoT solutions. Additionally, they contribute to R&D in AI and robotics, or launch startups focused on AI-powered automation and smart technologies.

Program Learning Outcomes (PLOs)

PLO 1: Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

PLO 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.

PLO 3: Communicate effectively with a range of audiences.

PLO 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.

PLO 5: Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

PLO 6: Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

PLO 7: Acquire and apply new knowledge as needed, using appropriate learning strategies.

Program Completion Requirements

The Bachelor of Science in Mechatronics Engineering (BScME) degree shall be awarded to a student who is officially enrolled in the program and has fulfilled the following requirements:

- Successful completion of 134 credit hours.
- Achievement of a minimum cumulative GPA of 2.0 on a 4.0 scale.
- Completion of at least 50% of total program credit hours at CUD.
- Completion of the Internship and Graduation Project while enrolled at CUD.

Program Structure

Core Courses	**115 Cr. Hrs.**
Technical Electives	**12 Cr. Hrs.**
Practical Experience and Projects	**07 Cr. Hrs.**
Total	**134 Cr. Hrs.**

List of Courses

I. Core Courses

Course			Pre/Co-requisite	Cr. Hrs.
Mathematics and Statistics				**30**
MTH	112	Calculus I	None	3
MTH	113	Calculus II	MTH 112	3
MTH	114	Linear Algebra	MTH 112	3
MTH	120	Discrete Mathematics	None	3
MTH	130	Probability and Statistics	MTH 112	3
MTH	212	Calculus III	MTH 113	3
MTH	220	Ordinary Differential Equations	MTH 212	3
SCI	210	Modern Physics	None	3
SCI	220	Engineering Mechanics	None	3
SHS	103	Chemistry	None	3
Electromechanical Engineering				**46**
ENG	102	Digital Logic	None	3
ENG	122	Engineering Graphics and Design	None	1
NET	105	Microprocessors and Microcontrollers	ENG 102 or NET 100	3
ENG	213	Electric Circuit I	SCI 210	3
ENG	225	Electronics I	ENG 213	3
ENG	315	Control Systems	MTH 220	3
ENG	317	Digital Signal Processing	MTH 212	3
ENG	323	Electric Machines	ENG 213	3
MEC	305	Mechanical Vibrations	MTH 220	3
MEC	307	Mechanical Engineering Design	ENG 122	3
MEC	309	Electro-Pneumatic & Hydraulic Control Circuits	PRE 252	3
MEC	323	Industrial Automation	Co-requisite MEC 324	3
MEC	324	Mechatronics Systems Design	MTH 220	3

Course			Pre/Co-requisite	Cr. Hrs.
MEC	414	Programmable Logic Controllers	ENG 315	3
MEC	415	Computer Integrated Manufacturing (CIM)	MEC 323	3
PRE	252	Thermo Dynamics and Fluid Mechanics	SCI 210	3
Computer Science and Computation				12
SWS	110	Programming I	None	3
SWS	111	Programming II	SWS 110	3
ENG	316	Internet of Things and Data Science	NET 105	3
BCS	407	Artificial Intelligence	SWS 111 or BCS 206, BCS 222	3
Professional Studies and General Education				**27**
Compulsory Courses				**24**
LNG	181	English I for Engineering and Computing	None	3
LNG	182	English II for Engineering and Computing	LNG 181 or LNG 172	3
GED	190	Emirati Studies	None	3
GED	255	Critical Thinking and Problem Solving	LNG 182 or LNG 172	3
ENT	141	Fundamentals of Innovation and Entrepreneurship 1	None	2
ENT	142	Fundamentals of Innovation and Entrepreneurship 2	ENT 141	1
ENT	241	Entrepreneurship 1	ENT 142	2
ENT	242	Entrepreneurship 2	ENT 241	1
BUS	311	Engineering Economy	MTH 130	3
ENG	416	Professional and Engineering Ethics	Min 60 Cr. Hrs.	3
Humanity Elective Courses (03 Credits): Students are required to select one course from the following courses				**3**
GED	103	Head Anatomy Sculpture	None	3
GED	106	Smart Decisions: Data Literacy and Visualization	None	3
GED	110	Modern Art Appreciation	None	3
GED	111	Music Appreciation and Communication	None	3
GED	191	Islamic Studies	None	3
GED	196	Communication Skills in Arabic	None	3
GED	205	Psychology in Everyday Life	LNG-172 or LNG-182	3
GED	324	Ethical Reasoning for Today's World	LNG-172 or LNG-182	3
GED	330	Introduction to Canadian Studies	None	3

II. Technical Elective Courses

Course			Pre/Co-requisite	Cr. Hrs.
Suggested Elective Options (Students are required to select One of the following two options)				
1- Robotics Artificial Intelligence				**12**
BAI	306	Introduction to Computer Vision	ENG 317 or BCS 202, MTH 114, BAI 301	3
RAI	401	Robotics	MTH 114, MEC 324	3
RAI	403	Machine Learning for Robotics	MTH 120, RAI 401	3
RAI	404	Vehicle Automation Systems	RAI 401	3
2- Industrial Management				**12**
IDM	401	Smart Manufacturing Systems	ENG 316	3
IDM	402	Smart Supply Chain Management	ENG 316	3

Course			Pre/Co-requisite	Cr. Hrs.
IDM	403	Production Planning and Control	MEC 415	3
IDM	404	Industrial Safety and Risk Management	MEC 323	3

III. Practical Experience & Projects

Course			Pre/Co-requisite	Cr. Hrs.
Practical Experience and Project				**07**
MEC	480	Internship in Mechatronics Engineering	90 Cr. Hrs. & CGPA ≥ 2.0	3
MEC	407	Graduation Project 1	Completed 90 Cr. Hrs.	2
MEC	408	Graduation Project 2	MEC 407	2

Eight Semesters Study Plan

Semester	Course Code		Course Title	Prerequisite / Co-requisite	Cr. Hrs.
1	LNG	181	English I for Engineering & Computing	None	3
	ENG	102	Digital Logic	None	3
	MTH	112	Calculus I	None	3
	SGS	103	Chemistry	None	3
	SWS	110	Programming I	None	3
	ENT	141	Fundamentals of Innovation and Entrepreneurship 1	None	2
	Total				**17**
2	LNG	182	English II for Engineering & Computing	LNG 181	3
	ENT	142	Fundamentals of Innovation and Entrepreneurship 2	ENT 141	1
	MTH	113	Calculus II	MTH 112	3
	MTH	120	Discrete Mathematics	None	3
	ENG	122	Engineering Graphics and Design	None	1
	SWS	111	Programming II	SWS 110	3
	SCI	210	Modern Physics	None	3
	Total				**17**
3	MTH	130	Probability and Statistics	MTH 112	3
	MTH	212	Calculus III	MTH 113	3
	NET	105	Microprocessors and Microcontrollers	ENG 102 or NET 100	3
	ENG	213	Electric Circuit I	SCI 210	3
	ENT	241	Entrepreneurship 1	ENT 142	2
	SCI	220	Engineering Mechanics	None	3
	Total				**17**
4	MTH	114	Linear Algebra	MTH 112	3
	MTH	220	Ordinary Differential Equations	MTH 212	3
	ENG	225	Electronics I	ENG 213	3
	ENT	242	Entrepreneurship 2	ENT 241	1
	PRE	252	Thermo Dynamics and Fluid Mechanics	SCI 210	3
	GED	255	Critical Thinking and Problem-Solving	LNG 182 or LNG 172	3
	Total				**16**
5	GED	XXX	Humanity Elective	None	3
	GED	190	Emirati Studies	None	3
	MEC	305	Mechanical Vibrations	MTH 220	3
	ENG	315	Control Systems	MTH 220	3
	ENG	316	Internet of Things and Data Science	NET 105	3
	ENG	317	Digital Signal Processing	MTH 212	3
	Total				**18**
6	BUS	311	Engineering Economy	MTH 130	3
	ENG	323	Electric Machines	ENG 213	3
	MEC	307	Mechanical Engineering Design	ENG 122	3
	MEC	309	Electro-Pneumatic & Hydraulic Control Circuits	PRE 252	3
	MEC	323	Industrial Automation	Co-requisite MEC 324	3
	MEC	324	Mechatronics Systems Design	MTH 220	3
	Total				**18**
7	MEC	407	Graduation Project 1	Completed 90 Cr. Hrs.	2
	ENG	416	Professional and Engineering Ethics	Min 60 Cr. Hrs.	3
	MEC	414	Programmable Logic Controllers	ENG 315	3
	MEC	415	Computer Integrated Manufacturing (CIM)	MEC 323	3
	XXX	XXX	Technical Elective 1		3
	XXX	XXX	Technical Elective 2		3
	Total				**17**
8	BCS	407	Artificial Intelligence	SWS 111 or BCS 206, BCS 222	3
	MEC	408	Graduation Project 2	MEC 407	2
	XXX	XXX	Technical Elective 3		3
	XXX	XXX	Technical Elective 4		3
	Total				**11**
	Internship to be taken after completion of 90 Cr. Hrs. and CGPA 2.0 or more.				3
Total Program Credits					**134**