University of Technology

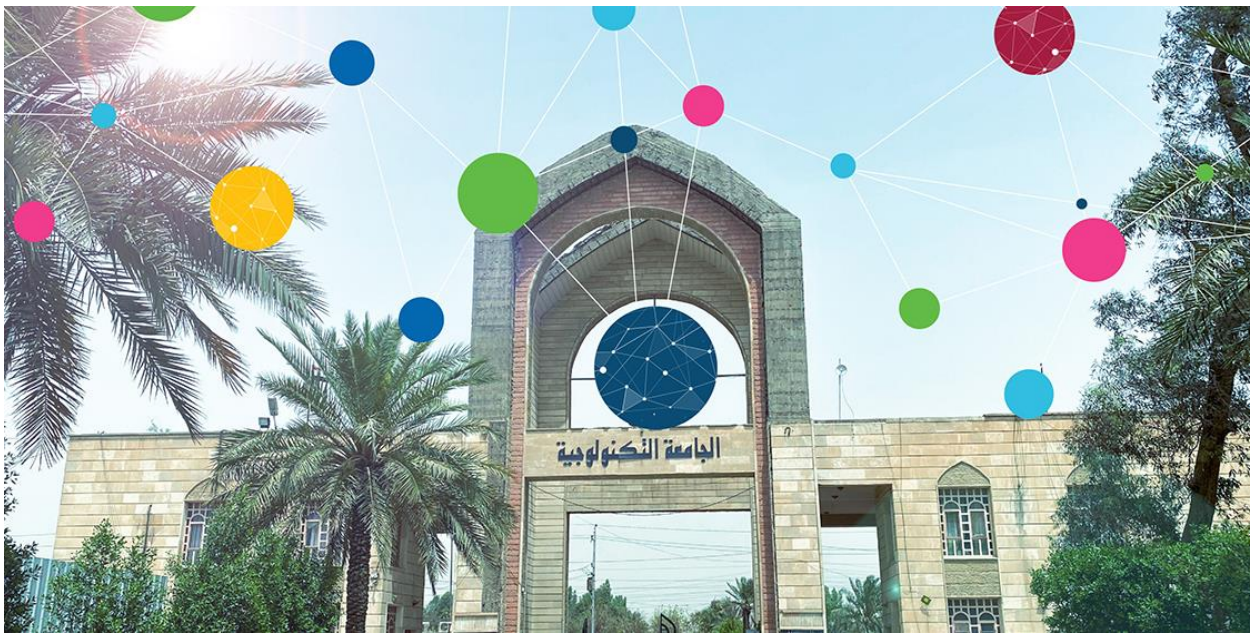
Electromechanical Engineering department

Oil and Gas Equipment Engineering Branch

2023 – 2024

First Cycle,

Bachelor's Degree (B.Sc.) - Oil and Gas Equipment Engineering Program



Appendix 2 Program Catalogue

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1. Mission and Vision Statement

Vision Statement

Aiming to build an engineering establishment in Oil and Gas Equipment Engineering field to be outstanding one among the top international university.

Mission Statement

1- Prepare our students for successful careers in the petroleum equipment 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 oil industry sectors in Iraq, including drilling, transportation, marketing and management, production and refining, safety and environment in a specialist of equipment engineering. The branch developed his courses through the communications with Ministry of Oil (symposiums, industrial advisory board meeting) to meet the needs of the Ministry which is responsible for all oil companies in Iraq.

2. Program Specification

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

Subject Areas Requirements

The Oil and Gas Equipment Engineering program produces graduates who are prepared to enter the practice of oil and gas industry. For two paths, there are three major components of the program: (1) foundation in the mathematical, chemical, 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, chemical, 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.

Chemistry (one course) in the first level includes basic concepts of organic chemistry and organic compounds, types of bonding in organic compounds, and organic compound from petroleum and their applications.

Physics (one course) 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 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, aims to provide theoretical knowledge and principles of Statics and Dynamics.
- Strength of Material and Vibration, studies 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, illustrates and discusses 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, provides working knowledge of Fluid Mechanics and illustrates and discusses the principles of fluid motional flow classification Bernoulli's equation as well as applications of Bernoulli's equation and anther subject in Fluid Mechanics.
- Heat Transfer, teaches theoretical basics of the conduction, convection and radiation heat transfer Coincided with a laboratory experiment.
- Hydraulic System, illustrates and discusses the principles of operation for hydraulic machines and their types.
- Drilling Systems, studies the parts and functions and separation of all parts of drilling equipment.
- Storage and Transmission, illustrates the types and design of storage and piping systems in addition to study the multiphase flow inside oil pipelines.
- Gas Compression, studies the basic concepts of gas compression theories and types of gas compressors.
- Principles of Equipment Engineering, illustrates the basic principles of oil and gas equipment and their mass and energy balances.
- Flow Assurance System, explains and discusses the main problems in flow systems and explains how to solve and manage each flow problem in oil and gas pipelines.

Electrical Courses,

- Fundamental of Electric Engineering, illustrates and discusses the fundamental of 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, illustrates and discusses the principles of DC and AC machines, description of the machine, as well as its operation in electrical machines.
- Electric Drives, Giving Knowledge about the electronic devices designed to control certain parameters of the motor for controlling the electrical energy into mechanical power in a precise controllable way.
- Devices and Measurements, illustrates the main devices used in oil and gas industry and the major measurement techniques.
- Digital Signal Processing, illustrates and discusses the principles of digital signal analysis to give an output to a control system.

Final Joint Courses,

- Industrial Engineering and Economics, provides knowledge about production and oil economics.
- Equipment Maintenance, provides the principles of maintenance types and importance.
- Safety and Environment Engineering in oil and gas industry.

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 OGEE faculty members, representatives from industry and OGEE 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 Oil and Gas Equipment engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse areas that related to Oil and Gas Equipment engineering.
2- Pursue graduate education and research at major research universities in Oil and GAS Equipment 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 Oil and Gas Equipment program will attain (by the time of graduation):

1. An ability to identify, formulate, and solve engineering in oil and gas equipment 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
Raheek Ismael Ibrahim	PhD. in Chem. Eng. (2007)	Prof.	80058@uotechnology.edu.iq
Raed Naeem Al-Dhalmi	PhD. in Mech. Eng. (2010)	Prof.	10596@uotechnology.edu.iq
Qusay Khalid Mohammed	PhD. in Mech. Eng. (2007)	Prof. Assistance	qusay.k.mohammed@uotechnology.edu.iq
Hussain Abdulaziz Abrahem	PhD. in Mech. Eng. (2012)	Prof. Assistance	50008@uotechnology.edu.iq
Aseel Abdulbaky Abdulrazaq	PhD. in Mech. Eng. (2011)	Prof. Assistance	Aseel.a.abdulrazak@uotechnology.edu.iq
Asifa Mahdi Mohammed	MSc. in Mech. Eng. (2014)	Prof. Assistance	50009@uotechnology.edu.iq
Azhar Sabah Ameed	MSc. in Mech. Eng. (1999)	Prof. Assistance	50085@uotechnology.edu.iq
Rasha Fahim Nadhim	PhD. in Elec. Eng. (2006)	Lecturer	50244@uotechnology.edu.iq
Wajdi Rasheed Ismaeel	PhD. in Elec. Eng. (2018)	Lecturer	50132@uotechnology.edu.iq
Akeel Abdulkareem Abtan	PhD. in Mech. Eng. (2019)	Lecturer	akeel.a.abtan@uotechnology.edu.iq
Burak Abdul Hadi	MSc. in Elec. Eng. (2008)	Lecturer	50050@uotechnology.edu.iq
Dina Harith Shaker	MSc. in Elect. Eng. (1998)	Lecturer	50061@uotechnology.edu.iq
Waleed Yousif Shehab	MSc. in Thermal Eng. (2016)	Lecturer Assistance	50093@uotechnology.edu.iq

Aws Falah Hassan	MSc. Electromechanical Eng. (2018)	Lecturer Assistance	50258@uotechnology.edu.iq
Lamyaa Hussein Aasi	MSc. Private Law (2022)	Lecturer Assistance	50276@uotechnology.edu.iq
Tamarah Ayad Kareem	MSc. Elect. Eng. (2022)	Lecturer Assistance	50284@uotechnology.edu.iq
Akram Sadeq Kramallah	MSc. Chem. Sci. (2021)	Lecturer Assistance	Akram.S.Alhaideri@uotechnology.edu.iq
Ahmed Imad Jawad	MSc. Chem. Sci. (2017)	Lecturer Assistance	Ahmed.I.Alkhshaymee@uotechnology.edu.iq
Hawraa Jumaa Hashim	MSc. in Chem. Sci. (2022)	Lecturer Assistance	Hawraa.J.Alsarai@uotechnology.edu.iq
Amna Muhammed Mustafa	BSc. in Electromechanical Eng. (2015)	Engineer	Eme.20.13@grad.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	SSWL	USSWL	ECTS	Type	Pre-request
WSHE106	Workshops	180	20	8	B	
DEHR105		33	17	2	B	
MATH113	Mathematics I	63	87	6	B	
CHEM 114	Chemistry	63	87	6	B	
ENME115	Engineering Mechanics	63	62	5	C	
COMP108	Computer Science I	48	27	3	B	
MSEN117	Materials Science & Engineering	33	67	4	C	

Semester 2: 30 ECTS: 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ENLA107	English Language I	33	17	2	B	
MATH122	Mathematics II	63	87	6	B	
PHYS123	Physics II	63	87	6	B	
FUEE124	Fundamentals of Electrical Engineering	63	62	5	C	

FATD125	Fundamentals of AutoCAD tools Drawing	48	27	3	S	
PEEN 126	Principles of Equipment Engineering	48	52	4	C	

8. Contact:

Program Manager: Raheek Ismael Ibrahim, Prof., PhD. in Chem. Eng. (2007)

Program Coordinator: Akeel Abdulkareem Abtan, Lecturer, PhD. in Mech. Eng. (2019)

Appendix 3 Modules Catalogue

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Oil and Gas Equipment 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
WSHE106	Workshop	8	1, 2
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
-	- / - / 6 / -	90	10
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.			

Module 2

Code	Course/module Title	ECTS	Semester
DEHR105		2	1
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-	33	17
Description			

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/w)
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
CHEM 114	Chemistry	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
4	-	63	87
Description			

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/w)
2	- / 2 / - / -	63	62
Description			
This unit of study aims to provide theoretical knowledge and principles of Statics and Dynamics.			

Module 6

Code	Course/module Title	ECTS	Semester
COMP108	Computer Science I	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-/1/-/-	48	27
Description			
Windows, Computer Science (Visual BASIC programs).			

Module 7

Code	Course/module Title	ECTS	Semester
MSEN117	Materials Science & Engineering	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-/-/-/-	33	67
Description			
Engineering of Materials Science			

Second semester

Module 1

Code	Course/module Title	ECTS	Semester
ENLA107	English Language I	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-	33	17
Description			

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/w)
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	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
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	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	- / 2 / - / -	63	62
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	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
-	- / 3 / - / -	48	27
Description			
Fundamental of AutoCAD tools Drawing studies the engineering drawing using AutoCAD Software and how to use this software to create a 2D and 3D modules.			

Module 6

Code	Course/module Title	ECTS	Semester
PEEN 126	Principles of Equipment Engineering	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	- / - / - / 1	48	52
Description			
Principles of oil and gas Equipment Engineering			

3. Contact:

Program Manager: Raheek Ismael Ibrahim, Prof., PhD. in Chem. Eng. (2007)
Program Coordinator: Akeel Abdulkareem Abtan, Lecturer, PhD. in Mech. Eng. (2019)

Appendix 4 Modules Description Form

First Semester

Module 1

Module Information			
Module Title	Workshops I		Module Delivery
Module Type	Support		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ■ Practical ☐ Seminar
Module Code	WOSH111		
ECTS Credit	8		
SWL	200		
Module level	1	Semester of Delivery	1, 2
Module Leader	Training and Workshops Center	College	Electromechanical Eng. Dept.
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		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes				
	Assignments	Every 3 weeks	60%		All
	Projects / Lab.				
	Report				
Summative Assessment	Midterm Exam				
	Final Exam	Week 30	40%		
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		
Recommended Texts		
Websites		

Module 2

Module Information			
Module Title	English Language I		Module Delivery
Module Type	Support		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ENLA112		
ECTS Credit	2		
SWL	50		
Module level	1	Semester of Delivery	1
Module Leader	Amged Talal saeed	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Prof. Assistance	e-mail	amged.t.saeed@uotechnology.edu.iq
Module Tutor		Module Leader's Qualification	PhD. Mech. Eng.
Peer Reviewer Name		e-mail	amged.t.saeed@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 Assessment	Quizzes	1	5%	5	LO # 1 , 2, 3
	Assignments	1	5%	7	LO # 4 , 5
	Projects / Lab.				
	Report	1	5%	11	6
Summative Assessment	Midterm Exam	1.5 hr	15%	9	LO # 1 - 6
	Final Exam	3 hr	70%	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 Credits	6				
SWL (hr/sem)	**150**				
Module Level		1	**Semester of Delivery**		1
Administering Department		EME	**College**	Electromechanical Eng. Dept.	
Module Leader	Read Naeem Hwayyin		**e-mail**	10596@uotechnology.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Read Naeem Hwayyin		**e-mail**	10596@uotechnology.edu.iq	
Peer Reviewer Name		Read N. Hwayyin	**e-mail**	10596@uotechnology.edu.iq	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Mathematic course in secondary school	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. learn the rules to solve quadratic Equation and Expand of Binomial Equation 2. learn the rules to draw sketches Trigonometric functions 3. learn the rules to solve the inverse of trigonometric functions 4. learn the rules to draw sketches of the Trigonometric Functions 5. learn the rules to solve the Limit and examples 6. learn the rules to solve L'Hopital Rule 7. learn the Definition and properties of the Hyperbolic Function 8. learn the rules to draw the sketches of hyperbolic functions 9. learn the rules to solve the derivative of the hyperbolic Functions 10. learn the rules to solve Inverse the Hyperbolic Functions 11. Draw sketches of the inverse of the Hyperbolic Functions 12. learn the rules to solve differentiable a derivative of the Implicit functions 13. learn the rules to solve Higher order derivative 14. learn the rules to solve the application of derivatives (distance, velocity, and, acceleration) 15. learn the Definition of undefined integral
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Able to solve quadratic Equation and Expand of Binomial Equation. 2. Able to draw sketches Trigonometric functions 3. Able to solve the inverse of trigonometric functions 4. Able to draw sketches of the Trigonometric Functions 5. Able to solve the Limit and examples 6. Able to solve L'Hopital Rule 7. Recognize the definition and properties of the Hyperbolic Function 8. Able to draw the sketches of hyperbolic functions 9. Able to solve the derivative of the hyperbolic Functions 10. Able to solve Inverse the Hyperbolic Functions 11. Draw the sketches of the inverse of the Hyperbolic Functions 12. Able to solve differentiable a derivative of the Implicit functions 13. Able to solve Higher order derivative

	14. Able to analyze and draw conclusions to solve the application of derivatives (distance, velocity, and, acceleration) 15. Recognize the definition of undefined integral
Indicative Contents	Indicative content includes the following. <u>Part A - Quadratic Equation and Trigonometric Functions</u> Quadratic Equation, Expand of Binomial equation, Sketches Trigonometric Functions, Inverse Trigonometric Functions, Sketches the Trigonometric Functions [20 hrs] <u>Part B - The Limit and Hyperbolic Function</u> The Limit definition and examples, definition the L'Hopital Rule, Definition and properties of Hyperbolic Function, Sketches Hyperbolic Functions, Derivative the Hyperbolic Functions, Inverse the Hyperbolic Functions, Sketches the inverse of the Hyperbolic Functions. [28 hrs] <u>Part C - Differentiable</u> The derivative the Implicit functions, Higher order derivative, Application of Derivatives distance ,velocity and, acceleration, Definition of undefined integral [12 hrs]

Learning and Teaching Strategies	
Strategies	Write something like: The main strategy to be adopted in introducing this unit is for students to engage in solving exercises while improving analysis, synthesis, and reasoning skills. This will be achieved by solving various examples and linking them with applications in reality.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)**	5.8
Total SWL (h/sem)	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	70% (70)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Quadratic Equation & Expand of Binomial equation
Week 2	Sketches Trigonometric Functions
Week 3	Inverse Trigonometric Functions

Week 4	Sketches the Trigonometric Functions
Week 5	The Limit and examples
Week 6	L'Hopital Rule
Week 7	Hyperbolic Function: Definition, properties
Week 8	Sketches Hyperbolic Functions
Week 9	Derivative the Hyperbolic Functions
Week 10	Inverse the Hyperbolic Functions
Week 11	Sketches the inverse of the Hyperbolic Functions
Week 12	Differentiable: (derivative the Implicit functions)
Week 13	Higher order derivative
Week 14	Application of Derivatives (distance , velocity, acceleration)
Week 15	Integration: Definition of integral
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India).	Yes
Recommended Texts	Murry R. Spiegel," Mathematical Handbook of formulas and tables",1968.	No
Websites	http://mcb111.org/w01/Mathematical_Handbook_of_Formulas_and_Ta.pdf	

Module 4

Module Information					
Module Title	**Chemistry**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CHEM 114				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		1	**Semester of Delivery**		1
			College	Electromechanical Eng. Dept.	
Module Leader	Raheek I. Ibrahim		**e-mail**	Raheek.I.Ibrahim@uotechnology.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. To develop problem solving skills. 2. To know the chemical and physical properties of organic compounds. 3. To understand the preparation methods of organic compounds. 4. To apply the knowledge of organic compounds in petroleum chemistry. 5. To understand some chemical processes related to chemistry of petroleum
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Describe the relation between organic chemistry and oil industry. 2. Apply the basic knowledge of chemistry in oil and gas equipment. 3. Define the basic compounds of organic chemistry. 4. Discuss the relationship between organic chemistry and equipment design. 5. Recognize how chemical processes works. 6. List the various terms associated with organic chemistry.
Indicative Contents	Indicative content includes the following. <u>Part A – Organic compounds</u> Alkanes – Naming, Physical properties, Chemical Properties, Preparation. [15 hrs] Alkenes – Naming, Physical properties, Chemical Properties, Preparation. [15 hrs] Alkynes - Naming, Physical properties, Chemical Properties, Preparation. [10 hrs] Revision problem classes [6 hrs] <u>Part B – Chemicals from petroleum</u> Fundamentals

	Carbone cycle, petroleum compositions, origin of petroleum, compounds from oil, compounds from natural gas. [15 hrs] Fossil fuel, coal, oil, and natural gas. [10 hrs] Chemical processes on petroleum, cracking, reforming, alkylation, octane number. [15 hrs]

Learning and Teaching Strategies	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)**	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #4, #5
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6
	Projects /				
	Report	1	10% (10)	13	LO #4, #5 and #6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to organic chemistry
Week 2	Organic compounds
Week 3	Organic compounds in nature
Week 4	Synthetic Organic compounds
Week 5	Naming of alkanes
Week 6	Physical and chemical properties
Week 7	Preparation of alkanes

Week 8	Naming of alkenes and alkynes
Week 9	Physical and chemical properties
Week 10	Markonikovs Rule
Week 11	Hydrocarbons from petroleum
Week 12	Fossil fuels
Week 13	Crude oil refining and cracking
Week 14	Reforming and alkylation
Week 15	Octane number
Week 16	Preliminary before Final Exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Fundamentals of organic chemistry, John McMurry, seventh edition, McGraw-Hill Education	Yes
Recommended Texts	Organic chemistry textbook by Robert Neuman Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/chemical-science-and-engineering/organic-chemistry	

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)	78	Structured SWL (h/w)	5.00
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.80
Total SWL (h/sem)	150		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	7.5%	5	LO # 1 , 2, 3
	Assignments	1	7.5%	7	LO # 4 , 5
	Projects / Lab.	1	10%		LO # 3
	Report				
Summative Assessment	Midterm Exam	1.5 hr	15%	9	LO # 1 - 5
	Final Exam	3 hr	60%	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	Computer Science I		Module Delivery
Module Type	Support		■ Theory ☐ Lecture ■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	COSC116		
ECTS Credit	3		
SWL	75		
Module level	1	Semester of Delivery	1
Module Leader	Waleed Yousif Shehab	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Lec. assistance	e-mail	50195@uotechnology.edu.iq
Module Tutor		Module Leader's Qualification	MSc. in Mech. Eng.
Peer Reviewer Name		e-mail	50195@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)	3.00
Unstructured SWL (h/sem)	52	Unstructured SWL (h/w)	3.46
Total SWL (h/sem)	100		

Module Evaluation

		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	1	7.5%	5	LO # 1, 2
	Assignments	1	7.5%	7	LO # 3, 4
	Projects / Lab.				
	Report				
Summative Assessment	Midterm Exam	1.5 hr	15%	10	LO # 1 – 4
	Final Exam	3 hr	70%	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	Visual Basic. Net Fundamentals By Alfred C. Thompson II · 2018	no
Recommended Texts	Basic Principles of Learning Visual Basic Language 2016	no
Websites		

Second Semester

Module 1

Module Information				
Module Title	**Principles of Equipment Engineering**		**Module Delivery**	
Module Type	**C Core**		■ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**PEEN 126**			
ECTS Credits	**4**			
SWL (hr/sem)	**100**			
Module Level	1	**Semester of Delivery**	2	
Administering Department	EMEN	**College**	EME	
Module Leader		**e-mail**	E-mail	
Module Leader's Acad. Title	Prof	**Module Leader's Qualification**		
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	07/06/2023	**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Knowledge and Understanding introductions of materials and there properties 2. Enable the student to get the knowledge and understanding the theoretical Principles of using Materials and Structures. 3. Proceeding the understanding a Structure of Crystalline Solids 4. Proceeding knowledge and understanding of Defects, Phases and Mechanical Properties.
Module Learning Outcomes	1. Recognize how materials play major roles in life. 2. List the various terms associated with materials and applications. 3. Summarize what is meant by a basic information about connections between atoms. 4. Discuss the reaction and involvement of atoms in Crystal structure. 5. Describe defects and imperfection, and how defects play major role in properties. 6. Discuss The Structure of Crystalline Solids 7. Define Miller indices 8. Identify the Imperfections in Solids and their applications. 9. Discuss the what is the meaning of mechanical properties 10. Discuss the various types of mechanical testing. 11. Explain the stress and strain in materials analysis. 12. Identify the stress strain diagram and find out the mechanical properties
Indicative Contents	Part A - Material Theory Materials, compositions, synthesis and properties definitions, choosing materials according to their types, functional and structure. Example how choosing the best material for a specific application. [SSWL=4 hrs] Crystal structure I– Types of crystal structural and theory of Brafay lattice. [4 hrs]

	Crystal structure II - Types of crystal structural and theory BCC, FCC and HSC. [SSWL=4 hrs] Miller indices (direction and plan). [SSWL=4 hrs] Defects and imperfections in materials . [SSWL=4 hrs] Mechanical Properties and applications Revision problem classes [SSWL=8 hrs]

Learning and Teaching Strategies	
Strategies	It has been submitted description for origin of materials behavior and the interrelationships of structure/property /performance. Materials selection and use of familiar material (metals, ceramics, polymers, and composites) in structural and other engineering applications.

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	67	**Unstructured SWL (h/w)**	3.8
Total SWL (h/sem)	**100**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction
Week 2	Operation with units
Week 3	Gas mixtures
Week 4	Liquid mixtures
Week 5	solid mixtures
Week 6	Material balance
Week 7	Open systems
Week 8	Closed systems
Week 9	Steady state system
Week 10	unsteady state system
Week 11	Energy balance
Week 12	Concepts of material balance
Week 13	Enthalpy calculations
Week 14	Heat transfer
Week 15	Final Exam

Week 16	

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Introduction to Oil and Gas Equipment	no
Recommended Texts	Introduction to Oil and Gas Equipment	
Websites		

Module 2

Module Information				
Module Title	**Mathematics II**		**Module Delivery**	
Module Type	**Basic**		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MATH122**			
ECTS Credits	6			
SWL (hr/sem)	**150**			
Module Level	1		**Semester of Delivery**	1
Administering Department			**College**	Electromechanical Eng. Dept.
Module Leader	Read Naeem Hwayyin		**e-mail**	10596@uotechnology.edu.iq
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.
Module Tutor	Read Naeem Hwayyin		**e-mail**	10596@uotechnology.edu.iq
Peer Reviewer Name	Read N. Hwayyin		**e-mail**	10596@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0

Relation with other Modules			
Prerequisite module	Mathematic course in secondary school	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	16. Learn the rules to solve the technique of integral and defined integral 17. Learn the rules to solve the Integration by a part method 18. Learn the rules to solve integral the odd and even powers of sine and cosine. 19. Learn the rules to solve integral by trigonometric substitutions 20. Learn the rules to solve integral by completing the square 21. Learn the rules to solve integral by reducing an improper fraction 22. Learn the rules to solve integral by partial fraction 23. Learn the rules to solve integral by Rational function 24. Learn how solving applications of definite integral, areas, and volume 25. Recognize the Matrix's properties and Determinants 26. Learn the rules to solve and determine the inverse of matrices 27. Learn the rules to draw polar Coordinates 28. Learn the rules to solve complex Number 29. Learn the rules to solve Complex Variables 30. Learn the rules to draw the complex function
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 16. Able to solve the technique of integral and defined integral 17. Able to solve the Integration by a part method 18. Able to solve integral the odd and even powers of sine and cosine. 19. Able to solve integral by trigonometric substitutions 20. Able to solve integral by completing the square 21. Able to solve integral by reducing an improper fraction 22. Able to solve integral by partial fraction

	23. Able to solve integral by Rational function 24. Solving the applications of definite integral, areas, and volume 25. Recognize the Matrix's properties and Determinants 26. Able to solve and determine the inverse of matrices 27. Able to draw polar Coordinates 28. Able to solve complex Number 29. Able to solve Complex Variables 30. Able to draw the complex function
Indicative Contents	Indicative content includes the following. <u>Part A - Technique of Integral</u> Technique of Integral and Defined integral, Method of integration: Integration by Part, Integral the Odd and even powers of sine and cosine, Integral by trigonometric substitutions, Integral by completing the square, Integral by reducing an improper fraction, Integral by partial fraction, Integral by Rational function. [32 hrs] <u>Part B - Application of Definite Integral and matrices</u> Application of Definite Integral, Areas and Volume, Introduction to Matrices and Determinants, Determine the inverse of matrices, Polar Coordinates . [16 hrs] <u>Part C - Complex Number</u> Complex Number, Complex Variables, Draw the complex function. [12 hrs]

Learning and Teaching Strategies	
Strategies	Write something like: The main strategy to be adopted in introducing this unit is for students to engage in solving exercises while improving analysis, synthesis, and reasoning skills. This will be achieved by solving various examples and linking them with applications in reality.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)**	5.8
Total SWL (h/sem)	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	70% (70)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Technique of Integral ,Defined integral , Mode of Integral
Week 2	Method of integration: Integration by Part
Week 3	Integral the Odd and even powers of sine and cosine
Week 4	Integral by trigonometric substitutions

Week 5	Integral by completing the square
Week 6	Integral by reducing an improper fraction
Week 7	Integral by partial fraction
Week 8	Integral by Rational function
Week 9	Application of Definite Integral, Areas and Volume
Week 10	Introduction to Matrices and Determinants
Week 11	Determine the inverse of matrices
Week 12	Polar Coordinates
Week 13	Complex Number
Week 14	Complex Variables
Week 15	Draw the complex function
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India).	Yes
Recommended Texts	Murry R. Spiegel," Mathematical Handbook of formulas and tables",1968.	No
Websites	http://mcb111.org/w01/Mathematical_Handbook_of_Formulas_and_Ta.pdf	

Module 3

Module Information			
Module Title	Physics		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	Dina Harith Shaker	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Lecturer	e-mail	50061@uotechnology.edu.iq
Module Tutor		Module Leader's Qualification	MSc. 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	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	7.5%	5	LO # 1
	Assignments	1	7.5%	7	LO # 2
	Projects / Lab.				
	Report				
Summative Assessment	Midterm Exam	1.5 hr	15%	10	LO # 1 – 3
	Final Exam	3 hr	70%	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	**Fundamental of Electrical Circuits AC & DC**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**FUEE124**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		1	**Semester of Delivery**		1
Administering Department			**College**	Electromechanical Eng. Dept.	
Module Leader	Buraq Abdul Hadi Awad		**e-mail**	E-mail	
Module Leader's Acad. Title		Lecture	**Module Leader's Qualification**		MCS
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs]

	AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies	
Strategies	

	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)**	5.8
Total SWL (h/sem)	**125**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction - Difference between Circuit Theory and Field Theory
Week 2	Basics of Network Elements
Week 3	Resistance and Resistivity, Ohm's Law and Inductance, Capacitance
Week 4	Review of Kirchhoff's Laws, Circuit Analysis - Nodal and Mesh
Week 5	Linearity and Superposition, Source Transformations, Thévenin and Norton Equivalents
Week 6	Review of Inductor and Capacitor as Circuit Elements, Source-free RL and RC Circuits, Transient Response
Week 7	Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
Week 8	Sinusoidal Forcing, Complex Forcing, Phasors, and Complex Impedance, Sinusoidal Steady State Response
Week 9	Nodal and Mesh Revisited, Average Power, RMS, Introduction to Polyphase Circuits
Week 10	Mutual Inductance, Linear and Ideal Transformers, Circuits with Mutual Inductance
Week 11	Frequency Response of Series/Parallel Resonances, High-Q Circuits
Week 12	Complex Frequency, s-Plane, Poles and Zeros, Response Function, Bode Plots
Week 13	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 14	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 15	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Module 5

Module Information			
Module Title	Fundamentals of AutoCAD tools Drawing		Module Delivery
Module Type	Support		☐ Theory ☐ Lecture ■ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	FATD125		
ECTS Credit	3		
SWL	75		
Module level	1	Semester of Delivery	1
Module Leader	Akeel Abdulkareem Abtan	College	Electromechanical Eng. Dept.
Module Leader Academic Title	Lecturer	e-mail	akeel.a.abtan@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 learn how to create, edit, store, and print engineering drawings.

Module Learning Outcomes	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.
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)	48	Structured SWL (h/w)	3
Unstructured SWL (h/sem)	27	Unstructured SWL (h/w)	2.46
Total SWL (h/sem)	75		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes				
	Assignments				
	Projects / Lab.	1.5/ 2	25%	7, 10	LO # 1-7
	Report				

Summative Assessment	Midterm Exam	1.5 hr	15%	12	All
	Final Exam	3 hr	60%	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		

University of Technology

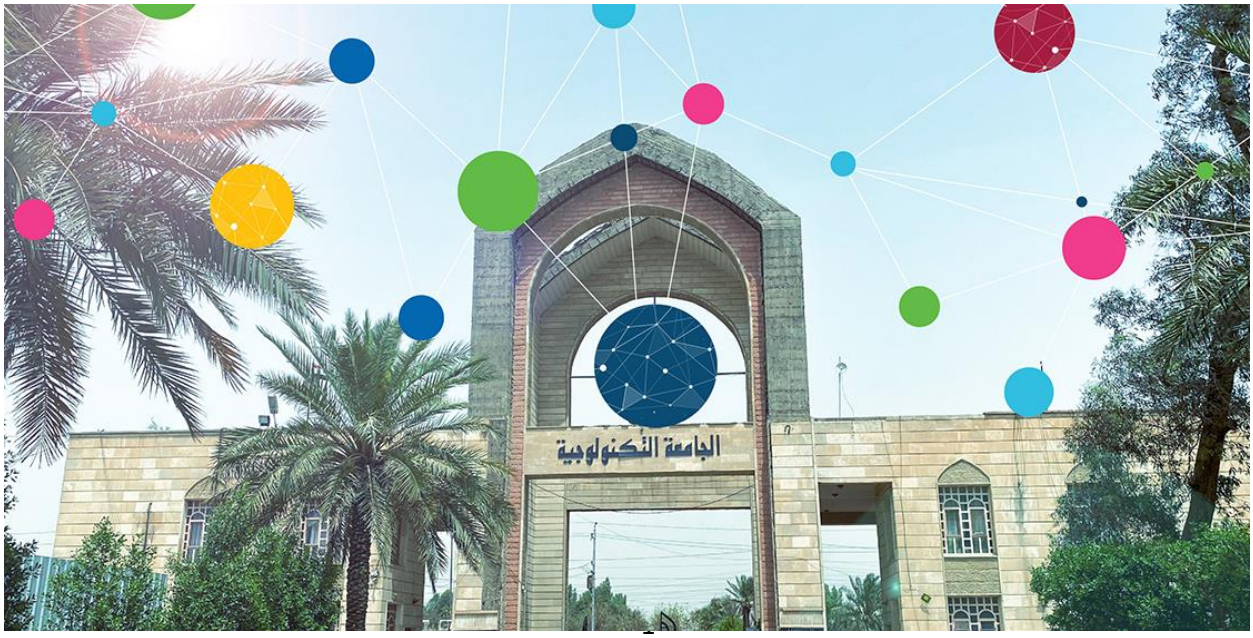
Electromechanical Engineering department

Oil and Gas Equipment Engineering Branch

2024 – 2025

Second Stage,

Bachelor's Degree (B.Sc.) - Oil and Gas Equipment Engineering Program



Appendix 2 Program Catalogue

Table of Contents

1. Mission and Vision Statement

Vision Statement

Aiming to build an engineering establishment in Oil and Gas Equipment Engineering field to be outstanding one among the top international university.

Mission Statement

1- Prepare our students for successful careers in the oil and gas equipment profession,
2- Conduct high-quality and innovative research, and
3- Serve the community and industry by providing educational and research resources.

For future plans, the branch intends to cover all required courses in oil industry sectors in Iraq, including drilling, transportation, marketing and management, production and refining, safety and environment in a specialist of equipment engineering. The branch developed its courses through the communications with Ministry of Oil (symposiums, industrial advisory board meeting) to meet the needs of the Ministry which is responsible for all oil companies in Iraq.

2. Program Specification

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

Subject Areas Requirements

The Oil and Gas Equipment Engineering program produces graduates who are prepared to enter the practice of oil and gas industry. For two paths, there are three major components of the program: (1) foundation in the mathematical, chemical, 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, chemical, 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.

Chemistry (one course) in the first level includes basic concepts of organic chemistry and organic compounds, types of bonding in organic compounds, and organic compound from petroleum and their applications.

Physics (one course) 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 satisfies ICAEE requirement.

Engineering Topics

The aim of the program is to graduate students capable to work as mechanical and electrical engineer in oil and gas 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, aims to provide theoretical knowledge and principles of Statics and Dynamics.
- Strength of Material and Vibration, studies 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, illustrates and discusses 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, provides working knowledge of Fluid Mechanics and illustrates and discusses the principles of fluid motional flow classification Bernoulli's equation as well as applications of Bernoulli's equation and anther subject in Fluid Mechanics.
- Heat Transfer, teaches theoretical basics of the conduction, convection and radiation heat transfer Coincided with a laboratory experiment.
- Hydraulic System, illustrates and discusses the principles of operation for hydraulic machines and their types.
- Drilling Systems, studies the parts and functions and separation of all parts of drilling equipment.
- Storage and Transmission, illustrates the types and design of storage and piping systems in addition to study the multiphase flow inside oil pipelines.
- Gas Compression, studies the basic concepts of gas compression theories and types of gas compressors.
- Principles of Equipment Engineering, illustrates the basic principles of oil and gas equipment and their mass and energy balances.
- Flow Assurance System, explains and discusses the main problems in flow systems and explains how to solve and manage each flow problem in oil and gas pipelines.

Electrical Courses,

- Fundamental of Electric Engineering, illustrates and discusses the fundamental of 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, illustrates and discusses the principles of DC and AC machines, description of the machine, as well as its operation in electrical machines.
- Electric Drives, Giving Knowledge about the electronic devices designed to control certain parameters of the motor for controlling the electrical energy into mechanical power in a precise controllable way.
- Devices and Measurements, illustrates the main devices used in oil and gas industry and the major measurement techniques.
- Digital Signal Processing, illustrates and discusses the principles of digital signal analysis to give an output to a control system.

Final Joint Courses,

- Industrial Engineering and Economics, provides knowledge about production and oil economics.
- Equipment Maintenance, provides the principles of maintenance types and importance.
- Safety and Environment Engineering in oil and gas industry.

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 oil and gas equipment 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 OGEE faculty members, representatives from industry and OGEE 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 Oil and Gas Equipment engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse areas that related to Oil and Gas Equipment engineering.
2- Pursue graduate education and research at major research universities in Oil and GAS Equipment 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 Oil and Gas Equipment program will attain (by the time of graduation):

1. An ability to identify, formulate, and solve engineering in oil and gas equipment 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
Raheek Ismael Ibrahim	PhD. in Chem. Eng. (2007)	Prof.	80058@uotechnology.edu.iq
Raed Naeem Al-Dhalmi	PhD. in Mech. Eng. (2010)	Prof.	10596@uotechnology.edu.iq
Akram Hamzah Abed	PhD. in Mech. Eng. (2021)	Prof. Assistance	akram.h.abed@uotechnology.edu.iq
Aseel Abdulbaky Abdulrazaq	PhD. in Mech. Eng. (2011)	Prof. Assistance	Aseel.a.abdulrazak@uotechnology.edu.iq
Asifa Mahdi Mohammed	MSc. in Mech. Eng. (2014)	Prof. Assistance	50009@uotechnology.edu.iq
Rasha Fahim Nadhim	PhD. in Elec. Eng. (2006)	Lecturer	50244@uotechnology.edu.iq
Wajdi Rasheed Ismaeel	PhD. in Elec. Eng. (2018)	Lecturer	50132@uotechnology.edu.iq
Akeel Abdulkareem Abtan	PhD. in Mech. Eng. (2019)	Lecturer	akeel.a.abtan@uotechnology.edu.iq
Burak Abdul Hadi	MSc. in Elec. Eng. (2008)	Lecturer	50050@uotechnology.edu.iq
Dina Harith Shaker	MSc. in Elect. Eng. (1998)	Lecturer	50061@uotechnology.edu.iq
Waleed Yousif Shehab	MSc. in Thermal Eng. (2016)	Lecturer Assistance	50093@uotechnology.edu.iq
Aws Falah Hassan	MSc. Electromechanical Eng. (2018)	Lecturer Assistance	50258@uotechnology.edu.iq
Lamyaa Hussein Aasi	MSc. Private Law (2022)	Lecturer Assistance	50276@uotechnology.edu.iq
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Hawraa Jumaa Hashim	MSc. in Chem. Sci. (2022)	Lecturer Assistance	Hawraa.J.Alsarai@uotechnology.edu.iq
Amna Muhammed Mustafa	BSc. in Electromechanical Eng. (2015)	Engineer	Eme.20.13@grad.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 it 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	SSWL	USSWL	ECTS	Type	Pre-request
SPRT202	Sports	33	17	2	S	
ADMT203	Advance Mathematics I	63	87	6	B	Mathematics I in the first stage
DRSY204	Drilling Systems	63	62	5	C	Petroleum Chemistry in the first stage
THDY205	Thermodynamics	63	62	5	C	
MEIN206	Measurements and Instrumentation	63	62	5	C	Fundamental of Electrical Engineering in the first stage
EECI214	Electrical and Electronic Circuits	63	37	4	C	Fundamental of Electrical Engineering in the first stage
COMP208	Computer II	48	27	3	B	Computer I in the first stage

Semester 2: 30 ECTS: 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CBRI201	Crimes of the Baath Regime in Iraq	33	17	2	B	Democracy and Human Rights in the first stage
ADMT209	Advance Mathematics II	63	87	6	B	Mathematics II in first stage
CORN210	Corrosion Engineering	48	77	5	C	Materials Science & Engineering
FLME211	Fluid Mechanics	63	62	5	C	
STMA212	Strength of Material	63	62	5	C	Materials Science & Engineering
DIEL213	Digital Electronics	63	62	5	C	Fundamental of Electrical Engineering in the first stage
ENLA207	English Language II	33	17	2	B	English Language I in the first stage

8. Contact:

Program Manager: Raheek Ismael Ibrahim, Prof., PhD. in Chem. Eng. (2007)

Program Coordinator: Akram Hamzah Abed, Asst.Prof., PhD. in Mech. Eng. (2021)

Appendix 3 Modules Catalogue

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Oil and Gas Equipment Engineering to gain a 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

Second Stage / First Semester

Module 1

Code	Course/module Title	ECTS	Semester
SPRT202	Sports	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	- / - / - / -	33	17
Description			
This course will cover sport, fitness, and coaching, helping students understand the science and leadership behind these areas.			

Module 2

Code	Course/module Title	ECTS	Semester
ADMT203	Advance Mathematics I	6	1
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
4	-	63	87
Description			
Teaching the students Advanced Mathematics with different Math. subjects and the importance basics of the different Math subjects. Teach students the main applications of the different Math. subjects on the other engineering sciences.			

Module 3

Code	Course/module Title	ECTS	Semester
DRSY204	Drilling Systems	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-, 2 , -, -	63	62
Description			
This Course Specification provides the main features of theory and design of drilling systems in addition to engineering analysis for the students of 2nd year in Electromechanical Engineering. 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 program's specification as oil and gas equipment Engineering.			

Module 4

Code	Course/module Title	ECTS	Semester
THDY205	Thermodynamics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-, 2 , -, -	63	62
Description			
The thermodynamic work begins with providing a working knowledge of open systems and closed systems, Illustration and discussion the principles of energy, work done, internal energy, 1st and 2nd laws of thermodynamics as well as applications. This unit of study aims to provide you with an understanding of the fundamentals of the thermodynamic. The ability to analyse existing flow and contribute to new designs.			

Module 5

Code	Course/module Title	ECTS	Semester
MEIN206	Measurements and Instrumentation	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	- / 2 / - / -	63	62
Description			
The topic of devices and measurements includes an explanation of the measurement process and everything related to the measurement process (units of measurement, measurement errors), as well as the measurement methods used and measuring devices for oil and gas equipment.			

Module 6

Code	Course/module Title	ECTS	Semester
EECI214	Electrical and Electronic Circuits	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-/2/-/-	63	37
Description			
This course covers the operating principles, analysis and applications of semiconductor devices underpinning electronic systems. It builds on the foundational electrical concepts developed at Level I and provides an in-depth exploration of important non-linear devices: diodes, bipolar junction transistors and field-effect transistors.			

Module 7

Code	Course/module Title	ECTS	Semester
COMP208	Computer II	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
1	-/2/-/-	48	27
Description			
This course introduces the student to the basics of programming language using C++ by studying the concepts of program specifications and design, developing algorithms to solve engineering problems, and coding and testing using a modern software development environment. Students will also understand the concept of data types, variables, assignments, decision and control, loops, and matrices. Enables the student to use a computer or through a mobile phone to write programs.			

Second Stage / Second semester

Module 1

Code	Course/module Title	ECTS	Semester
CBRI201	Crimes of the Baath Regime in Iraq	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-/-/-/-	33	17
Description			
To identify and learn about a group of crimes committed by the defunct and dissolved Baath Party against the Iraqi people and their various components, and to establish awareness among students to reject all forms of injustice and tyranny of these regimes and to demand all civil and political rights.			

Module 2

Code	Course/module Title	ECTS	Semester
ADMT209	Advance Mathematics II	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
4	-	63	87
Description			
Teaching the students Advanced Mathematics with different Math. subjects and the importance basics of the different Math subjects. Teach students the main applications of the different Math. subjects on the other engineering sciences.			

Module 3

Code	Course/module Title	ECTS	Semester
CORN210	Corrosion Eng.	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	-,-,-,1	48	77
Description			
This Course Specification provides an introductory course in corrosion and its definitions in addition to knowing the thermodynamics and kinetics of corrosion. Corrosion types have been reviewed in this course.			

Module 4

Code	Course/module Title	ECTS	Semester
FLME211	Fluid Mechanics	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	- / 2 / - / -	63	62
Description			
The Fluid Mechanics work begins with It provides a working knowledge of Flow classification and continuity equation, Bernoulli's equations, Application of Bernoulli's equations, Momentum equation and some of its applications, Laminar and turbulent flow in pipes. This unit of study aims to provide you with an understanding of the fundamentals of the Fluid Mechanics. The ability to analyses existing flow and contribute to new designs			

Module 5

Code	Course/module Title	ECTS	Semester
STMA212	Strength of Material	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	- / 2 / - / -	63	62
Description			
This course aims to offer a thorough examination of the fundamental principles that govern the mechanical behavior of materials. Students will have the opportunity to explore the intricate connection between stress and strain, thereby developing a solid understanding of how materials respond to various mechanical loads.			

Module 6

Code	Course/module Title	ECTS	Semester
DIEL213	Digital Electronics	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL(h/sem)	USWL (h/w)
2	- / 2 / - / -	63	62
Description			
Digital electronics is the electronic circuits that are used to process and control digital signals. It is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, etc. Students learn the digital circuit design process to create circuits and present solutions that can improve people's lives.			

Module 7

Code	Course/module Title	ECTS	Semester
ENLA207	English Language II	2	2
Class (hr/w)	Lect./Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	- / - / - / -	33	17
Description			
This English language course is designed to help students improve their proficiency in the English language and encourage the students to learn how to use the language in their daily events and how to apply it, as well as emphasizing listening To English speakers and encouraging the student to read, speak, and use scientific vocabulary.			

3. Contact:

Program Manager: Raheek Ismael Ibrahim, Prof., PhD. in Chem. Eng. (2007)

Program Coordinator: Akram Hamzah Abed, Asst. Prof., PhD. in Mech. Eng. (2021)

Appendix 4 Modules Description Form

Second Stage / First Semester

Module 1

Module Information					
Module Title	**Sports**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**SPRT202**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		2	**Semester of Delivery**		1
			College	Electromechanical Eng. Dept.	
Module Leader	Muaeed Waleed Nafi		**e-mail**	10755@uotechnology.edu.iq	
Module Leader's Acad. Title		Assist Prof	**Module Leader's Qualification**		Msc
Module Tutor	Muaeed Waleed Nafi		**e-mail**	10755@uotechnology.edu.iq	
Peer Reviewer Name		Muaeed W. Nafi	**e-mail**	10755@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes, and Indicative Contents	
Module Objectives	This course aims to enable students to get the knowledge and understanding of the theoretical principles of sport, including skills, tactics, and strategies required for effective training, practices, and game-day decisions.

Module Learning Outcomes	1 - This course will cover sport, fitness, and coaching, helping students understand the science and leadership behind these areas. Sport training may also help students to improve their skills in these areas. 2- Taking a course in sports can fine-tune sports skills, provide training about the business and science behind sports and physical activity, and set the foundation for a future fitness-related career.
Indicative Contents	1. Enabling students to get the knowledge and understanding of the theoretical principles of sport. 2. This knowledge includes an in-depth understanding of the skills, tactics, and strategies required for effective training, practices, and game-day decisions. 3. Helping the students achieve physical fitness Improvement, sports skills Acquisition, and mental abilities Improvement.

Learning and Teaching Strategies	
Strategies	The branch uses problem-based learning which new and student-active method. The method helps the student get the program outcomes.

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
	Quizzes	1	20%	5	

Formative assessment	**Assignments**	1	20%	7	
	Projects /				
	Report				
Summative assessment	**Midterm Exam**	1.5	10%	10	
	Final Exam	3	50%		All
Total assessment					

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Sports - concept, benefits, and types. Fitness - the concept and elements of fitness
Week 2	Sports - concept, benefits, and types. Fitness - the concept and elements of fitness
Week 3	Football - concept + history, Football - basic soccer skills, Football Law - Article 1, 2
Week 4	Football - concept + history, Football - basic soccer skills, Football Law - Article 1, 2
Week 5	Football - concept + history, Football - basic soccer skills, Football Law - Article 1, 2
Week 6	Football Law - Articles 3, 4, 5, Basketball - concept + history,Basketball - basic basketball skills
Week 7	Football Law - Articles 3, 4, 5, Basketball - concept + history,Basketball - basic basketball skills

Week 8	Football Law - Articles 3, 4, 5, Basketball - concept + history,Basketball - basic basketball skills
Week 9	Anatomy, The skeleton, Circulatory system
Week 10	Anatomy, The skeleton, Circulatory system
Week 11	Anatomy, The skeleton, Circulatory system
Week 12	Muscular system - concept + muscle,injuries, Scouting - concept + stages + scouting law
Week 13	Muscular system - concept + muscle,injuries, Scouting - concept + stages + scouting law
Week 14	Biorhythm - concept + benefits + historical overview , Biorhythm cycles
Week 15	Biorhythm - concept + benefits + historical overview , Biorhythm cycles
Week 16	Biorhythm - concept + benefits + historical overview , Biorhythm cycles

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1- Ahmed, Imad Zubair (2005) "Technique and tactics in five-a-side football", 1st edition, Sinbad Printing Company, Baghdad, Iraq. 2- Haroun Muhammad Kishk, Five-a-side Football, Al-Jazeera Library, Mansoura, Cairo, Egypt (2004) 3- Akram Zaki Khattabiya: Modern Volleyball Encyclopedia, 1st edition, Amman, Dar Al-Fikr for Printing, Publishing and Distribution, 1996. 4- Aqeel Abdullah Al-Kateb: Volleyball in training, group plans, and physical fitness, Part 1, Higher Education Press, 1998. 5- Fayez Bashir Hamouda and Moayed Abdullah: Basketball. Dar Al-Kutub for Printing and Publishing, University of Mosul, 2nd edition, 1999.	

	6- Ali Albaik and Shaaban Ibrahim. Planning training in basketball: Alexandria, Manshaet Al-Maaref, 1995.	
Recommended Texts		
Websites		

Module 2

Module Information					
Module Title	**Advance Mathematics I**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ADMT203**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		2	**Semester of Delivery**		1
			College	Electromechanical Eng. Dept.	
Module Leader	Raed Abbas Jessam		**e-mail**	50097@uotechnology.edu.iq	
Module Leader's Acad. Title		Assist Professor	**Module Leader's Qualification**		Ph.D
Module Tutor	Raed Abbas Jessam		**e-mail**	50097@uotechnology.edu.iq	
Peer Reviewer Name		Raed Abbas Jessam	**e-mail**	50097@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Mathematic in first stage	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. learn the rules to solve line integral part I and part II 2. learn the Greens Theorem problems 3. learn the rules to solve the Iterated Integral. 4. learn the rules to solve Doble Integral over General Regions 5. learn the rules to solve Volume of Solid

	6. learn the rules to solve Double Integral in Polar Coordinates 7. learn the rules to solve the Triple Integrals 8. learn the rules to solve the Triple Integrals in Cylindrical and Spherical Coordinates 9. learn the rules to solve Introduction and Interpretation of Partial Derivatives 10. learn the rules to solve the Higher Order of Partial Derivatives 11. learn the rules to solve Differentials and Chain Rule 12. learn the rules to solve Relative Minimums and Maximins 13. learn the rules to solve the Basic concepts and Real and distinct roots learn the Definition of undefined integral 14. learn the rules to solve the Complex and repeated roots 15. learn the rules to solve the Nonhomogeneous differential equations
Module Learning Outcomes	1. Able to solve line integral part I and part II 2. Able to solve Greens Theorem problems 3. Able to solve the Iterated Integral problems. 4. Able to solve the Doble Integral over General Regions problems 5. Able to solve the solve Volume of Solid problems 6. Able to solve Double Integral in Polar Coordinates. 7. Able to solve the Triple Integrals problems 8. Able to solve the Triple Integrals in Cylindrical and Spherical Coordinates 9. Able to solve Introduction and Interpretation of Partial Derivatives 10. Able to solve the Higher Order of Partial Derivatives 11. Able to solve Differentials and Chain Rule Able to solve differentiable a derivative of the Implicit functions. 12. Able to solve Relative Minimums and Maximins problems 13. Able to solve the Basic concepts and Real and distinct roots problems 14. Able to solve the Complex and repeated roots problems 15. Able to solve the Nonhomogeneous differential equations problems.
Indicative Contents	Indicative content includes the following. <u>Part A – line Integral, Double Integral and Triple integral</u>

	Line Integral part I and part II, Greens Theorem, Iterated Integral, Doble Integral over General Regions, Double Integral in Polar Coordinates, Triple Integrals and Triple Integrals in Cylindrical and Spherical Coordinates [28 hrs]. Part B – Partial Derivative Introduction and Interpretation of Partial Derivatives, Higher Order of Partial Derivatives, Differentials and Chain Rule, Relative Minimums and Maximins. [20 hrs] Part C – Second order differential equations Basic concepts and Real and distinct roots, Complex and repeated roots, Nonhomogeneous differential equations. [12 hrs]

Learning and Teaching Strategies	
Strategies	W The main strategy to be adopted in introducing this unit is for students to engage in solving exercises while improving analysis, synthesis, and reasoning skills. This will be achieved by solving various problems of different mathematical subjects .

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)**	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
	Quizzes	2	20% (20)	5 and 10	LO #1, #2 and #10, #11

Formative assessment	**Assignments**	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /	0	0% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO #1, #7
	Final Exam	3 hr	50% (10)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Line Integral part I and part II
Week 2	Greens Theorem
Week 3	Iterated Integral
Week 4	Doble Integral over General Regions
Week 5	Volume of Solid
Week 6	Double Integral in Polar Coordinates
Week 7	Triple Integrals
Week 8	Triple Integrals in Cylindrical and Spherical Coordinates
Week 9	Introduction and Interpretation of Partial Derivatives
Week 10	Higher Order of Partial Derivatives
Week 11	Differentials and Chain Rule
Week 12	Relative Minimums and Maximins
Week 13	Basic concepts

Week 14	Real and distinct roots
Week 15	Complex and repeated roots
Week 16	Nonhomogeneous differential equations

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India).	Yes
Recommended Texts	Calculus for Engineering Students: Fundamentals, Real Problems, and Computers (Mathematics in Science and Engineering)	No
Websites	https://www.amazon.com/Calculus-Engineering-Students-Fundamentals-Mathematics/dp/012817210X	

Module 3

Module Information					
Module Title	**Drilling Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**DRSY204**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		2	**Semester of Delivery**		1
			College	Electromechanical Eng. Dept.	
Module Leader	Raheek Ismael Ibrahim		**e-mail**	Raheek.I.Ibrahim@uotechnology.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		26/5/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Chemistry in the first stage	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	- The student will be able to understand and analyze the: Oilwell drilling, equipment and methods, components, system assemblies and arrangement. - Understanding and analyzing the drill string load analysis, drill string dimensioning, static and dynamic, critical oscillations. Circulation of

	drilling fluids, challenges in the drilling process, pressure, stabilize the wellbore with pressure control equipment, - Studying and understanding the drilling fluids, hydraulic optimization, casing, casing analysis. Loads, including dimensioning of the rig, the drill string and the drilling fluid.
Module Learning Outcomes	1. Training on several analysis methods to solve the same problem. 2. An ability for solving different mathematics problems in Electromechanical applications. 3. An ability to communicate effectively. 4. Recognition of the need for, and the ability to engage in life-long learning.
Indicative Contents	Ch.1: Drilling process: gives definition on drilling process and types of drilling systems Ch.2: Drilling Equipment: offers a detailed information on drilling equipment Ch.3: Drilling Fluids: provides information of drilling fluids that may be used in drilling locations and types and functions of drilling fluids.

Learning and Teaching Strategies	
Strategies	The main strategy to be adopted in introducing this unit is for students to engage in solving exercises while improving analysis, synthesis, and reasoning skills. This will be achieved by solving various examples and linking them with applications in reality.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)**	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1 hr/ 1	10	5	Ch. 1
	Assignments	1	10	10	Ch.2
	Projects /Lab	2 hrs/ week	10		
	Report	1	10	12	ch.2, Ch. 3
Summative assessment	**Midterm Exam**	2 hrs/ 1	10	7	Ch. 1, ch.2
	Final Exam	3 hrs/ 1	50	15	Ch. 1, ch.2, ch.3
Total assessment			100		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction
Week 2	Definitions
Week 3	Types of drilling processes
Week 4	Drilling process operation
Week 5	Drilling process description
Week 6	Types of oilfields
Week 7	Mid-term exam
Week 8	Drilling systems types
Week 9	Mechanical drilling equipment

Week 10	Electrical drilling equipment
Week 11	Drilling fluid definition
Week 12	Drilling fluid types
Week 13	Drilling fluids functions
Week 14	Report discussion
Week 15	review
Week 16	Final exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Drilling Engineering, J.J.Azar and Robello Samauel	no
Recommended Texts	Composition and properties of oil well drilling fluids, Fourth edition, George R. Gray	no
Websites		

Module 4

Module Information					
Module Title	**Thermodynamics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**THDY205**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	EME		**College**	Electromechanical Eng. Dept.	
Module Leader	Khalid Faisal sultan		**e-mail**	50084@uotechnology.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Khalid Faisal sultan		**e-mail**	50084@uotechnology.edu.iq	
Peer Reviewer Name	Khalid Faisal sultan		**e-mail**	50084@uotechnology.edu.iq	
Scientific Committee Approval Date	26/5/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Learn, Fundamentals & Concepts of thermodynamics 2. Learn, the thermodynamic systems and the definition the properties of the systems of the thermodynamics 3. Learn analysis the process of cycle in the thermodynamics. 4. Learn, analysis the open and closed system in thermodynamics. 5. Learn , analysis the steam and gas power plant. 6. Learn, analysis the Steam and Double Phase System 7. Learn, analysis Steam formation, triple point

	8. Learn analysis T – S diagram, tabulated properties application 9. Application of SFEE (compressor, turbine, boiler, condenser, diffuser, nozzle, throttling valve). 10. Learn, analysis Statement of second law of thermodynamics (the Kelvin-plank statement, the Clausius statement), efficiency of thermal cycle, 11. Learn, analysis heat engine, reveres heat engine, heat pump, refrigerator, reversible process 12. Learn and analysis Air Standard Power Cycles, Otto cycle, diesel cycle, dual cycle, pressure cycle, Brayton cycle or Joule cycle. 13. Learn, analysis Reciprocating Power Cycle 14. Learn and analysis Work of compressor, efficiency of compressor, effect of clearance volume, multistage reciprocating compressor. 15. Learn, and analysis Vapor Standard Power Cycles, Carnot steam cycle, Rankine cycle.
Module Learning Outcomes	16. Able to knowledge, Fundamentals & Concepts of thermodynamics 17. Able to knowledge of the thermodynamic systems properties of the systems of the thermodynamics. 18. Able to analysis the open and closed system in thermodynamics. 19. Able to analysis the process of cycle for the steam and gas power plant. 20. Able to knowledge the steam formation, triple point 21. Able to draw sketches of the T – S diagram, tabulated properties application. 22. Able to knowledge of the Application of SFEE (compressor, turbine, boiler, condenser, diffuser, nozzle, throttling valve). 23. Able to understand and statement of second law of thermodynamics (the Kelvin-plank statement, the Clausius statement), efficiency of thermal cycle, 24. Recognize the definition heat engine, reveres heat engine, heat pump, refrigerator, reversible process 25. Able to calculated the Air Standard Power Cycles , Otto cycle, diesel cycle, dual cycle, pressure cycle, Brayton cycle or Joule cycle. 26. Able to calculated the Reciprocating Power Cycle 27. Recognize the definition work of compressor, efficiency of compressor, effect of clearance volume, multistage reciprocating compressor. 28. The ability to analyses Vapor Standard Power Cycles, Carnot steam cycle, Rankine cycle 29. Able to Illustration and discussion the principles of energy, work done, internal energy, 30. Able to understanding of the 1^{st} and 2^{nd} law of thermodynamics as well as applications.

Indicative Contents	Part A - Fundamentals & Concepts of thermodynamics Units and dimension, thermodynamic system, closed system, open system, properties, process of cycle, Zero law of thermodynamics, temperature, energy, internal energy, kinetic energy, potential energy, enthalpy, work, displacement work and flow work, power, mechanical power, electrical power, efficiency.[20 hrs] Part B - Perfect Gas and state equation Perfect gas, process in perfect gas, and work in perfect gas, steam and double phase system, steam formation, triple point, T – s diagram, tabulated properties application. Statement of second law of thermodynamics (the kelvin-plank statement, the Clausius statement), efficiency of thermal cycle, heat engine, reveres heat engine, heat pump, refrigerator, reversible process, [28 hrs] Part C - Entropy equation and applications with the cycles Clausius Inequality, entropy of pure material, Change of entropy for varies gas process, change of entropy in steam, application, Vapor Standard Power Cycles, [12 hrs].

Learning and Teaching Strategies	
Strategies	Providing the student with experience in how the student acquires all the skills, including analysis and calculation of machine parts, steam and gas thermal energy, and hydroelectric machines, as well as classroom activities through asking questions, monthly, daily and quarterly examinations and discussions on the topic of scientific research, which is thermodynamics and fluid mechanics.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)**	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /Lab	3	10% (10)	Continuous	All
	Report	0	0% (0)	-	-
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 , #7, #8 and#9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Fundamentals & Concepts of thermodynamics
Week 2	The thermodynamic systems and the definition the properties of the systems of the thermodynamics
Week 3	The process of cycle in the thermodynamics.
Week 4	The open and closed system in thermodynamics.
Week 5	The steam and gas power plant.
Week 6	The Steam and Double Phase System
Week 7	Steam formation, triple point
Week 8	T – S diagram, tabulated properties application

Week 9	Application of SFEE (compressor, turbine, boiler, condenser, diffuser, nozzle, throttling valve).
Week 10	Statement of second law of thermodynamics (the Kelvin-plank statement, the Clausius statement), efficiency of thermal cycle,
Week 11	heat engine, reveres heat engine, heat pump, refrigerator, reversible process
Week 12	Air Standard Power Cycles, Otto cycle, diesel cycle, dual cycle, pressure cycle, Brayton cycle or Joule cycle.
Week 13	Reciprocating Power Cycle
Week 14	Work of compressor, efficiency of compressor, effect of clearance volume, multistage reciprocating compressor.
Week 15	Vapor Standard Power Cycles, Carnot steam cycle, Rankine cycle.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	"Thermodynamics: An Engineering Approach" Text book by Michael A. Boles and Yunus A Çengel, 9th-edition	Yes
Recommended Texts	R. Joel "Basic Engineering thermodynamic "Longman 1974 .	No
Websites	https://iunajaf.edu.iq/Gradual/Publicationoflectures/uploadsPdf/pdfcoffee.com_engineering-thermodynamics-by-cengel-boles-and-kanoglu-9th-edition-pdf-free.	

Module 5

Module Information					
Module Title	**Measurements and Instrumentation**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**MEIN206**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		2	**Semester of Delivery**		1
			College	Electromechanical Eng. Dept.	
Module Leader	Rasha Fahim Nadhim		**e-mail**	Rasha.f.nadhim@uotechnology.edu.iq	
Module Leader's Acad. Title		Lec.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Rasha Fahim Nadhim		**e-mail**	Rasha.f.nadhim@uotechnology.edu.iq	
Peer Reviewer Name		Rasha Fahim Nadhim	**e-mail**	Rasha.f.nadhim@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Fundamental of Electrical Engineering in the first stage	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	16. learn the definition of measurement. 17. learn the definition of the performance characteristics. 18. learn the units of measurement. 19. learn the types of errors in measurement. 20. learn about the electrical indicating instrument. 21. learn about the bridge and its application. 22. learn about the electronic analog measuring instrument.

	23. learn about the transducer. 24. learn about the signal analysis. 25. learn about the digital instrument. 26. learn about the electrical indicating instrument 27. learn about the Measuring devices for oil and gas equipment.
Module Learning Outcomes	31. Able to recognize the definition and properties the main parts of measurement instrument. 32. Able to Recognize and compute the performance characteristics 33. Able to drive the dimension of the measurement units. 34. Able to compute absolute and relative error. 35. Able to found the statistical analysis. 36. Able to recognize the method of measurement. 37. Able to compute combination of quantities with limiting error. 38. Able to compute the deflecting and controlling torque. 39. Able to design D.C. Ammeter by using direct and indirect method. 40. Able to design D.C. voltmeter by using direct and indirect method. 41. Able to find unknown resistance by D.c. bridge . 42. Able to find unknown impedance by types of A.c. bridge. 43. Able to recognize the types of transducer. 44. Able to recognize the types of measurement instrument for Oil and gas equipment. 45. Able to recognize the types of digital instrument
Indicative Contents	<u>Part A – introduction to measurement</u> Definition of measurement, main elements of instrument, performance characteristics, measurement units, errors in measurement [10 hrs.] <u>Part B - The electromechanical indicating instrument</u> The Essential of indicating instrument, moving coil instrument, PMMC, mathematical representation of PMMC, design D.C. ammeter and voltmeter, resistance and impedance measurement. [10 hrs.] 1. <u>Part C - measurement instrument for Oil and gas equipment.</u> Transducer, digital instrument, types of measurement instrument for oil equipment [10 hrs]

Learning and Teaching Strategies	
Strategies	The main strategy to be adopted in delivering this unit is for students to engage in solving exercises while improving their analysis, synthesis and reasoning skills. This will be achieved by solving various examples and linking them to applications on the ground. Homework assignments will also be given to the student and reports related to the scientific material will be prepared.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)**	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10	6	
	Assignments	5	10	2 to 13	
	Projects / lab.	15	10	15	
	Report	1	10	15	
Summative assessment	**Midterm Exam**	2hr	10	8	
	Final Exam	3hr	50	16	
Total assessment			100		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to measurement
Week 2	Measuring units
Week 3	Measurement error
Week 4	Statistical analysis
Week 5	Relative limiting error
Week 6	D.C. Bridges and their applications
Week 7	A.C. Bridges and their applications
Week 8	Design D.C ammeter
Week 9	Design D.C voltmeter
Week 10	Indicating instrument
Week 11	Transducers (part 1)
Week 12	Transducer (part2)
Week 13	Signal analysis
Week 14	Digital instrument
Week 15	Oil and gas industry test and measurement devices
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1-Electronic measurement system. U.A B akshi	yes

	2- Electronic instrumentation and measurement techniques	
Recommended Texts	Electronic and electrical measurements and instrumentation J.B. Gupta	
Websites	https://www.learncbse.in/units-measurements-cbse-notes-class-11-physics/	

Module 6

Module Information					
Module Title	**Electrical and Electronic Circuits**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**EECI214**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	EME		**College**	Electromechanical Eng. Dept.	
Module Leader	Buraq Abdul Hadi Awad		**e-mail**	50050@uotechnology.edu.iq	
Module Leader's Acad. Title	Ass.Professor		**Module Leader's Qualification**	master	
Module Tutor	Buraq Abdul Hadi Awad		**e-mail**	50050@uotechnology.edu.iq	
Peer Reviewer Name	Buraq A. Hadi Awad		**e-mail**	50050@uotechnology.edu.iq	
Scientific Committee Approval Date	26/5/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Fundamental of Electrical Engineering in first stage	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	To present, in context, the fundamental concepts of circuits, devices and systems that underpin all branches of Engineering. 1. Students will study fundamental circuit analysis techniques including nodal analysis, mesh analysis, Thevenin circuits as well as transient analysis applied to 1st and 2nd order circuits.

	2.Students will study fundamental mathematical operations of DC and AC quantities including phasors, vectors and complex numbers. 3.Students will also study basic electronic components (like diodes, transistors, operational amplifiers and filters) that make up more complex electrical and electronic circuitry.
Module Learning Outcomes	By the end of the module, students should be able to: • 1. Understand basic principles in electrical and electronic circuits. 2. Appreciate fundamental aspects of electronic component operation. 3.Make appropriate assumptions to simplify and thus model real-life electrical and electronic components 4. Measure electrical components and build electrical circuits to determine parameters and behaviors.
Indicative Contents	Indicative content includes the following. Part A – Bipolar Junction Transistor (BJT) Circuits: 1. BJT as an Amplifier. 2. DC Biasing Circuits (Design, Analysis, and Stability). 3. The BJT Inverter (Transistor as a Switch). 4. Small-Signal BJT Amplifiers. 5. BJT Modeling (hybrid and re). [20 hrs] 46. Part B – Graphical Determination of the h-Parameters, Voltage Gain Power Gain and Current Gain. Graphical Determination of the h-Parameters, Voltage Gain Power Gain and Current. [28 hrs] Part C - Differentiable 1. Field-Effect Transistor (FET) Circuits: 2. Small-Signal FET. 3. Amplifiers FET Modeling. [12 hrs]

Learning and Teaching Strategies	
Strategies	Write something like: The main strategy to be adopted in introducing this unit is for students to engage in solving exercises while improving analysis, synthesis, and reasoning skills. This will be achieved by solving various examples and linking them with applications in reality.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	37	**Unstructured SWL (h/w)**	2.46
Total SWL (h/sem)	**100**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	6	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 to 13	LO #3, #4 and #6, #7
	Projects / Lab.	5	10% (10)	15	All
	Report	1	10% (10)	15	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	1. Bipolar Junction Transistor (BJT) Circuits:
Week 2	2. BJT as an Amplifier.
Week 3	3. DC Biasing Circuits (Design)
Week 4	4. DC Biasing Circuits (Analysis)

Week 5	5. DC Biasing Circuits(Stability).
Week 6	6. The BJT Inverter (Transistor as a Switch).
Week 7	7. Draw dc load line
Week 8	8. Small-Signal BJT Amplifiers.
Week 9	9. BJT Modeling (hybrid and re).
Week 10	10. Graphical Determination of the h-Parameters,
Week 11	11. Calculate the Voltage Gain Power Gain.
Week 12	12. Voltage Gain Power Gain and Current Gain.
Week 13	13. Current Gain.
Week 14	Field-Effect Transistor (FET) Circuits:
Week 15	Small-Signal FET.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	electric Circuits, 9th edition, J. Nilsson and S. Riedel, Prentice Hall, 2011	Yes
Recommended Texts	Murry R. Spiegel," Mathematical Handbook of formulas and tables",1968.	No
Websites		

Module 7

Module Information					
Module Title	**Computer II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**COMP208**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level		2	**Semester of Delivery**		1
			College	Electromechanical Eng. Dept.	
Module Leader	Asifa M Mohammed		**e-mail**	50009@uotechnology.edu.iq	
Module Leader's Acad. Title		Asst. professor	**Module Leader's Qualification**		MSc. in Mech. Eng.
Module Tutor	Asifa Mahdee Mohammed		**e-mail**	50009@uotechnology.edu.iq	
Peer Reviewer Name		Asifa M Mohammed	**e-mail**	50009@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Computer course in the first stage	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes, and Indicative Contents	
Module Objectives	1. The possibility of the learner obtaining skills through educational experience. By learning about the principles of programming language 2. The learner realizes the importance of taking advantage of the computer's capabilities in solving his problems and using the computer program for the C++ language.

	3. The learner develops the motivation to benefit from computer capabilities and employ them in applying computer programs and completing engineering projects that simulate reality with theoretical study.
Module Learning Outcomes	To able be will student the, course the completing A a1. Recognize the fundamental programming concepts such as variables, Selection, Iteration, and arrays using C++. b1. Create programs using C++ programming language. b2. Develop a detailed algorithmic solution to a well-defined problem. c1. Apply C++ programming language syntax to programming problems d1. Work effectively both in a team and independently.
Indicative Contents	1. What is programming 2. What are programming languages 3. Codeblocks 4. C++ programming on mobile 5. Print sentences and explain escape sequences 6. Definition of variables 7. Rules and conditions for naming variables 8. Data types 9. Calculations 10. Boolean operations 11. If condition cases 12. Multiple condition cases If else 13. Multiple condition cases If else If 14. Switch case conditions 15. Difference between switch and if condition states 16. Write comments in programming 17. While Loop 18. Duplicates do while

Learning and Teaching Strategies	
Strategies	1. Knowledge and Understanding CILOs (teaching strategies) a) lectures b) discussion c) practical classes d) independent study e) case study

	f) brainstorm 2. Alignment of Intellectual Skills CILOs a) Lectures, b) tutorials, c) group discussions, d) practical classes, e) brainstorming, f) independent study

Student Workload (SWL)			
Structured SWL (h/sem)	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	27	**Unstructured SWL (h/w)**	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10%	6	b1,d1
	Assignments	1	10%	7	c1,b2
	Projects/lab	1	10%		B1,C1,d1
	Report	1	10%	15	d1
Summative assessment	**Midterm Exam**	2hr	10%	10	a1,d1,c1
	Final Exam	3hr	50%		All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	C++ programming basic
Week 2	the introduction
Week 3	numeric data types arithmetic
Week 4	Identify the types of mathematical operations and the tools used in them
Week 5	Learn about input and output tools
Week 6	Understanding the basic variables and declaring them
Week 7	Using types of variables and how to write them
Week 8	Conditional tools and writing a program about if
Week 9	Termination tool blocks
Week 10	Writing if/else clauses with a computer application
Week 11	Using the switch conditional tool with examples
Week 12	Writing a program for a while loop with examples
Week 13	Write a program about the for loop
Week 14	How to use continue statesmen With practical examples
Week 15	Generating random numbers by computer
Week 16	Use the mathematical function library

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	**programming with c++ johnr hubbard pdf** Determined binding	yes

Recommended Texts	Structured Programming(C++)	yes
Websites	http://file.fouladi.ir/courses/fcp/books/Programming%20With%20C++.pdf	

Second Stage / Second Semester

Module 1

Module Information					
Module Title	**Crimes of the Baath Regime in Iraq**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CBRI201**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		2	**Semester of Delivery**		2
Administering Department			**College**	Electromechanical Eng. Dept.	
Module Leader	Lamyaa Hussain Assi		**e-mail**	50276@uotechnology.edu.iq	
Module Leader's Acad. Title		Assistant lecturer	**Module Leader's Qualification**		Assistant lecturer.
Module Tutor	Lamyaa Hussain Assi		**e-mail**	50276@uotechnology.edu.iq	
Peer Reviewer Name		Lamyaa Hussain Assi	**e-mail**	50276@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Human Rights course in the first stage	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	• **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	Rejecting Baathist thought in all its forms And Recognizing the ugliness crimes committed and Violations committed For the sake of humanity and the Oppressing and exterminating the people Cruelty, intimidation and torture Politics of repression Reject the idea of change And expressing an opinion Burying crime scenes Killing and slaughtering the Shiite Kurds Concealing the evidence of crimes Continuous killing Hiding signs of genocide Collective of the people

Learning and Teaching Strategies	
Strategies	Delivering theoretical lectures, opening the door to discussion, participation, asking questions, and getting to know each other The extent of human rights violations committed by the Baath regime in Iraq over a long period of time during which the Iraqi people suffered from the scourges of wars, mass graves...etc. One of the heinous crimes at the international level

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	5	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0% (10)	Continuous	All
	Report	2	20% (20)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

1. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First Second Third Fourth		Rejecting Baathist thought in all its forms	Concept of crimes Effects of crimes Violations of law	Theoretical Theoretical Theoretical Theoretical	Class activity Quiz Report Midterms

Fifth Sixth Seventh Eighth Ninth Tenth Eleventh Twelfth Thirteenth Fourteenth Fifteenth		Recognizing the ugliness crimes committed Violations committed For the sake of humanity Oppressing and exterminating the people Cruelty, intimidation and torture Politics of repression Reject the idea of change And expressing an opinion Burying crime scenes Killing and slaughtering the Shiite Kurds Concealing the evidence of crimes Continuous killing Hiding signs of genocide Collective of the people	Violations decisions Prison and detention places Environmental crimes Destruction of cities and villages Mass grave crimes Genocide cemeteries events The events of the Shaabani uprising Genocide cemeteries Kurdish cemeteries Cemeteries of the Shaabaniya Intifada Chronological classification Cemetery sites	Theoretical Theoretical Theoretical Theoretical Theoretical Theoretical Theoretical Theoretical Theoretical Theoretical Theoretical	

Main references (sources)	A methodological book (Crimes of the Baath Regime in Iraq) Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Module 2

Module Information					
Module Title	**Advance Mathematics II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ADMT209**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		2	**Semester of Delivery**		2
			College	Electromechanical Eng. Dept.	
Module Leader	Raed Abbas Jessam		**e-mail**	50097@uotechnology.edu.iq	
Module Leader's Acad. Title		Assist Professor	**Module Leader's Qualification**		Ph.D
Module Tutor	Raed Abbas Jessam		**e-mail**	50097@uotechnology.edu.iq	
Peer Reviewer Name		Raed Abbas Jessam	**e-mail**	50097@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Mathematic course in first stage	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	28. learn the Vectors (The basics – Vector Athematic). 29. learn the Dot products and its properties and applications 30. learn the rules to solve the Cross products and its properties and applications

	31. learn the rules to solve Stocks Theorem 32. learn the rules Laplace Transformer (Basics) 33. learn the rules to solve Inverse Laplace Transformer (Basics) 34. learn the rules to solve the Inverse Laplace Transformer (Applications) 35. learn the rules to solve the Step Function (Basics and applications) 36. learn the rules to solve the IVP with Laplace Transformer 37. learn the rules to solve the Fourier series (basics and applications) 38. learn the rules to solve Even and Odd Functions 39. learn the rules to solve Half Range Expansions 40. learn the rules to solve the Power Series (basics and applications) 41. learn the rules to solve the Arithmetic and geometric series 42. learn the rules to solve the Series of powers of natural numbers
Module Learning Outcomes	47. Able to solve the Vector Athematic problems 48. Able to solve Dot products and its applications problems 49. Able to solve the Cross products and its applications problems. 50. Able to solve the solve Stocks Theorem problems 51. Able to learn rules Laplace Transformer (Basics) problems 52. Able to solve Inverse Laplace Transformer problems 53. Able to solve the Inverse Laplace Transformer (Applications) problems 54. Able to solve the Step Function (Basics and applications) problems 55. Able to solve IVP with Laplace Transformer problems 56. Able to solve the Fourier series (basics and applications) problems 57. Able to solve to solve Even and Odd Functions problems 58. Able to solve to solve Half Range Expansions problems 59. Able to solve the Power Series (basics and applications) problems 60. Able to solve the Arithmetic and geometric series problems 61. Able to solve the Series of powers of natural numbers problems.
Indicative Contents	Indicative content includes the following. <u>Part A – Vectors</u> Vectors (The basics – Vector Athematic), Dot products and its properties and applications, Cross products and its properties and applications, Stocks Theorem [18 hrs].

	Part B – Laplace Transformer Inverse Laplace Transformer (Basics), Inverse Laplace Transformer (Application Step Function (Basics and applications), Solving the IVP with Laplace Transformer. [20 hrs] Part C – Fourier series and Power Series Fourier series (basics and applications), Even and Odd Functions, Half Range Expansions, Power Series (basics and applications), Arithmetic and geometric series, Series of powers of natural numbers. [22 hrs]

Learning and Teaching Strategies	
Strategies	W The main strategy to be adopted in introducing this unit is for students to engage in solving exercises while improving analysis, synthesis, and reasoning skills. This will be achieved by solving various problems of different mathematical subjects.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)**	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /	0	0% (0)	Continuous	All

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO #1, #7
	Final Exam	3 hr	50% (10)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Vectors (The basics – Vector Athematic).
Week 2	Dot products and its properties and applications.
Week 3	Cross products and its properties and applications
Week 4	Stocks Theorem
Week 5	Laplace Transformer (Basics)
Week 6	Inverse Laplace Transformer (Basics)
Week 7	Inverse Laplace Transformer (Applications)
Week 8	Step Function (Basics and applications)
Week 9	Solving the IVP with Laplace Transformer
Week 10	Fourier series (basics)
Week 11	Fourier series (applications)
Week 12	Even and Odd Functions
Week 13	Half Range Expansions
Week 14	Power Series (basics and applications)
Week 15	Arithmetic and geometric series

Week 16	Series of powers of natural numbers

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India).	Yes
Recommended Texts	Calculus for Engineering Students: Fundamentals, Real Problems, and Computers (Mathematics in Science and Engineering)	No
Websites	https://www.amazon.com/Calculus-Engineering-Students-Fundamentals-Mathematics/dp/012817210X	

Module 3

Module Information					
Module Title	**Corrosion Eng.**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CORN210**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		2	**Semester of Delivery**		2
			College	Electromechanical Eng. Dept.	
Module Leader	Asifa M Mohammed		**e-mail**	50009@uotechnology.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Asifa Mahdee Mohammed		**e-mail**	50009 @uotechnology.edu.iq	
Peer Reviewer Name		Asifa Mohammed	**e-mail**	50009@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Materials Science & Engineering in first stage	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes, and Indicative Contents	
Module Objectives	1. Understanding the basics of corrosion. 2. Understanding the behavior of materials in different environments (Dry and Wet corrosion). 3. Recognize to nature of cathodic and anodic reactions. 4. Calculate thermodynamic and kinetic parameters for the corrosion process. 5. Determine the lifetime of types of equipment. 6. Recognize to causes of the corrosion forms. 7. The student acquires a cognitive skill in metal corrosion engineering

	8. Gains an understanding of the types of corrosion and forms of corrosion 9. It can treat and solve corrosion problems anywhere 10. The student acquires skills in calculating and measuring the corrosion rate 11. The student acquires a cognitive and practical skill in estimating the time of metal collapse due to corrosion 12. The student can address the problems of corrosion of oil and gas transportation pipelines 13. Acquires skill in the role of paint in eliminating corrosion of metal parts found in oil transport pipelines and industrial facilities
Module Learning Outcomes	A- Knowledge and Understanding A1. Able to form a background about the definition of corrosion and its causes. A2. Able to Solve the problems. A3. Completely realization of the types of corrosion and their mechanism. A4. Review about special types of corrosion. B. Subject-specific skills B1. an ability to identify, formulate, and solve engineering problems B2. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. B3. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. C . Thinking Skills C1. Combination between theoretical and experimental fields. D. General and Transferable Skills (other skills relevant to employability and personal development) D1. an ability to apply mathematics, science, and engineering knowledge. D2. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. D3. a recognition of the need for, and an ability to engage in life-long learning.
Indicative Contents	

Learning and Teaching Strategies	
Strategies	1. Active learning strategies 2. Teamwork strategy

	3. Discussion Strategy 4. lectures 5. Data show with power point program

Student Workload (SWL)			
Structured SWL (h/sem)	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	77	**Unstructured SWL (h/w)**	5.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10%	1	B3,C3
	Assignments	1	10%	4	A1,B2
	Projects /	1	10%	6	D3,C1
	Report	1	10%	7	A3,A4
Summative assessment	**Midterm Exam**	2hr	10%	11	D1
	Final Exam	3hr	50%		ALL
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
	Material Covered

Week 1	Understand the basics of eating
Week 2	Study of types of corrosion
Week 3	Study of corrosion forms
Week 4	Study of corrosion forms ||
Week 5	Causes of corrosion of the metal surface
Week 6	Iron rust
Week 7	Anode and cathode
Week 8	Galvanic cell
Week 9	Galvanic cell ||
Week 10	Report on the past topics
Week 11	Types of corrosion rates
Week 12	Problems and exercises in calculating the corrosion rate
Week 13	General review with questions
Week 14	Protecting metals from corrosion
Week 15	Protecting metals from corrosion ||
Week 16	General review with exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	اساسيات هندسة التاكل 2018 1. corrosion of engineering materials 2. 1- Corrosion (Vol.1&2), L.L.Shreir, 3rd edition - 2000 3. Corrosion and protection, Einar Bardal, 2003	yes

	4. Electrochemistry and corrosion science, Nestor Peres, 2004	
Recommended Texts		
Websites	file:///C:/Users/asus/Downloads/73043979-CORROSION-MaterialsAdvancedHnbk.pdf	

Module 4

Module Information					
Module Title	**Fluid Mechanics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**FLME211**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	EME		**College**	Electromechanical Eng. Dept.	
Module Leader	Khalid Faisal sultan		**e-mail**	50084@uotechnology.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Khalid Faisal sultan		**e-mail**	50084@uotechnology.edu.iq	
Peer Reviewer Name	Khalid F. sultan		**e-mail**	50084@uotechnology.edu.iq	
Scientific Committee Approval Date	26/5/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Understand and study the Introduction /Dimensions and units of Measurement in fluid mechanics 2. Learn Fluid properties 3. Understand and study the Fluid in equilibrium (fluid static) 4. Understand and study Measurement of pressure and pressure difference 5. Understand and study Hydrostatics thrusts on submerged surfaces

	6. Understand and study The buoyancy 7. Learn Principle of fluid motion flow classification 8. Learn Flow classification / continuity equation 9. Understand and study Bernoulli's equations, Application of Bernoulli's equations. 10. Learn Momentum equation and some of its applications. 11. Understand and study Laminar and turbulent flow in pipes. 12. Understand and study Share stress distribution in pipes, Hagen and The law of Poiseuille states 13. Understand and study Pressure heat losses in pipes and fittings. 14. Learn Energy and pressure lines, Combinations of pipes. 15. Learn Boundary layer and its kinds.
Module Learning Outcomes	1. Able to the recognize Dimensions and units of Measurement in fluid mechanics. 2. Recognize the definition Fluid properties. 3. Able to analysis the Fluid in equilibrium (fluid static). 4. Able to knowledge Measurement of pressure and pressure difference. 5. Able to knowledge Hydrostatics thrusts on submerged surfaces. 6. Able to understanding of the buoyancy. 7. Able to understanding and draw sketches of Principle of fluid motion and flow classification. 8. Able to analysis the Flow classification and continuity equation calculated. 9. Able to calculate the Bernoulli's equations, Application of Bernoulli's equations. 10. Able to calculate the Momentum equation and some of its applications. 11. Able to analysis the Laminar and turbulent flow in pipes. 12. Able to understanding and draw sketches of Share stress distribution in pipes, Hagen and poiseuille's law. 13. Able to calculate the Pressure heat losses in pipes and fittings. 14. Able to analysis the Energy and pressure lines, Combinations of pipes. 15. Able to analysis the Boundary layer and its kinds.
Indicative Contents	<u>Part A - Dimensions and units of Measurement in fluid mechanics</u> Fluid properties, study the Fluid in equilibrium (fluid static), Measurement of pressure and pressure difference, Hydrostatics thrusts on submerged surfaces, the buoyancy Principle of fluid motion flow classification, Flow classification / continuity equation .[20 hrs].

	Part B - Bernoulli's equations, Application of Bernoulli's equations Principle of fluid motion and flow classification, Flow classification and continuity equation calculated, Bernoulli's equations, Application of Bernoulli's equations, Momentum equation and some of its applications, the Laminar and turbulent flow in pipes, understanding and draw sketches of Share stress distribution in pipes, Hagen and poiseuille's law. [28 hrs] Part C - Analysis the Energy and pressure in fluid mechanics Calculated the Pressure heat losses in pipes and fittings, analysis the Energy and pressure lines, Combinations of pipes, the Boundary layer and its kinds, Kinematic and dynamic Viscosity and Laminar Flow. **[12 hrs]**

Learning and Teaching Strategies	
Strategies	Providing the student with experience in how the student acquires all the skills, including analysis and calculation of Introduction /Dimensions and units of Measurement, Fluid properties, Fluid in equilibrium (fluid static), Measurement of pressure and pressure difference, Hydrostatics thrusts on submerged surfaces, The buoyancy, Principle of fluid motion flow classification and quarterly examinations and discussions on the topic of scientific research, which is fluid mechanics.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)**	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10 % (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5 % (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /	3	10 % (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	3hr	10% (10)	7	LO #1 - #7, #13, #14and #15
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**Introduction /Dimensions and units of Measurement**
Week 2	**Fluid properties**
Week 3	**Fluid in equilibrium (fluid static)**
Week 4	**Measurement of pressure and pressure difference**
Week 5	**Hydrostatics thrusts on submerged surfaces**
Week 6	**The buoyancy**
Week 7	**Principle of fluid motion flow classification**
Week 8	**Flow classification / continuity equation**

Week 9	**Bernoulli's equations, Application of Bernoulli's equations**
Week 10	**Momentum equation and some of its applications**
Week 11	**Laminar and turbulent flow in pipes**
Week 12	**Share stress distribution in pipes, Hagen and poiseuille's low**
Week 13	**Pressure heat losses in pipes and fittings**
Week 14	**Energy and pressure lines, Combinations of pipes**
Week 15	**Boundary layer and its kinds**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	**Fluid Mechanics: Streeter, Victor L., Wylie, E. Benjamin,** 7th-edition, **2018.** **Fluid mechanics and hydraulic machines , R. K. Rajput,** 7th-edition, **2015**	yes
Recommended Texts	**Hydraulic machines including fluidics , Dr. Jag – sh. Lal,** 9th-edition **2008.**	No
Websites	https://www.academia.edu/61624629/Fluid_mechanics_Streeter_7th	

Module 5

Module Information					
Module Title	**Strength of Materials**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**STMA212**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		2	**Semester of Delivery**		2
			College	Electromechanical Eng. Dept.	
Module Leader	Aseel Abdulbaky Abdulrazak		**e-mail**	50243@uotechnology.edu.iq	
Module Leader's Acad. Title		Asst. Professor	**Module Leader's Qualification**		
Module Tutor	Aseel Abdulbaky Abdulrazak		**e-mail**	50243@uotechnology.edu.iq	
Peer Reviewer Name		Aseel Abdulbaky Abdulrazak	**e-mail**	50243@uotechnology.edu.iq	
Scientific Committee Approval Date		26/5/2024	**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Materials Science & Engineering	**Semester**	1
Co-requisites module	-	**Semester**	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	• Providing students with detailed information about types of stresses • Providing students with detailed information about bending street • The student can understand and derive theoretical equations for torsion and comp stresses

	Providing students with the ability to analyze the Mohr's circle and stresses in beams
Module Learning Outcomes	• Boosting students' interest through interactive lesson delivery improves learning • Improving teacher and students relationship improves learning. • Encouraging students to participate freely in lesson delivery improves stud learning. • Provision of efficient laboratories and workshops makes students to improve in t learning.
Indicative Contents	Indicative content includes the following. <u>Part A – Simple stress and simple strain , shear stress , allowable stress</u> understand tensile test, evaluation principle of simple stress and strain , shear stress and strain factor of safety [4 hrs] <u>Part B – Banding stress</u> The banding definition and examples, definition the shearing force and bending monument diagrams, Definition and properties beams and different types of load on beams. [20 hrs] <u>Part C - Differentiable</u> The drive the torsion theory, the bending theory and complex stresses using Mohr's stress circle [12 hrs]

Learning and Teaching Strategies	
Strategies	The primary approach to be taken in presenting this unit involves encouraging students to actively participate in solving problems in order to enhance their analytical, synthetic, and reasoning abilities. This objective will be accomplished through the completion of diverse exercises and the connection of theoretical concepts to real-world applications.

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)**	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /	0	0% (0)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Simple stress and strain
Week 2	Examples on simple stress and strain
Week 3	Shearing force and bending monument

Week 4	Shearing force and bending monument
Week 5	Rectangular sections
Week 6	Torsion theory
Week 7	Mid exam
Week 8	COMPLEX STRESSES
Week 9	Principal plane inclination in terms of the associated principal stress
Week 10	Graphical solution - Mohr's stress circle
Week 11	Bending theory
Week 12	Examples
Week 13	DEFLECTION OF BEAMS
Week 14	Examples
Week 15	RINGS, DISCS AND CYLINDERS SUBJECTED TO ROTATION AND THERMAL GRADIENTS
Week 16	COMPOUND BARS

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	**-E. J. HEARN ,Mechanics of Materials, 3rd edition.** **- K. William, Strength of Materials**	Yes yes
Recommended Texts	**R.C.Hibbeler, Statics and Mechanics of Materials.**	No
Websites	**Educational video on website**	

Module 6

Module Information					
Module Title	**Digital Electronics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**DIEL213**			☐ **Laboratory**	
ECTS Credits	**5**			☐ **Tutorial**	
SWL (hr/sem)	**125**			☐ **Practical**	
				☐ **Seminar**	
Module Level	2	**Semester of Delivery**			
		College	Electromechanical Eng. Dept.		
Module Leader	Rafah K. Mahmood	**e-mail**	50150@uotechnology.edu.iq		
Module Leader's Acad. Title	Assist. Lect.	**Module Leader's Qualification**	M.SC. in Computer Science		
Module Tutor	Rafah Kareem Mahmood	**e-mail**	50150@uotechnology.edu.iq		
Peer Reviewer Name	Rafah K. Mahmood	**e-mail**	50150@uotechnology.edu.iq		
Scientific Committee Approval Date	26/5/2024	**Version Number**	1.0		

Relation with other Modules			
Prerequisite module	**Computer science in the first class**	**Semester**	2
Co-requisites module	**Digital communication in third class**	**Semester**	1

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	• Identify the principles of digital systems, and how to deal with them in digital electronics. • Identifying Logic Gates and how to use them on electronic panels

	• Identify ways to simplify complex electronic components and reduce the components of large electronic circuits using digital systems
Module Learning Outcomes	**After studying this course the students would gain enough knowledge** 1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics. 2. To understand and examine the structure of various number systems and its application in digital design. 3.Became familiar with the digital signal, positive and negative logic, Boolean algebra, logic gates, logical variables, the truth table, number systems, codes, and their conversion from to others. 4. The ability to understand, analyze and design various combinational and sequential circuits. 5. Ability to identify basic requirements for a design application and propose a cost effective solution. 6. The ability to identify and prevent various hazards and timing problems in a digital design.
Indicative Contents	• Numbering systems • Logic gates • Boolean Algebra and logic simplification • Combinational logic

Learning and Teaching Strategies	
Strategies	• Lectures are written on the board ,enrching and mathematical examples are solved • Solving questions and asking them to dialogue and answer on the board in front of the students to encourage them to understand and participate • Conduct daily exams to help them review topics Not forcing students to write and making it optional, which will reflect positively them and they will

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)**	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10%	6	1,2
	Assignments	1	10%	7	3
	Projects /	1	10%	14	4,5,6
	Report	1	10%	15	3,4
Summative assessment	**Midterm Exam**	2hr	10%	10	1,2,3
	Final Exam	3hr	50%		All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to Digital concept
Week 2	Numbering Systems
Week 3	Binary arithmetic

Week 4	Hexadecimal Numbers and Octal numbers
Week 5	Complements
Week 6	Logic Gates
Week 7	Boolean Algebra and Logic Simplification
Week 8	Boolean Algebra and Logic Simplification
Week 9	Midterm Exam
Week 10	DEMorgan's Theorems
Week 11	Boolean Analysis of Logic circuits
Week 12	Simplification using Boolean algebra
Week 13	Designing logic circuits
Week 14	Karnaugh Map
Week 15	Solving examples
Week 16	Review

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Foundation of Digital Electronics and Logic Design by Subir Kumar Sarkar, Asish Kumar De,Souvik Sarkar	Yes
Recommended Texts	Digital Fundamentals, Eighth edition by Thomas l. Floyd	Yes
Websites	1. https://www.youtube.com/watch?v=YysQEuKQ5Hc 2. https://www.youtube.com/@ALLABOUTELECTRONICS	

Module 7

Module Information					
Module Title	**English Language II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ENLA207**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	2	
			College	Electromechanical Eng. Dept.	
Module Leader	Ahmed Imad Jawad		**e-mail**	Ahmed.I.jawad@uotechnology.edu.iq	
Module Leader's Acad. Title	Asst. Lec.		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Ahmed Imad Jawad		**e-mail**	Ahmed.I.jawad@uotechnology.edu.iq	
Scientific Committee Approval Date	26/5/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	English course in first stage	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	• focusing on understanding the language and how to use it on a daily basis for the second-stage students • Encouraging the students to use English in class conversation • Introduce them to new vocabulary

	• Focusing on the grammar and understand the differences between tenses and how to use them correctly
Module Learning Outcomes	• Understand the English Language • Understand the Important Vocabulary • Enhance the speaking Skills and communication • Understand the English Grammar • Enhance the Writing Skills • Enhance their Listening Skills
Indicative Contents	a. How to Introduce yourself b. Preposition • What is the preposition? • Why does it use. • How does it use. c. Question tools • How to ask a Question. • How to use Question tools. d. Tenses e. Parts of Speech • What are the parts of speech • Noun • Pronoun • Verb • Adjective • Adverb • Proposition • Conjunction • Interjection f. How to write an email g. Grammar Exercises

Learning and Teaching Strategies	
Strategies	The lecture strategy was adopted as a teaching method that included a discussion point about grammar and encouraged the Students to learn how to use the language in their daily events and how to apply it, as well as emphasizing listening For English speakers encouraging the student to read, speak, and use scientific vocabulary.

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	12	20%	1,2,3,4,5,6, 8,9,10,11,1 2	LO #1,2,3,4,5,6,8,9,10,11, 12
	Assignments	2	20%	6,12	LO # 6,12
	Projects /				
	Report				
Summative assessment	**Midterm Exam**	1 hr	10%	7,15	LO # 1 - 14
	Final Exam	3 hr	50%	17	All
Total assessment			100% (100 Marks)		100%

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to the importance of communication and learning the English language

Week 2	Getting to know you - Learn how to introduce yourself
Week 3	Whatever makes you happy - Learn about how to talk about what you like
Week 4	What's in the news - Learn to talk about daily news and events
Week 5	Eat, drink, and be merry - Learn how to use the food and drinks vocabulary
Week 6	Looking forward - Learn to talk about future plans and goals
Week 7	Exam 1
Week 8	Living history - Learn how to express the past
Week 9	Girls and boys - Learn about each gender's vocabulary
Week 10	Time for story - Learn about How to read stories
Week 11	Our interactive world - Learn communication methods and tools
Week 12	Life's what you make - Learn about how to make a decision
Week 13	Just wondering - Learn about how to express your wonderings
Week 14	emails - Learn how to write an email
Week 15	Exam 2
Week 16	Presentation project - Review and each group of students has to do a presentation

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	New Headway Pre-Intermediate Fourth Edition student's b New Headway Pre-Intermediate Fourth Edition Workbook	no
Recommended Texts		
Websites	Pre-Intermediate Fourth Edition | Headway Student's Site | Oxford University Press (oup.com)	