



Sana'a University
Faculty of Engineering

Mechatronics
Engineering
Program Specifications



October - 2020

Faculty of Engineering, Sana'a University

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	Head of the Department Assoc. Prof. Dr. Abdul- Malik Momin	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
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Mechatronics Engineering Program Specifications

Program Identification and General Information:	
Program Title:	Mechatronics Engineering Program.
Host Element:	Faculty of Engineering.
Responsible Department:	Mechatronics Engineering Department.
Other Departments with major Teaching Contributions:	Basic Engineering Sciences, Mechanical Engineering and Electrical Engineering Departments.
Media of Instruction:	English Language.
Mode of Delivery:	Semesters.
Total credit hours needed for completion of the program	17 ¹ hours.
Length full time:	5 years (10 Semesters).
Award granted on completion of the Program:	Bachelor Degree in Mechatronics Engineering.
Location(s) where the program is offered	Faculty of Engineering.
Approval date:	October 2020

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Vision, Mission & Aims of the Department

Vision

Providing an engineering education that integrate multiple fields such as mechanical and electrical engineering, software and control systems, to fulfill the increase demands of technology in the labor market.

Mission of the Department

The department of Mechatronics Engineering at the Faculty of Engineering has an important mission to provide quality engineering education as well as scientific research development in this vital area of engineering.

Aims of the Department

1. To graduate flexible engineering graduates with skills required to access entry level positions in the mechatronics engineering industry as well as in a wider range of employment in commerce, research, manufacturing and maintenance where mechatronics engineers play a vital role.
2. To deliver a program which equips graduates with a high level of understanding of mechatronics concept complemented by professional, practical, and transferable skills that enable graduates to solve a wide range of mechatronics problems.
3. Ensure that graduates are able to make a rapid and effective contribution to their employers' enterprise.
4. Promote a culture amongst graduates of continuous personal and professional development.
5. Ensure that graduates have competencies that enable them to communicate both orally and in writing in the Arabic and English Languages.
6. Ensure that graduates have group skills that will enable them to work professionally in teams.

Graduate Attributes

Upon successful completion of an undergraduate Mechatronics Engineering Program, the graduates will be able to:

1. *Apply knowledge of mathematics, physics and basic sciences to demonstrate the application of this knowledge to electromechanical systems.*
2. *Identify, formulate, and analyze problems related to mechatronics engineering to find solutions using appropriate techniques, skills, engineering tools, and implemented*

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prototypes.

3. *Design mechatronics systems and components to meet the desired applications within realistic constraints.*
4. *Conduct experiments safely in measurements, actuating, control and robotic systems and present results effectively.*
5. *Investigate and analyze the inter-disciplinary characteristics of mechanical, electrical, pneumatic and hydraulic systems.*
6. *Consider the impact of engineering solutions in societal and environmental contexts for sustainable development.*
7. *Carry out researches of literature in mechatronics engineering and use databases to come up with valid information.*
8. *Perform business studies relevant to applications of mechatronics.*
9. *Apply ethical principles and commit to professional ethics and responsibilities.*
10. *Function and communicate effectively in multi-disciplinary teams and engage in life-long learning.*

Program Intended Learning Outcomes (PILOs)

A: Knowledge and Understanding:

Upon successful completion of an undergraduate Mechatronics Engineering Program, graduates should be able to:

- A1. *Use knowledge of mathematics, physics and basic engineering sciences (electrical, mechanical and computer sciences) in the field of mechatronics.*
- A2. *Describe the principles of mechatronics systems and computer design.*
- A3. *Identify necessary knowledge and theoretical concepts of robotics and mechatronics systems for sustainable development.*
- A4. *Respond to professional ethics and responsibilities in mechatronics practices.*
- A5. *Reflect the impacts of effective electromechanical solutions on society and environment.*
- A6. *Use different methodologies for data collection and interpretation in solving*

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engineering problems.

B. Cognitive/ Intellectual Skills:

Upon successful completion of an undergraduate Mechatronics Engineering Program, graduates should be able to:

- B1. Identify, formulate and solve mechatronics problems using suitable methods.*
- B2. Categorize mechatronics systems and components based on their features.*
- B3. Integrate components from different domains to construct useful mechatronics products.*
- B4. Consider social development issues in designing mechatronics projects.*
- B5. Compose and develop innovative solutions for practical industrial problems.*
- B6. Analyze problems related to dynamics, instrumentation, computer aided design, manufacturing using appropriate mathematical and computer models.*

C. Practical and Professional Skills:

Upon successful completion of an undergraduate Mechatronics Engineering Program, graduates should be able to:

- C1. Conduct experiments safely to verify theoretical concepts related to electrical, mechanical, control and embedded systems.*
- C2. Implement and develop automatic systems using electrical/electronic devices and machinery equipment.*
- C3. Identify, formulate and solve engineering problems using appropriate tools and computer software.*
- C4. Perform feasibility studies, prepare budgets and management for mechatronics projects.*
- C5. Use standard approaches while designing and integrating electromechanical systems.*

D. General and Transferable Skills:

Upon successful completion of an undergraduate Mechatronics Engineering Program, graduates should be able to:

- D1. Conduct a search of literature and use databases and other sources of information.*
- D2. Demonstrate personal commitment to tasks and effectively manage time and resources.*
- D3. Co-operate in work as a part of a team coherently and share learned knowledge successfully.*
- D4. Assess technical reports, discuss ideas, and justify results creatively through different*

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- forms.*
- D5. Manage and evaluate the acquisition of new knowledge as a part of life-long learning strategy.
- D6. Demonstrate an awareness of ethical principles and issues.
- D7. Work in stressful environments considering safety regulations.

Study Plan (Mechatronics Engineering Program):

UR stands for University Requirements.

FR stands for Faculty Requirements.

BR stands for Basic Requirements.

MTE stands for Mechatronics Engineering Program Requirements.

University Requirements:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	UR001	Arabic Language 1	لغة عربية ١	2	-	-	2
2.	UR002	English Language 1	لغة انجليزية ١	2	-	-	2
3.	UR003	Computer Skills	مهارات حاسوب	2	2	-	3
4.	UR004	Arabic Language 2	لغة عربية ٢	2	-	-	2
5.	UR005	English Language 2	لغة انجليزية ٢	2	-	-	2
6.	UR006	Islamic Culture	ثقافة اسلامية	2	-	-	2
7.	UR007	Arabic Israeli Conflict	الصراع العربي الإسرائيلي	2	-	-	2
8.	UR008	National Culture	الثقافة الوطنية	2	-	-	2
		Total Credit Hours					

Faculty Requirements:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	FR001	Mathematics 1	رياضيات ١	2	-	2	3
2.	FR002	Engineering Physics	فيزياء هندسية	2	2	2	4
3.	FR003	Mathematics 2	رياضيات ٢	2	-	2	3

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4.	FR404	Engineering Project Management	ادارة مشاريع هندسية	1	-	2	2
5.	FR305	Entrepreneurship & Communication Skills	ريادة اعمال ومهارات تواصل	1	-	2	2
		Total Credit Hours					

Basic Requirements:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	BR001	Engineering Mechanics - Statics	ميكانيكا هندسية - استاتيكا	2	-	2	3
2.	BR002	Engineering Workshop	ورش هندسية	2	2	-	3
3.	BR003	Engineering Drawing	رسم هندسي	1	4	-	3
4.	BR005	Engineering Chemistry	كيمياء هندسية	2	-	2	3
5.	BR006	Engineering Mechanics - Dynamics	ميكانيكا هندسية - ديناميكا	2	-	2	3
6.	BR112	Technical Writing	تقارير فنية	2	-	-	2
7.	BR123	Engineering Mathematics	رياضيات هندسية	2	-	2	3
8.	BR124	Mathematics 3	رياضيات ٣	2	-	2	3
		Total Credit Hours					

General Field:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	MTE101	Logic System Design	تصميم دوائر منطقية	2	2	2	4
2.	MTE302	Renewable Energy Technology (Elective 1)	تقنيات الطاقة المتجددة	2	-	2	3
3.	MTE103	Computer Programming 1	برمجة الحاسوب ١	2	2	-	3

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4.	MTE204	Computer Programming 2	برمجة الحاسوب ٢	2	2	-	3
5.	MTE305	Introduction to Biomedical Technology (Elective 1)	مقدمة لتقنيات الطبية الحيوية	2	-	2	3
		Total Credit Hours					

1. Electrical / Electronics Field:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	MTE111	Electrical Circuits 1	دوائر كهربائية ١	2	2	2	4
2.	MTE112	Electrical Circuits 2	دوائر كهربائية ٢	2	2	2	4
3.	MTE113	Electronics 1	الالكترونيات ١	2	2	2	4
4.	MTE214	Electronics 2	الالكترونيات ٢	2	2	2	4
5.	MTE215	Electrical Machines 1	الات كهربائية ١	2	2	2	4
6.	MTE216	Electrical Machines 2	الات كهربائية ٢	2	2	2	4
		Total Credit Hours					

2. Fluid /Thermal Field:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	MTE121	Thermodynamics and Heat Transfer	ديناميكا حرارية وانتقال حرارة	2	-	2	3
2.	MTE122	Fluid Mechanics	ميكانيكا الموائع	2	١	١	٣
3.	MTE223	Hydraulic and Pneumatic Systems	الأنظمة الهيدروليكية والهوائية	2	-	2	3
4.	MTE424	Air Conditioning and Refrigeration (Elective 2)	التكييف والتبريد	2	-	2	3
		Total Credit Hours					

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3. Control Field:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	MTE231	Analog and Digital Signals	الأشارات التماثلية والرقمية	2	2	2	4
2.	MTE232	Analog Control System	التحكم التماثلي	2	2	-	3
3.	MTE333	Digital Control System	التحكم الرقمي	2	2	-	3
4.	MTE434	Advanced Modern Control (Elective 2)	التحكم بالانظمة المتقدمة	2	-	2	3
		Total Credit Hours					

4. Design Field:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	MTE141	Properties and Strength of Materials	خواص ومقاومة مواد	2	-	2	3
2.	MTE242	Theory of Machines	نظرية الآلات	2	2	-	3
3.	MTE243	Manufacturing Processes	اساليب التصنيع	2	2	-	3
4.	MTE244	Design of Machine Elements	تصميم عناصر الآلات	2	2	-	3
5.	MTE345	System Dynamics and Vibrations	ديناميكا الأنظمة والأهتزازات	2	2	-	3
6.	MTE346	Manufacturing Systems Engineering (Elective 1)	نظم الإنتاج الهندسي	2	-	2	3
		Total Credit Hours					

5.Industrial Field:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	MTE251	Industrial	قياسات وأجهزة صناعية	2	2	-	3

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		Instrumentation and Measurements					
2.	MTE352	Power Electronics and Drives	الالكترونيات قوى ومحركات	2	2	2	4
3.	MTE353	Industrial Statistics & Quality Control	إحصاء وضبط الجودة	2	-	2	3
4.	MTE354	PLC	الحاكنات القابلة للبرمجة	2	2	-	3
5.	MTE355	Industrial Automation	أتمته صناعية	2	2	-	3
6.	MTE356	Industrial Networking	شبيكات صناعية	2	2	-	3
7.	MTE457	Industrial Safety	الأمان الصناعي	2	-	2	3
8.	MTE458	Industrial Training	تدريب صناعي	1	4	-	3
		Total Credit Hours					

6. Integrated Field:

S. No.	Course Code	Course Title	اسم المقرر	Th.	Pr.	Tu.	Cr. Hrs.
1.	MTE261	Microcontrollers and Microprocessors	المعالجات والمتحكمات الدقيقة	2	2	-	3
2.	MTE362	Embedded Systems and Interfacing	الأنظمة المدمجة والواجهات	2	2	-	3
3.	MTE363	System Modeling and Identification	تحديد ونمذجة الأنظمة	2	2	-	3
4.	MTE364	Robotics	روبوت	2	2	2	4
5.	MTE465	Artificial Intelligence	ذكاء صناعي	2	-	2	3
6.	MTE466	Mechatronics System Design	تصميم أنظمة ميكاترونكس	2	2	-	3
7.	MTE467	Machine Vision (Elective 2)	الرؤية الآلية	2	-	2	3
8.	MTE468	Graduation Project	مشروع تخرج	1	2	-	2
9.	MTE468	Graduation Project	مشروع تخرج	1	2	-	2

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Study Plan 2020

Level 1- Semester 1:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	UR001	Arabic Language 1	لغة عربية ١	2	-	-	2
2.	UR002	English Language 1	لغة انجليزية ١	2	-	-	2
3.	UR003	Computer Skills	مهارات حاسوب	2	-	2	3
4.	UR007	Arabic Israeli Conflict	الصراع العربي الاسرائيلي	2	-	-	2
5.	FR001	Mathematics 1	رياضيات ١	2	2	-	3
6.	FR002	Engineering Physics	فيزياء هندسية	2	2	2	4
7.	BR001	Engineering Mechanics - Statics	ميكانيكا هندسية - استاتيكا	2	2	-	3
8.	BR002	Engineering Workshop	ورش هندسية	١	-	٤	3
First Semester Total				١٥	6	٨	22

Level 1- Semester 2:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	UR004	Arabic Language 2	لغة عربية ٢	2	-	-	2
2.	UR005	English Language 2	لغة انجليزية ٢	2	-	-	2
3.	UR006	Islamic Culture	ثقافة اسلامية	2	-	-	2
4.	UR008	National Culture	الثقافة الوطنية	2	-	-	2
5.	FR003	Mathematics 2	رياضيات ٢	2	2	-	3
6.	BR003	Engineering Drawing	رسم هندسي	1	-	4	3
7.	BR005	Engineering Chemistry	كيمياء هندسية	2	2	-	3
8.	BR006	Engineering Mechanics - Dynamics	ميكانيكا هندسية - ديناميكا	2	2	-	3
Second Semester Total				15	6	4	20

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Level 2- Semester 1:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	BR112	Technical Writing	تقارير فنية	2	-	-	2
2.	BR124	Mathematics 3	رياضيات ٣	٢	٢	-	٣
3.	MTE101	Logic System Design	تصميم دوائر منطقية	٢	٢	٢	٤
4.	MTE111	Electrical Circuits 1	دوائر كهربائية ١	2	2	2	4
5.	MTE121	Thermodynamics and Heat Transfer	ديناميكا حرارية وانتقال حرارة	2	2	-	3
6.	MTE141	Properties and Strength of Materials	خواص ومقاومة مواد	2	2	-	3
First Semester Total				12	9	5	19

Level 2- Semester 2:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	BR123	Engineering Mathematics	رياضيات هندسية	2	2	-	3
2.	MTE103	Computer Programming 1	برمجة الحاسوب ١	٢	-	٢	٣
3.	MTE112	Electrical Circuits 2	دوائر كهربائية ٢	2	2	2	4
4.	MTE113	Electronics 1	الالكترونيات ١	2	2	2	4
5.	MTE122	Fluid Mechanics	ميكانيكا الموائع	2	١	1	3
Second Semester Total				10	7	7	17

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Level 3- Semester1:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	MTE204	Computer Programming 2	برمجة الحاسوب ٢	٢	-	٢	٣
2.	MTE214	Electronics 2	الالكترونيات ٢	2	2	2	4
3.	MTE215	Electrical Machines 1	الات كهربائية ١	2	2	2	4
4.	MTE231	Analog and Digital Signals	الاشارات التماثلية والرقمية	2	2	2	4
5.	MTE242	Theory of Machines	نظرية الآلات	٢	-	٢	٣
6.	MTE261	Microcontrollers and Microprocessors	المعالجات والمتحكمات الدقيقة	2	-	2	3
First Semester Total				12	6	12	21

Level 3- Semester2:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	MTE216	Electrical Machines 2	الات كهربائية ٢	2	2	2	4
2.	MTE223	Hydraulic and Pneumatic Systems	الأنظمة الهيدرولكية والهوائية	2	2	-	3
3.	MTE232	Analog Control System	التحكم التماثلي	2	-	2	3
4.	MTE243	Manufacturing Processes	اساليب التصنيع	2	-	2	3
5.	MTE244	Design of Machine Elements	تصميم عناصر الآلات	2	-	2	3
6.	MTE251	Industrial Instrumentation and Measurements	قياسات وأجهزة صناعية	2	-	2	3
Second Semester Total				12	2	12	19

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Level 4- Semester 1:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	MTE333	Digital Control System	التحكم الرقمي	2	-	2	3
2.	MTE352	Power Electronics and Drives	الالكترونيات قوى ومحركات	٢	٢	٢	٤
3.	MTE353	Industrial Statistics & Quality Control	إحصاء وضبط الجودة	2	2	-	3
4.	MTE354	PLC	الحاكمات القابلة للبرمجة	2	-	2	3
5.	MTE355	Industrial Automation	أتمته صناعية	2	-	2	3
6.	MTE362	Embedded Systems and Interfacing	الأنظمة المدمجة والواجهات	2	-	2	3
First Semester Total				12	4	10	١٩

Level 4- Semester 2:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	FR305	Entrepreneurship & Communication Skills	ريادة اعمال ومهارات تواصل	1	2	-	2
2.	MTE345	System Dynamics and Vibrations	ديناميكا الأنظمة والاهتزازات	2	-	2	3
3.	MTE356	Industrial Networking	شبكات صناعية	2	-	2	3
4.	MTE363	System Modeling and Identification	تحديد ونمذجة الانظمة	2	-	2	3
5.	MTE364	Robotics	روبوت	2	2	2	4
6.	MTE3xx	Elective Course 1	أختياري ١	2	2	-	3
Second Semester Total				11	6	8	18

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Level 5- Semester 1:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	FR404	Engineering Project Management	ادارة مشاريع هندسية	1	2	-	2
2.	MTE457	Industrial Safety	الأمان الصناعي	2	2	-	3
3.	MTE465	Artificial Intelligence	ذكاء صناعي	2	2	-	3
4.	MTE466	Mechatronics System Design	تصميم أنظمة ميكاترونكس	2	-	2	3
5.	MTE468	Graduation Project	مشروع تخرج	1	-	2	2
6.	MTE4xx	Elective Course 2	أختياري ٢	2	2	-	3
First Semester Total				10	8	4	16

Level 5- Semester 2:

S.No.	Course Code	Course Title (Modified)	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	MTE458	Industrial Training	تدريب صناعي	١	-	٤	٣
2.	MTE468	Graduation Project	مشروع تخرج	1	-	2	2
Second Semester Total				2	-	6	5
Total Credit Hours for 5 Years Program				١١١	٥٤	76	17٦

Elective Courses:

Students can select one course from each group i.e. Elective 1 and Elective 2:

S.No.	Level/ Sem	Course Code	Course Name	اسم المقرر	Th.	Tu.	Pr.	Cr. Hrs.
1.	4 th Level/2 nd Semester	MTE346	Manufacturing Systems Engineering (Elective 1)	نظم الإنتاج الهندسي	2	2	-	3
2.	4 th Level/2 nd Semester	MTE302	Renewable Energy Technology (Elective 1)	تقنيات الطاقة المتجددة	2	2	-	3
3.	4 th Level/2 nd Semester	MTE305	Introduction to Biomedical Technology (Elective 1)	مقدمة لتقنيات الطبية الحيوية	2	2	-	3
4.	5 th Level/1 st	MTE424	Air Conditioning and Refrigeration	التكييف والتبريد	2	2	-	3

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	Semester		(Elective 2)					
5.	5 th Level/1st Semester	MTE467	Machine Vision (Elective 2)	الرؤية الآلية	2	2	-	3
6.	5 th Level/1 st Semester	MTE434	Advanced Modern Control (Elective 2)	التحكم بالأنظمة المتقدمة	2	2	-	3

System of Study:	
Terms of study. Specify the structure of the academic year of study in the program, does it follow a year or semester, Total Credit hours, mode of delivery etc.,	Semester Wise (5 years-10 Semesters)
Study Credit. Specify the program structure and the distribution of Credit and average for each component of the program. Therefore, the program structure should specify: Total number of hours; core requirements; elective requirements, particularly any restriction on electives; the minimum and/or maximum credit points of certain elements of the program where applicable; the requirements for activities such as field studies or professional practice, and Specify how to calculate the student GPA, etc.	
Program Requirement	% (Credit Hours)
• University Requirements.	10 % (17 Credit Hours).
• Faculty Requirements.	8 % (14 Credit Hours).
• Basic Requirements	13 % (23 Credit Hours).
• Program Requirements.	69 % (122 Credit Hours).

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Details of the Courses of the Program:

S. No.	Course Code	Course Title	Course Description
1.	UR001	Arabic Language 1	يتناول هذا المقرر موضوعات تتعلق بالمهارات اللغوية الأساسية في الاستماع والقراءة وكتابة الملخصات والخط والإملاء، وبعض القواعد النحوية والصرفية والبلاغية التي تساعد غير المتخصصين في اللغة العربية على الاتصال والتواصل الفعال، ويتم عرض المهارات اللغوية من خلال بعض النصوص اللغوية من القرآن الكريم ومن الحديث وتذوق جمال الشريف ومن النصوص الأدبية العربية (الشعرية والنثرية) التي تنمي اللغة العربية،
2.	UR002	English Language 1	This course is one of the University General Requirements. It is a prerequisite to other specialized courses which are offered in English. The course is designed to provide students of Engineering with basic knowledge and skills in English language related to their field of study.
3.	UR003	Computer Skills	This course provides students with a general orientation to computers and their operations. It includes a basic understanding of the primary components of a typical computer system and how they function.
4.	UR007	Arabic Israeli Conflict	يهدف هذا المقرر الى تعريف الدارسين بالتشخيص القرآني لأهل الكتاب في القرآن الكريم ، وأساليب بني اسرائيل الخبيثة في استهداف الأمة، والوسائل لمواجهة العدو الإسرائيلي، وأن يتعرف الطلاب على حالات بني اسرائيل من كفرهم بالله وتفريطهم وانكارهم لنعم الله عليهم وقتلهم الانبياء بغير حق بحسب ما نص عليه القرآن الكريم.
5.	FR001	Mathematics 1	This course prepared to be a primary education in the first branch of the calculus (differential calculus), whereas focus on the fundamental concepts of: Real functions, Limits of the functions, Continuity of the functions, Derivatives of the functions, The complex numbers, Matrices and determinants and how to use them to get solution of simultaneous linear equations.
6.	FR002	Engineering Physics	This course introduces fundamental principles and concepts of theoretical and practical physics of importance to Mechatronic engineering, and their applications.

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S. No.	Course Code	Course Title	Course Description
7.	BR001	Engineering Mechanics - Statics	This course provides a basic understanding of the part of mechanics which is concerned with the equilibrium of bodies under the action of forces.
8.	BR002	Engineering Workshop	This course is an introductory to principles of production, function and planning of workshop, industrial safety, measurements, electrical circuits and its installation, carpentry tools, engineering materials, metal machining, joining of materials, sheet metal work, metal forming, bench work and filling, foundry and pattern making.
9.	UR004	Arabic Language 2	ويتضمن هذا المقرر المعارف والقواعد الأساسية المتصلة بالكتابة الوظيفية، وبالذات المقالات و التقارير، والرسائل الوظيفية، والسير الذاتية، كما يتضمن نماذج لأنواع الكتابة الوظيفية يتم من خلالها تدريب الطلبة على مهارات كتابة المقالة والتقارير والرسائل الوظيفية وعلى مهارة الكشف عن الكلمات في المعاجم العربية
10.	UR005	English Language 2	The course covers language areas and skills (listening, speaking, reading and writing) which enable students to understand and use English in engineering-related settings and contexts. It covers wide range of topics related to the field of Engineering with a view to introduce students to the required scientific and engineering terminology.
11.	UR006	Islamic Culture	يهدف هذا المقرر الى إكساب الطلاب المعلومات والمعارف عن معنى الثقافة الإسلامية واهمية الارتباط بثقافة القرآن الكريم والثقة بالله، والامام بجوانب معرفة الله وعظمته، ووعده ووعيده من واقع القرآن الكريم، وتعريفهم بأساليب الغزو الفكري، وخطورة الحرب الناعمة وطرق الوقاية منها، والتعرف على معنى وأسباب الغلو والتطرف والتكفير..
12.	UR008	National Culture	يهدف هذا المقرر الى تعريف الطلاب بالهوية الايمانية، والهوية الوطنية، والتعريف بأهمية اليمن ارضاً و انساناً، و ابراز اهداف الاحتلال وكيفية مواجهته، مع التطرق الى اهم الثورات الحقيقة وقادتها ، وبيان اطماع قوى الاستكبار العالمي للسيطرة على اليمن، واساليب مواجهة العدوان
13.	FR003	Mathematics 2	This course is prepared to be a primary education in the second branch of the calculus (Integral calculus), whereas focus on the fundamental concepts of: Integral techniques of integration.
14.	BR003	Engineering Drawing	This course covers two sections, manual drawing and computer-aided drafting (CAD), such as Solid Works. It is an introductory engineering drawing for problem solving and technical

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S. No.	Course Code	Course Title	Course Description
			communication.
15.	BR005	Engineering Chemistry	This course will focus on the concepts of theoretical and its application in the field of engineering chemistry and highlighted the theories which are based in this field.
16.	BR006	Engineering Mechanics-Dynamics	This course provides fundamental concepts for most of engineering branches The course focusses on the physical/mathematical analysis of the kinematics and kinetic motion of particles and rigid bodies.
17.	BR112	Technical Writing	This course emphasizes the role of English Language in the part of Engineering. Their topics focus on the basic grammatical structures and language functions needed for the study and communication in the field of Mechatronics.
18.	BR124	Mathematics 3	This course will introduce the concepts of Ordinary Differential Equations (ODEs) of the first order and some methods to solve them and extended the concept of derivatives and integrals to function of more than one variable.
19.	MTE101	Logic System Design	This course provides mechatronics students the basic concepts, logic elements, analysis, and design of digital systems. This course is important for understanding electronics II (IC design using VHDL), microprocessor-based systems, embedded systems, and mechatronics applications.
20.	MTE111	Electrical Circuits 1	This is a foundation course in circuit analysis. The course introduces students to the fundamental principles and concepts of electrical circuits analysis and their applications that are required in the design and implementation of electrical systems related to mechatronics engineering.
21.	MTE121	Thermodynamics and Heat Transfer	This course will cover main topics in thermodynamics and heat transfer. These topics are: energy analysis, energy transfer as work and heat, the laws of thermodynamics will be taken into account. The processes of heat transfer: Conduction, Convection and Radiation will be covered with detailed numerical problems. The course will also focus on the solutions of steady flows.
22.	MTE141	Properties and	This course presents the basic concepts, theory and principles of strength of materials as well as common mechanical properties of

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S. No.	Course Code	Course Title	Course Description
		Strength of Materials	materials necessary for engineering design of various machine components.
23.	BR123	Engineering Mathematics	This course deals with topics which provide students the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.
24.	MTE103	Computer Programming 1	The course provides the students with the knowledge and skills in the area of computer programming through learning C programming language. The course includes: introduction to programming, how to think in designing a program, writing a program, the compiler, and programming language fundamentals (basic data types, program structure, statements, expressions, I/O operations, control statements, functions, arrays, pointers, and structures).
25.	MTE112	Electrical Circuits 2	This course is a continuation of Electrical Circuits (1). The course topics focus on fundamentals, calculations and analysis of AC circuits that includes: complex numbers and phasors, impedance, admittance, voltage, current, powers in AC circuits and their components, power factor improvement, polyphase circuits, and passive and active filters
26.	MTE113	Electronics 1	This course introduces fundamental principles and concepts of analog electronics elements and their applications. It includes the main principles of formatting the semiconductor devices, such as P-N Junction Diodes, PNP and NPN Junctions that form the Bipolar Junction Transistors (BJT) and their AC and DC analysis and design.
27.	MTE122	Fluid Mechanics	The course provides a study on main characteristics of fluid flow through fluid statics and dynamics. It will also cover the concept of the boundary layer theory and how can be useful in planning different aspects applied for laminar and turbulent flows in different channels through flow measurement.
28.	MTE204	Computer Programming 2	This course introduces the Object-Oriented Programming (OOP) concepts, principles, and techniques, including classes, objects, inheritance, and polymorphism. All these concepts are illustrated via a contemporary object-oriented programming language called

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S. No.	Course Code	Course Title	Course Description
			C++.
29.	MTE214	Electronics 2	This course is the foundation of all modern electronic devices based on digital integrated circuits, such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions. It illustrates to students the fundamental principles, concepts, and importance of digital electronics and their applications.
30.	MTE215	Electrical Machines 1	This course is designed to provide principal concepts of electrical machines as a major Mechatronics system component. The course includes: Electromechanical energy conversion (EMEC) principles. The construction, classification, performance characteristics, analysis, parallel operation, testing and applications.
31.	MTE231	Analog and Digital Signals	The course provides strong foundation on analog and digital signals, and systems analysis which are necessary for creating good foundations in analyzing, interpreting, and evaluating the performance of basic Mechatronics Systems.
32.	MTE242	Theory of Machines	Theory of Machines is that branch of Engineering-science, which deals with the study of relative motion between the various parts of a machine and forces which act on them. The knowledge of this subject is very essential for an engineer in designing the various parts of a machine.
33.	MTE261	Microcontrollers and Microprocessors	Microprocessors/Microcontroller often serves as the “brain” in mechatronic systems. Like a mini, self-contained computer, it can be programmed to interact with both the hardware of the system and the user.
34.	MTE216	Electrical Machines 2	This course covers construction, classification, performance characteristics, analysis, parallel operation, testing and applications of: three-phase synchronous AC machines, special purpose motor and asynchronous AC machines as well as, starting and speed control of the different types of motors.
35.	MTE223	Hydraulic and Pneumatic Systems	This course introduces the basic components and functions of Hydraulic and Pneumatic Systems. The control of Hydraulic and Pneumatic Systems and maintenance procedures are introduced.

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S. No.	Course Code	Course Title	Course Description
36.	MTE232	Analog Control System	The course introduces the basic concepts of analog control systems, develop knowledge for model, analysis, and design of analog feedback control systems.
37.	MTE243	Manufacturing Processes	This course covers fundamentals of manufacturing processes including interrelationships between the properties of the material and the manufacturing process under the classification of processing operations and the basic parameters involved in these processes.
38.	MTE244	Design of Machine Elements	Machine Design is the art of developing ideas for the construction of machines and expressing those ideas in the form of plans and drawings. This course will integrate the knowledge and principles learned in statics, dynamics, properties and strength of materials into the analysis, selection and design process of specific machine elements.
39.	MTE251	Industrial Instrumentation and Measurements	The fundamentals of measurements and instrumentation is of great importance in Mechatronics Engineering as essential tools for giving insight into physical quantities. The course provides, the Basics of Measurement systems, Types of instruments, Methods of measuring, Static & Dynamic Characteristics of Instruments, Quantification of Systematic Errors, Random Errors Statistical Analysis.
40.	MTE333	Digital Control System	The course introduces the basic concepts of modern control systems , the basic principles of digital control systems, quantization and quantization errors – data acquisitions – Z-transform – Inverse Z- transform – Z- transform method to solve the difference equations.
41.	MTE352	Power Electronics and Drives	This course is offered to provide students with the principle concepts in the field of power electronics and drives as enabling technologies. Further, it helps students to identify commonly employed electric motor drives and their speed control methods.
42.	MTE353	Industrial Statistics and Quality Control	Statistics and Quality Control is the science that uses the collected data from the manufacturing products and employs statistical analysis to monitor the quality standard of the products.

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S. No.	Course Code	Course Title	Course Description
43.	MTE354	PLC	Programmable Logic Controllers (PLCs) are used in many industrial and commercial processes, so the intent of this course is to have students develop the basic level skills of PLCs required by the industry. The study of the course includes basic to intermediate theoretical classes as well as practical applications of PLCs in the Lab.
44.	MTE355	Industrial Automation	This course is planned primarily for the design and integration of automated systems for industrial and manufacturing applications. In addition, emphasis is on aspects of automation, types of automated manufacturing systems, production planning and procedures, integration of components, process developments and practical methods.
45.	MTE362	Embedded Systems and Interfacing	This course provides students of mechatronics with the principles and fundamental concepts in embedded and interfacing engineering systems. It offers the desired skills for the student to construct and design a complete embedded and interfacing system for various work environments. This course is important for mechatronic systems, and robotics courses.
46.	FR305	Entrepreneurship & Communication Skills	This course combines class room lectures with field study and exercises supplemented and case studies on small and medium scale industries. The course offers the basic framework for understanding process of entrepreneurship, principles of management and related techniques in decision making, planning, Marketing and financial control. Exercises in product designing and prototype development, preparation of workable project feasibility reports, practical ideas about launching their own enterprises are also covered. Meaning of process communication involves purposeful exchanges between all interested parties.
47.	MTE345	System Dynamics and Vibrations	This course is an introduction to the dynamics and vibrations of lumped-parameter models of mechanical systems. After this course, students will be able to evaluate forced and free vibration of linear multi-degree of freedom models of mechanical systems and matrix eigenvalue problems.
48.	MTE356	Industrial Networking	This course is intended to provide mechatronics students the basic concepts and technical aspects on data communications and industrial networking. Students also learned in the laboratory how

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S. No.	Course Code	Course Title	Course Description
			to design, implement, install, and configure different network types for commercial and industrial environments using standard computer simulation software.
49.	MTE363	System Modeling and Identification	This course provides students with an overview of modeling and simulation methods of dynamic systems. The contents of the course are distributed into three main areas: principles for physical modeling, simulation, and system identification.
50.	MTE364	Robotics	This course provides students with essential knowledge and foundation of robotics. In practical sessions, students learn different computer tools for robot design and analysis such as: Robotics Toolbox for Matlab, Robot Studio, and ROS. In addition, the course includes a group-based term project in which students will design and fabricate working robotic systems.
51	MTE3xx	Elective Course (1)	-
52.	MTE404	Engineering Project Management	This course is designed to introduce and reinforce the principles, tools and techniques of project management, including project planning, scheduling and controlling, estimating, budgeting, staffing, task and cost control; marketing and feasibility studies, communication; and resource management.
53.	MTE457	Industrial Safety	This course enhances safety awareness of students towards potential hazards in the workplace and provides useful practical knowledge for workplace safety which is mandated by national and international standards. Emphasis is placed on main causes of industrial accidents and protection, risk management and accident prevention, automated systems and robot safety as well as safety management systems.
54.	MTE465	Artificial Intelligence	The course introduces the Artificial Intelligence (AI) concepts, techniques and area of applications. The course will introduce the AI programming language PROLOG with comprehensive laboratory exercises to master the major principles of the language.
55.	MTE466	Mechatronics System Design	This course is offered to provide students with the experience, confidence and competence in the design and implementation process of mechatronics systems. The course-project must

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S. No.	Course Code	Course Title	Course Description
			incorporate all elements of mechatronics, namely, mechanical design, electrical and electronics, computers and software.
56.	MTE468	Graduation Project	Graduation project (GP) provides graduating students with opportunities to optimally and professionally apply skills they have accumulated during their course of study into practical engineering design practice and/or research areas. GP is carried out in two phases, in first and second semesters of the final year.
57.	MTE4xx	Elective Course 2	-
58.	MTE458	Industrial Training	Industrial Training refers to the work experience that is relevant to professional development in which students will relate knowledge and skills learned at the university with practical skills and the applications in the industry. During the industrial training, the students can build a platform and compare the theoretical aspects with the practical one which exists in the prescribed industry.
59.	MTE468	Graduation Project	Graduation project (GP) provides graduating students with opportunities to optimally and professionally apply skills they have accumulated during their course of study into practical engineering design practice and/or research areas. GP is carried out in two phases, in first and second semesters of the final year.
60.	MTE346	Manufacturing Systems Engineering (Elective 1)	This course surveys the design and management of manufacturing systems, and also offers the opportunity to understand the relationship between materials flow and information flow. It includes topics such as plant layout, planning, scheduling and control of manufacturing systems with emphasis on information flow and decision-making.
61.	MTE302	Renewable Energy Technology (Elective 1)	The design and implementation of renewable energy based technologies and their integration with existing technologies and distribution system for example how the orientation should be towards the fundamentals of Energy Science and Technology. This introductory course of Renewable Energy Technology will provide in-depth understanding of the technology, applications, economics and policies relevant to each type of energy source.
62.	MTE305	Introduction to Biomedical	This course aims to advance student knowledge with the basic principles, concepts, and theories of the biomedical engineering

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S. No.	Course Code	Course Title	Course Description
		Technology (Elective 1)	and its applications in medical fields.
63.	MTE424	Air Conditioning and Refrigeration (Elective 2)	The course is designed to give fundamental knowledge of types of refrigeration, refrigeration cycles, refrigerants and behavior under various conditions, different air conditioning terms and load calculation, designing of components of air distribution system.
64.	MTE467	Machine Vision (Elective 2)	The aim of this course is to introduce machine vision main concepts, applications and problems involved in machine vision systems development. The course introduces the “low-level” algorithms of image processing that are necessary for the “mid-level” vision or feature extraction. Then it covers “high-level” algorithms such as pattern recognition, and 3D analysis and modeling of objects and scenes.
65.	MTE434	Advanced Modern Control (Elective 2)	This course covers design and applications of advanced modern control systems. This course will provide a solid theoretical background and practical examples of design, simulation and implementation of digital controllers for electromechanical systems.

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List of the Academic Staff who Participated in the Course Specification and the Course Plan of the Program:

1. Prof. Dr. Mohammed A. Al-Bukhaiti.
2. Assoc. Prof. Dr. Abdul-Malik Momin.
3. Assoc. Prof. Radwan Al-Budegi.
4. Asst. Prof. Dr. Abdul-Salam Al-Mekhlafi.
5. Asst. Prof. Dr. Abdulla Daiban.
6. Eng. Mahran Al-Absi.
7. Assoc. Prof. Dr. Mohammed Al-Gorafi.
8. Assoc. Prof. Dr. Adnan Al-Salhi.
9. Assoc. Prof. Dr. Riyadh Muharam.
10. Asst. Prof. Dr. Yasser Al-Huri.
11. Asst. Prof. Dr. Mohammed Al-Yadoumi.
12. Assoc. Prof. Farooq Al-Fuhedi.
13. Assoc. Prof. Dr. Khalil Al-Hatab.
14. Asst. Prof. Dr. Hamud Al-Nahari.
15. Asst. Prof. Dr. Sami Al-Maqtari.
16. Asst. Prof. Dr. Abdul Kafi Al-Iryani.
17. Assoc. Prof. Dr. Amin Al-Khuledi.
18. Asst. Prof. Mohammed Al-Olafi.
19. Asst. Prof. Dr. Hatem Al-Dois.
20. Asst. Prof. Dr. Tareq Barakat.
21. Assoc. Prof. Dr. Ahmed Al-Arashi.
22. Late Prof. Dr. Abdulla Al-Khorabi.
23. Prof. Dr. Omar Al-Sakaf.
24. Assoc. Prof. Dr. Huda Al-Emad.
25. Prof. Dr. Suad Al-Saba.
26. Assoc. Prof. Dr. Mohammed Hussein Taqi.
27. Assoc. Prof. Dr. Ibrahim Tajaddeen.
28. Assoc. Prof. Hilal Al-Qubati.

Revision of the Program under the Supervision of:

1. Assoc. Prof. Dr. Ahmed Mugahed.
2. Asst. Prof. Dr. Munasar Al-Subari.

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