



**Ministry of Higher Education
and Scientific Research
University of Baghdad
Al-Khwarizmi College of Engineering
Mechatronics Engineering Department**

Program Catalogue | 2023-2024 | دليل البرنامج الدراسي

Mechatronics Engineering Department

2023 - 2024

1-10-2023

1. **Mission & Vision Statement**

Vision Statement

The academic staff of the Mechatronics Engineering Division at (Al-Khwarizmi College of Engineering/ University of Baghdad) believe that students come to understand the discipline of Mechatronics through a combination of coursework, laboratory experiences, research, and fieldwork. The combination of instructional methods leads students to a balanced understanding of the scientific and technological methods used by Mechatronics to make observations, develop insights, design, and implementation of mechatronic systems that can be used for different applications in our daily life. Normal class sizes within technological programs foster a close working relationship between academic staff and students in an informal and nurturing atmosphere.

Mission Statement

The academic staff of Mechatronics pursues a multifaceted charge at (Al-Khwarizmi College of Engineering/ University of Baghdad). The Program seeks to provide all Mechatronics students with fundamental knowledge of Mechatronics, as well as a deeper understanding of a selected focus area within the Mechatronics engineering. The curriculum and advising have been designed To provide strong fundamentals and technical skills in Mechatronics Engineering through effective teaching-learning Methodologies, to transform the lives of the students by fostering ethical values, creativity, and innovation to become Entrepreneurs and establish Start-ups, and To inculcate learning of emerging technologies for pursuing higher studies leading to lifelong learning.

2. **Program Specification**

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

Mechatronics engineering also called mechatronics, is an interdisciplinary branch of engineering that focuses on the integration of mechanical, electrical, and electronic engineering systems, and also includes a combination of robotics, electronics, computer science, telecommunications, systems, control, and product engineering. As technology advances over time, various subfields of engineering have succeeded in both adapting and multiplying. The intention of mechatronics is to produce a design solution that unifies each of these various subfields. Originally, the field of mechatronics was intended to be nothing more than a combination of

mechanics, electrical and electronics, hence the name being a portmanteau of the words "mechanics" and "electronics"; however, as the complexity of technical systems continued to evolve, the definition had been broadened to include more technical areas.

Level 1 exposes students to the fundamentals of Mechatronics, suitable for progression to all programs within the mechatronics program group. Program-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4. The University mechatronics engineering graduate is therefore trained to appreciate how research informs teaching, according to the University and School Mission statements.

At Levels 2, 3 and 4 students are ready to unite the principles of mechanics, electrical, electronics, and computing to generate a simpler, more economical and reliable system. Decisions on what to study are made with input from personal tutors.

There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3 and 4. At Level 4 all students carry out an independent research project.

Academic tutorials are held at Levels 1 and 2 with the same tutor, who is also the personal tutor, providing continuity and progressive guidance. Level 1 and 2 tutorials include a number of workshops to teach skills, e.g. library use and presentation skills, followed by assessed exercises, e.g. essays and talks, as opportunities to practice these skills in a subject-specific context.

International years and Industrial placements are also offered and individual needs are discussed with the appropriate tutor and accommodated wherever possible.

3. Program Objectives

In four years after the completion of the baccalaureate degree, mechatronics engineering graduates will:

- Be competent mechatronic engineers who are knowledgeable, skillful and able to solve complex engineering problems.
- Have inclination towards research and lifelong learning and be able to promote entrepreneurial ideas.
- Be effective engineers with leadership qualities and high morals and professional ethics.

4. Student Learning Outcomes

Mechatronics engineering graduates will have an ability to:

- Identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
- 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
- Communicate effectively with a range of audiences
- 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
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- Acquire and apply new knowledge as needed, using appropriate learning strategies

5. Academic Staff

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6. Credits, Grading and GPA

Credits

(Al-Khwarizmi College of Engineering/ University of Baghdad) 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)

- 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
MCT111	Engineering Mechanics (Static)	63	87	6.00	C	
MCT112	Physics of Materials and Semiconductors	78	72	6.00	B	
MCT113	Mathematics I	78	72	6.00	B	
MCT114	Electrical Circuits I	78	72	6.00	C	
MCT115	English Language 1	48	27	3.00	B	
MCT116	Baath Crimes	18	3	0.84	B	
MCT117	Computer 1	48	6	2.16	B	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MCT121	Engineering Mechanics (Dynamic)	63	62	5.00	C	
MCT122	Engineering Drawing and Auto CAD	48	77	5.00	B	
MCT123	Mathematics II	78	47	5.00	C	MCT113
MCT124	Electrical Circuits II	78	47	5.00	C	MCT114
MCT125	Electronics I	78	47	5.00	C	
MCT 126	Foundation of Programming	63	37	4.00	C	MCT117
MCT127	Human Rights and General Freedoms	18	7	1.00	B	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MCT211	Engineering Mathematics I	63	62	5.00	B	
MCT212	Strength of Materials	63	62	5.00	C	
MCT213	Materials & Manufacturing	63	62	5.00	C	
MCT214	Thermal system design	48	77	5.00	C	
MCT215	Digital Logic	78	47	5.00	C	
MCT216	Computer programming	63	62	5.00	B	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MCT221	Engineering Mathematics II	78	47	5.00	B	MCT211
MCT222	Theory of Machines	63	62	5.00	C	
MCT223	English I	48	27	3.00	B	
MCT224	Fluid Mechanics	63	62	5.00	C	
MCT225	Embedded system	63	87	6.00	B	
MCT226	Electronics II	63	87	6.00	C	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MCT311	Engineering and Numerical Analysis	63	62	5.00	B	
MCT312	English Language II	63	37	4.00	C	
MCT313	Electrical Machines	63	62	5.00	S	
MCT314	Sensors and Instrumentation	63	62	5.00	C	
MCT315	Hydraulic and Pneumatic Systems	63	62	5.00	C	
MCT316	Control Systems	63	87	6.00	C	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MCT321	Engineering Measurements	63	62	5.00	S	
MCT322	Elective course I	63	62	5.00	E	
MCT323	Mechanical Vibrations	63	62	5.00	C	
MCT324	Power Electronics	63	62	5.00	C	
MCT325	Digital Signal Processing	63	62	5.00	C	
MCT326	Control Systems Design	78	47	5.00	C	MCT316

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MCT411	Artificial Intelligence	93	32	5.00	C	
MCT412	Data communications and networks	78	47	5.00	S	
MCT413	Robotics fundamentals	78	47	5.00	C	
MCT414	System Modeling and Simulation	78	72	6.00	C	
MCT415	Image Processing and Computer Vision	63	62	5.00	C	MCT325
MCT416	Engineering Project I	63	37	4.00	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MCT421	CAD/CAM	78	47	5.00	C	
MCT422	Mechanical Design	63	62	5.00	C	
MCT423	Bio Mechatronics	78	47	5.00	C	
MCT424	Mobile Robotics	93	57	6.00	C	MCT413
MCT425	Elective course II	78	47	5.00	E	
MCT426	Engineering Project II	63	37	4.00	C	MCT416

7. Contacts

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