University of Technology

Electromechanical Engineering department

Energy and Renewable Energy Engineering Branch

2023 – 2024

First Cycle,

Bachelor's Degree (B.Sc.) - Energy and Renewable Energy Engineering Program

Appendix 2 Program Catalogue

Table of Contents

1- Mission and Vision Statement
2- Program Specification
3- Program Objectives
4- Student Learning Outcomes
5- Academic Staff
6- Credit, Grading and GPA
7- Modules
8- Contact

1. Mission and Vision Statement

Vision Statement

Aiming to build an engineering establishment in Energy and Renewable Energy field to be outstanding one among the top international university.

Mission Statement

1- Prepare our students for successful careers in the energy and renewable energies profession,
2- Conduct high quality and innovative research, and
3- Serve the community and industry providing educational and research resources.

For future plans, the branch intends to cover all required courses in energy sectors in Iraq, including gas, steam, renewable energies (solar, wind and others, added recently), nuclear, water power plants. Through the communications with Ministry of Electricity (symposiums, industrial advisory board meeting), the branch developed his courses according to the needs of the Ministry which is responsible for all power plants in Iraq.

2. Program Specification

Program Code	BSc-EREE	ECTS	240
Duration	4 Year, 8 Semesters	Method of Attendance	Full Time

Subject Areas Requirements

The Energy and Renewable Energy Engineering program produces graduates who are prepared to enter the practice of energy and renewable energies engineering. For two paths, there are three major components of the program: (1) foundation in the mathematical and physical sciences, (2) engineering topics in both mechanical and electric systems with design applications, and (3) general education in the humanities, English course and ethics.

Mathematics and Physical Sciences

The engineering science fundamentals and engineering design skills are built upon the basic mathematics and physical sciences. The mathematics work begins with a three levels course (six courses) sequence on differential and integral calculus. The first two courses include topics in limits, derivatives, and the integrals of functions of one variable, work on partial derivatives and multiple integrals is presented. Vector analysis and three-dimensional analytical geometry, solution of the first and second order linear differential equations with numerous applications, Laplace transforms, power series solutions, numerical methods, linear systems and numerical analysis with engineering applications in numerical differentiation and integration. With this foundation in mathematics, our students have necessary tools for applications in analysis and design.

Physics (two courses) in the first level includes materials science, classification of materials, atomic structure and the type of bonding forces, types of materials and their applications and the mechanical material properties.
It is noted that the number of hours for Math and Basic Science is 30 hours and it's satisfies ICAEE requirement.

Engineering Topics

The aim of the program is to graduate students capable to work as mechanical and electrical engineer in energy and renewable energies field. The engineering topics are divided into four parts; preliminary joint courses, mechanical courses, electrical courses and final joint courses.

Preliminary joint courses:

- Workshop Training; Preparation of engineering cadres trained scientific and practical areas in the electricity, automobiles, machining (lathe, milling, drilling), forging, denting, filings, forging, welding, and casting.
- Computer Courses; Computer Science (Visual BASIC programs), Advanced Programming (C++), Application of Advance Computer (Microprocessors and MATLAB languages).
- Industrial Engineering, determine the most effective ways for an organization to use the basic factors of production.
- Engineering and Machine Drawing is to teach students manual drafting and

dimensioning of views, explains the principles of orthographic views, multi view projection and sectional view drawing.

Engineering courses are divided into two parts;

Mechanical Courses,

- Engineering Mechanics. This unit of study aims to provide theoretical knowledge and principles of Statics and Dynamics.
- Strength of Material and Vibration. In this course, students will learn; the behavior of solid bodies under loads and deflections, study the simple bending theory for beams and the simple torsion theory for shafts circular and non-circular, deflection of beams, complex stresses, compounds beam and discussion the principles of free & forced vibrations
- Control System, illustration and discussion the Main Theoretical Principles of control systems and understanding of using different system Damping.
- Thermodynamics, Fundamental thermodynamic concepts including system, state, state postulate, equilibrium, process and cycle, Heat, work, 1st Law of Thermodynamics, Properties of a substance, Energy balances for idealized closed systems, Energy and mass balances for idealized control volumes, 2nd Law of Thermodynamics, Carnot cycles, thermal efficiencies, Entropy, isentropic processes, isentropic efficiencies, idealized power cycles (Otto, Diesel and Rankine Cycles).
- Fluid Mechanics. This course provides a working knowledge of Fluid Mechanics and Illustration and discussion the principles of Principle of fluid motional flow classification Bernoulli's equation as well as applications of Bernoulli's equation and anther subject in Fluid Mechanics.
- Heat Transfer; teach theoretical basics of the conduction, convection and radiation heat transfer Coincided with a laboratory experiment.
- Fluid Machinery, Illustration and discussion the principles of operation for fluid machinery and their types.
- Power Plants, studying the thermal analysis of the steam or gas turbine plants.
- Combustion and Air Pollution, to explain concept of various forms combustion process & air pollution problem.
- Nuclear Power Plants, illustration the principles of Nuclear Power Plant operation and their types, study main four elements of nuclear core, their kinds, and desirable features, study thermal design of the PWR and BWR and study thermodynamic, control of the Nuclear Power Plant.
- Renewable Energy Sources, explain concept of various forms of renewable energy (solar, wind, geothermal, bio and other kinds of renewable energies).
- Renewable Energy System, concentrates on solar or wind systems.

Electrical Courses,

- Fundamental of Electric Engineering (illustration and discussion the fundamental f electric engineering and definition, proceeding to the student the DC Electrical Circuits, series, parallel, series-parallel and identify the equations voltages &current for circuits above).

- Electric and Electronic Circuits, in electrical engineering, we are often interested in communicating or transferring energy from one point to another. To do this requires an interconnection of electrical devices. Such interconnection is referred to as an electric circuit.
- Electrical Machines, Illustration and discussion the principles of DC and AC machines, description of the machine, as well as its operation in electrical machines.
- Power systems, Giving Knowledge about the generation, transmission, and distribution type systems.
- Power system analysis, illustration and discussion the principles of power system analysis.
- Power Electronics and Electrical Drives, theoretical and practical experiences in the field of power electronics and electrical drives such as AC to DC converters (Rectifiers), DC to AC converters (invertors), DC to DC converters (DC choppers), AC to AC converters (AC voltage regulator and cycloconverter), speed control of DC motors, and speed control of AC motors (inductions and synchronous motors).

Final Joint Courses,

- Electromechanical Equipment, this course specification provides the main features of the Electromechanical Systems and Devices.
- Power Plant Operation and Maintenance, illustration and discussion the principles of Power plant operation and maintenance.
- Energy Efficiency concentrates on energy efficiency for mechanical and electrical applications.

Others Including General Education

The third major area of the curriculum is the general education component. The University of Technology has a mandated General Education Requirements for all degrees. To satisfy the General Education Requirements the Energy and Renewable Energies Engineering Program set required courses in the general education component as follows:

- English Language (two levels), this course will improve the ability of the students to understand, speak, read and write English as a second language with some technical texts. It is also intended to teach them, how to use technical English effectively as a language of instruction, Lab. Experiments and Exercises, examples, using Technical Terminologies as close as possible to the lectures they receive during their study.
- Human Rights (second level), Freedom and Democracy, the course covers the concept of human rights and development, definition, classes, properties, and the most important human rights conventions and declarations and international conventions on human rights and human rights in religions and the role of non-governmental organizations in this field and other human rights issues. The substance of freedom and democracy include the concept of freedom and kinds, democracy and the types and components, individual liberty and freedom forced to reconcile the sovereignty, freedom, democracy during the Greeks time, lobbyists, the most important theories on the nature of election, the rights of

minorities in democratic governance and other topics that make the student familiar with the issues.

- Ethics in Engineering (fourth level), concentrates on professional Ethics.
- Sport (first level), concentrates on different sport activities.

Major Design Experience

In the last year, students take Senior Capstone Design, which is the final major design course. In this course, students learn how to apply the basic engineering science and design principles to formulate a design problem, and then follow recommended process to complete the design project. Students are required to demonstrate their ability to use the knowledge of mechanical and electrical courses for the whole undergraduate curriculum. Some professional components if not taught in other courses, such as life- long learning to keep knowledge up to date, are covered in this course. For the capstone design experience. The students are typically in teams of three people. At the end of the year, all the design teams present their capstone design projects. All the EREE faculty members, representatives from industry and EREE Industrial Advisory Council members are invited at the presentation and they also serve as evaluators for the capstone design projects. The evaluation includes the project evaluation in three parts (overall technical content, presentation, and response to questions), assessment of the related Graduate Outcomes and comment.

3. Program Goals (objectives)

1- Enter the energy and renewable energies engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse areas that related to energy and renewable energies engineering.
2- Pursue graduate education and research at major research universities in Energy and Renewable Energies engineering, and related fields
3- Advance in their chosen fields to supervisory and management positions
4- Engage in continued learning through professional development
5- Participate in and contribute to professional societies and community services

4. Student (Graduate) Learning Outcomes

Students from the Energy and Renewable Energies program will attain (by the time of graduation):

1. An ability to identify, formulate, and solve engineering in energy and renewable energies engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline

3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
4. An ability to communicate effectively with a range of audiences
5. An 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
6. An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge
7. An ability to function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment

5. Academic Staff (Faculty)

Faculty Name	Highest Degree Earned-Field and Year	Rank	Email
Jalal Mohammed Jalil	PhD. in Mech. Eng. (1989)	Prof.	50003@uotechnology.edu.iq
Ameer Abed Jaddoa	PhD. in Mech. Eng. (2016)	Prof. Assistance	Ameer.A.Jaddoa@uotechnology.edu.iq
Muhannad Z. Khalifa	PhD. in Mech. Eng. (2003)	Prof.	Muhannad Z. Khalifa @uotechnology.edu.iq
Kays A. Al-Tae'y	PhD. in Mech. Eng. (2006)	Prof. Assistance	Kays A. Al-Tae'y @uotechnology.edu.iq
Khalid Faisal Sultan	PhD. in Mech. Eng. (1998)	Prof.	Khalid Faisal Sultan @uotechnology.edu.iq
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Hind D. Salman	PhD student	---	@uotechnology.edu.iq

6. Credit Grading and GPA

Credits

University of Technology 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 structure 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 are 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
	B – very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable Error
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work with met 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
Notes:				
Marks with decimal places above or below 0.5 will 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 fail" 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 ita ECTS, all are divided by the program total ECTS.

CGPA of a 4 – year B.SC. Degrees:

CGPA = [91st module score x ECTS) + (2nd module score x ECTS) + …]/240

7. Curriculum/Modules

Semester 1: 30 ECTS: 1 ECTS = 25 hrs

Code	Module	USSWL	SSWL	ECTS	Type	Pre-request
WORSH11	Workshops	14	186	8	S	-
ENLA112	English Language I	67	33	4	S	-
MATH113	Mathematics I	87	63	6	B	-
PHYS114	Physics I	87	63	6	B	-
ENME115	Engineering Mechanics II	77	48	5	C	-
TERE116	Technical Report	42	33	3	S	-
SPOR117	Sport	17	33	2	S	-

Semester 2: 30 ECTS: 1 ECTS = 25 hrs

Code	Module	USSWL	SSWL	ECTS	Type	Pre-request
COSC121	Computer Science I	27	48	3	S	-
MATH122	Mathematics II	87	63	6	B	-
PHYS123	Physics II	87	63	6	B	-
FUEE124	Fundamentals of Electrical Engineering (AC + DC)	22	78	4	C	-
FATD125	Fundamentals of AutoCAD tools Drawing	37	63	4	S	-
ENME1	Engineering Mechanics II	27	48	3	C	-

8. Contact:

Program Manager: Ameer Abed Gaddoa, Prof. Assistance, PhD in Mech. Eng. (2016)

Program Coordinator: Ahmed Kamil Hasan Al-Ali, Lecturer, PhD Electrical Eng. 2020

Appendix 3 Modules Catalogue

Table of Contents

1- Overview
2- Undergraduate Modules
3- Contact

1. Overview

This catalogue is about the courses (modules) given by the program of Energy and Renewable Engineering to gain the Bachelor of Science degree. This program delivers 48 Modules with 6000 total student workload hours and 240 total ECTS. The module deliver is based on the Bologna Process.

2. Undergraduate Courses

First and Second Semesters

Module 1

Code	Course/module Title	ECTS	Semester
WORSH11	Workshop	8	1, 2
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
-	- / - / 6 / -	93	7
Description			
Preparation of engineering cadres trained scientific and practical areas in the electricity, automobiles, machining (lathe, milling, drilling), forging, denting, filings, forging, welding, and casting.			

First Semester

Module 2

Code	Course/module Title	ECTS	Semester
ENLA112	English Language I	4	1
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-	33	67
Description			

This course will improve the ability of the students to understand, speak, read and write English as a second language with some technical texts. It is also intended to teach them, how to use technical English effectively as a language of instruction, Lab. Experiments and Exercises, examples, using Technical Terminologies as close as possible to the lectures they receive during their study.

Module 3

Code	Course/module Title	ECTS	Semester
MATH113	Mathematics I	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
4	-	63	87
Description			
The mathematics work begins with differential and integral calculus, limits, derivatives, and the integrals of functions of one variable, work on partial derivatives and multiple integrals is presented.			

Module 4

Code	Course/module Title	ECTS	Semester
PHYS114	Physics I	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
4	-	63	87
Description			
The aims which can be achieved during teaching this course program are concept of materials science, classification of materials, atomic structure and the type of bonding forces.			

Module 5

Code	Course/module Title	ECTS	Semester
ENME115	Engineering Mechanics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
1	- / 1 / - / -/ 1	48	77
Description			
This unit of study aims to provide theoretical knowledge and principles of Statics and Dynamics.			

Module 6

Code	Course/module Title	ECTS	Semester
TERE116	Technical Report	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-	33	42
Description			
This course considers the following: what is writing, reasons for writing, performing technical studies, writing strategy, document options, criteria for good technical writing, writing style, using illustration and formal report.			

Module 7

Code	Course/module Title	ECTS	Semester
SPOR117	Sport	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-	33	17
Description			
This course considers the main sport games.			

Second semester

Module 1

Code	Course/module Title	ECTS	Semester
COSC121	Computer Science I	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
1	- / 2 / - / -	48	27
Description			
Windows, Computer Science (Visual BASIC programs).			

Module 2

Code	Course/module Title	ECTS	Semester
MATH122	Mathematics II	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
4	-	63	87
Description			
Vector analysis and three-dimensional analytical geometry are included in this course.			

Topics include solution of the first and second order linear differential equations with numerous applications.

Module 3

Code	Course/module Title	ECTS	Semester
PHYS123	Physics II	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
4	-	63	87
Description			
This course considers the types of materials and their applications and the mechanical material properties.			

Module 4

Code	Course/module Title	ECTS	Semester
FUEE124	Fundamentals of Electrical Engineering (AC + DC)	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
3	- / 2 / - / -	78	22
Description			
In this course, students learn some details of Fundamental of AC and DC circuits and their analysis by using different methods, Firstly, they are taken the atomic structure to understand the concept of current and voltage, then they are given the Kirchhoff's current and voltage laws and how they can employ them to analysis of the AC and DC circuits. Besides, the analysis methods are presented to learn the students the analysis of the AC and DC circuits. In addition, the analysis the AC and DC circuits by network theorems are given.			

Module 5

Code	Course/module Title	ECTS	Semester
FATD125	Fundamentals of AutoCAD tools Drawing	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
-	- / 4 / - / -	63	37
Description			
Fundamental of Electric Engineering (illustration and discussion the fundamental f electric engineering and definition, proceeding to the student the DC Electrical Circuits, series, parallel, series-parallel and identify the equations voltages &current for circuits above).			

Module 6

Code	Course/module Title	ECTS	Semester
ENME126	Engineering Mechanics II	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
1	- / 1 / - / 1	48	27
Description			
In this course of engineering mechanics I, students learn how to apply the basic principles of engineering, physics and mathematics' to analysis and solve Three-dimensional force system, component forces for three dimensions ,Moment in three-dimensional force system, dot product, couple in three-dimensional force system, couple-force system in three-dimensional force system, Resultant in three-dimensional force systems, Equilibrium, free body diagram and Types of friction problems			

3. Contact:

Program Manager: Ameer Abed Gaddoa, Prof. Assistance, PhD in Mech. Eng. (2015)
Program Coordinator: Ahmed Kamil Hasan Al-Ali, Lecturer, PhD Electrical Eng. (2020)

Appendix 4 Modules Description Form

First and Second Semesters

Module 1

Module Information			
Module Title	Workshops		Module Delivery
Module Type	Support		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ■ Practical ☐ Seminar
Module Code	WORSH11		
ECTS Credit/year	8		
SWL/year	200		
Module level	1	Semester of Delivery	1, 2
Module Leader	Training and	College	

	Workshops Center		
Module Leader Academic Title	Prof.	e-mail	twc@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	Ph.D.
Peer Reviewer Name	-	e-mail	-
Scientific Committee Approval Date	1/6/2023	e-mail	-
-	-	Version Number	1

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	1-Preparing applied engineers in the field of engineering sciences who are distinguished by a high level of knowledge and technological creativity, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding engineering programs, while adhering to the ethics of the engineering profession. 2. Enable the student to know and understand work systems, risks, and the factors surrounding them. 3. Enable the student to know and understand theoretical principles in handicrafts and measurements.
Module Learning Outcomes	1- To familiarize the student with the vocabulary of occupational safety and its importance in the field of work. 2- Acquisition of the student's manual operation skills, for example (Filings and Tinsmith workshops), and mechanical operation skills, for example (Turning). 3- Acquisition of the student's mechanical forming skills, for example (Casting and Blacksmithing). 4- The student acquires basic engineering skills such as Welding, Carpentry, and Electrical installations that serve him in the professional field. 5- Enabling the student to operate the various machines and devices in mechanical operations and formation. 5- Cooperative learning by working collectively.
Inductive Contents	

	1. Introducing the student to the basics of the art of turning and milling, types of cold working machines, the skill of dealing with them, choosing metals, operational tools, and methods of measurement and standardization 2. Introducing the student to the basics of the art of casting, hot forming, metal selection, method of working on casting furnaces and tools, and manufacturing casting molds 3. Familiarize students with the basics of cars and the systems they use, as well as maintenance, disassembly, and assembly processes. 4. Introducing students to the basics of household and industrial electrical appliances, the skill of using tools, and designing electrical circuits and control panels 5. Introducing the student to the basics of the art of plumbing, leveling surfaces, the skill of using tools, manufacturing and installing geometric shapes, and methods of measurement and standardization 6. Introducing the student to the basics of the art of blacksmithing, cold and hot forming of metals, the method of hardening them, and the skills of dealing with hand tools, forming machines, and heating furnaces 7. Introducing the student to the basics of the art of filing and manual operation of metals with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and the methods of measurement and standardization 8. Introducing the student to the basics of the art of welding, the installation and assembly of metals, the types of welding machines, the skills of dealing with them, the types of welding, and the methods of measurement and standardization 9. Introducing the student to the basics of the art of carpentry and woodworking with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and methods of measurement and standardization

Learning and Teaching Strategies	
Strategies	-

Student Workload (SWL)			
Structured SWL (h/sem)	93	Structured SWL (h/w)	6.00
Unstructured SWL (h/sem)	7	Unstructured SWL (h/w)	0.46
Total SWL (h/sem)	100	-	-
Structured SWL (h/year)	186	Structured SWL (h/w)	6.00
Unstructured SWL (h/year)	14	Unstructured SWL (h/w)	0.46
Total SWL (h/year)	200	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	-	10%	-	-
	Assignments		10%		All
	Projects / Practice	Every 3 weeks	-	Continuous	-
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	-	20%	-	-
	Exam	Every 3 weeks	50%	Continuous	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Welding workshop. -Occupational safety and its importance in welding workshops. -Introduction to the basics of welding. -Electric arc exercise. -An exercise for welding straight lines in a circular motion (helical).
Week 2	Welding workshop - An exercise for welding straight lines with a crescent movement and other welding methods -Construction welding exercise.
Week 3	Welding workshop. -Welding two pieces together. Written exam in practical exercises.
Week 4	Casting workshop -Occupational safety and its importance in plumbing workshops. -Introduction to the basics of metal casting. -Simple wooden disc exercise. Half workout.
Week 5	Casting workshop Wheel exercise. Pushing arm exercise.
Week 6	Casting workshop. -Complete pulley exercise. -Circular pole exercise. -Written exam in practical exercises.

Week 7	Blacksmith Workshop -Occupational safety and its importance in blacksmithing workshops. -Introduction to the Basics of Blacksmithing. - Barbell adjustment exercise. -Eight-star exercise. - Exercise forming the number eight in English. -Six formation exercises in English.
Week 8	Blacksmith Workshop -An exercise forming the number five in English. - Exercise forming the number nine in English. . -An exercise in forming an iron model in the form of a circle
Week 9	Blacksmith Workshop - S-shape exercise. - Air hammer hot barbell exercise. - Exercise to form a circle on an electric bending machine. - Exercising cold and hot ornament formation. .- A written exam in practical exercises
Week 10	Automotive Workshop -Occupational safety and its importance in car maintenance workshops. -An introduction to cars and their basic parts. -Parts of the engine, how it works, types of engines, and methods of classification.
Week 11	Automotive Workshop - Open the engine and identify the parts -Lubrication system -Cooling system.
Week 12	Automotive Workshop -The fuel system. -The old and new ignition circuits. -Written exam in practical exercises.
Week 13	Turning Workshop -Introduction to lathe machines and identifying their parts -Measuring tools and the use of an oven measuring instrument -Circular column lathing exercise on different diameters.
Week 14	Turning Workshop -Exercise using the pen (semicircular R) brackets. An exercise in making different angles using a pen (square + angle pen 55).
Week 15	Turning Workshop - Making shaft with different diameter exercises using (left and right pen) - Workout (Tube Connection). -Written exam in practical exercises.
Week 16	Fitting workshop Occupational safety and its importance in filing workshops -An introduction to the basics of filing -Pen holder exercise “preparation and preparation”

Week 17	Fitting workshop Pencil holder exercises finishing and assembling.
Week 18	Fitting workshop -The catcher exercise. - Clamping exercise. Written exam in practical exercises.
Week 19	Carpentry workshop -Occupational safety and its importance in carpentry workshops. - An introduction to carpentry, its types, types of wood, tools used, and preparation Preparing the tools used Face modification exercise using the reindeer
Week 20	Carpentry workshop Garden fence work and how to connect its parts, the eight-star exercise
Week 21	Carpentry workshop - Wood smoothing exercise using smoothing paper - Wood dyeing exercise in three stages Final smoothing and varnishing exercise Written exam in practical exercises
Week 22	The tinsmith workshop Occupational safety and its importance in plumbing workshops An introduction to plumbing, its tools, and plumbing stages Planning and marking exercise on metal plates
Week 23	The tinsmith workshop Geometric shapes Types of individuals and methods of individuals Geometric shape individuals exercise on a metal board
Week 24	The tinsmith workshop Cone members exercise - Exercise of cylinders with an oblique cut Roll forming operations Connection without the use of an intermediary Written exam in practical exercises
Week 25	Electric Workshop Occupational Safety and its importance in electrical workshops An introduction to the basics of electrical installations - Linking a simple circuit consisting of a lamp to the control of a single-way switch. Connect two lamps in series with one-way switch control. Connecting two lamps in parallel with the control of a single road switch. Connect two lights with one-way dual switch control.
Week 26	electric Workshop Connect a fluorescent lamp circuit to a one-way switch control Connecting an electric supply socket circuit to the control of a separate or combined one-way switch

	Written exam in practical exercises
Week 27	electric Workshop Occupational Safety and its importance in blacksmithing workshops Introduction to the basics of Blacksmithing - Barbell adjustment exercise Eight-star exercise - Exercise forming the number eight in English Exercise forming the number six in English
Week 28	supplementary training curriculum Welding workshop Plumbing workshop Blacksmith's workshop
Week 29	supplementary training curriculum - Automotive workshop - Turning workshop Fitting workshop
Week 30	supplementary training curriculum Carpentry workshop The plumbing workshop electric Workshop

Learning and Teaching Resources		
-	Text	Available in the library
Required Texts	Workshop technology and measurements, Ahmed Salem Al-Sabbagh,	yes
Recommended Texts	-	-
Websites	-	-

First Semester

Module 2

Module Information			
Module Title	English Language I		Module Delivery
Module Type	Support		■ Theory
Module Code	ENLA112		☐ Lecture
ECTS Credit	4		☐ Lab
SWL	100		☐ Tutorial ☐ Practical ☐ Seminar
Module level	1	Semester of Delivery	1
Module Leader	Ahmed Kamil	College	Electromechanical Eng.

	Hasan Al-Ali		Dept.
Module Leader Academic Title	Lecturer	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. Elec. Eng.
Peer Reviewer Name	-	E-mail	50035@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, students will learn: • Proceeding to the Student the benefits of studying English Language as Second language • Giving Knowledge about using the Technical Terminologies in their studies • Understanding of using the scientific English language in the Academic Program • Giving knowledge of how write, describe, typing the reports in English
Module Learning Outcomes	In this course, – Computer Science students will learn: 1. Introduction to Computer. 2. Computer Hardware (Microprocessor, Memory, Input and Output Devices). Programming Languages, Operating Systems / Types of Files and Directories 3. Numbers representation (Binary, Decimal, Octal, Hexadecimal)

	4. Logic Gates 5. Algorithm and Flow Chart 6. Programming in Visual Basic: a. Introduction to visual basic b. Elements of the Integrated Development Environment (IDE) c. Toolbox (Properties and its Events) d. Built the project by using Toolbox and Properties Window e. Built the project by using Code Module f. Input box and Messages box g. Visual Basic Operators h. Conditional Statements (IF, Select Case) 7. One Dimensional Array 8. Two Dimensional Array Subroutine
Inductive Contents	a. Parts of Speech • What are the parts of speech • Noun • Pronoun • Verb • Adjective • Adverb • Proposition • Conjunction • Interjection b. Preposition • What is the preposition? • Why does it use. • How does it use. c. Your world (unit Two). • How to know your world. • How to communicate with each other. • Knowing your Nationality. d. ALL ABOUT YOUFAMILY AND FRIENDS • Personal information • Your family members. • RELATIVES AND EXTENDED

	FAMILY. • Jobs. e. Everyday Life • Sport. • Food. • Drinks. • Activities. f. My favorite • Questions words. • Pronouns. • Demonstratives. • Adjectives. • Favorites. g. Where do I live • ROOMS. • KITCHEN FURNITURE. • Bedroom Furniture. • Living Room Furniture. • Bathroom. • Grammar (difference between SOME and ANY). • DIRECTIONS • Grammar (difference between BUT&AND). • Because and SO.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.00
Unstructured SWL (h/sem)	67	Unstructured SWL (h/w)	4.46
Total SWL (h/sem)	100	-	-

Module Evaluation					
-		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative	Quizzes	1	10%	5	LO # 1 , 2, 3

Assessment	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	-	-	-	-
	Report	1	10%	11	6
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 - 6
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Parts of speech, Introduction of English language, Sentences
Week 2	Introduction
Week 3	Countries
Week 4	Jobs
Week 5	Family
Week 6	The time
Week 7	preposition of time
Week 8	My favorites
Week 9	Rooms and furniture
Week 10	Mid-term Exam
Week 11	Question
Week 12	Saying years
Week 13	Questions (past simple)
Week 14	present continuous
Week 15	Positive (present continuous)
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	John and Liz Soars "New Headway Plus" Student's book.	YES
Recommended Texts	John and Liz Soars "New Headway Plus" Workbook without key	YES
Websites	-	-

Module 3

Module Information		
Module Title	Mathematics I	Module Delivery

Module Type	Basic		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MATH113		
ECTS Credit	6		
SWL	150		
Module level	1	Semester of Delivery	1
Module Leader	Karema A. Hamad	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. Assistance	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	MSc. Mech. Eng.
Peer Reviewer Name	-	e-mail	Karema.A.Hamad@uotechnology.edu.iq
Scientific Committee Approval Date	-	e-mail	--
-	-	Version Number	

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	The student will learn the first part of mathematics
Module Learning Outcomes	In this course, for students will learn 1. Introduction, Quadratic Formula, Binomial Formula 2. Function (Inverse Hyperbolic Function). 3. Limits &Continuity. 4. Matrices (Operation, inverse of Square Matrix, Eigen values & Eigen Vectors). 5. Volumes (Volumes by slicing, Disk Around x-axis, Washer Around x-axis, washer around y-axis). 6. Functions (Inequality, Intervals, Domain & Range) 7. Determinants (Properties, Grammer's

	Rule, Applications) 8. Functions (Trigonometric Functions, Inverse Trigonometric Functions, Logarithmic Function)
Inductive Contents	In this course, students will learn: • Introduction, Quadratic Formula, Binomial Formula • Straight Line, Conic Sections (Circle, Parabola, Ellipse, Hyperbola) • Functions (Inequality, Intervals, Domain & Range) • Functions (Inverse Functions, Drawing Function, Absolute Value) • Functions (Trigonometric Functions, Inverse Trigonometric Functions, Logarithmic Function) • Function(Natural Logarithmic Function, Exponential Function, Hyperbolic Functions) Functions (Inverse Hyperbolic Functions) • Limits & Continuity • Determinants (Properties, Grammer's Rule, Applications) • Matrices (Operations, Inverse of Square Matrix, Eigen Values & Eigen Vectors) • Polar Coordinates • Complex Numbers • Applications of Complex Numbers • Vectors, Properties of Vectors • Vectors in Free Space • Applications of Vectors.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.00
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.80

Total SWL (h/sem)	150	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	-	-	-	-
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 - 6
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Introduction , quadratic formula , binomial formula Straight line , conic section (circle ,parabola , Inequality, intervals, domain & range, Inverse function
Week 2	Drawing function, Absolute value, Trigonometric function Inverse trigonometric function
Week 3	logarithmic function, natural logarithmic function, Exponential function
Week 4	Hyperbolic functions Inverse hyperbolic function
Week 5	Limits and continuity
Week 6	Matrices & Determinants, properties, Grammers Rule
Week 7	Applications, Matrices (operations)
Week 8	Inverse of Square matrix
Week 9	Eigen values & Eigen vectors
Week 10	Mid-term Exam
Week 11	polar coordinates
Week 12	Complex Numbers, Applications of complex number
Week 13	Vectors
Week 14	properties of vectors
Week 15	vectors in free space, Applications of vectors
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the library
Required Texts	Thomas Calculus, George B. Thomas et al, 12th, edition, 2010, USA	YES
Recommended Texts	-	-
Websites	-	-

Module 4

Module Information			
Module Title	Physics I		Module Delivery
Module Type	Basic		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	PHYS114		
ECTS Credit	6		
SWL	150		
Module level	1	Semester of Delivery	1
Module Leader	Hadia K. Judran	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. Assistance	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. in Physics
Peer Reviewer Name	-	e-mail	50100@uotechnology.edu.iq
Scientific Committee Approval Date	-	e-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, students learn the principles of semiconductor materials. The doping of semiconductor, using it in P-N junction and its applications in different types of diodes, transistors, and solar cells.

Module Learning Outcomes	In this course, students will learn: 1. Study the general classification of engineering materials according to energy bands theory. 2. Realization the principles, properties, and electrical conduction especially in semiconductors. 3. Concept of intrinsic and extrinsic semiconductors. 4. Operation principle and models of p-n junction. 5. Realization the principles of some semiconductors devices as transistor and solar cells.
Inductive Contents	• Electronics physics • Magnetic properties. • Thermal properties. • Logic circuits

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.00
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.80
Total SWL (h/sem)	150		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2
	Assignments	1	10%	7	LO # 3, 4
	Projects / Lab.	-	-	-	-

	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 - 4
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Introduction to materials science and engineering
Week 2	Classification of Materials, Metals, Polymers
Week 3	Ceramics, Composites, Advanced Materials
Week 4	Nano-materials, Biomaterials, Smart materials
Week 5	Semiconductors, Concepts of nanostructures, Modern Materials' Needs
Week 6	Atomic Structure and Interatomic Bonding
Week 7	Atomic structure, Atomic bonding in solid
Week 8	Types and applications of materials, Types of metal alloys, Ferrous alloys, Nonferrous alloys
Week 9	Types of ceramics, Types of polymers, Types of conductors and semiconductors, Types of composite
Week 10	Mid-term Exam
Week 11	Mechanical properties, Elastic deformation
Week 12	Mechanical behavior of materials, Hardness and other mechanical properties.
Week 13	Principles of energy and work, What is the energy?
Week 14	Forms of energy, General equation of work,
Week 15	Renewable energies
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	S. M. Sze, "Physics of Semiconductor Devices," third edition	-
Recommended Texts	Thomas L. Floyd, "Electronic Devices,"9th Ed., P.CM, 2012	-
Websites	-	-

Module 5

Module Information			
Module Title	Engineering Mechanics		Module Delivery
Module Type	Core		■ Theory □ Lecture ■ Lab ■ Tutorial □ Practical □ Seminar
Module Code	ENME115		
ECTS Credit	5		
SWL	125		
Module level	1	Semester of Delivery	1
Module Leader	Mohammed H. Jibal	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof.	e-mail	**eme@uotechnology.edu.iq**
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	E-mail	mohammed.h.jabal @uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, students learn how to apply the basic principles from physics and mechanics to analysis and solve the forces, moment and couples problems. In this course, students learn how to apply the basic principles from physics and mechanics to analysis and solve the forces, moment and couples problems in three-dimensional (3D).
Module Learning Outcomes	In this course, students will learn: 1. Fundamentals of Engineering Mechanics 2. How to analyze the forces and moment in mechanisms 3. Calculate the Resultant in two dimensional force systems 4. Fundamentals of Engineering Mechanics(3D)

	5. How to analyze the forces and moment in mechanisms(3D) 6. Calculate the Resultant in three-dimensional force systems 7. Introduction to dynamic
Inductive Contents	In this course, for engineering mechanics students will learn: ● Introduction to Statics ● Scalar quantity, vector quantity, standers units ● Two-dimensional force systems, rectangular components ● Moment, principle of moment, couple, couple-force system ● Resultants ● Three-dimensional force system, component forces for three dimensions ● Moment in three-dimensional force system, dot product, couple in three-dimensional force system, couple-force system in three-dimensional force system ● Resultant in three-dimensional force systems ● Equilibrium, free body diagram ● Types of friction, type's friction problems ● Three-dimensional force system, component forces for three dimensions ● Moment in three-dimensional force system, dot product, couple in three-dimensional force system, couple-force system in three-dimensional force system ● Resultant in three-dimensional force systems ● Equilibrium, free body diagram ● Types of friction, type's friction problems ● Introduction to dynamic ● Velocity, acceleration & motion laws

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	48	Structured SWL (h/w)	3.00
Unstructured SWL (h/sem)	77	Unstructured SWL (h/w)	5.13
Total SWL (h/sem)	125	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	1	-		LO # 3
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 - 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Introduction to static
Week 2	Two–dimensional force systems, rectangular components
Week 3	Resultants
Week 4	Moment in three-dimensional force system, dot product, couple in three-dimensional force system
Week 5	Equilibrium, free body diagram
Week 6	Types of friction, types friction problem
Week 7	Composite bodies & figures: approximations
Week 8	Resultant in three –dimensional force systems.
Week 9	Mid-term Exam
Week 10	Introduction to dynamic
Week 11	Velocity, acceleration &motion laws

Week 12	Projectile motion
Week 13	Plane curvilinear motion
Week 14	Kinetics of particles, work power, Efficiency, principle of work
Week 15	Impulse & momentum
Week 16	Preparatory week before the final Exam

Delivery Plan (weekly lab. Syllabus)	
	Materials Covered
Week 1	The determination of the resultant of two forces (or more)
Week 2	The determination of friction coefficient between two surfaces
Week 3	Centroids and center of gravity
Week 4	Center of gravity of the composite areas
Week 5	The investigation of Hook's law using helical spring
Week 6	The fundamental law of rotation
Week 7	The law of energy conservation

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Engineering Mechanics Statics, J. L. Meriam and L.G. Kraige, John Wiley & Sons, 2013.	-
Recommended Texts	R. C. Hibbeler, "Engineering Mechanics: Statics & Dynamics", 14th ed. Pearson Prentice Hall.	-
Websites	-	-

Module 6

Module Information			
Module Title	Technical Report		Module Delivery
Module Type	Support		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	TERE116		
ECTS Credit	3		
SWL	75		
Module level	1	Semester of Delivery	1
Module Leader	Jalal M. Jalil	College	Electromechanical Eng. Dept.
Module Leader	Prof.	e-mail	eme@uotechnology.edu.iq

Academic Title			
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	e-mail	50003@uotechnology.edu.iq
Scientific Committee Approval Date	-	e-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	Develop the ability of the students to write a technical report with different kinds (formal, informal, others)
Module Learning Outcomes	In this course, students will learn: 1. Performing Technical Studies 2. Writing Strategy 3. Document Options 4. Criteria for Good Technical Writing 5. Writing Style 6. Using Illustrations 7. Formal Reports
Inductive Contents	• Formal report • Informal Report • Other writing

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.0
Unstructured SWL (h/sem)	42	Unstructured SWL (h/w)	2.8
Total SWL (h/sem)	75	-	-

Module Evaluation

		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	-	10%	-	-
	Assignments	1	10%	7	LO # 1, 2, 3
	Projects / Lab.	-	-	-	-
	Report	1	10%	12	LO# 1, 2, 3, 4, 5, 6, 7
Summative Assessment	Midterm Exam	1.5 hr	20%	11	LO # 1 - 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Technical Writing
Week 2	Reasons for Writing
Week 3	Performing Technical Studies
Week 4	Writing Strategy
Week 5	Document Options
Week 6	Criteria for Good Technical Writing
Week 7	Writing Style
Week 8	Using Illustrations
Week 9	Formal Reports: The Outline and Introduction
Week 10	Formal Reports: Writing the Body
Week 11	Mid-term Exam
Week 12	Formal Reports: Closure
Week 13	Informal Reports
Week 14	Review and Editing
Week 15	References
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	ENGINEERS' GUIDE TO TECHNICAL WRITING, Kenneth G. Budinski	pdf
Recommended Texts	-	-
Websites	-	-

Module 7

Module Information			
Module Title	Sport		Module Delivery
Module Type	Support		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	SPOR117		
ECTS Credit	2		
SWL	50		
Module level	1	Semester of Delivery	1
Module Leader	Muaid Waleed	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Asst. Prof.	e-mail	10755@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	MsC.
Peer Reviewer Name	-	E-mail	10755@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	Develop the ability of the students to understand the main sport activities
Module Learning Outcomes	In this course, students will learn: 1- Football 2- Basketball
Inductive Contents	• Football • Basketball

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.0
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13
Total SWL (h/sem)	50	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	-	10%	-	-
	Assignments	1	10%	7	LO # 1, 2, 3
	Projects / Lab.	-	-	-	-
	Report	1	10%	12	LO# 1, 2, 3, 4, 5, 6, 7
Summative Assessment	Midterm Exam	1.5 hr	20%	11	LO # 1 - 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Sports - concept, benefits and types
Week 2	Fitness - the concept and elements of fitness
Week 3	Football - concept + history
Week 4	Football - basic soccer skills
Week 5	Football Law - Article 1, 2
Week 6	Football Law - Articles 3, 4, 5
Week 7	Basketball - concept + history
Week 8	Basketball - basic basketball skills
Week 9	Anatomy
Week 10	The skeleton
Week 11	Circulatory system
Week 12	Muscular system - concept + muscle injuries
Week 13	Scouting - concept + stages + scouting law
Week 14	Biorhythm - concept + benefits + historical overview
Week 15	Biorhythm cycles
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Volleyball (history - skills - plans - game management - and training) Series/basketball basics Sports training and future prospects Applications in sensory education Rapid methods and techniques of sports training Football law	pdf
Recommended Texts	-	-
Websites	-	-

Second Semester

Module 1

Module Information			
Module Title	Computer Science I		Module Delivery
Module Type	Support		■ Theory
Module Code	COSC121		☐ Lecture
ECTS Credit	3		■ Lab
SWL	75		☐ Tutorial ☐ Practical ☐ Seminar
Module level	1	Semester of Delivery	1
Module Leader	Ameer Abed Gaddoa	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. assistance	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	E-mail	ameer.A.Jaddoa@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-

Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, the student will learn how to use software in his work (Visual Basic Language)
Module Learning Outcomes	In this course, – Computer Science students will learn: 1. Computer Hardware (Microprocessor, Memory, Input and Output Devices). Programming Languages, Operating Systems / Types of Files and Directories 2. Numbers representation (Binary, Decimal, Octal, Hexadecimal) 3. Logic Gates 4. Algorithm and Flow Chart 5. Programming in Visual Basic: a- Introduction to visual basic b- Elements of the Integrated Development Environment (IDE) c- Toolbox (Properties and its Events) d- Built the project by using Toolbox and Properties Window e- Built the project by using Code Module f- Input box and Messages box g- Visual Basic Operators h- Conditional Statements (IF, Select Case) 6. One Dimensional Array 7. Two Dimensional Array Subroutine
Inductive Contents	In this course for Computer Science, the topics are: ● Logic Gates ● Numbers representation (Binary, Decimal, Octal, Hexadecimal) ● Algorithm & Flow Chart ● Programming in Visual Basic

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active

	method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	48	Structured SWL (h/w)	3.0
Unstructured SWL (h/sem)	27	Unstructured SWL (h/w)	1.8
Total SWL (h/sem)	75	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2
	Assignments	1	10%	7	LO # 3, 4
	Projects / Lab.	-	-	-	-
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 – 4
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Computer Hardware Concepts
Week 2	Computer Software Concepts
Week 3	Application Software
Week 4	System Software
Week 5	Machine Language
Week 6	High Level Languages
Week 7	Assembly Language
Week 8	Programming Language
Week 9	Application Software
Week 10	Mid-term Exam
Week 11	Compiler and Interpreter
Week 12	Files & Folders
Week 13	Binary Decimal Octal and Hexadecimal number system
Week 14	Logic gates
Week 15	Algorithms & Flow Charts
Week 16	Preparatory week before the final Exam

Delivery Plan (weekly lab. Syllabus)	
	Materials Covered
Week 1	Windows 7 / operating systems
Week 2	Microsoft Word2007
Week 3	Microsoft Excel 2007
Week 4	Microsoft Power Point 2007
Week 5	Visual basic programming
Week 6	Assignment Statement
Week 7	Declaration Statement

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Basic Principles of Learning Visual Basic Language 2016	-
Recommended Texts	Basic Principles of Learning Visual Basic Language C++ 2014	-
Websites	-	-

Module 2

Module Information			
Module Title	Mathematics II		Module Delivery
Module Type	Basic		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MATH122		
ECTS Credit	6		
SWL	150		
Module level	1	Semester of Delivery	1
Module Leader	Naser Fadel	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Lecture	E-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	Phd. Mech. Eng.
Peer Reviewer Name	-	E-mail	Naser. F. husaan@uotechnology.edu.iq
Scientific	-	E-mail	-

Committee Approval Date			
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	The students will learn the second part of the basic math
Module Learning Outcomes	In this course, for students will learn 1. Differentiation (Derivative Definition, Techniques of Derivative, Applications) 2. Differentiation (Parametric Equations, Implicit Differentiation) 3. Integration (Definite Integrals, Properties, Relation Between Indefinite & definite Integrals) 4. Integration (Partial Fractions For 2nd Equation Degree in Denominator) 5. Integration of (Irrational Functions, Rational Functions) 6. Applications of Definite Integral(Area, Area Under the Curve, 7. Area between Curve and y-axis, Area Between Two Curves) 8. Differential Equations D.E. 1st degree equation: (5- Exact, 6- Bernoulli's Equations)
Inductive Contents	In this course, students will learn: • Differentiation (Derivative Definition, Techniques of Derivative, Applications) • Differentiation (Derivative of Trigonometric Functions, • Derivative of Inverse Trigonometric Functions, Chain Rule,) • Differentiation (Parametric Equations, Implicit Differentiation) • Differentiation (Derivative of Some Functions, Derivative of • Hyperbolic Functions, Derivative of Inverse Hyperbolic Functions) • Integration (Indefinite Integrals & Substitution Rule) • Integration (Definite Integrals, Properties, Relation Between • Indefinite & definite Integrals)

	• Forms of Integration (Substitution Methods, By Part, By Tabular) • Integration (Partial Fractions For 2nd Equation Degree in • Denominator) • Integration (Product between Trigonometric Functions, Product • Between Hyperbolic Functions) • Integration (Simple Square Root, Trigonometric Substitutions, • Hyperbolic Substitutions) • Integration of (Irrational Functions, Rational Functions) • Applications of Definite Integral(Area, Area Under the Curve, • Area between Curve and y-axis, Area Between Two Curves) • Differential Equations D.E, 1st degree equation: • (1-Direct Integration , 2-Variable Separable) • Differential Equations D.E. 1st degree equation: • (3- Homogeneous, 4- Linear Equations) • Differential Equations D.E. 1st degree equation: • (5- Exact, 6- Bernoulli's Equations)

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.8
Total SWL (h/sem)	150	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2, 3
	Assignments	1	10%	7	LO # 4, 5, 6
	Projects / Lab.	-	-	-	-
	Report	-	10%	-	-

Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 – 6
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Differentiation Derivative by definition Techniques of differentiation Applications
Week 2	Derivative of trigonometric functions Derivative of inverse trigonometric functions Chain rule Parametric equation
Week 3	Implicit differentiation Derivative of some functions Derivative of hyperbolic functions Derivative of inverse of hyperbolic functions
Week 4	Integration : 2-1 Indefinite of integral Definite of integral Properties
Week 5	Relation between indefinite& definite integral Forms of integration Substitution By parts
Week 6	By tabulate By partial fractions For 2^{nd} equation degree in denominator Product between trigonometric functions Product between hyperbolic functions
Week 7	Simple square root Trigonometric substitutions Hyperbolic substitutions
Week 8	Integration of irrational functions Integration of rational function Applications of definite integral
Week 9	Mid-term Exam
Week 10	Areas Area under the curve Area between curve and y- axis : 2-4-3 area between two curves Area in polar co-ordinates
Week 11	Volumes by slicing Disks around x-axis

Week 12	Disks around y-axis Volume in polar co-ordinate
Week 13	1st of D.E Introduction
Week 14	Formation of differential equation Solution of differential equation
Week 15	Method-1-by direct integration Method -2- by separating the variables Method -3- homogeneous equation Method -4- linear equation , use of integrating factor
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
-	Text	Available in the library
Required Texts	Thomas Calculus, George B. Thomas et al, 12th, edition, 2010, USA.	YES
Recommended Texts	-	-
Websites	-	-

Module 3

Module Information			
Module Title	Physics II		Module Delivery
Module Type	Basic		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	PHYS123		
ECTS Credit	6		
SWL	150		
Module level	1	Semester of Delivery	1
Module Leader	Amjed Al Ezzi	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. assistance	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. Mech. Eng.
Peer Reviewer Name	-	E-mail	50093@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-

-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, students learn the basic of material science and engineering. Also students learn the principles of mechanical tests of metallic materials.
Module Learning Outcomes	In this course, students will learn: 1) Concept of materials science and materials engineering. 2) Study the general classification of engineering materials, in addition to concept and types of advanced materials. 3) Analyze the atomic structure and types of atomic bonding in solid materials. 4) Realization the principles, properties, synthesize techniques of nanostructures, and advance applications of these materials. 5) Study the mechanical properties of metallic materials where this includes mechanical tests types and (elastic, plastic) behaviors.
Inductive Contents	1- Introduction to materials science and engineering. 2- Atomic Structure and Interatomic Bonding 3- Types and applications of materials 4- Mechanical properties.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.8
Total SWL (h/sem)	150	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1
	Assignments	1	10%	7	LO # 2
	Projects / Lab.	-	-		
	Report		10%		
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 – 3
	Final Exam	3 hr	50%	17	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Introduction
Week 2	Types of semiconductor materials
Week 3	Types of semiconductor materials
Week 4	Current density
Week 5	Intrinsic semiconductor
Week 6	Examples
Week 7	The Diode
Week 8	Symbol of Diode in Electronic Circuits
Week 9	Reverse Bias & Current
Week 10	Mid-term Exam
Week 11	General Diode Equation
Week 12	Models of Diode
Week 13	Examples
Week 14	DC or Static Resistance
Week 15	Types of Diodes
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	William D. Callister, "Materials science and engineering (An introduction)," 8th edition.	-
Recommended Texts	Bryan Harris,"Engineering composite materials,"The Institute of Materials, London,	-

	1999	
Websites	-	-

Module 4

Module Information			
Module Title	Fundamentals of Electrical Engineering (AC + DC)		Module Delivery
Module Type	Core		■ Theory ☐ Lecture ■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	FUEE124		
ECTS Credit	4		
SWL	100		
Module level	1	Semester of Delivery	1
Module Leader	Hashmia S. Dakheel	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Lecturer	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	MSc. Elect. Eng.
Peer Reviewer Name	-	E-mail	-
Scientific Committee Approval Date	-	E-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, students learn some details of Fundamental of AC and DC circuits and their analysis by using different methods, Firstly, they are taken the atomic structure to understand the concept of current and voltage, then they are given the Kirchhoff's current and voltage laws and how they can employ them to analysis of the AC and DC circuits. Besides, the analysis methods are presented to learn the students the analysis of the AC and DC circuits. In addition, the analysis the AC and DC circuits by network theorems are given.

Module Learning Outcomes	In this course, the students will learn: 1) Analysis of DC circuits by using Kirchhoff's current and voltage laws 2) Analysis of DC circuits by using analysis methods 3) Analysis of DC circuits by using network theorem 4) Fundamental of AC circuits 5) Analysis of AC circuits by using Kirchhoff's current and voltage laws 6) Analysis of AC circuits by using analysis methods 7) Analysis of AC circuits by using network theorem
Inductive Contents	In this course, these topics will be presented to the students during weekly lecture • DC electrical circuit • Analysis methods of DC circuits • Network theorems of DC circuit • Sinusoidal alternating wave • Complex number • AC circuits • Methods of AC circuits analysis • Network theorems of AC circuits

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5.0
Unstructured SWL (h/sem)	22	Unstructured SWL (h/w)	1.46
Total SWL (h/sem)	100		-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2
	Assignments	1	10%	7	LO # 3, 4
	Projects / Lab.	1	-	14	LO # 5
	Report	-	10%	-	-

Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 – 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Basic of Electrical
Week 2	DC electrical circuit
Week 3	Analysis Method
Week 4	Network Theorems
Week 5	Sinusoidal Alternating wave
Week 6	Complex number
Week 7	AC circuits
Week 8	Power in AC circuits
Week 9	Method of A.C. Analysis
Week 10	Mid-term Exam
Week 11	Delta-Star conversions
Week 12	Network Theorems for A.C. Circuits
Week 13	Norton's Theorem
Week 14	Magnetic Circuits
Week 15	Magnetizing force
Week 16	Preparatory week before the final Exam

Delivery Plan (weekly lab. Syllabus)	
	Materials Covered
Week 1	Ohm’s Law
Week 2	Kirchhoff’s Law
Week 3	Delta/star+ transformation
Week 4	The venin’s theorem
Week 5	Super position theorem
Week 6	Induction and capacitive Reactance
Week 7	Oscilloscope

Learning and Teaching Resources

	Text	Available in the library
Required Texts	Robert L. Boylestad, Introductory Circuit Analysis, Charles E. Merrill Publishing Company, 1977	-
Recommended Texts	U. A. Bakshi and V. U. Bakshi, Basic Electrical Engineering, Technical Publications Pune, 2008	-
Websites	-	-

Module 5

Module Information			
Module Title	Fundamentals of AutoCAD tools Drawing		Module Delivery
Module Type	Support		☐ Theory
Module Code	FATD125		☐ Lecture
ECTS Credit	4		■ Lab
SWL	100		☐ Tutorial
			☐ Practical
			☐ Seminar
Module level	1	Semester of Delivery	1
Module Leader	Akram Hamzah Abed	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Lecturer	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. Mech. Eng.
Peer Reviewer Name	-	E-mail	akram.h.abed@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	Students learn how to create, edit, store, and print engineering drawings.
Module Learning	1-Tour of AutoCAD.

Outcomes	2- User Interface. 3- Entering commands. 4- Basic Objects. 5- Object selection. 6- Entering coordinates. 7- Object snap. 8- Construction Aids. 9-Solid and curved objects. 10- Adding and Altering objects. 11- Moving and Duplicating Objects.
Inductive Contents	1- Tour of AutoCAD. 2- User Interface. 3- Entering commands. 4- Basic Objects. 5- Object selection. 6- Entering coordinates. 7- Object snap. 8- Construction Aids. 9-Solid and curved objects. 10- Adding and Altering objects. 11- Moving and Duplicating Objects. 12- Modifying and Maneuvering**.**

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	2.46
Total SWL (h/sem)	100	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes		10%		
	Assignments		10%		
	Projects / Lab.	1.5/ 2	-	7, 10	LO # 1-7
	Report		10%		
Summative	Midterm	1.5 hr	20%	12	All

Assessment	Exam				
	Final Exam	3 hr	50%	15	All
Total assessment			100%	-	-

Delivery Plan (weekly lab. Syllabus)	
	Materials Covered
Week 1	Tour of AutoCAD.
Week 2	User Interface.
Week 3	Entering commands.
Week 4	Basic Objects.
Week 5	Object selection.
Week 6	Entering coordinates.
Week 7	Object snap.
Week 8	Construction Aids.
Week 9	Solid and curved objects.
Week 10	Mid-term Exam
Week 11	Moving and Duplicating Objects.
Week 12	Modifying and Maneuvering.
Week 13	Orthographic projection.
Week 14	Isometric Projection.
Week 15	Final Exam
Week 16	-

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Computer Aided Drawing. Assistant professor Ali Hussein Ali Saeed, UOT, 2011	-
Recommended Texts	Engineering Drawing. Assistant professor Abed Alrassol AL-Khfaf , UOT , 1990	-
Websites	-	-

Module 6

Module Information		
Module Title	Engineering Mechanics	Module Delivery
Module Type	Core	■ Theory

Module Code	ENME126		☐ Lecture ■ Lab ■ Tutorial ☐ Practical ☐ Seminar
ECTS Credit	3		
SWL	75		
Module level	1	Semester of Delivery	1
Module Leader	Mohammed H. Jibal	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof.	e-mail	**eme@uotechnology.edu.iq**
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	e-mail	mohammed.h.jabal @uotechnology.edu.iq
Scientific Committee Approval Date	-	e-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, students learn how to apply the basic principles from physics and mechanics to analysis and solve the forces, moment and couples problems. In this course, students learn how to apply the basic principles from physics and mechanics to analysis and solve the forces, moment and couples problems in three-dimensional (3D).
Module Learning Outcomes	In this course, students will learn: 8. Fundamentals of Engineering Mechanics 9. How to analyze the forces and moment in mechanisms 10. Calculate the Resultant in two dimensional force systems 11. Fundamentals of Engineering Mechanics(3D) 12. How to analyze the forces and moment in mechanisms(3D) 13. Calculate the Resultant in three-

	dimensional force systems 14. Introduction to dynamic
Inductive Contents	In this course, for engineering mechanics students will learn: ● Introduction to Statics ● Scalar quantity, vector quantity, standers units ● Two-dimensional force systems, rectangular components ● Moment, principle of moment, couple, couple-force system ● Resultants ● Three-dimensional force system, component forces for three dimensions ● Moment in three-dimensional force system, dot product, couple in three-dimensional force system, couple-force system in three-dimensional force system ● Resultant in three-dimensional force systems ● Equilibrium, free body diagram ● Types of friction, type's friction problems ● Three-dimensional force system, component forces for three dimensions ● Moment in three-dimensional force system, dot product, couple in three-dimensional force system, couple-force system in three-dimensional force system ● Resultant in three-dimensional force systems ● Equilibrium, free body diagram ● Types of friction, type's friction problems ● Introduction to dynamic ● Velocity, acceleration & motion laws

Learning and Teaching Strategies

Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	48	Structured SWL (h/w)	3.0
Unstructured SWL (h/sem)	27	Unstructured SWL (h/w)	1.8
Total SWL (h/sem)	75	--	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	1	-		LO # 3
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 - 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Introduction to dynamic.
Week 1	Kinematics of particles, rectilinear motion.
Week 2	Velocity, acceleration &motion laws.
Week 3	Plane curvilinear motion (rectangular coordinate (x-y)).
Week 4	Projectile motion.
Week 5	Plane curvilinear motion (normal & tangential coordinates (n-1)).
Week 6	Plane curvilinear motion (polar coordinates (r- Θ)).
Week 7	Kinetics ‘of particles, Newton s second law.
Week 8	Rectilinear motion.
Week 9	Curvilinear motion.
Week 10	Kinetics of particles, work power, Efficiency, principle of work & kinetic energy.
Week 11	Impulse & momentum.
Week 12	Introduction to dynamic.
Week 13	Kinematics of particles, rectilinear motion.

Week 14	Velocity, acceleration &motion laws.
Week 15	Plane curvilinear motion (rectangular coordinate (x-y)).
Week 16	Preparatory week before the final Exam

Delivery Plan (weekly lab. Syllabus)	
	Materials Covered
Week 1	The determination of the resultant of two forces (or more)
Week 2	The determination of friction coefficient between two surfaces
Week 3	Centroids and center of gravity
Week 4	Center of gravity of the composite areas
Week 5	The investigation of Hook's law using helical spring
Week 6	The fundamental law of rotation
Week 7	The law of energy conservation

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Engineering Mechanics Statics, J. L. Meriam and L.G. Kraige, John Wiley & Sons, 2013.	-
Recommended Texts	R. C. Hibbeler, "Engineering Mechanics: Statics & Dynamics", 14th ed. Pearson Prentice Hall.	-
Websites	-	-

University of Technology

Electromechanical Engineering department

Energy and Renewable Energy Engineering Branch

2024 – 2025

Second Cycle,

Bachelor's Degree (B.Sc.) - Energy and Renewable Energy Engineering Program

Appendix 2 Program Catalogue

Table of Contents

1- Mission and Vision Statement
2- Program Specification
3- Program Objectives
4- Student Learning Outcomes
5- Academic Staff
6- Credit, Grading and GPA
7- Modules
8- Contact

1. Mission and Vision Statement

Vision Statement

Aiming to build an engineering establishment in Energy and Renewable Energy field to be outstanding one among the top international university.

Mission Statement

1- Prepare our students for successful careers in the energy and renewable energies profession,
2- Conduct high quality and innovative research, and
3- Serve the community and industry providing educational and research resources.

For future plans, the branch intends to cover all required courses in energy sectors in Iraq, including gas, steam, renewable energies (solar, wind and others, added recently), nuclear, water power plants. Through the communications with Ministry of Electricity (symposiums, industrial advisory board meeting), the branch developed his courses according to the needs of the Ministry which is responsible for all power plants in Iraq.

2. Program Specification

Program Code	BSc-EREE	ECTS	240
Duration	4 Year, 8 Semesters	Method of Attendance	Full Time

Subject Areas Requirements

The Energy and Renewable Energy Engineering program produces graduates who are prepared to enter the practice of energy and renewable energies engineering. For two paths, there are three major components of the program: (1) foundation in the mathematical and physical sciences, (2) engineering topics in both mechanical and electric systems with design applications, and (3) general education in the humanities, English course and ethics.

Mathematics and Physical Sciences

The engineering science fundamentals and engineering design skills are built upon the basic mathematics and physical sciences. The mathematics work begins with a three levels course (six courses) sequence on differential and integral calculus. The first two courses include topics in limits, derivatives, and the integrals of functions of one variable, work on partial derivatives and multiple integrals is presented. Vector analysis and three-dimensional analytical geometry, solution of the first and second order linear differential equations with numerous applications, Laplace transforms, power series solutions, numerical methods, linear systems and numerical analysis with engineering applications in numerical differentiation and integration. With this foundation in mathematics, our students have necessary tools for applications in analysis and design.

Physics (two courses) in the first level includes materials science, classification of materials, atomic structure and the type of bonding forces, types of materials and their applications and the mechanical material properties.
It is noted that the number of hours for Math and Basic Science is 30 hours and it's satisfies ICAEE requirement.

Engineering Topics

The aim of the program is to graduate students capable to work as mechanical and electrical engineer in energy and renewable energies field. The engineering topics are divided into four parts; preliminary joint courses, mechanical courses, electrical courses and final joint courses.

Preliminary joint courses:

- Workshop Training; Preparation of engineering cadres trained scientific and practical areas in the electricity, automobiles, machining (lathe, milling, drilling), forging, denting, filings, forging, welding, and casting.
- Computer Courses; Computer Science (Visual BASIC programs), Advanced Programming (C++), Application of Advance Computer (Microprocessors and MATLAB languages).
- Industrial Engineering, determine the most effective ways for an organization to use the basic factors of production.
- Engineering and Machine Drawing is to teach students manual drafting and

dimensioning of views, explains the principles of orthographic views, multi view projection and sectional view drawing.

Engineering courses are divided into two parts;

Mechanical Courses,

- Engineering Mechanics. This unit of study aims to provide theoretical knowledge and principles of Statics and Dynamics.
- Strength of Material and Vibration. In this course, students will learn; the behavior of solid bodies under loads and deflections, study the simple bending theory for beams and the simple torsion theory for shafts circular and non-circular, deflection of beams, complex stresses, compounds beam and discussion the principles of free & forced vibrations
- Control System, illustration and discussion the Main Theoretical Principles of control systems and understanding of using different system Damping.
- Thermodynamics, Fundamental thermodynamic concepts including system, state, state postulate, equilibrium, process and cycle, Heat, work, 1st Law of Thermodynamics, Properties of a substance, Energy balances for idealized closed systems, Energy and mass balances for idealized control volumes, 2nd Law of Thermodynamics, Carnot cycles, thermal efficiencies, Entropy, isentropic processes, isentropic efficiencies, idealized power cycles (Otto, Diesel and Rankine Cycles).
- Fluid Mechanics. This course provides a working knowledge of Fluid Mechanics and Illustration and discussion the principles of Principle of fluid motional flow classification Bernoulli's equation as well as applications of Bernoulli's equation and anther subject in Fluid Mechanics.
- Heat Transfer; teach theoretical basics of the conduction, convection and radiation heat transfer Coincided with a laboratory experiment.
- Fluid Machinery, Illustration and discussion the principles of operation for fluid machinery and their types.
- Power Plants, studying the thermal analysis of the steam or gas turbine plants.
- Combustion and Air Pollution, to explain concept of various forms combustion process & air pollution problem.
- Nuclear Power Plants, illustration the principles of Nuclear Power Plant operation and their types, study main four elements of nuclear core, their kinds, and desirable features, study thermal design of the PWR and BWR and study thermodynamic, control of the Nuclear Power Plant.
- Renewable Energy Sources, explain concept of various forms of renewable energy (solar, wind, geothermal, bio and other kinds of renewable energies).
- Renewable Energy System, concentrates on solar or wind systems.

Electrical Courses,

- Fundamental of Electric Engineering (illustration and discussion the fundamental f electric engineering and definition, proceeding to the student the DC Electrical Circuits, series, parallel, series-parallel and identify the equations voltages &current for circuits above).

- Electric and Electronic Circuits, in electrical engineering, we are often interested in communicating or transferring energy from one point to another. To do this requires an interconnection of electrical devices. Such interconnection is referred to as an electric circuit.
- Electrical Machines, Illustration and discussion the principles of DC and AC machines, description of the machine, as well as its operation in electrical machines.
- Power systems, Giving Knowledge about the generation, transmission, and distribution type systems.
- Power system analysis, illustration and discussion the principles of power system analysis.
- Power Electronics and Electrical Drives, theoretical and practical experiences in the field of power electronics and electrical drives such as AC to DC converters (Rectifiers), DC to AC converters (invertors), DC to DC converters (DC choppers), AC to AC converters (AC voltage regulator and cycloconverter), speed control of DC motors, and speed control of AC motors (inductions and synchronous motors).

Final Joint Courses,

- Electromechanical Equipment, this course specification provides the main features of the Electromechanical Systems and Devices.
- Power Plant Operation and Maintenance, illustration and discussion the principles of Power plant operation and maintenance.
- Energy Efficiency concentrates on energy efficiency for mechanical and electrical applications.

Others Including General Education

The third major area of the curriculum is the general education component. The University of Technology has a mandated General Education Requirements for all degrees. To satisfy the General Education Requirements the Energy and Renewable Energies Engineering Program set required courses in the general education component as follows:

- English Language (two levels), this course will improve the ability of the students to understand, speak, read and write English as a second language with some technical texts. It is also intended to teach them, how to use technical English effectively as a language of instruction, Lab. Experiments and Exercises, examples, using Technical Terminologies as close as possible to the lectures they receive during their study.
- Human Rights (first level), Freedom and Democracy (first level), the course covers the concept of human rights and development, definition, classes, properties, and the most important human rights conventions and declarations and international conventions on human rights and human rights in religions and the role of non-governmental organizations in this field and other human rights issues. The substance of freedom and democracy include the concept of freedom and kinds, democracy and the types and components, individual liberty and freedom forced to reconcile the sovereignty, freedom, democracy during the Greeks time, lobbyists, the most important theories on the nature of election, the

rights of minorities in democratic governance and other topics that make the student familiar with the issues.

- Crimes of the Baath Regime in iraq (second level), this course making this generation aware of the crimes committed by the Baathist regime, and extent of human rights violations publicly
- Ethics in Engineering (fourth level), concentrates on professional Ethics.
- Sport (second level), concentrates on different sport activities.

Major Design Experience

In the last year, students take Senior Capstone Design, which is the final major design course. In this course, students learn how to apply the basic engineering science and design principles to formulate a design problem, and then follow recommended process to complete the design project. Students are required to demonstrate their ability to use the knowledge of mechanical and electrical courses for the whole undergraduate curriculum. Some professional components if not taught in other courses, such as life- long learning to keep knowledge up to date, are covered in this course. For the capstone design experience. The students are typically in teams of three people. At the end of the year, all the design teams present their capstone design projects. All the EREE faculty members, representatives from industry and EREE Industrial Advisory Council members are invited at the presentation and they also serve as evaluators for the capstone design projects. The evaluation includes the project evaluation in three parts (overall technical content, presentation, and response to questions), assessment of the related Graduate Outcomes and comment.

3. Program Goals (objectives)

1- Enter the energy and renewable energies engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse areas that related to energy and renewable energies engineering.
2- Pursue graduate education and research at major research universities in Energy and Renewable Energies engineering, and related fields
3- Advance in their chosen fields to supervisory and management positions
4- Engage in continued learning through professional development
5- Participate in and contribute to professional societies and community services

4. Student (Graduate) Learning Outcomes

Students from the Energy and Renewable Energies program will attain (by the time of graduation):

1. An ability to identify, formulate, and solve engineering in energy and renewable energies engineering problems by applying principles of engineering, science, and mathematics.

2. An ability to apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
4. An ability to communicate effectively with a range of audiences
5. An 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
6. An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge
7. An ability to function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment

5. Academic Staff (Faculty)

Faculty Name	Highest Degree Earned-Field and Year	Rank	Email
Jalal Mohammed Jalil	PhD. in Mech. Eng. (1989)	Prof.	50003@uotechnology.edu.iq
Ameer Abed Jaddoa	PhD. in Mech. Eng. (2016)	Prof. Assistance	Ameer.A.Jaddoa@uotechnology.edu.iq
Muhannad Z. Khalifa	PhD. in Mech. Eng. (2003)	Prof.	Muhannad Z. Khalifa @uotechnology.edu.iq
Khalid Faisal Sultan	PhD. in Mech. Eng. (1998)	Prof.	Khalid Faisal Sultan @uotechnology.edu.iq
Ibtisam A. Hassan	PhD. in Mech. Eng. (1998)	Prof.	Ibtisam A. Hassan @uotechnology.edu.iq
Hussein M. Salih	PhD. in Mech. Eng. (2006)	Prof.	Hussein M. Salih @uotechnology.edu.iq
Aseel J. Mohammed	PhD. in Mech. Eng. (2006)	Prof. Assistance	Aseel J. Mohammed @uotechnology.edu.iq
Sahar R. Al- Sakini	PhD. in Elect. Eng. (2003)	Prof. Assistance	Sahar R. Al- Sakini @uotechnology.edu.iq
Mohammed H. Jibal	PhD. in Mech. Eng. (2016)	Prof.	Mohammed H. Jibal @uotechnology.edu.iq
Hayder Q. Alwan	PhD. in Mech. Eng. (2017)	Prof. Assistance	Hayder Q. Alwan @uotechnology.edu.iq
Hadia K. Judran	PhD. in Physics (2009)	Prof. Assistance	Hadia K. Judran @uotechnology.edu.iq

Zainab B. Abdulla	MSc. Elect. Eng. (2001)	Prof. Assistance	Zainab B. Abdulla @uotechnology.edu.iq
Hussain G. Jabir	MSc. Elect. Eng. (2004)	Lecturer Assistance	Hussain G. Jabir @uotechnology.edu.iq
Hashmia S. Dakheel	MSc. Elect. Eng. (2000)	Prof. Assistance	Hashmia S. Dakheel @uotechnology.edu.iq
Raed A. Jessam	PhD. Mech. Eng. (2018)	Prof. Assistance	Raed A. Jessam @uotechnology.edu.iq
Adel Hannon Ayaal	PhD. Mech. Eng. (2017)	Prof	**Adel Hannon Ayaal** @uotechnology.edu.iq
Sammar J. Ismail	PhD. in Elect. Eng. (2017)	Prof. Assistance	Hussain S. Abid @uotechnology.edu.iq
Hussain S. Abid	PhD. in Mech. Eng. (2017)	Prof. Assistance	Hussain S. Abid @uotechnology.edu.iq
Mahmoud M. Mahdi	PhD. in Mech. Eng. (2005)	Prof. Assistance	Mahmoud M. Mahdi @uotechnology.edu.iq
Sundus S. Jumaah	PhD. in Mech. Eng. (2017)	Prof. Assistance	Sundus S. Jumaah @uotechnology.edu.iq
Wafaa Abood Makee	MSc. Mech. Eng. (2002)	Lecturer Assistance	Wafaa Abood Makee @uotechnology.edu.iq
Waleed Yousif Shahb	MSc. Mech. Eng. (2017)	Lecturer Assistance	Waleed Yousif Shahb @uotechnology.edu.iq
Ayad K. Khlief	PhD. Mech. Eng. (2019)	Prof. Assistance	Ayad K. Khlief @uotechnology.edu.iq
Ali Abdulwahab Ismaeel	PhD. Mech. Eng. (2019)	Prof. Assistance	Ali Abdulwahab Ismaeel@uotechnology.edu.iq
Ahmed Kamil Hasan AL-ALI	PhD. Elect. Eng. (2020)	Prof. Assistance	Ahmed Kamil Hasan AL-ALI @uotechnology.edu.iq
Akram Hamzah Abed	PhD. Mech. Eng. (2020)	Prof. Assistance	Akram Hamzah Abed @uotechnology.edu.iq
Luay A. Rashed	PhD student	-	Luay A. Rashed @uotechnology.edu.iq
Abdulmunem R Abdulmunem	PhD. Mech. Eng. (2019)	Prof. Assistance	Abdulmunem R Abdulmunem@uotechnology.edu.iq
Nasar F. Hassan	PhD. Mech. Eng. (2012)	Prof. Assistance	Nasar F. Hassan @uotechnology.edu.iq
Assam K. Fadhal	PhD student	-	Assam K. Fadhal @uotechnology.edu.iq
Hind D. Salman	PhD student	---	@uotechnology.edu.iq

6. Credit Grading and GPA

Credits

University of Technology 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 structure 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 are 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
	B – very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable Error
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work with met 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
Notes:				
Marks with decimal places above or below 0.5 will 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 fail" 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 ita ECTS, all are divided by the program total ECTS.

CGPA of a 4 – year B.SC. Degrees:

CGPA = [91^{st} module score x ECTS) + (2^{nd} module score x ECTS) + …]/240

7. Curriculum/Modules

Semester 1: 30 ECTS: 1 ECTS = 25 hrs

Code	Module	USSWL	SSWL	ECTS	Type	Pre-request
CBRI201	Crimes of the Baath Regime in iraq	17	33	2	S	-
ADMA213	Advanced Mathematics I	87	63	6	B	-
COMP212	Computer Science II	12	63	3	S	-
ELMA214	Electrical Machines (DC)	62	63	5	C	-
THER215	Thermodynamics	62	63	5	C	-
MEIN216	Measurement & Instrument	62	63	5	C	-
ELC1217	Electronics Circuits	37	63	4	C	-

Semester 2: 30 ECTS: 1 ECTS = 25 hrs

Code	Module	USSWL	SSWL	ECTS	Type	Pre-request
ENLA221	English Language II	42	33	3	S	-
ADMS223	Advanced Mathematics II and Probability and Statistics	87	63	6	B	-
SPOR222	Sport	17	33	2	S	-
FLME224	Fluid Mechanics	62	63	5	C	-
ELCI225	Electrical Circuits	37	63	4	C	-
STMA226	Strength of Materials	62	63	5	C	-
ELMA227	Electrical Machines (AC)	62	63	5	C	-

8. Contact:

Program Manager: Ameer Abed Gaddoa, Prof. Assistance, PhD in Mech. Eng. (2016)

Program Coordinator: Ahmed Kamil Hasan Al-Ali, Prof. Assistance, PhD Electrical Eng. 2020

Appendix 3 Modules Catalogue

Table of Contents

1- Overview
2- Undergraduate Modules
3- Contact

1. Overview

This catalogue is about the courses (modules) given by the program of Energy and Renewable Engineering to gain the Bachelor of Science degree. This program delivers 48 Modules with 6000 total student workload hours and 240 total ECTS. The module deliver is based on the Bologna Process.

2. Undergraduate Courses

First Semester

Module 1

Code	Course/module Title	ECTS	Semester
CBRI201	Crimes of the Baath Regime in iraq	2	1
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2		33	17
Description			
The goal of this course is to learn the students about making this generation aware of the crimes committed by the Baathist regime, and the extent of human rights violations publicly			

Module 2

Code	Course/module Title	ECTS	Semester
ADMA213	Advanced Mathematics I	6	1
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
4	-	63	87
Description			

The mathematics work begins with the topics including sequence, convergence of sequence, series, power series, Fourier series. Laplace transform, inverse Laplace transform, and solution of differential equation using Laplace transform is also presented in this course.

Module 3

Code	Course/module Title	ECTS	Semester
COMP212	Computer Science II	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
1	-/2/-/-	63	12
Description			
This course deals with C++ program and the following topics are included in this course 1- Introduction to C++ 2- Selection 3- Iteration 4- Array 5- Pointer 6- Reference			

Module 4

Code	Course/module Title	ECTS	Semester
ELMA214	Electrical Machines (DC)	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-/2-/-/-	63	62
Description			
As electrical machines either it is a generator or a motor are importance in our daily life, this course deals with DC machines. It is essentially providing knowledge of the DC machine construction, working principle and mathematical models for different types of DC generator and DC motor. It is also introducing performance analysis of the DC based on studding different characteristics of the machines. Moreover, it deals with efficiency calculation to evaluate the machine performance.			

Module 5

Code	Course/module Title	ECTS	Semester
THER215	Thermodynamics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	- / 2 / - / -/ -	63	62
Description			
Thermodynamics is the branch of physics that deals with the relationships between heat, work, temperature, and energy. Its principles are crucial for understanding how energy is transferred and transformed in physical and chemical processes.			

Module 6

Code	Course/module Title	ECTS	Semester
MEIN216	Measurement & Instrument	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-/ 2 / - / -/ -	63	62
Description			
This course deals with explaining the measurement process and its importance in our daily lives, clarifying the most important basic characteristics of the devices and how use these devices in the measurement process.			

Module 7

Code	Course/module Title	ECTS	Semester
ELC1217	Electronics Circuits	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-/ 2 / - / -/ -	63	37
Description			
This course specification provides the main features of the theory of electronic circuit for the students of 2nd year in the Electromechanical Engineering Department. Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programmer specification as Energy and Renewable Energies Engineering.			

Second semester

Module 1

Code	Course/module Title	ECTS	Semester
ENLA221	English Language II	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-	33	42
Description			
The goal of this course is to build up the student's interest in fundamentals of the English language basics such as grammar, punctuation, tense types, reading skills, Writing skills, and presentation skills.			

Module 2

Code	Course/module Title	ECTS	Semester
ADMS223	Advanced Mathematics II and Probability and Statistics	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
4	-	63	87
Description			
This course describes the partial derivative, chain rule, solution of first order differential equation including variable separable, reduction into separable, linear and non linear differential equation, exact differential equation, reduction into exact, and second order differential equation. The vector is also presented in this section. The random variable probability distribution, and engineering statistics are also described in this course.			

Module 3

Code	Course/module Title	ECTS	Semester
SPOR222	Sport	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-	33	17
Description			

This course considers the main sport games.

Module 4

Code	Course/module Title	ECTS	Semester
FLME224	Fluid Mechanics	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	-/ 2- / - / -	63	62
Description			
Fluid mechanics is one of the basic sciences in which the laws of equilibrium and movement of fluids are studied. It can be divided into statics fluid and dynamics fluid. It has a wide application in hydraulic engineering and in the work of transporting and storing liquids and gases. .			

Module 5

Code	Course/module Title	ECTS	Semester
ELCI225	Electrical Circuits	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	- / 2 -/ - / -	63	37
Description			
This course specification provides the main features of the theory of electric circuit for the students of 2nd year in the Electromechanical Engineering Department. Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programmer specification as Energy and Renewable Energies Engineering.			

Module 6

Code	Course/module Title	ECTS	Semester
STMA226	Strength of Materials	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	- / 2 / - / -	63	62
Description			
This course provides an understanding of the mechanics of deformable materials and structures. It introduces the concepts of stress and strain, and basic structural			

elements like rods, beams, and shearing and bending elements.

Module 7

Code	Course/module Title	ECTS	Semester
ELMA227	Electrical Machines (AC)	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/sem)
2	- / 2 / - / -	63	62
Description			
As types of an AC electrical machine, transformer and three-phase induction motor are playing essential part in our life regarding power transmission and consuming, this course deals with transformer and three-phase induction motor. It is essentially providing knowledge of the transformer and three-phase induction motor construction, working principle. It is also introducing performance analysis of the transformer based on its equivalent circuit. Moreover, it deals with prediction of the motor equivalent circuit parameters in order to analysis the motor performance including torque and efficiency			

3. **Contact:**

Program Manager: Ameer Abed Gaddoa, Prof. Assistance, PhD in Mech. Eng. (2015)
Program Coordinator: Ahmed Kamil Hasan Al-Ali, Prof. Assistance, PhD Electrical Eng. (2020)

Appendix 4 Modules Description Form

First Semester

Module 1

Module Information		
Module Title	Crimes of the Baath Regime in Iraq	Module Delivery
Module Type	Support	■ Theory
Module Code	CBRI201	☐ Lecture
ECTS Credit/year	2	☐ Lab
		☐ Tutorial
		☐

SWL/year	50		Practical ☐ Seminar
Module level	1	Semester of Delivery	1
Module Leader	Sajad Qasim	College	
Module Leader Academic Title	Assist Lecturer	e-mail	
Module Tutor	-	Module Leader's Qualification	MSc.
Peer Reviewer Name	-	e-mail	11536@uotechnology.edu.iq
Scientific Committee Approval Date	1/6/2023	e-mail	-
-	-	Version Number	1

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	• Making this generation aware of the crimes committed by the Baathist regime • The extent of human rights violations publicly • Spreading awareness of the extent of violation of Sharia and law
Module Learning Outcomes	The student will learn about generation aware of the crimes committed by the Baathist regime.
Inductive Contents	1. Introducing the student to Rejecting Baathist **2.** Familiarize students with Recognizing the ugliness crimes committed . **3.** Introducing students to the Killing and slaughtering the Shiite Kurds 4. Introducing the student to the Hiding signs of genocide 5. Familiarize students with expressing an opinion.

Learning and Teaching Strategies

Strategies		-	
Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.00
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13
Total SWL (h/sem)	50		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	-	-	-	-
	Assignments				All
	Projects / Practice	Every 3 weeks	50%	Continuous	-
	Report	-	-	-	-
Summative Assessment	Midterm Exam	-	-	-	-
	Exam	Every 3 weeks	50%	Continuous	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	**Rejecting Baathist**
Week 2	**Recognizing the ugliness crimes committed** .
Week 3	**Violations committed**
Week 4	**For the sake of humanity**
Week 5	**Oppressing.and exterminating.the people**
Week 6	**Cruelty,intimidation and torture**
Week 7	**Politics of repression**
Week 8	**Reject the idea of change**
Week 9	**expressing an opinion**

Week 10	**Burying crime scenes**
Week 11	**Killing and slaughtering the Shiite Kurds**
Week 12	**Concealing the evidence of crimes**
Week 13	**Continuous killing**
Week 14	**Hiding signs of genocide**
Week 15	**Collectiv the people**

Learning and Teaching Resources		
-	Text	Available in the library
Required Texts	**A methodological book (Crimes of the Baath Regime in Iraq)Ministry of Higher Education and Scientific Research**	Yes
Recommended Texts	-	-
Websites	-	-

First Semester

Module 2

Module Information			
Module Title	Advanced Mathematics I		Module Delivery
Module Type	Basic		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ADMA213		
ECTS Credit	6		
SWL	150		
Module level	1	Semester of Delivery	1
Module Leader	Ahmed Kamil Hasan Al-Ali	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Assistance Prof.	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. Elec. Eng.
Peer Reviewer Name	-	E-mail	50035@uotechnology.edu.iq
Scientific Committee	-	E-mail	-

Approval Date			
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	In this course, students will learn: • Sequence • Laplace Transform • Inverse Laplace Transforms • Fourier Series • Power Series
Module Learning Outcomes	In this course, – Computer Science students will learn: 1. Introduction to sequence, convergence of sequence 2. Introduction to series, Types of series, Convergence of series, Fourier series 3. Laplace transform and inverse Laplace transform.
Inductive Contents	• Sequences and series • Arithmetic and geometric series • Series of powers of natural numbers • Convergent and divergent series • Power series • Standard series • The binomial series • Maclaurian and Taylor series. • **Fourier Series** • **Laplace Transform** • L.T for standard important function • Properties of L.T • L.T of derivatives • L.T of integral • Periodic functions

	• Unit step function • Inverse L.T • Inverse L.T for standard important function • Properties of inverse L.T • Inverse L.T of derivatives • Inverse L.T of integral • Solution of ODE in L.T • Double integral

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.00
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.8
Total SWL (h/sem)	150	-	-

Module Evaluation					
-		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	-	-	-	-
	Report	1	10%	11	6
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 – 6
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Introduction to sequence, convergence of sequence
Week 2	Introduction to series, testing rule for series
Week 3	Taylor series
Week 4	Binomial series

Week 5	Fourier series
Week 6	Introduction to Laplace transform
Week 7	Laplace properties
Week 8	Inverse Laplace transform
Week 9	Introduction to Solution of inverse Laplace transform
Week 10	Mid-term Exam
Week 11	Examples of solution of inverse Laplace transform
Week 12	Introduction to solution of differential equation using Laplace transform
Week 13	Examples of solution of differential equation using Laplace transform
Week 14	Introduction to double integral
Week 15	Examples of double integral
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Advanced Engineering Mathematics. K.A. Stroud,2003	YES
Recommended Texts	Advanced Engineering Mathematics. K.A. Stroud,2003	YES
Websites	-	-

Module 3

Module Information			
Module Title	Computer Science II		Module Delivery
Module Type	Supplement		■ Theory
Module Code	COMP212		☐ Lecture
ECTS Credit	3		■ Lab
SWL	75		☐ Tutorial
			☐ Practical
			☐ Seminar
Module level	1	Semester of Delivery	1
Module Leader	Ameer Abed Gaddoa	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. Assistance	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's	PhD. Mech. Eng.

		Qualification	
Peer Reviewer Name	-	e-mail	Ameer.A.Jaddoa@uotechnology.edu.iq
Scientific Committee Approval Date	-	e-mail	--
-	-	Version Number	

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	• Introduction & Basics • Selection • Iteration • Functions • Arrays • Pointers • Strings Files
Module Learning Outcomes	In this course, for students will learn 1. Pre-Increment & post -increment operators. 2. Conditional operator 3. Switch. 4. Loops. 5. Standard functions. 6. References 7. Classes
Inductive Contents	In this course, students will learn: ● Pre-Increment & post -increment operators. ● Conditional operator ● Switch. ● Loops. ● Standard functions. ● References ● Classes

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.00
Unstructured SWL (h/sem)	12	Unstructured SWL (h/w)	0.80
Total SWL (h/sem)	75	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	-	-	-	-
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 – 6
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Basics of C++
Week 2	Structure of a program, Basic Input / Output
Week 3	Variables Data Types,
Week 4	Operators, Increase and decrease (++, --)
Week 5	Selection, Conditional structure (if), Conditional structure (Switch)
Week 6	Conditional Opterator
Week 7	**Iteration, For Loop**
Week 8	While loop
Week 9	do…while loop
Week 10	Mid-term Exam
Week 11	**Function**
Week 12	Standard Function, and User Functions
Week 13	**Arrays**

Week 14	One-dimension arrays, Two-dimension arrays
Week 15	**Files, Open files, Input / output from files, Files with Functions**
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	PROGRAMMING WITH C++, JOHN R. HUBBARD, SCHAUM'S OUTLINE SERIES, McGRAW-HILL, 2000.	YES
Recommended Texts	-	-
Websites	-	-

Module 4

Module Information			
Module Title	Electrical Machines (DC)		Module Delivery
Module Type	Core		■ Theory ☐ Lecture ■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ELMA214		
ECTS Credit	5		
SWL	125		
Module level	1	Semester of Delivery	
Module Leader	Ahlam L. Shuraiji	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. Assistance	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. in Electrical
Peer Reviewer Name	-	e-mail	Ahlam L. Shuraiji @uotechnology.edu.iq
Scientific Committee Approval Date	-	e-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	The main aims of this course are • provide learners with knowledge and an understanding of the working principle, and constructional features of DC machines. • Functionality of DC generators and DC Motors with their classification • evaluate efficiency of the DC machines under different load operation conditions.
Module Learning Outcomes	**At the end of this course students will demonstrate the ability to** • Understand the concept of energy conversion from electrical form to mechanistical form and vice versa. • Understand the principle operating of both DC generator and DC motor • Analysis the armature reaction in DC machine • Explain commutator process in DC machines • Evaluate DC generator EMF, efficiency for different load conditions • Evaluate different types of DC generators based on their performance characteristics • Analysis back-EMF and torque of the DC motor • Mention different speed control methods for DC motor based on the speed equation. • Summarize losses that would be occurred on the dc machines and classified them.
Inductive Contents	1-Introduction, Basics of electrotechnical energy conversion. 2- Construction of DC machine and operating principle of DC generation. 3- EMF equation of dc generator. 4- armature reaction and commutator

	process in DC machines 5- classification of DC generator and mathematical model of each type. 6- Voltage build up process in self-excited DC generator. 7- Characteristics of DC generator. 8- Torque equation of DC motor and back-EMF. 9- Speed control methods of DC motor. 10- Performance characteristics of DC motor 11- losses and efficiency of DC machine.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.00
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13
Total SWL (h/sem)	125		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2
	Assignments	1	10%	7	LO # 3, 4
	Projects / Lab.	-	-	-	-
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 – 4
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Dc Machines construction
Week 2	Armature windings
Week 3	Armature reaction
Week 4	Types of Dc Generators
Week 5	Mathematical model of DC generator types
Week 6	Characteristics of DC generators
Week 7	Losses and efficiency
Week 8	Operating principle of DC motor
Week 9	Types of DC motor
Week 10	Mid-term Exam
Week 11	Mathematical model of DC motor types
Week 12	Characteristics of DC motor
Week 13	Speed control of DC motor
Week 14	Starting of DC motor
Week 15	Losses and efficiency of DC motor
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	P. C. Sen, "Principles of electric machines and power electronics", John Willy and Sons Inc., 1997.	-
Recommended Texts		-
Websites	-	-

Module 5

Module Information		
Module Title	Thermodynamics	Module Delivery
Module Type	Core	■ Theory
Module Code	THER215	□ Lecture
ECTS Credit	5	■ Lab

SWL	125		☐ Tutorial ☐ Practical ☐ Seminar
Module level	1	Semester of Delivery	1
Module Leader	Amged Al Ezzi	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Assistance prof.	e-mail	**eme@uotechnology.edu.iq**
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	E-mail	Amged Al Ezzi @uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	**Definition of the thermodynamics basics and its units** **. Definition of Energy Balance** **. Definition of Newton's laws of Thermodynamics** **. Definition of the Thermodynamics processes** **. Definition of power plant cycles** **. Definition of the property of entropy**
Module Learning Outcomes	In this course, students will learn: 1. Fundamentals of thermodynamic 2. How to use Newton law of thermodynamics 3. Introduction to thermodynamic process.
Inductive Contents	In this course, for engineering mechanics students will learn: 1 System and Surroundings: • System: The part of the universe being studied, typically defined by boundaries.

	• Surroundings: Everything outside the system. 2 Laws of Thermodynamics: • Zeroth Law: If two systems are each in thermal equilibrium with a third system, they are in thermal equilibrium with each other. This law defines temperature. • First Law (Law of Energy Conservation): Energy cannot be created or destroyed, only transferred or converted from one form to another. Mathematically, $\Delta U = Q - W$, where ΔU is the change in internal energy, Q is heat added to the system, and W is work done by the system. • Second Law: The total entropy of an isolated system can never decrease over time. Entropy, a measure of disorder, tends to increase, explaining the natural tendency towards energy dispersal and equilibrium. • Third Law: As the temperature of a system approaches absolute zero, the entropy of the system approaches a minimum value. 3 Key Processes: • Isothermal Process: Occurs at a constant temperature. • Adiabatic Process: Occurs without heat exchange between the system and its surroundings. • Isobaric Process: Occurs at a constant pressure. • Isochoric Process: Occurs at a constant volume. 4 Applications: • Thermodynamics is applied in various fields such as engineering (design of engines and refrigerators), chemistry (reaction spontaneity and equilibrium), and even biology (metabolic processes). Thermodynamics provides a framework for understanding how energy flows and transforms in natural and engineered

	systems, making it a fundamental aspect of both theoretical and applied sciences.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.00
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13
Total SWL (h/sem)	125	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	1	-		LO # 3
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 – 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	**Basics of Thermodynamics**
Week 2	Energy balance
Week 3	Newton’s thermodynamics laws
Week 4	**Pressure, volume, and Temperature**
Week 5	Test
Week 6	Thermodynamics processes

Week 7	**Heat engine, heat pump** **Refrigerator**
Week 8	Carnot cycle
Week 9	Rankine cycle
Week 10	Test
Week 11	Otto and Desal cycle
Week 12	Boiler and Turbine
Week 13	Heat exchanger and pumps
Week 14	Entropy
Week 15	Test
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Thermodynamic an Engineering Approach, Yunus A. Cengel, Michael A. Boles, 5th edition 2004	-
Recommended Texts	Thermodynamic an Engineering Approach, Yunus A. Cengel, Michael A. Boles, 5th edition 2004	-
Websites	-	-

Module 6

Module Information			
Module Title	Measurement & Instrument		Module Delivery
Module Type	Core		■ Theory □ Lecture ■ Lab □ Tutorial □ Practical □ Seminar
Module Code	MEIN216		
ECTS Credit	5		
SWL	125		
Module level	1	Semester of Delivery	1
Module Leader	Hashima Shried	College	Electromechanical Eng.

			Dept.
Module Leader Academic Title	Assistance Prof.	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	MSc. in Mech. Eng.
Peer Reviewer Name	-	e-mail	
Scientific Committee Approval Date	-	e-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	1-Introducing the student to the basic principles of measurements and general characteristics of the devices 2- Explain design and construction of the devices and knowing all their parts. 3- Explain the working principle of these devices
Module Learning Outcomes	● Define the basics in **Measurements** such as the performance characteristics of an instrument which are include: Accuracy, Precision, Range, Threshold,… ● Learn number of divisions on scale, Measuring units, deflection of the pointer and types of errors in Measurement. ● Understand Relative limiting Errors and their applications. ● Develop the ability to apply combination of quantities with limiting errors. ● Recognize Electromechanical Indicating Instruments and essentials of indicating instruments includes (deflecting, controlling and damping) torque. ● Explain types of instruments such as: Permanent magnet moving coil (PMMC), Moving Iron, Electrodynamometer

	Instruments and Induction Type Wattmeter. ● Describe design Ammeter, Voltmeter and Wattmeter for each instrument. ● Identify the construction and working principles of devices. ● Summarize DC and AC Bridges. ● Discuss the procedure experimental laboratory such Calibration of Ammeter, Calibration of Ammeter and AC Bridges. 1. ●Ability to solve problems
Inductive Contents	1-Introduction, Basics of Measurements and Performance Characteristics, Errors in Measurement. 2- Relative limiting Errors (er). 3- Statistical analysis, combination of quantities with limiting errors. 4- Electromechanical Indicating Instruments, Methods of Providing Controlling Torque 5- Permanent magnet moving coil (PMMC). 6- Extension of Ammeter and Voltmeter range by using direct and indirect method. 7- Moving IRON Instrument. 8- Electrodynamometer Instruments – Ammeter, Voltmeter and Wattmeter 9- Induction Type Wattmeter 10- DC Wheatstone Bridge and AC Wheatstone Bridge.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13
Total SWL (h/sem)	125	-	-

Module Evaluation

		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	-	10%	-	-
	Assignments	1	10%	7	LO # 1, 2, 3
	Projects / Lab.	-	-	-	-
	Report	1	10%	12	LO# 1, 2, 3, 4, 5, 6, 7
Summative Assessment	Midterm Exam	1.5 hr	20%	11	LO # 1 – 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	**Introduction to measurements:** **Accuracy, precision, resolution, linearity, sensitivity……etc.)**
Week 2	Measurement errors: Absolute error ,relative error ,types of error and their calculations ,limiting errors
Week 3	General Theory of Analog Measuring Instruments: Indicating type: PMMC, moving iron,
Week 4	**Electronic Analogue Measuring Instruments: DC&AC voltage and current measurement, power and resistance measurement.**
Week 5	Bridges and their applications : DC bridge (Wheatstone, Kelvin,) AC bridge (Maxwell, Hay's, Wien Bridge)
Week 6	Cathode Ray Oscilloscope : ()
Week 7	Transducers: Classification and Selection , acceleration thermo-electric.
Week 8	Signal analysis : Wave analyzer, Harmonic distortion analyzer, Spectrum analyzer
Week 9	Digital Instruments : D/A &A/D , Voltage and current.
Week 10	resistance digital measurement
Week 11	Mid-term Exam
Week 12	Formal Reports: Closure
Week 13	primary sensing elements (Displacement ,LVDT)
Week 14	CRT, Block diagram ,applications
Week 15	Rrview
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts		
Recommended Texts	-	-
Websites	-	-

Module 7

Module Information			
Module Title	Electronics Circuits		Module Delivery
Module Type	Core		■ Theory ☐ Lecture ■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ELC1217		
ECTS Credit	4		
SWL	100		
Module level	1	Semester of Delivery	1
Module Leader	Sahar R. Al-Sakini, Ghassan Abdul-Hussein Bilal	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Asst. Prof.	e-mail	Sahar R. @uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	Dr.
Peer Reviewer Name	-	E-mail	10755@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	Students successfully completing this course should be able to perform the following tasks

	with minimum degree of difficulty: ● . The ability to compute Simplified Structure and Mode of operation BJTS transistors circuits ● . an understanding the basic structure- Characterizing BJT amplifier- CE amplifier- BC amplifier Multistage amplifier- Differential amplifier; ● . an introduction to field effect transistor Characteristic of JEFT and biasing circuits, COSFET, DMONSFET, MOS-FET, C/CS of transistor MOSFET, amplifying circuits, Equivalent circuit, amplifier types CS, CD, CG; ● . the ability to evaluate power amplifiers class A, class B, class AB, class C; ● . the ability to use oscillator Feedback loop and the oscillator criterion, the oscillator circuits, Oscillator circuits, LC-oscillator circuits, crystal oscillators.
Module Learning Outcomes	Most students will be able to calculate BJTS transistors circuits with a reasonable degree of skill. • Students should be able to use the basic structure- Characterizing BJT amplifier- CE amplifier- BC amplifier- Multistage amplifier- Differential amplifier. • Students should be made an introduction to field effect transistor Characteristic of JEFT and biasing circuits, COSFET, D-MONSFET, MOS-FET, C/CS of transistor MOSFET, amplifying circuits, Equivalent circuit, amplifier types CS, CD, CG. • The students should be made aware of the resonance circuits interpretation. • The students should be able to evaluate power amplifiers class A, class B, class AB, class C.

	• The students should be able to use oscillator Feedback loop and the oscillator criterion, the oscillator circuits, RC- oscillator circuits, LC-oscillator circuits, crystal oscillators.
Inductive Contents	1- Fundamentals of DC Circuit. 2- Diodes. 3- Introduction to the Transistor 4- The Transistor Switch 5- Fundamentals of AC Circuits 6- Filters 7- Resonant Circuits 8- Transistor Amplifiers 9- Oscillators 10- The Transformer 11- Power Supply Circuits

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	2.46
Total SWL (h/sem)	100	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	-	10%	-	-
	Assignments	1	10%	7	LO # 1, 2, 3
	Projects / Lab.	-	-	-	-
	Report	1	10%	12	LO# 1, 2, 3, 4, 5, 6, 7
Summative Assessment	Midterm Exam	1.5 hr	20%	11	LO # 1 – 5
	Final Exam	3 hr	50%	17	All

Total assessment	100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Bipolar junction Transistors (BJTS)
Week 2	Simplified Structure and Mode of operation
Week 3	Type of transistor Connection
Week 4	characteristic curve- load line-connection analysis of each type of connection
Week 5	The BJT as an amplifier an as a switch
Week 6	Biasing in BJT amplifier circuits, BJT amplifier: The basic structure
Week 7	Characterizing BJT amplifier-CE amplifier- BC amplifier- Multistage amplifier-Differential amplifier
Week 8	Field Effect transistor (FET), Characteristic of JEFT and biasing circuits
Week 9	COSFET, D-MONSFET,MOS-FET, C/CS of transistor MOSFET
Week 10	amplifying circuits, Equivalent circuit, amplifier types CS, CD, CG
Week 11	Power Amplifiers: class A, class B, class AB, class C
Week 12	Oscillator: Feedback loop and the oscillator criterion
Week 13	the oscillator circuits, RC
Week 14	oscillator circuits, LC- oscillator circuits
Week 15	crystal oscillators
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Electronic Devices, Thomas L. Floyd, 10th Edition, 2018	Pdf
Recommended Texts	-	-
Websites	-	-

Second Semester

Module 1

Module Information		
Module Title	English Language II	Module Delivery
Module Type	Support	■ Theory
Module Code	ENLA221	□ Lecture

ECTS Credit	3		☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
SWL	75		
Module level	1	Semester of Delivery	1
Module Leader	Dr. NASSR FADHIL HUSSEIN	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. assistance	e-mail	eme@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	E-mail	
Scientific Committee Approval Date	-	E-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	• Defining the grammar writing skills • Defining verbal presentation skills • Defining of the content that needs to be presented • Organization of the content to make it easy to be followed. • Data presentation in such audience is easily able to grasp significance
Module Learning Outcomes	Students will learn: • Tense types, and parts of speech. • Sentence structure, affixes & prefixes, and Engineering Vocabulary. • Punctuations, and the differences between British and American English. • Writing skills (essay and Email)

	• Reading Skills (how to be an effective reader). • Presentation Skills and discussion skills.
Inductive Contents	□ Part of speech, and Sentence Structure □ Tense types, and Passive Voice □ Transitions Words □ How to Write an Email □ How to write an essay □ Reading Skills □ Vocabulary, Punctuation, and the way to Vocabulary Development. □ Discussion Skills, and How to give a good presentation □ Affixes, Prefixes , and Differences between British and American English.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.0
Unstructured SWL (h/sem)	42	Unstructured SWL (h/w)	2.8
Total SWL (h/sem)	75	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2
	Assignments	1	10%	7	LO # 3, 4
	Projects / Lab.	-	-	-	-
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 – 4
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Parts of speech
Week 2	Sentence Structure: Sentence Types
Week 3	Tenses
Week 4	Transitions Words
Week 5	How to Write an Email in English
Week 6	Discussion Skills
Week 7	How to write an essay
Week 8	How to be an effective reader
Week 9	Classroom Language
Week 10	Engineering Vocabulary
Week 11	Vocabulary Development
Week 12	Punctuation
Week 13	Presentation Language
Week 14	Affixes & Prefixes
Week 15	Differences between British and American English
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts		-
Recommended Texts		-
Websites	-	-

Module 2

Module Information			
Module Title	Advanced Mathematics II and Probability and Statistics		Module Delivery
Module Type	Basic		■ Theory
Module Code	ADMS223		☐ Lecture
ECTS Credit	6		☐ Lab
SWL	150		☐ Tutorial ☐ Practical ☐ Seminar
Module level	1	Semester of	1

		Delivery	
Module Leader	Ahmed Kamil Hasan and Mahomed Mustafa	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Assistance Prof	E-mail	eme@uotechnology.edu.iq
Module Tutors	-	Module Leader's Qualification	Phd. Elect. Eng. Phd. Mech. Eng
Peer Reviewer Name	-	E-mail	Ahmed.k.alali@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	The students will learn the second part of the basic math and principle of statistics.
Module Learning Outcomes	In this course, for students will learn 1. Differentiation (Derivative Definition, Techniques of Derivative, Applications) 2. Differentiation (Parametric Equations, Implicit Differentiation) 3. Integration (Definite Integrals, Properties, Relation Between Indefinite & definite Integrals) 4. Differential Equations D.E. 1st degree equation 5. Differential Equations D.E. 2 nd degree equation 6. Vector. 7. Random variable and probability distribution 8. Engineering Statistic.
Inductive Contents	In this course, students will learn: • Differentiation (Derivative Definition, Techniques of Derivative, Applications) • Area between Curve and y-axis, Area Between Two Curves) • Differential Equations D.E, 1st degree equation:

	• (1-Variable Separable, 2- reduction into separable, 3- Linear differential equation, 4- non linear differential equation 5- exact differential equation 6- Bernoulli's Equations 7- reduction into exact) • Differential Equations D.E. 2^{nd} degree equation: • Vector • Definition of random variable, discrete and continuous random variables • Types of statistics (mean, variance, and standard deviation).

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.8
Total SWL (h/sem)	150	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2, 3
	Assignments	1	10%	7	LO # 4, 5, 6
	Projects / Lab.	-	-	-	-
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 – 6
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Differentiation Derivative by definition Techniques of differentiation

	Applications
Week 2	Chain rule, chain rule for three independent variables
Week 3	Implicit differentiation Directional derivative Gradient vector
Week 4	Properties of directional derivative Gradients and tangents to level curves
Week 5	Solution of first order differential equation Variable separable Method
Week 6	Solution of first order differential equation Reduction into separable, and linear differential methods
Week 7	Solution of first order differential equation Non linear differential, Bernoulli methods
Week 8	Solution of first order differential equation Exact differential and reduction into exact methods
Week 9	Mid-term Exam
Week 10	Solution of second order differential equation
Week 11	Tripple integral
Week 12	Vector
Week 13	Introduction to probability, Random experiment, Sample Spaces, Events, Probability
Week 14	Random variables and probability distributions
Week 15	Mathematical expectation and variance
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
-	Text	Available in the library
Required Texts	Thomas Calculus, George B. Thomas et al, 12th, edition, 2010, USA.	YES
Recommended Texts	-	-
Websites	-	-

Module 3

Module Information		
Module Title	Sport	Module Delivery
Module Type	Support	■ Theory
Module Code	SPOR222	□ Lecture
ECTS Credit	2	□ Lab

SWL	50		☐ Tutorial ☐ Practical ☐ Seminar
Module level	1	Semester of Delivery	1
Module Leader	Muaid Waleed	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Asst. Prof.	e-mail	10755@uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	MsC.
Peer Reviewer Name	-	E-mail	10755@uotechnology.edu.iq
Scientific Committee Approval Date	-	E-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	Develop the ability of the students to understand the main sport activities
Module Learning Outcomes	In this course, students will learn: 1- Football 2- Basketball
Inductive Contents	• Football • Basketball
Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.0
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13

Total SWL (h/sem)	50	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	-	10%	-	-
	Assignments	1	10%	7	LO # 1, 2, 3
	Projects / Lab.	-	-	-	-
	Report	1	10%	12	LO# 1, 2, 3, 4, 5, 6, 7
Summative Assessment	Midterm Exam	1.5 hr	20%	11	LO # 1 - 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Sports - concept, benefits and types
Week 2	Fitness - the concept and elements of fitness
Week 3	Football - concept + history
Week 4	Football - basic soccer skills
Week 5	Football Law - Article 1, 2
Week 6	Football Law - Articles 3, 4, 5
Week 7	Basketball - concept + history
Week 8	Basketball - basic basketball skills
Week 9	Anatomy
Week 10	The skeleton
Week 11	Circulatory system
Week 12	Muscular system - concept + muscle injuries
Week 13	Scouting - concept + stages + scouting law
Week 14	Biorhythm - concept + benefits + historical overview
Week 15	Biorhythm cycles
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Volleyball (history - skills - plans - game	Pdf

	management - and training) Series/basketball basics Sports training and future prospects Applications in sensory education Rapid methods and techniques of sports training Football law	
Recommended Texts	-	-
Websites	-	-

Module 4

Module Information			
Module Title	Fluid Mechanics		Module Delivery
Module Type	Core		■ Theory ☐ Lecture ■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	FLME224		
ECTS Credit	5		
SWL	125		
Module level	1	Semester of Delivery	
Module Leader	Ibtisam A. Hassan	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof.	e-mail	Ibtisam A. Hassan @uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. Mech. Eng.
Peer Reviewer Name	-	E-mail	-
Scientific Committee Approval Date	-	E-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	Students will learn how to apply the value of properties of the fluid and the forces in continuity and energy and momentum equation. Also

	analysis the boundary layer.
Module Learning Outcomes	In this course, students will learn how to apply the value of properties of the fluid and the forces in continuity and energy and momentum equation. Students learn how to apply the basic principles from physics and fluid mechanics to solve the problem of static and dynamic fluid. Students will also learn how to calculate the losses in the fluid flow.
Inductive Contents	Fluid properties 2. Measurement of pressure 3. Flow classification 4. Acceleration analysis 5. Applications of Bernoullis Equations 6. Momentum Equation and its applications 7. Laminar and Turbulent flow in pipes 8. Pressure heat losses in pipes and fittings 9. Boundary layer

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13
Total SWL (h/sem)	125		-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1, 2
	Assignments	1	10%	7	LO # 3, 4
	Projects / Lab.	1	-	14	LO # 5
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	10	LO # 1 – 5
	Final Exam	3 hr	50%	17	All

Total assessment	100%	-	-

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Introduction /Dimensions and units of Measurement
Week 2	Fluid properties
Week 3	Fluids in Equilibrium (fluid statics
Week 4	Measurement of pressure and pressure difference
Week 5	Hydrostatics Thrusts on submerged surfaces
Week 6	Principle of fluid motional flow classification
Week 7	Flow classification /continuity equation
Week 8	Bernoulli's Equations
Week 9	Application of Bernoulli's Equation
Week 10	Mid-term Exam
Week 11	Momentum Equation and some of its Applications
Week 12	Laminar and Turbulent flow in pipes
Week 13	Pressure heat losses in pipes and Fittings
Week 14	Boundary layer and its Kinds
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Fluid Mechanics, Victor. Streeter& E. Benjamin Wylie, 6th Ed., McGraw-Hill, 1975	-
Recommended Texts		-
Websites	-	-

Module 5

Module Information		
Module Title	Electrical Circuits	Module Delivery
Module Type	Core	■ Theory
Module Code	ELCI225	□ Lecture

ECTS Credit	4		■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
SWL	100		
Module level	1	Semester of Delivery	1
Module Leader	Sahar R. Al-Sakini, Ghassan Abdul-Hussein Bilal	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Assistance Prof	e-mail	Sahar R. @uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. Elec. Eng.
Peer Reviewer Name	-	E-mail	
Scientific Committee Approval Date	-	E-mail	-
-	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	Students successfully completing this course should be able to perform the following tasks with minimum degree of difficulty: 1. To develop an understanding of the fundamental laws and elements of electrical circuits. 2. To learn the energy properties of electric elements and the techniques to measure voltage and current. 3. To develop the ability to apply circuit analysis to DC and AC circuits 4. . To understand transient and steady-state response of RLC circuits and to understand advanced mathematical methods such as Laplace transforms for solving circuit problems. 5. . To provide an exposure to P-Spice. .

Module Learning Outcomes	These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes. 1. Lecturer method (L) needs not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. 2. Use of Video/Animation to explain functioning of various concepts. 3. Encourage collaborative (Group Learning) Learning in the class. 4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking. 5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyses information rather than simply recall it. 6. Introduce Topics in manifold representations. 7. Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them. 8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
Inductive Contents	1- Natural and Step Responses of First and Second Order Circuits 2- Natural Responses of a Series and a Parallel RLC Circuits 3- Step Responses of a Series and a Parallel RLC Circuits 4- Balanced Three-Phase Voltages-part1 5- Balanced Three-Phase Voltages- part2 6- Resonance Circuits- part1 7- Resonance Circuits- part2 8- Two-Port Networks-part1 9- Two-Port Networks part2 10- Two-Port Networks part3 11- mini-project. 12- Review

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0

Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	2.46
Total SWL (h/sem)	100	-	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes		10%		
	Assignments		10%		
	Projects / Lab.	1.5/ 2	-	7, 10	LO # 1-7
	Report		10%		
Summative Assessment	Midterm Exam	1.5 hr	20%	12	All
	Final Exam	3 hr	50%	15	All
Total assessment			100%	-	-

Delivery Plan (weekly lab. Syllabus)	
	Materials Covered
Week 1	Natural and Step Responses of First and Second Order Circuits
Week 2	Natural and step responses of an RL circuit 1
Week 3	Natural and step responses of an RC circuit.1
Week 4	Natural and step responses of a Parallel RLC circuit
Week 5	Natural and step responses of a Series RLC circuit
Week 6	Balanced Three-Phase Circuits
Week 7	Balanced 3-phase voltages, Balanced WYE-WYE connection
Week 8	Balanced WYE- Delta connection
Week 9	Balanced Delta - Delta connection.
Week 10	Mid-term Exam
Week 11	Power in balanced 3-phase system
Week 12	Modifying and Maneuvering.
Week 13	Resonance circuits
Week 14	Series resonance, Parallel resonance, Transfer function, Decibel scale, Bode plots
Week 15	Two-Port Networks: (Impedance parameters, Admittance parameters, Hybrid parameters, Transmission parameters)
Week 16	Preparatory week before the final Exam -

Learning and Teaching Resources

	Text	Available in the library
Required Texts	Basic AC circuits, John Clayton Rawlins.2nd Edition, 2000.	-
Recommended Texts		-
Websites	-	-

Module 6

Module Information			
Module Title	Strength of Materials		Module Delivery
Module Type	Core		■ Theory □ Lecture ■ Lab □ Tutorial □ Practical □ Seminar
Module Code	STMA226		
ECTS Credit	5		
SWL	125		
Module level	1	Semester of Delivery	1
Module Leader	Muhannad Zaidan Khalifa	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof.	e-mail	Muhannad Zaidan Khalifa @uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	e-mail	
Scientific Committee Approval Date	-	e-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	• Introduces the fundamental concepts in mechanics of materials by study of the behavior of solid bodies under loads and deflections. • Study the simple bending theory for beams and the simple torsion theory for shafts

	(circular) and non-circular, deflection of beams, complex stresses, compounds beam. • Illustration and discussion the principles of free & forced vibrations and definition with and without damping. • Proceeding to the Student free & forced vibrations of single degree of freedom and two degree of freedom.
Module Learning Outcomes	This course will enable students; 1. To understand the basic concepts of the stresses and strains for different materials and strength of structural elements. 2. To know the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements. 3. To analyse and understand different internal forces and stresses induced due to representative loads on structural elements. 4. To analyse and understand principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials. 5. To evaluate the behavior of torsional members, columns and struts.
Inductive Contents	**Module (1): Simple Stresses and Strain:** Introduction, Definition and concept and of stress and strain. Hooke's law, Stress-Strain diagrams for ferrous and non-ferrous materials, factor of safety, Elongation of tapering bars of circular and rectangular cross sections, Elongation due to selfweight. Saint Venant's principle, Compound bars, Temperature stresses, Compound section subjected to temperature stresses, state of simple shear, Elastic constants and their relationship. **Module (2): Compound Stresses**: Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses Thin and Thick Cylinders: Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal

	stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lame's equation, radial and hoop stress distribution. **Module (3): Bending and Shear Stresses in Beams**: Introduction, pure bending theory, Assumptions, derivation of bending equation, modulus of rupture, section modulus, flexural rigidity. Expression for transverse shear stress in beams, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections. Shear centre(only concept). **Module (4): Torsion in Circular Shaft:** Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft, combined bending and torsion.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13
Total SWL (h/sem)	125	--	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	1	-		LO # 3

	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 – 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Introduction to dynamic.
Week 1	**SIMPLE STRESS AND STRAIN** 1.1 Normal Stress and Strain 1.2 Mechanical Properties of Material 1.3 Elasticity and Plasticity 1.4 Sign convention for direct stress and strain 1.5 Linear elasticity .
Week 2	1.6 Hooke's law 1.7 Poisson's Ratio 1.8 Shear stress and strain 1.9 Allowable Stresses& Allowable Load 1.10 Ductile material
Week 3	1.12Brittle material 1.1 3 Application of Poisson's Ratio to a two dimensional stress system 1.14 Modulus of rigidity
Week 4	**2. SHEARING FORCE AND BENDING MOMENT DIAGRAMS** 2.1 Shearing force and bending moment 2.1.1 Shearing force (S.F.) sign convention 2.1.2 Bending moment (B.M.) sign convention 2.2 S.F. and B.M. diagrams for beams carrying concentrated loads only
Week 5	2.3 S.F. and B.M. diagrams for uniformly distributed loads 2.4 S.F. and B.M. diagrams for combined concentrated and uniformly distributed loads 2.5 Points of contrafexure 2.6 Relationship between S.F. Q, B.M. M, and intensity of loading w 2.7 S.F. and B.M. diagrams for an applied couple or moment
Week 6	2.8 S.F. and B.M. diagrams for inclined load 2.9 Graphical construction of S.F. and B.M. diagrams

	2.10 S.F. and B.M. diagrams for beams carrying distributed loads of increasing value 2.1 1 S.F. at points of application of concentrated loads
Week 7	**3. DEFLECTION OF BEAMS** 3.1Differential Equation of the Deflection Curve 3.2 Deflection Formulas 3.3 Deflection by Integration of the Bending-Moment Equation 3.4 Deflection by Integration of the Shear Force ND Load Equation 3.5 Method of Superposition 3.6 Moment- Area Method 3.7 Non prismatic Beams
Week 8	3.8 Strain Energy 3.9 Castigliano's Theorem 3.10 Deflection Produced by Impact-Temperature Effects
Week 9	**4 .TORSION** 4.1 Torsion Deformation 4.2 Circular Bar and Tube 4.3 Non Uniform Torsion 4.4 Pure Shear 4.5 Transmission of Power
Week 10	.6 Statically Indeterminate Torsional Members 4.7 Strain Energy in Torsion 4.8 Thin-Walled Tubes 4.9 Stress Concentration in Torsion.
Week 11	**OSCILLATORY MOTION** 5.1 Harmonie Motion 5.2 Periodie Motion 5.3 Vibration Terminology.
Week 12	**FREE VIBRATION** 6.1 Vibration Model 6.2 Equations of Motion: Natural Frequency 6.3 Energy Method 6.4 Rayleigh Method: Effective Mass 6.5 Principle of Virtual Work 6.6 Viscously Damped Free Vibration 6.7 Logarithmie Decrement 6.8 Coulomb Damping

Week 13	**HARMONICALL Y EXCITED VIBRATION** 7.1 Forced Harmonie Vibration 7.2 Rotating Unbalance 7.3 Rotor Unbalanee 7.4 Whirling of Rotating Shafts
Week 14	7.5 Support Motion 7.6 Vibration Isolation 7.7 Energy Dissipated by Damping 7.8 Equivalent Viscous Damping 7.9 Structural Damping.
Week 15	**NOISE SOURCES AND THEIR MEASUREMENT** 8.1 Sources of Noise 8.2Choice of noise measure 8.3 Industrial noise
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	● Mechanics of Materials I., E. J. HEARN, THIRD EDITION, 2007. ● Strength of materials, G. G. Jon, 2009. Mechanical vibration by S.S. Rao.	-
Recommended Texts		-
Websites	-	-

Module 7

Module Information		
Module Title	Electrical Machines (AC)	Module Delivery
Module Type	Core	■ Theory

Module Code	ELMA227		☐ Lecture ■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
ECTS Credit	5		
SWL	125		
Module level	1	Semester of Delivery	1
Module Leader	Ahlam L. Shuraiji	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Assistance Prof	e-mail	Ahlam L. Shuraiji @uotechnology.edu.iq
Module Tutor	-	Module Leader's Qualification	PhD. in Mech. Eng.
Peer Reviewer Name	-	e-mail	
Scientific Committee Approval Date	-	e-mail	-
	-	Version Number	-

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	The main aims of this course are • provide learners with knowledge and an understanding of the

	working principle, and constructional features of transformer and three-phase induction motor. • introduce the concept of equivalent electrical circuit for both transformer and induction motor • evaluate efficiency of the machines under different load operation conditions.
Module Learning Outcomes	**At the end of this course students will demonstrate the ability to** • Understand the basic construction and working principle of transformer. • Mathematically predicted the transformer performance through the equivalent circuit of the transformer. • Explain different connection of three-phase winding transformer. • Evaluate transformer efficiency at different loading conditions. • Understand the basic construction and working principle of three-phase induction motor • Understand the concept of synchronous speed, slip, rotor

	voltage and its frequency • Predicate the motor equivalent circuit parameters using open and short circuit tests. • Analysis torque equation for different operation states. • Understand the power flow in the 3-phase induction motor and predicate the motor efficiency.
Inductive Contents	1-transforenr construction, features operating principle and classification. 2- EMF equation of transformer. 3- equivalent circuit, referring rules, power flow and efficiency of the transformer. 4- three-phase transformer, winding connection methods of three-phase transformer. 5- construction, operating principle of three-phase induction motor. 6- slip and its effect on the rotor circuit parameters, rotor current and power factor equations. 7- equivalent circuit of three-phase induction motor. 8- Torque equation of the motor. 9- losses and efficiency of the motor.

Learning and Teaching Strategies	
Strategies	The branch use a problem based learning which new and student active method. The method help the student getting

	the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.0
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13
Total SWL (h/sem)	125	--	-

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	10%	5	LO # 1 , 2, 3
	Assignments	1	10%	7	LO # 4 , 5
	Projects / Lab.	1	-		LO # 3
	Report	-	10%	-	-
Summative Assessment	Midterm Exam	1.5 hr	20%	9	LO # 1 – 5
	Final Exam	3 hr	50%	17	All
Total assessment			100%	-	-

Delivery Plan (Weekly Syllabus)	
	Introduction to dynamic.
Week 1	Single-phase transformers: operating principles and construction.
Week 2	Equivalent circuit of single-phase transformer

Week 3	Open and short circuit test of single-phase transformer
Week 4	Losses and efficiency of single-phase transformer
Week 5	Auto transformer construction, working principle and applications
Week 6	three- phase transformers: operating principles and construction
Week 7	Winding connection of three-phase transformer
Week 8	Three-phase induction motor: operating principles and construction
Week 9	Types of induction machines-advantages and disadvantages
Week 10	Mid term exam .
Week 11	Equivalent circuit of three-phase induction motor
Week 12	Torque production of three-phase induction motor
Week 13	Three-phase induction motor characteristics
Week 14	Power flow diagram of three-phase induction motor
Week 15	Preparatory week before the final Exam