

# University of Mosul

## جامعة الموصل



*First Cycle – Bachelor's degree (B.Sc.) – Mechatronics Engineering*

بكالوريوس - هندسة ميكاترونكس



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### 1. Mission & Vision Statement

#### *Vision Statement*

To be recognized globally for world-class technical education emphasis on practical-oriented training, rich industrial partnerships and research catering to the changing industrial demands and social needs.

#### *Mission Statement*

The mission of Mechatronics Engineering Department at the University of Mosul is to advance knowledge, enable applications, and train future high qualified leaders through research and education in the technical fields of sensing, actuation, intelligent systems, advanced manufacturing, healthcare, power and energy, also preparing advanced technological engineering researches and unique society services under the global quality systems to contribute to the achievement of sustainable development, promote the production of knowledge, and establish the ethical values within a framework of professional responsibility and community partnership.

### 2. Program Specification

Programme code:		ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

The Mechatronics Engineering undergraduate program aims to satisfy the academic goals as set by the Faculty of Engineering that applies to all its departments. Consistent with these goals, the

educational objectives of the program can be stated as follow: Provide a firm foundation in mathematics, engineering and basic sciences as required by the engineering discipline. Provide a selection of interdisciplinary and general education courses that will enhance students' understanding of the economic, environmental, ethical, political, societal, and cultural impact of their engineering solutions and/or decisions. The program offers a balanced combination of mechanics, electronics and computer engineering skills in addition to special courses for integrating these disciplines of engineering to be able to develop and implement complex systems. The program is designed to give students in depth knowledge of principles of mechanics, electronics, control theory and computer programming. Encourage self-learning, life-long learning, and help develop a strong sense of responsibility. Provide students with a satisfactory level of competence in the analysis and solution of engineering problems. Provide students the opportunities to work in a team, either as a member or as a team leader. Prepare the graduates for the industry or postgraduate studies.

Students enrolled in the program are offered high tech laboratories and modern seminar rooms, classrooms and laboratories; which CAD/CAM, computer, dynamics, automotive and AutoCAD laboratories are available for teaching, projects and research, and they closely integrate the processes associated with design, manufacturing, and robotics. Apart from an academic advisor for each student, lab assistants are available to assist students. Along with the university library, students may benefit from libraries hosted by Mechanical Engineering and Electrical Engineering Departments.

### **3. Program Goals**

1. Synthesize and integrate mechatronic subsystems to create custom solutions for different engineering problems.
2. Use computational facilities, analytical tools, equipment, techniques, measuring instruments, workshops and laboratory equipment.
3. Put the necessary specifications describing the different variants of mechatronic equipment such as Robotics, CNC machines, CAD/CAM systems, pneumatic and hydraulic equipment, etc. for purpose of purchasing and contracting.
4. Write the necessary software for the equipment and the control of the mechatronic systems
5. Develop mechanical, electrical, electronic, programming and communication elements necessary for improving the quality life of humans.
6. Integrate a wide range of techniques and software tools to create a complete Mechatronics system.
7. Design mechatronic components that can be used in the synthesis of industrial automation.

## **4. Student Learning Outcomes**

### **Outcome 1**

The ability to apply mathematics, physics, mechanics and electronics to solve engineering and industrial problems and to identify, formulate, and solve complex engineering problems.

### **Outcome 2**

The ability to apply engineering design to produce solutions that meet specified needs with consideration of safety, and welfare, cultural, social, environmental, and economic factors.

### **Outcome 3**

The ability to develop technical expertise in digital design, microcontroller operation, interfacing, and programming, sensors, actuators, drive systems, control theory and data communication.

### **Outcome 4**

The ability to develop technical expertise in mechanical design, computer-aided design, robotics as well as manufacturing technology and to analyze the engineering systems for better operation, performance and control.

### **Outcome 5**

The ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

### **Outcome 6**

The ability to 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.

### **Outcome 7**

The ability to acquire and apply new knowledge as needed, using appropriate learning strategies and to pursue further studies and research nationally and internationally.

## 5. Academic Staff

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## 6. Credits, Grading and GPA

### Credits

University of Mosul is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

### Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

### Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.



CGPA of a 4-year B.Sc. degree:

$$\text{CGPA} = [ (1^{\text{st}} \text{ module score} \times \text{ECTS}) + (2^{\text{nd}} \text{ module score} \times \text{ECTS}) + \dots ] / 240$$

## 7. Curriculum/Modules

### Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE 101	English Language	33	17	2.00	S	
MTE 102	Mathematics I	63	87	6.00	B	
MTE 103	Material Science	63	87	6.00	B	
MTE 104	Engineering Drawing & AutoCAD	63	62	5.00	B	
MTE 105	Computer	48	27	3.00	B	
MTE 106	Electrical Circuits Analysis I	78	72	6.00	C	
MTE 107	Democracy and Human Rights	33	17	2.00	S	

### Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE 108	Arabic language	33	17	2.00	S	
MTE 109	Mathematics II	63	62	5.00	B	
MTE 110	Engineering Mechanics-Statics I	78	47	5.00	B	
MTE 111	Computer Programming	63	62	5.00	B	
MTE 112	Manufacturing Processes	63	37	4.00	C	
MTE 113	Electrical Circuits Analysis II	78	47	5.00	C	MTE 106
MTE 114	Physics	48	52	4.00	B	

### Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE 201	Baath regime crimes in Iraq	33	17	2.00	S	
MTE 202	Engineering Mechanics-Dynamics	78	47	5.00	C	

MTE 203	Applied Mathematics I	63	62	5.00	B	MTE 109
MTE 204	Electronic Principles and Devices	93	82	7.00	C	MTE 113
MTE 205	Electrical Machines	63	62	5.00	C	MTE 113
MTE 206	Thermodynamics	63	37	4.00	C	
MTE 207	Experimental Methods for Engineers	33	17	2.00	C	

**Semester 4 | 30 ECTS | 1 ECTS = 25 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE 208	Applied Mathematics II	78	72	6.00	B	MTE 109
MTE 209	Fluid Mechanics	93	57	6.00	C	
MTE 210	Mechanics of Materials	63	87	6.00	B	
MTE 211	Digital Circuits Design	63	37	4.00	C	
MTE 212	Engineering Economics with statistics	63	62	5.00	B	
MTE 213	Signals and Systems	48	27	3.00	C	MTE 203

**Semester 5 | 30 ECTS | 1 ECTS = 25 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE 301	Measurement and Instrumentation	93	57	6.00	C	
MTE 302	Control System	93	57	6.00	C	MTE 208
MTE 303	Signal Processing	63	37	4.00	C	
MTE 304	Microprocessors & Assembly Language	93	57	6.00	C	
MTE 305	Mechanical Engineering Laboratory	33	17	2.00	C	
MTE 306	Theory of Machines	78	72	6.00	C	MTE 202

**Semester 6 | 30 ECTS | 1 ECTS = 25 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE 307	Heat Transfer	63	62	5.00	C	MTE 206
MTE 308	Hydraulic & Pneumatic Systems	63	62	5.00	C	
MTE 309	Computer Aided Machine Design I	63	62	5.00	C	MTE 202
MTE 310	Microcontroller System Design	63	62	5.00	C	MTE 304

MTE 311	Numerical Methods	63	62	5.00	B	
MTE 312	Power Electronics and Drive	63	62	5.00	C	MTE 204

**Semester 7 | 30 ECTS | 1 ECTS = 25 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE 401	Modern Control Systems	93	57	6.00	C	MTE 302
MTE 402	Industrial Automation	63	62	5.00	C	
MTE 403	Robotics	93	57	6.00	C	
MTE 404	Computer Interface	78	47	5.00	C	MTE 304
MTE 405	Artificial Intelligence	78	22	4.00	C	
MTE 406	Capstone Project I	48	52	4.00	C	MTE104 / MTE111 / MTE112 / MTE202 / MTE204 / MTE205 / MTE206 / MTE207 / MTE209 / MTE210 / MTE211 / MTE213 / MTE301 / MTE302 / MTE304

**Semester 8 | 30 ECTS | 1 ECTS = 25 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MTE407	Computer Aided Machine Design II	78	97	7.00	C	MTE 309
MTE408	Special Topics in Mechatronics	63	87	6.00	C	
MTE409	Engineering management	33	42	3.00	B	
MTE410	Design of Mechatronics Systems	63	62	5.00	C	
MTE411	Computer Aided Manufacturing (CAM)	63	62	5.00	C	
MTE412	Capstone Project II	48	52	4.00	C	MTE 406

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