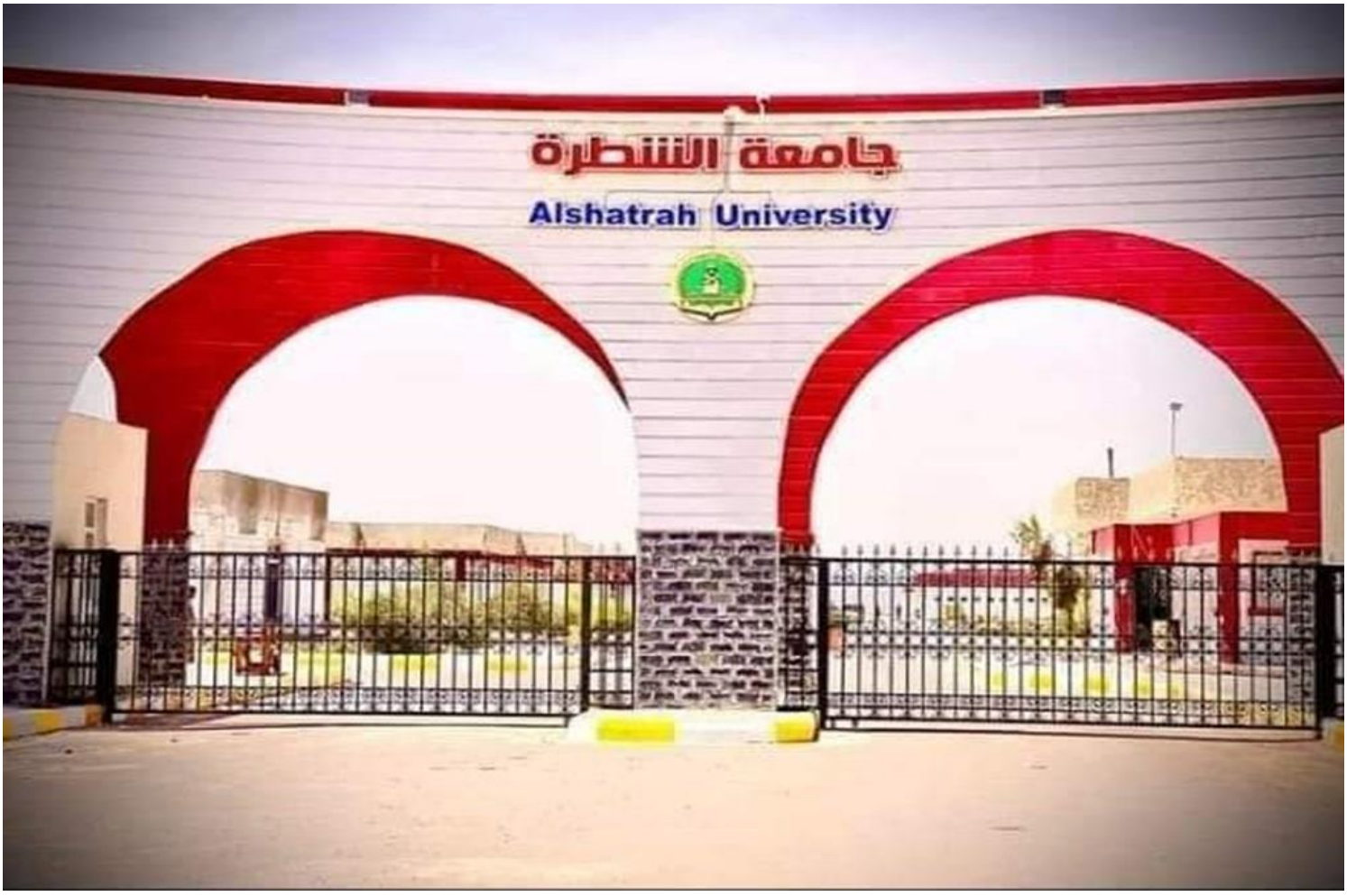
جامعة الشطرة

Al-Shatrah University

first Cycle – Bachelor's degree (B.Sc.) –computer Engineer

بكالوريوس هندسة – هندسة الحاسبات



وزارة التعليم العالي والبحث العلمي
جـــهاز الإشـــراف والتقـويم العلـمي
دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد
للعام الدراسي 2024/2023

الجامعة : الشطرة
الكلية /المعهد : كلية الهندسة
القسم العلمي : هندسة الحاسبات
تاريخ ملء الملف : 2024

التوقيع :
اسم رئيس القسم أ.م.د رائد لعيبي لفته
التاريخ : ٢٠٢٤/٧/٢

التوقيع :
اسم المعاون العلمي :م.د حسن رحيم حسن
التاريخ :

دقق الملف من قبل
شعبة ضمان الجودة والأداء الجامعي
اسم مدير شعبة ضمان الجودة والأداء الجامعي: مرسل عباس غما ح
التاريخ ٢٠٢٤/٧/٢
التوقيع

مصادقة السيد العميد
أ.م.د
مصطفى جبار حياوي
عميد الكلية

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1. Mission & Vision Statement

Vision Statement

A scientific and practical pioneering environment in both research and teaching sectors and has the capability of keeping pace with the continues growth of the technological developments in the fields of computer engineering and information technology.

Mission Statement

The department seeks to provide the excellent environment that stimulates creativity, innovation, research and development in order to produce highly qualified computer engineers who are able to serve the labor market locally and globally

2. Program Specification

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

Computer engineering department has been established in 1997 to meet the emerging needs for skilled computer engineers also to keep track with the global scientific and technical progress. The Department thrives on exploration and discovery from the beginning, it adopted an efficient academic program that matched the global standers in both theoretical and practical fields.

Students who join our department are able to develop skills and knowledge that set them on successful and enriching careers especially our program focus on the practical sector to establish the required qualifications that are vital to securing employment in the wider industry. The undergraduate study at the department takes four years in total then the student will be awarded a Bachelor of Science degree in computer engineering.

As known Postgraduate studies can open the door to new experiences and opportunities, our department started the postgraduate courses in 2001 to grant Master's degree in computer engineering after completing two years of the academic study.

3. Program Goals

1. Provide highly qualified and competitive computer engineers who can deal with the professional challenges in both private and public sectors since that are well prepared and fully equipped for a successful career as computer engineers.
2. Providing advanced academic programs in the computer engineering field for both theoretical and practical sectors that match the international standards and meet the labor market needs.
3. Encourage the development of the scientific research in computer engineering field especially the information technology, computer software, computer networks, telecommunication systems, AI and robotics.
4. Communicate effectively in a variety of professional contexts with the private, public and government sectors.
5. Create enabling environment for the faculty member that helps them to improve their teaching and research skills.

4

4. Student Learning Outcomes

1. Knowledge and Understanding

1-1. Clarify the basic concepts of computer systems and their applications in social and industrial fields.

1-2. Acquiring skill in dealing with problems and dealing with them through computer systems.

1-3. Acquiring basic skills for the software industry.

1-4. Acquiring experience in industrial computer systems.

1-5. Designing programmed home systems.

1-6. Making websites and databases for various engineering systems.
1-7. Achieving the a to k criterion.
2. Subject-specific skills
2-1. The ability to design simple and advanced programs in different programming languages.
2-2. The ability to think in addressing the issues by algorithms and methods of work.
2-3. Writing scientific reports, reading charts and analyzing digital data.
3. Thinking Skills
3-1. Attention: Arousing students ’attention by implementing one of the application programs on the display screen in the hall
3-2. Response: Follow up the student's interaction with the material displayed on the screen
3-3. Interest: following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display
3-4. Formation of direction: meaning that the student is sympathetic to the presentation and may have an opinion towards the presented topic and defend it.
3-5. The formation of value behavior: meaning that the student reaches the top of the emotional ladder, so that he has a constant level in the lesson and does not lethargic or fidget.
4. General and Transferable Skills (other skills relevant to employability and personal development)

4-1. Developing the student's ability to deal with technology.

4-2. Develop the student's ability to deal with the Internet.

4-3. Develop the student's ability to deal with multiple media.

4-4. Developing the student's ability to dialogue and debate.

5. Academic Staff

No.	Rank	Full Name	Email
1.	Lecturer	Dr. Mustafa Jabar	---
2.	Lecturer	Dr. Raid Labi Lafta	---
3.	Assist. Lecturer	Kamal Kadhim Shamal	---
4.	Assist. Lecturer	Khalid Farhan kafil	---
5.	Assist. Lecturer	Sameea Sakban Abd	----
6.	Assist. Lecturer	Mariam Salim Ali	---
7.	Assist. Lecturer	Taiseer Muhsan Dohi	---
Note: PG= Postgraduate student (i.e. Ph. D Students)			

Engineers, Technicians, and administrators in M.E department

	Name	Position, Specialty and Place of Work
1	Mrs.Noor Falah Hassan	BSc. Material Engineering/ Workshop ,Laboratory Assistant
2	Mrs. Sahar Dhaher Kamal	BSc. Assist. programmer /Workshop,Laboratory Assistant
3	Mrs. Noor Jassim	BSc. / Laboratory Technician

6. Credits, Grading and GPA

Credits

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

Grading

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

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

Calculation of the Cumulative Grade Point Average (CGPA)

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

CGPA of a 4-year B.Sc. degree:
CGPA = [(1st ^{m}odule score x ECTS) + (2nd ^{m}odule score x ECTS) + ……] / 240
Course code is presented according to three requirements:
1- University requirement started by the letter U
2- Engineering College requirement is started by the letter E

3- Department Requirement (Materials Engineering) is started by the letters MAE Course code started by capital letters followed by number of 3-digits as following:
1st digit represents the class number
2nd digit represent the semester number, 1: 1st Semester, 2: 2nd Semester,…, 0: Yearly
3rd digit represent the subject number
For examples:
Example: U112 represents University requirements, first year, first semester, and second subject.
Example: MAE212 represents Department Requirements, second year, first semester, and second subject.

7- Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE111	*Calculus I*	*62*	*113*	*7.00*	*B*	
CoE112	*Electrical Circuits 1*	*93*	*57*	*6.00*	*S*	
CoE113	*Programming & Problems Solving*	*93*	*57*	*6.00*	*C*	
CoE114	*Fundamentals of Logic systems*	*47*	*78*	*5.00*	*C*	
CoE115	*Industrial Chemistry*	*32*	*43*	*3.00*	*B*	
CoE116	*English Language I*	*32*	*43*	*3.00*	*S*	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE121	*Calculus II*	*62*	*113*	*7.00*	*B*	*CoE111*
CoE122	*Digital Logic Circuits*	*78*	*72*	*6.00*	*C*	*CoE114*
CoE123	*Object Oriented Programming*	*93*	*82*	*7.00*	*C*	*CoE113*
CoE124	*Engineering Design/ Auto CAD*	*47*	*53*	*4.00*	*S*	
CoE125	*Device Physics*	*32*	*43*	*3.00*	*B*	*CoE115*
CoE126	*English language II/ Technical Writing*	*32*	*43*	*3.00*	*S*	*CoE116*

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE211	*Calculus III*	*62*	*88*	*6.00*	*B*	*CoE121*
CoE212	*Discrete Structures*	*47*	*53*	*4.00*	*S*	
CoE213	*Signals & Systems*	*62*	*63*	*5.00*	*C*	*CoE112*
CoE214	*Digital System Design*	*93*	*57*	*6.00*	*C*	*CoE122*
CoE215	*Electrical Circuits 2*	*93*	*57*	*6.00*	*C*	*CoE112*
CoE216	*Human Rights, Democracy & Freedom*	*32*	*43*	*3.00*	*B*	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE221	*Differential Equations*	*62*	*63*	*5.00*	*S*	*CoE211*
CoE222	*Probability and Statistics*	*62*	*63*	*5.00*	*C*	*CoE121*
CoE223	*Microprocessor Programming*	*78*	*72*	*6.00*	*C*	*CoE214*
CoE224	*Algorithms*	*78*	*72*	*6.00*	*C*	*CoE123*
CoE225	*Digital Electronics*	*47*	*78*	*5.00*	*S*	*CoE115*
CoE226	*Ethics, Society, Profession*	*32*	*43*	*5.00*	*S*	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE311	*Linear Algebra*	*47*	*78*	*5.00*	*S*	*CoE221*
CoE312	*Computer Architecture*	*78*	*72*	*6.00*	*C*	*CoE214*
CoE313	*Operating Systems*	*78*	*72*	*6.00*	*C*	
CoE314	*Artificial Intelligence*	*47*	*78*	*5.00*	*C*	*CoE224*
CoE315	*Analog Electronics*	*78*	*47*	*5.00*	*S*	*CoE122*
CoE316	*Engineering Economics*	*32*	*43*	*3.00*	*S*	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE321	*Numerical Analysis*	*47*	*78*	*5.00*	*S*	*CoE311*
CoE322	*Microprocessor Interface*	*78*	*47*	*5.00*	*C*	*CoE223*
CoE323	*Instrumentation*	*32*	*68*	*4.00*	*C*	*CoE215*
CoE324	*Digital Communication*	*78*	*72*	*6.00*	*C*	
CoE325	*Computer Maintenance*	*47*	*53*	*4.00*	*C*	
CoE326	*Digital Signal Processing*	*78*	*72*	*6.00*	*C*	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE411	*Embedded Computing Systems*	*78*	*72*	*6.00*	*C*	*CoE322*
CoE412	*Computer Network*	*78*	*72*	*6.00*	*C*	*CoE324*
CoE413	*Control Systems*	*48*	*77*	*5.00*	*C*	
CoE4P	*Engineering Project (continued)*	*77*	*48*	*5.00*	*C*	
CoE414	*Project management*	*32*	*43*	*3.00*	*S*	
CoE415	*Image Processing*	*63*	*62*	*5.00*	*E*	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SS WL	USS WL	ECTS	Type	Pre-request
CoE421	*Information Security*	*32*	*68*	*4.00*	*E*	
CoE422	*Software Design*	*63*	*62*	*5.00*	*C*	
CoE423	*Networks Technology*	*78*	*47*	*5.00*	*C*	*CoE412*
CoE424	*Parallel Processing Architecture*	*47*	*78*	*5.00*	*C*	*CoE312*
CoE4P	*Engineering Project*	*77*	*48*	*5.00*	*C*	
CoE425	*Discrete Control Systems*	*78*	*72*	*6.00*	*C*	*CoE413*

8. Contact

Program Manager:

Mohammed A. Al-Ibadi | Ph.D. in Computer Engineering | Assistant Prof.
Email: mohammed.joudah@uobasrah.edu.iq

Mobile no.: Program Coordinator:

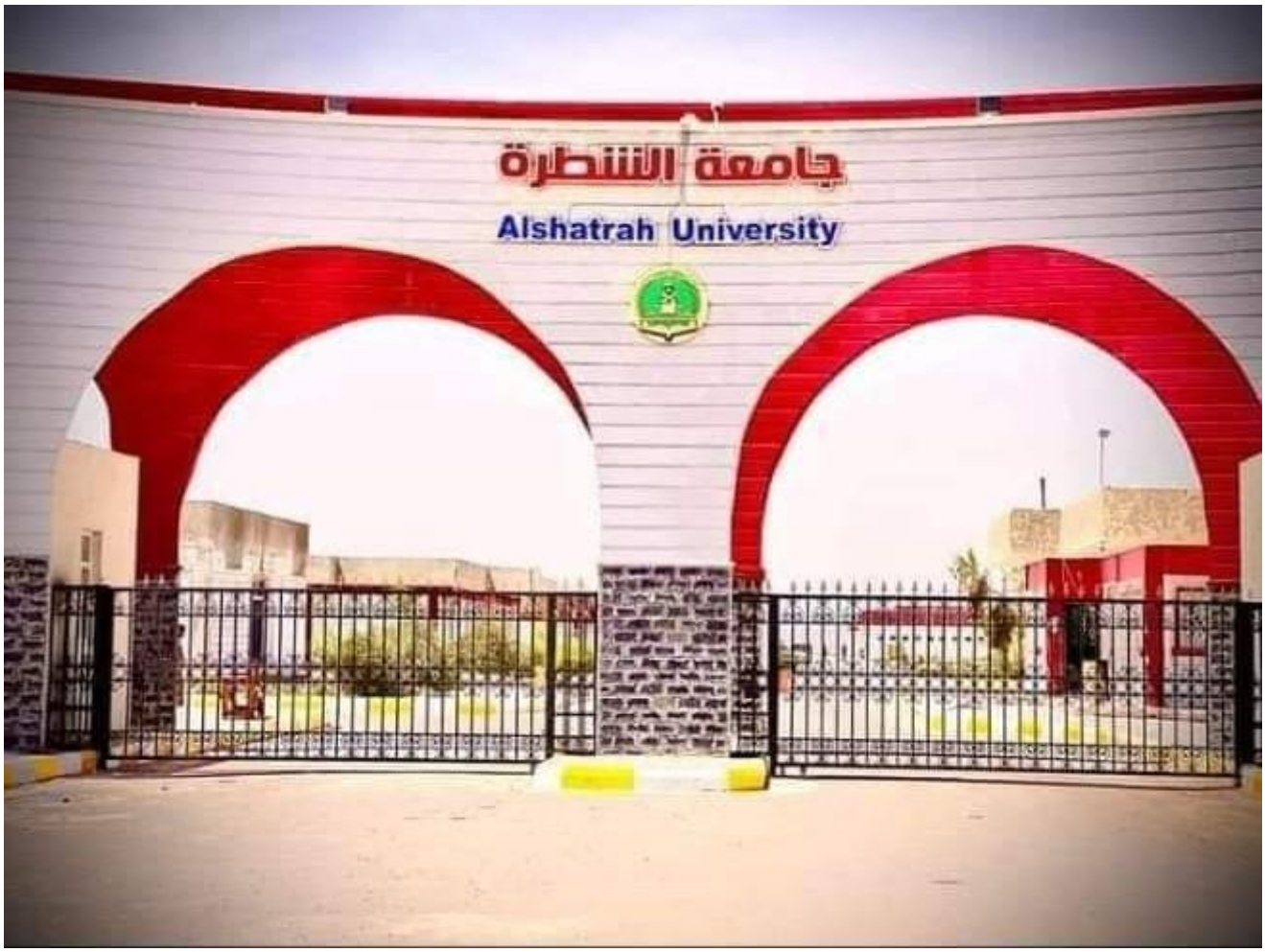
Hassanin Sh. Faham | Ph.D. in Engineering | Lecturer Email:
hassanin.husein@uobasrah.edu.iq

Mobile no.: +964 782 77 06 776

University of Al-Shatraa
جامعة الشطرة

First Cycle – Bachelor's Degree (B.Sc.) – Computer Engineering

بكالوريوس – هندسة الحاسبات



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1. Overview

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

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة الحاسبات للحصول على درجة بكالوريوس العلوم. يقدم البرنامج ( )48مادة دراسية مع ( )٦٠٠٠إجمالي ساعات حمل الطالب و ٢٤٠إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
CoE111	*Calculus I*	*7*	*1*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*1*	*62*	*113*
Description			
Calculus gives engineers the ability to model and control systems. It provides a way to construct relatively simple quantitative and deduce their consequences and the ability to find the effects of changing conditions on the system being investigated. This semester reviews the basic ideas a student need to start calculus for engineering. Topics include a brief review of functions, followed by adiscussion of limits, derivatives, and applications of differential calculus to real-world problem areas. An introduction to integration concludes the course, with a brief description of complex geometry.			

Module 2

Code	Course/Module Title	ECTS	Semester
CoE112	*Electrical Circuits 1*	*6*	*1*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*3*	*93*	*57*
Description			
Understanding basic circuit components, such as resistors, capacitors, and inductors, and their properties. Familiarizing with various types of circuits, such as series, parallel, and combination circuits. Analyzing DC circuits using different analysis techniques. Analyzing AC circuits using complex impedance and phasor notation. Understanding the behavior of circuits with reactive components. Understanding the concept of power and energy in circuits, developing practical skills in designing and building basic electrical circuits.			

Module 3

Code	Course/Module Title	ECTS	Semester
CoE113	*Programming & Problems Solving*	*6*	*1*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*3*	*93*	*57*
Description			
The Programming and Problem-Solving module focuses on developing skills in programming and problem-solving techniques. This module aims to provide students with a solid foundation in computer programming concepts and the ability to apply these concepts to solve real-world problems. Throughout the module, students will learn various programming languages, such as C++. They will gain a thorough understanding of fundamental programming concepts like variables, data types, control structures (loops and conditionals) and functions.			

Module 4

Code	Course/Module Title	ECTS	Semester
CoE114	*Fundamentals of Logic systems*	*5*	*1*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*47*	*78*	
Description			
This course aims to enable the student to learn basics of digital systems design, Numbering Systems and Conversion between different number systems, Mathematical Operations of different number systems, Principles and laws of Boolean algebra, Simplification logical functions using K-Map, Design the Logic circuits, Coding systems.			

Module 5

Code	Course/Module Title	ECTS	Semester
CoE115	***Industrial Chemistry***	**3**	**1**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**32**	**43**	**2**
Description			
Describe the fundamental issues of chemical reactions, equilibrium and kinetics. Study the considerations of industrial chemistry such as reaction evaluation and types of industrial reactors. Depict the chemistry of gas and petroleum. Elaborate on the chemistry of ethylene and propylene and treat the C4 and C5 olefins. Discuss the chemistry of the benzene, toluene, and the xylenes.			

Module 6

Code	Course/Module Title	ECTS	Semester
CoE116	*English Language I*	*3*	*1*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*32*	*43*	
Description			
The main aim of this module is to enable the student to use the English language effectively for study purposes across the curriculum. Also, to develop and integrate the use of the four language skills: Reading, Listening, Speaking and Writing to revise and reinforce structure already learnt.			

Module 7

Code	Course/Module Title	ECTS	Semester
CoE121	*Calculus II*	*7*	*2*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*1*	*62*	*113*
Description			
Calculus II demands familiarity with mathematical concepts from Calculus I: integration, differentiation, limits, integrals, trigonometric properties, the fundamental theorem of calculus, and graphing techniques. The goal of the semester is to improve students' problem-solving abilities through examples and problems covered in lectures, problem sets, exams, and quizzes. The semester expounds and focuses on the topics: Coordinates, determinants, matrices, multiple Integrals, and functions of two or more variables. The students apply basic concepts and more difficult problems to develop students critical thinking skills.			

Module 8

Code	Course/Module Title	ECTS	Semester
CoE122	*Digital Logic Circuits*	*6*	*2*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**3**	**78**	**72**
Description			
Analyze and design the combinational logic circuits like (adder circuits, subtractor circuits, comparator circuits, multiplexer, and etc.). Analyze and implement the sequential logic circuits (Latches and Flip - Flops). Analyze and design a different types of register circuits (shift register). Analyze and design the counter circuits (synchronous counters and asynchronous counters).			

Module 9

Code	Course/Module Title	ECTS	Semester
CoE123	*Object Oriented Programming*	*7*	*2*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*3*	*93*	*82*
Description			
The Object-Oriented Programming (OOP) module aims to introduce students to the fundamental concepts and principles of object-oriented programming and enable them to apply these concepts in software development. The module aims to provide a solid understanding of the core principles of object-oriented programming, such as encapsulation, inheritance, polymorphism, and abstraction. Students will learn how these principles contribute to code organization, reusability, and maintainability.			

Module 10

Code	Course/Module Title	ECTS	Semester
CoE124	*Engineering Design/ Auto CAD*	*4*	*2*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	*2*	*47*	*53*
Description			
This course aims to introduce students to the basic concepts of computer engineering drawing. AutoCAD software is used to draw engineering designs. The course includes knowledge about AutoCAD tools and their properties for developing different software designs in different applications After completing this course, students are expected to become proficient in the main topics of Computer Drawing by AutoCAD and have the opportunity to explore current topics in the field.			

Module 11

Code	Course/Module Title	ECTS	Semester
CoE125	***Device Physics***	**3**	**2**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**32**	**43**	**2**
Description			
Gain a basic understanding of semiconductor material properties. Determine the properties of a pn junction including the ideal current–voltage characteristics of the pn junction diode. Examine dc analysis techniques for diode circuits. Develop an equivalent circuit for a diode that is used when a small, time-varying signal is applied to a diode circuit. Determine the operation of diode rectifier circuits, Zener diode voltage regulator circuit, clipper and clamper circuits. Analyze circuits that contain more than one diode. Understand the operation and characteristics of photodiode and light-emitting diode circuits. Study the structure, operation, and characteristics of MOSFETs and become familiar with the dc analysis of MOSFET circuits. Understand the operation and characteristics of the junction field-effect transistor and and analyze the dc response of JFET circuits. Develop the small-signal models of MOSFETs and analyze the common-source, source-follower, and common-gate amplifiers. Discuss the physical structure and operation of the bipolar junction transistor. Understand and become familiar with the dc analysis of BJT. Develop the small-signal models of BJTs and analyze the common-emitter, emitter-follower, and common-base amplifiers. Discuss the general frequency response characteristics of MOSFET and BJT amplifiers.			

Module 12

Code	Course/Module Title	ECTS	Semester
CoE126	*English language II/ Technical Writing*	*3*	*2*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*32*	*43*	
Description			
The main aim of this module is to enable the student to communicate effectively and appropriately in real life situation using the English Language. Also, pronounce English Correctly and intelligibly.			

Module 13

Code	Course/Module Title	ECTS	Semester
CoE211	*Calculus III*	*6*	*3*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*1*	*62*	*88*
Description			
***This course aims to introduce students to this fundamental field of computer science, which enables students to focus on the study of mathematics and their use for problem solving and systems design in engineering. This mathematics course covers vector calculus, sequences and series, Laplace transform* and partial differentiation it depends on the main topics of Math I and Math II courses. It can be as an introduction to study the topics of engineering analysis.**			

Module 14

Code	Course/Module Title	ECTS	Semester
CoE212	*Discrete Structures*	*4*	*3*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*1*	*47*	*53*
Description			
This course aims to introduce students to this fundamental field of computer science, which enables students to focus on the study of discrete mathematics and structures and their use for problem solving and systems design in science and engineering. The course introduces the principles of Logic, set theory, relations, functions, number systems, and their operations, Introduces the principles of counting and its basic ways, such as permutations, combinations, and counting methods, Methods of proof and their mathematical laws, To think logically in reasoning and to use rapid methods of counting.			

Module 15

Code	Course/Module Title	ECTS	Semester
CoE213	*Signals & Systems*	*5*	*3*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*1*	*62*	*63*
Description			
This module aims to introduce students to this fundamental field of computer science, which enables students to focus on the study of mathematics and mathematical analysis and their use for problem solving and systems design in science and engineering. The module introduces the principles of transforming systems and signals to mathematical equation, set theory, functions and their operations. It also introduces the principles of analyzing the equations into time domain and frequency domain and learning the transformation relations between each other. Also, this module gives the student the knowledge of the easiest way in the analyzing and obtaining the results in optimum way.			

Module 16

Code	Course/Module Title	ECTS	Semester
CoE214	*Digital System Design*	*6*	*3*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*3*	*93*	*57*
Description			
***The aim of this course is to teach students how to analyze, design and implement digital systems using powerful techniques and tools, such as Programmable Logic Devices and Finite State Machines (FSMs),* Understand the complex digital systems such as memory and programable logic devices, Analysis digital systems using various technologies, Design digital systems using combinational and sequential logic circuits.**			

Module 17

Code	Course/Module Title	ECTS	Semester
CoE215	*Electrical Circuits 2*	*6*	*3*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*3*	*93*	*57*
Description			
Understanding AC power concepts and terminologies, Familiarity with the various types of resonant circuits and their applications, Analysis of first and second order transient circuits, Understanding the concept of frequency response and transfer functions, Understanding the concept of two port networks and their different parameters, Study of the mutual inductance and magnetically coupled circuits.			

Module 18

Code	Course/Module Title	ECTS	Semester
CoE216	*Human Rights, Democracy & Freedom*	*3*	*3*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*32*	*43*	
Description			
The fundamental role of human rights education in the realization of human rights that focus on understanding the "human rights education" as a learning process encompassing various dimensions: Knowledge and skills - learning about human rights standards and mechanisms, as well as acquiring the skills to put them into practice in daily life; Values, attitudes - developing values and reinforcing attitudes which uphold human rights; Behavior, action - encouraging action to defend and promote human rights Human rights education teaches both about human rights and for human rights. Its goal is to help students understand human rights, value human rights, and take responsibility for respecting, defending, and promoting human rights. An important outcome of human rights education is empowerment, a process through which people and communities increase their control of their own lives and the decisions that affect them. The ultimate goal of human rights education is people working together to bring about human rights, justice, and dignity for all.			

Module 19

Code	Course/Module Title	ECTS	Semester
CoE221	**Differential Equations**	**5**	**4**
Class (hr/w)	***Lect/Lab./Prac./Tutor***	***SSWL (hr/sem)***	***USWL (hr/w)***
3	**1**	**62**	**63**
Description			
The construction of mathematical models to address real-world problems has been one of the most important aspects of each of the branches of science. It is often the case that these mathematical models are formulated in terms of equations involving functions as well as their derivatives. Such equations are called differential equations. If only one independent variable is involved, often time, the equations are called ordinary differential equations. The course will demonstrate the usefulness of ordinary differential equations for modeling physical and other phenomena. Complementary mathematical approaches for their solution will be presented, including analytical methods, graphical analysis and numerical techniques.			

Module 20

Code	Course/Module Title	ECTS	Semester
CoE222	*Probability and Statistics*	*5*	*4*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*1*	*62*	*63*
Description			
This module aims to introduce students to this basic field of engineering sciences, which enables students to focus on studying mathematics and ways to clarify statistics for experiments or systems that are studied or analyzed and use them to solve problems and design systems in science and engineering such as calculating the rate and the amount of variance and others. The module introduces the principles of calculating the probability distribution and random variables such as the normal, exponential, uniform distribution, etc., and the operations that take place on them. It also introduces students to the principles of counting and its basic methods such as permutations, combinations, counting methods, and methods of proof and proof of mathematical laws. The module enables students to think logically in reasoning and to use rapid methods of counting.			

Module 21

Code	Course/Module Title	ECTS	Semester
CoE223	*Microprocessor Programming*	*6*	*4*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*2*	*78*	*72*
Description			
The aim of this course is to teach students the basic concepts of microprocessor-based systems, and introduces the assembly language for Intel x86 microprocessor family, Understand the main components and working principles of the Intel x86 microprocessor family, Program and debug in assembly language, Understand the basic computer architecture.			

Module 22

Code	Course/Module Title	ECTS	Semester
CoE224	*Algorithms*	*6*	*4*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*2*	*78*	*72*
Description			
This course aims to introduce students to this fundamental field of computer science and computer engineering, which enables students to focus on the study of data structures and programming background and make them expert in programming the common algorithms and data structures with full understanding to the complexity of each algorithm, using the JAVA and C++ programming languages. Most searching, sorting, and graph algorithms are covered in this course. The students will perform laboratory exercises in programming the commonplace algorithms in C++. The students will also be exposed to computation models and computational complexity.			

Module 23

Code	Course/Module Title	ECTS	Semester
CoE225	*Digital Electronics*	*5*	*4*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*1*	*47*	*78*
Description			
Understanding the design and analysis of digital electronic circuits depending on theoretical mathematical methods for design and analysis, introducing simulation programs (e.g., Multisim) for running digital circuits implementation to enhance practical capabilities, Best practicing the theoretical concepts through the implementation of small class projects to facilitate students' skills			

Module 24

Code	Course/Module Title	ECTS	Semester
CoE226	*Ethics, Society, Profession*	*3*	*4*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*32*	*43*	
Description			
Engineering ethics is the study of the ethical issues and decisions facing individuals and organizations working in the field of engineering. The purpose of studying the ethics of the engineering profession is to increase the engineer's ability to face the ethical issues that arise during his engineering work and responsibly. Any profession must have rules of ethics regulating the general behavior of the members of this profession with each other and with others. ABET has called for the integration of ethics into education to teach future engineers ethical practices and ethical thinking			

Module 25

Code	Course/Module Title	ECTS	Semester
CoE311	*Linear Algebra*	*5*	*5*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*1*	*47*	*78*
Description			
At its root, linear algebra is the study of systems of linear equations. Systems of linear equations are ubiquitous in the natural and social sciences. One major contribution to the topic was made by Gauss (1777–1855), who was confronted with large systems of linear equations in his work on astronomy and developed the famous method of least squares to cope with measurement errors. Later in the nineteenth century Cauchy, Sylvester, Cayley and others developed the concept of a matrix, which provides the most convenient language for the theory and practice of linear equations. Matrices are intricate algebraic objects with many fascinating properties, but they also provide a bridge between linear equations and vectors, so infusing the subject of linear algebra with a strong geometric flavor. We will delve into all these topics, as well as the notions of determinant and eigenvalues, which are important numbers associated with any square matrix.			

Module 26

Code	Course/Module Title	ECTS	Semester
CoE312	*Computer Architecture*	*6*	*5*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*72*
Description			
Learn the basic CPU structure the performance factors, Learn the algorithms to design of the common Fixed- Point arithmetic operations, Learn how to design High speed CPU execution components and arithmetic and logic unit, Learn the real number representations and the algorithms to design of the common floating- Point arithmetic operations, Understand the memory hierarchies, cache memories & their mapping techniques and polices, and other memories, Understand the types of system bus and the types of control unit, Learn how to design processor system consists of Datapath and control path.			

Module 27

Code	Course/Module Title	ECTS	Semester
CoE313	*Operating Systems*	*6*	*5*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*72*
Description			
This course aims to convey a thorough understanding of the basics of an operating system by studying techniques and algorithms for providing services in a computer system, and to understand implementation aspects of popular systems by means of case studies.			

Module 28

Code	Course/Module Title	ECTS	Semester
CoE314	*Artificial Intelligence*	*5*	*5*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*1*	*47*	*78*
Description			
Starting with an understanding of the philosophical underpinnings of AI this module will explore advanced AI techniques via the application and evaluation of neural networks, Fuzzy Logic, genetic algorithms, local search techniques, and Hybrid Systems. The aim is to give students an appreciation of the types of application areas and problems that advanced AI techniques can enhance and optimize including artificial intelligence in control systems applications, artificial intelligence in modeling, artificial intelligence, and artificial intelligence in industrial control.			

Module 29

Code	Course/Module Title	ECTS	Semester
CoE315	*Analog Electronics*	*5*	*5*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*47*
Description			
Understanding the design and analysis of analog op-amp electronic circuits depending on theoretical mathematical methods for design and analysis, introducing simulation programs (e.g. Multisim) for running some op-amp circuits implementation to enhance practical capabilities, Best practicing the theoretical concepts through the lab and implementation of small class projects to facilitate students skills.			

Module 30

Code	Course/Module Title	ECTS	Semester
CoE316	*Engineering Economics*	*3*	*5*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*32*	*43*	
Description			
This course aims to introduce fundamental of Engineering Economics, which enables students to have knowledge on Making Economic Decision and how to select the best Alternative. The course dealswith the principles of: Economics Science, Engineering Cost & Cost Estimating, Breakeven Analysis Time Value of Money & Cash Flow Diagrams, Simple and Compound Interests, Equivalence for Repeated Cash Flows, Present Worth Analysis, Annual Cash Flow Analysis, Future Worth, Rate of Return, Benefit-Cost Ratio, and Payback Period, Projects Evaluation to choose Best Alternative، Depreciation Principles and Analysis Methods, Renewable Energy Projects, Sustainability Issues.			

Module 31

Code	Course/Module Title	ECTS	Semester
CoE321	*Numerical Analysis*	*5*	*6*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*1*	*47*	*78*
Description			
The main objective of this course is to provide students with an introduction to the field of numerical analysis. Aside from developing competency in the topics and emphases listed above, the course aims to: further develop and apply problem solving skills through the introduction of numerical methods; provide a ground for applying knowledge acquired in previous mathematics courses; and give students an opportunity to develop and present an independent project.			

Module 32

Code	Course/Module Title	ECTS	Semester
CoE322	*Microprocessor Interface*	*5*	*6*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*47*
Description			
Learning the basic concepts of memory and input and output interfaces, learning how to design memory subsystem and input and output ports, designing programs for managing input and output data, understanding the operation of programmable input and output devices, the ability to implement hardware designs for specific problems, the ability to interact with hardware designs through software, the ability to design dedicated and general-purpose ports, both fixed and programmable, the ability to handle interrupts and transfer data to and from the CPU.			

Module 33

Code	Course/Module Title	ECTS	Semester
CoE323	**Instrumentation**	**4**	**6**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**32**	**68**	**2**
Description			
Principle of measurement, Measuring electrical quantities, Analogue and digital transducers, Measurement of level, pressure, flow, temperature and other industrial measurements, Operation principle of DC, Servo, and Steeper motors.			

Module 34

Code	Course/Module Title	ECTS	Semester
CoE325	*Computer Maintenance*	*4*	*6*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	*2*	*47*	*53*
Description			
Introducing hardware concepts to a student, Early detection of computer problems, Define a computer as an electronic machine that can store information Design input/output ports with specific addresses. Identify commonly used computer devices and explain their usage of Programmable timers, give a strong foundation on the most fundamental concepts of computer hardware and operating systems, Explain the purpose of the most commonly used hardware devices, Assemble a computer system, Configure and troubleshoot hardware devices.			

Module 36

Code	Course/Module Title	ECTS	Semester
CoE326	*Digital Signal Processing*	*6*	*6*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*72*
Description			
Clarify the basic concepts of Fundamentals of discrete time signals systems, gain new skills relationships between system representations, Gain basic skills in computation of frequency response. Gain basic understanding of discrete system programming and Digital filter design.			

Module 37

Code	Course/Module Title	ECTS	Semester
CoE411	*Embedded Computing Systems*	*6*	*7*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*72*
Description			
Clarify the concepts associated with real time system regarding resource management, Clarify the requirements to establish a real time project using embedded system, Acquire the basic skills for synchronizing the process in foreground and background aspects, Acquire basic skills for interfacing, Synchronous serial interface and I/O programming, Acquiring the skills to Analog to digital conversion, Real-time data acquisition, Digital to analog conversion, Gain the skills required to build a networked embedded system, Reentrant programming, Critical section, Network topologies.			

Module 38

Code	Course/Module Title	ECTS	Semester
CoE412	*Computer Network*	*6*	*7*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*72*
Description			
Introduction to the design and performance analysis of computer networks Architectures, protocols, standards and technologies of computer networks. Including different computer networks types, media, models, switching, retransmission, flow and error control.			

Module 39

Code	Course/Module Title	ECTS	Semester
CoE413	*Control Systems*	*5*	*7*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*1*	*48*	*77*
Description			
Preparing and qualifying specialized engineers to meet the requirements of the labor market in the private and public sectors in control engineering through diversifying the methods of learning and teaching and training students to apply the acquired knowledge and skills to solve real problems. Providing distinguished academic programs in the field of control engineering, both theoretical and practical, that comply with international standards of academic quality and meet the needs of the labor market. Encouraging and developing scientific research in the fields of control engineering in general and the fields of artificial intelligence, robotics, computer software, computer networks, communications and control in particular.			

Module 40

Code	Course/Module Title	ECTS	Semester
CoE4P	*Engineering Project (continued)*	*5*	*7*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*77*	*48*
Description			
As we know projects can influence an engineering curriculum in various ways, and this can be done at a course level and/or program level. Therefore, in the final year our students complete an individual project involving the application of skills and knowledge attained during their earlier years of their degree program. Through these projects students develop new abilities for application to a real-world problem, learn the art of modeling and simulation, design, development and management of an industryor research-based projects.			

Module 41

Code	Course/Module Title	ECTS	Semester
CoE414	*Project management*	*3*	*7*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*32*	*43*	
Description			
This course is intended as an introduction to the different concepts, skills, tools, and techniques needed to successfully manage projects of various types and sizes, with focus on projects involving Computer Engineering. Course material covers the approaches and practices in project management over the life cycle of the project. This course is highly interactive, with hands-on, in-class practice projects and analysis of real-world project examples. While providing the knowledge needed for project planning, monitoring, and control, it focuses on the development of leadership, teamwork, and problem solving skills.			

Module 42

Code	Course/Module Title	ECTS	Semester
CoE415	*Image Processing*	*5*	*7*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*2*	*63*	*62*
Description			
Understanding the principles and mathematics of several techniques and algorithms needed in the field of image processing and computer vision. Programming these methods and algorithms with some languages (e.g. MATLAB or Python) to enhance practical capabilities. Best practicing the theoretical concepts through the lab and implementation of small class projects to facilitate students skills.			

Module 43

Code	Course/Module Title	ECTS	Semester
CoE421	*Information Security*	*4*	*8*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*32*	*68*	
Description			
To broaden knowledge of security concepts and practices, To demonstrate the expertise as a seasoned security professional, To make students more marketable in a competitive workforce, To make students be eligible for more employment opportunities, To bring improved security expertise to the student's future occupation, To show a dedication to the security discipline, Introducing software programs for running some attack implementation to enhance practical capabilities, Best practicing the theoretical concepts through the implementation of small class projects to facilitate students skills.			

Module 44

Code	Course/Module Title	ECTS	Semester
CoE422	*Software Design*	*5*	*8*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*2*	*63*	*62*
Description			
To acquire skills to develop large programs, handling exponential growth in complexity with size, Systematic techniques based on abstraction (modelling) and decomposition, learn systematic techniques of specification, design, user interface development, testing, project management, maintenance, etc., appreciate issues that arise in team development, to acquire skills to be a better programmer, Higher productivity, better quality programs.			

Module 45

Code	Course/Module Title	ECTS	Semester
CoE423	**Networks Technology**	**5**	**8**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**3**	**78**	**47**
Description			
Understanding the ability of network problem solving, Obtain the ability of connecting networks Knowledge, Obtain the ability of analyzing networks, the ability of estimating network requirements. The ability to deal with information systems, The ability to analyze different problems in the network and problems fixing, the ability to design a network for a given purpose, The ability to write technical reports.			

Module 46

Code	Course/Module Title	ECTS	Semester
CoE424	*Parallel Processing Architecture*	*3*	*8*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	*47*	*78*	
Description			
Students will gain fundamental knowledge and understanding of principles in parallel computer architecture and computing, emphasizing the hardware challenges, Analyze the parallelism, Identify the conditions of parallelism, Study different parallel interconnection systems, Identify the memory types in parallel processing systems, understanding pipelined and non-pipelined processing, Identify the pipeline system and pipeline hazards, Gain in-depth knowledge of parallel computer architecture. Learn parallel.			

Module 47

Code	Course/Module Title	ECTS	Semester
CoE4P	*Engineering Project*	*5*	*8*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*77*	*48*
Description			
As we know projects can influence an engineering curriculum in various ways, and this can be done at a course level and/or program level. Therefore, in the final year our students complete an individual project involving the application of skills and knowledge attained during their earlier years of their degree program. Through these projects students develop new abilities for application to a real-world problem, learn the art of modeling and simulation, design, development and management of an industry or research-based projects.			

Module 48

Code	Course/Module Title	ECTS	Semester
CoE425	*Discrete Control Systems*	*6*	*8*
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	*3*	*78*	*72*
Description			
The objective of this course is to introduce the students to the fundamental principles of discrete time control system. Introduction to discrete time control system, z transforms and inverse z transform, impulse sampling and data hold, pulse transfer function, time response and frequency response are studied. The performance of systems and the stability analysis will also be introduced.			

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electrical Circuits 1**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CoE112**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Mariam Salim Ali		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	**1. Understanding basic circuit components, such as resistors, capacitors, and inductors, and their properties.** **2. Familiarizing with various types of circuits, such as series, parallel, and combination circuits.** **3. Analyzing DC circuits using different analysis techniques.** **4. Analyzing AC circuits using complex impedance and phasor notation.** **5. Understanding the behavior of circuits with reactive components.** **6. Understanding the concept of power and energy in circuits.** **7. Developing practical skills in designing and building basic electrical circuits.**
Module Aims	**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. Describe electrical power, charge, and current.** **5. Define Ohm's law.** **6. Identify the basic circuit elements and their applications.** **7. Discuss the operations of sinusoid and phasors in an electric circuit.** **8. Discuss the various properties of resistors, capacitors, and inductors.** **9. Explain the two Kirchhoff's laws used in circuit analysis.** **10. Identify the capacitor and inductor phasor relationship with respect to voltage and current.**
أهداف المادة الدراسية	**art A: (Theoretical and Tutorial Hours)** **1. DC circuits – Current and voltage definitions, Passive sign convention and circuit** **elements [6 hours]** **2. Resistive networks, Combining resistive elements in series and parallel and** **Network reduction [6 hours]** **3. Kirchhoff's laws and Ohm's law [6 hours]** **4. voltage and current sources, current and voltage division [4 hours]** **5. Introduction to mesh and nodal analysis [6 hours]** **6. Thevenin and Norton equivalent circuits. maximum power transfer [6 hours]** **7. Time dependent signals, average and RMS values. [4 hours]** **8. simple AC steady-state sinusoidal analysis [6 hours]** **9. RMS and power dissipation [2 hours]** **10. Phasor diagrams, definition of complex impedance [6 hours]** **11. AC circuit analysis with complex numbers. [6 hours]**
	Part B: (Lab Hours) **.1Resistors and color codes [2 hours[** **.2Ohm's law [2 hours[** **.3Series and parallel resistive networks [4 hours[** **.4Kirchhoff's laws [4 hours[** **.5Delta -Star and Star –Delta Transformation [4 hours[** **.6Wheatstone bridge [2 hours[** **.7Superposition theorem [4 hours[** **.8Thevenin equivalent circuits [4 hours[** **9. Maximum power transfer [4 hours]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 10**	**LO #1, 2, 8 and 9**
	Assignments	**2**	**10% (10)**	**2, 12**	**LO # 3, 4, 6 and 7**
	Projects / Lab.	**1**	**10% (10)**	**Continuous**	
	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% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction – charge, current, and voltage**
Week 2	**Basics of Network Elements**
Week 3	**Resistance and Resistivity, Ohm's Law**
Week 4	**Review of Kirchhoff's Laws**
Week 5	**Nodal and Mesh Circuit Analysis**
Week 6	**Linearity and Superposition**
Week 7	**Mid-term Exam + Thévenin and Norton Equivalents**
Week 8	**Source Transformations**
Week 9	**Introduction to alternative current**
Week 10	**Sinusoidal voltages and currents**
Week 11	**Phasors, and Complex Impedance**
Week 12	**Average Power and RMS**
Week 13	**Sinusoidal Steady State Response**
Week 14	**Sinusoidal Forcing, Complex Forcing, ,**
Week 15	**Nodal and Mesh Revisited**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab 1: Resistors and color codes**
Week 2	**Lab 2: Ohm's law**
Week 3	**Lab 3: Series and parallel resistive networks**
Week 4	**Lab 4: Series and parallel resistive networks (continued)**
Week 5	**Lab 5: Kirchhoff's laws**
Week 6	**Lab 6: Kirchhoff's laws [continued]**
Week 7	**Lab 7: Delta -Star and Star –Delta Transformation**
Week 8	**Lab 8: Delta -Star and Star –Delta Transformation (continued)**
Week 9	**Lab 9: Wheatstone bridge**
Week 10	**Lab 10: Superposition theorem**
Week 11	**Lab 11: Superposition theorem (continued)**
Week 12	**Lab 12: Thevenin equivalent circuits**
Week 13	**Lab 13: Thevenin equivalent circuits (continued)**
Week 14	**Lab 14: Maximum power transfer**
Week 15	**Lab 15: Maximum power transfer (continued)**

Week 16	*Preparatory week before the final Exam*

Learning and Teaching Resources مصادر التعلم والتدريس		
	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	**Introductory Circuit Analysis, R. Boylestad, Pearson**	**Yes**
Websites	**https://www.coursera.org/browse/physical-science-and-engineering/electricalengineering**	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Industrial Chemistry**			**Module Delivery**	
Module Type	***Basic***			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	***3***				
SWL (hr/sem)	***75***				
Module Level	1		**Semester of Delivery**	1	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	**Describe the fundamental issues of chemical reactions, equilibrium and kinetics. Study the considerations of industrial chemistry such as reaction evaluation and types of industrial reactors. Depict the chemistry of gas and petroleum. Elaborate on the chemistry of ethylene and propylene and treat the C4 and C5 olefins. Discuss the chemistry of the benzene, toluene, and the xylenes.**
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	**1. Learn about the basics of chemicals relations such as stoichiometry, equilibrium and thermal energy. 2. Accounting to industrial considerations in the chemical yields and catalysis. 3. Learn about synthesis gas production and stream reforming. 4. Get knowledge about the stages of petroleum refining. 5. Obtain concise information on petrochemical industry, including ethylene and propylene-based processes, C4-Based Processes, and Benzene, Toluene, and Xylenes (BTX) Processes.**
Indicative Contents ***المحتويات الإرشادية***	**Indicative content includes the following. 1. Fundamentals, Chemical Reactions: Stoichiometry, reaction yields, thermochemistry. Equilibrium: Equilibrium constants, LeChatlier's principle. Kinetics: Rate expressions, temperature effects, catalysis. 2. Industrial Considerations, Reaction Evaluation: Selection, economic feasibility, thermodynamic feasibility, kinetic feasibility. Types of Industrial Reactors: Single and multiple products without separation, single product with separation, multiple separations involving reactor feed and product streams, and reactor with recycle. 3. Synthesis Gas Processes, Synthesis Gas Production: Steam reforming, shift reactions, and Methanation. Ammonia: Synthesis, oxidation: Nitric acid and fertilizers. Methanol: Synthesis, derivatives: Formaldehyde and acetic acid. 4. The Petroleum Industry, Petroleum Refining: Composition, distillation, catalytic cracking, catalytic reforming, hydrotreating and coking, alkylation and isomerization, steam cracking. 5. The Petrochemical Industry, Ethylene-Based Processes: Ethylene oxide and ethylene glycol, polyethylene, vinyl chloride and PVC. Propylene-Based Processes: Acrylic acid and acrylonitrile, PP and Ziegler-Natta chemistry. C4-Based Processes: Butadiene, Isobutylene. Benzene, Toluene, and Xylenes (BTX) Processes: Styrene and polystyrene, polyethylene terephthalate (PET), Phenol, adipic acid and nylon, phthalic anhydride.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	.1Class lectures. .2Tutoring. .3Homework. .4quizzes 5. Mid-term and final exams.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.86
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**1. Fundamentals:** **Chemical Reactions**
Week 2	**1. Fundamentals:** **Equilibrium**
Week 3	**Industrial Considerations:**

	Reaction Evaluation
Week 4	**Industrial Considerations:** **Types of Industrial Reactors**
Week 5	**Synthesis Gas Processes:** **Synthesis Gas Production and Steam Reforming**
Week 6	**Synthesis Gas Processes:** **Ammonia: Synthesis, oxidation**
Week 7	**Synthesis Gas Processes:** **Methanol Synthesis and Conversion**
Week 8	**Petroleum Refining:** **Composition, distillation, catalytic cracking, catalytic reforming, hydrotreating and coking**
Week 9	**Petroleum Refining:** **Alkylation and isomerization, steam cracking.**
Week 10	**Ethylene-Based Processes:** **Ethylene oxide and ethylene glycol, polyethylene, vinyl chloride and PVC.**
Week 11	**Propylene-Based Processes:** **Acrylic acid and acrylonitrile, PP and Ziegler-Natta chemistry.**
Week 12	**C4-Based Processes:** **Butadiene, Isobutylene**
Week 13	**BTX Processes:** **Styrene, Polystyrene**
Week 14	**BTX Processes:** **Polyethylene Terephthalate (PET), Phenol**
Week 15	**BTX Processes:** **Adipic Acid and Nylon, Phthalic anhydride.**
Week 16	***Preparatory week before the final Exam***

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**H. A. Wittcoff, B. G. Reuben, and J. S. Plotkin, "Industrial Organic Chemistry". USA: A john Wiley & Sons, Inc., 3rd ed، .2013** **K. Weissermel and Dr. H.-J. Arpe, "Industrial Organic Chemistry". USA: VCH publisher, 5th ed., 2010.**	**Yes**
Recommended Texts		**Yes**
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Calculus I**			**Module Delivery**	
Module Type	**Base**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CoE111**				
ECTS Credits	**07**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Khalid Farhan kafil		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Calculus II	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	**Calculus gives engineers the ability to model and control systems. It provides a way to construct relatively simple quantitative and deduce their consequences and the ability to find the effects of changing conditions on the system being investigated. This semester reviews the basic ideas a student need to start calculus for engineering. Topics include a brief review of functions, followed by a discussion of limits, derivatives, and applications of differential calculus to real-world problem areas. An introduction to integration concludes the course, with a brief description of complex geometry.**
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	**1- Illustrate the principle of calculus.** **2- Improve the ability to analyze and problem-solving approach.** **3- Gain the required mathematical skills to solve different problems.** **4- Cognitive development of the student by improving his/her learning through adopting a deep learning approach (focusing and understanding).** **5- Improve the essential skills to treat with different mathematical problems.** **6- Help students grasp the development of knowledge as a process.** **7- Improve the writing of scientific reports.** **8- Gain the required experience to deal with real-time and industrial systems applications mathematically.**
Indicative Contents ***المحتويات الإرشادية***	***Course Topics:*** **1- *Preliminaries:*** • Real numbers and the real line, lines, circles, and parabolas, functions and their graphs. ***(4hrs)*** • Absolute value function, greatest integer function, signum function, domain and range algebraic functions.***(4hrs)*** • Combining functions, shifting and scaling function graphs, even and odd functions. ***(4hrs)*** • Trigonometric functions. ***(4hrs)*** **2- *Differentiation:*** • Limits, continuity and differentiability. ***(4hrs)*** • Rules of Differentiation, chain rule, implicit differentiation. ***(4hrs)*** • Higher order differentiation. ***(4hrs)*** • Application, time rate, maxima and minima, concave, curve **plotting.** ***(4hrs)*** • Inverse functions, the limit sinx/x, trigonometric functions and their inverse. ***(4hrs)***

	3- *Integration:* • Finite integration, rules of integration. ***(4hrs)*** • Applications, area, volume, arc-length. ***(4hrs)*** • Integration methods, special integrals, rotating and shifting of axes, conical sections. ***(4hrs)*** 4- Complex Geometry: • Complex numbers: z = x +jy as an affix on the real point.(x y), modulus, argument, conjugate, addition, subtraction, products of such numbers. (4hrs) • (Cartesian, trigonometric, polar and exponential) forms. **(4hrs)** • Transformations: translation, rotation by an angle. **(4hrs)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	-1Explanation and clarification using the class lectures. -2Tutorials hours. -3Reading and self-learning. -4Home Works. -5Discussions and workshops -6Reports. -7Presentation. -8Short tests (quizzes.(-9Training and activities during lecture. -10Mid-terms and final exams. -11Encourage the student to: •Fully present in class. •Asking the questions that help to understand the material better. •Interaction during lectures • Practicing the examples, homework, and problems.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	113	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**10% (10)**	**6, 10**	**LO #1, 2, 4 and 6**
	Assignments	**3**	**15% (15)**	**3, 12**	**LO #2, 3, 4,5 and 6**
	Projects / Lab.				
	Report	**1**	**15% (15)**	**14**	**LO # 4, 5,7 and 8**
Summative assessment	**Midterm Exam**	**1.5 hr**	**10% (10)**	**7**	**LO # 1-7**
	Final Exam	**2hrs**	**50% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Preliminaries: Real numbers and the real line, lines, circles, and parabolas, functions and their graphs.**
Week 2	**Absolute value function, greatest integer function, signum function, domain and range algebraic functions.**
Week 3	**Preliminaries: Combining functions, shifting and scaling function graphs, even and odd functions.**
Week 4	**Preliminaries: Trigonometric functions.**
Week 5	**Differentiation: Limits, continuity and differentiability**
Week 6	**Differentiation: Rules of Differentiation, chain rule, implicit differentiation.**
Week 7	**Differentiation: Higher order differentiation.**
Week 8	**Differentiation: Application, time rate, maxima and minima, concave, curve plotting.**
Week 9	**Differentiation: Inverse functions, the limit sinx/x, trigonometric functions and their inverse.**
Week 10	**Integration: Finite integration, rules of integration.**
Week 11	**Integration: Applications, area, volume, arc-length.**
Week 12	**Integration: Integration methods, special integrals, rotating and shifting of axes, conical sections.**
Week 13	**Complex Geometry: Complex numbers: z = x +jy as an affix on the real point.(x y), modulus, argument, conjugate, addition, subtraction, products of such numbers.**
Week 14	**Complex Geometry: (Cartesian, trigonometric, polar and exponential) forms.**
Week 15	**Complex Geometry: Transformations: translation, rotation by an angle.**
Week 16	***Preparatory week before the final Exam***

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Calculus, By Anton Bivens Davis, 2002 Anton Textbooks, Inc**	***Yes***
Recommended Texts	**Advanced Engineering Mathematics, By Erwin Kreyszig, 1999, John Wiley & Sons, Inc**	***Yes***
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language I**			**Module Delivery**	
Module Type	***Support or related learning activity***			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CoE116***				
ECTS Credits	**3**				
SWL (hr/sem)	**32**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Kamal Kadhim Shamal		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	The main aim of this module is to enable the student to use the English language effectively for study purposes across the curriculum. Also, to develop and integrate the use of the four language skills: Reading, Listening, Speaking and Writing to revise and reinforce structure already learnt. The module presents the following principles that related to both writing and reading skills: 1. The ability to write English correctly. 2. Master the Mechanics of academic writing; for example, using correct punctuation marks, capital letters, etc... 3. Writing neatly and legibly using the appropriate vocabulary and the correct grammatical items. 4. Writing coherently in more than one paragraph, complete accurately and fluently semi-controlled compositions such as events, trends, and processes. 5. *understanding the total content and underlying meaning in the context.* 6. *Follow the sequence of ideas, facts etc...* 7. *locate Significant points and features.* *8. identifying and understanding phrase or sentence groups.* *9. predict outcomes.* *10. grasp meaning of words and sentences*
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	1. Identify the academic writing techniques and creative uses of language in academic texts. 2. Adapt their texts to particular audiences and purposes. 3. Articulate a thesis, a project or a report and present evidence using the suitable vocabulary to support it. 4. Finding, evaluating, and using appropriate bibliographic materials in their texts. 5. Describe their own writing practices and how they have evolved. 6. Apply relevant theoretical concepts to their texts and practices.
Indicative Contents ***المحتويات الإرشادية***	**Indicative content includes the following.** 1. Grammars. [6 hrs] 2. Reading. [4 hrs] 3. Writing. [4 hrs] 4. Describing Charts vocabulary and words order . [16 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	. 1Explanation and clarification using the class lectures. .2Tutorials hours. 3. Self-learning using homework and small projects. .4 Short tests (quizzes) .5 Reports. 6. Mid-terms and final exams.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 12**	**LO #1, 2, and 3**
	Assignments	**3**	**15% (10)**	**2, 6, 10**	**LO # 3, 4, and 5**
	Projects / Lab.				
	Report	**1**	**15% (15)**	**13**	**LO # 1, 2, 3,4 and 5**
Summative assessment	**Midterm Exam**	**1.5 hr**	**10% (10)**	**7**	**LO # 1-5**
	Final Exam	**2hrs**	**50% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Singular and Plural Nouns
Week 2	English Tenses Part I
Week 3	English Tenses Part II
Week 4	Prepositions and Modal Verbs
Week 5	Compound nouns and Compound Adjectives
Week 6	Academic Writing
Week 7	Trends
Week 8	Describing Trends
Week 9	Describing Trends, vocabulary, and word order.
Week 10	Tables and bar charts
Week 11	Describing Tables and bar charts, vocabulary, and word order.
Week 12	Pie Charts
Week 13	Describing Pie Charts, vocabulary, and word order.
Week 14	Describing Projections
Week 15	Formal and informal Email Writing
Week 16	*Preparatory week before the final Exam*

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Headway Academic Skills**	**Yes**
Recommended Texts	**All versions of Headway**	**Yes**
Websites	**British Council, Learn English online**	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Logic systems**			**Module Delivery**	
Module Type	***Core***			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CoE114**				
ECTS Credits	***5***				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Taiseer Muhsan Dohi		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Calculus II	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	**This course aims to enable the student to learn basics of digital systems design:** **1. Numbering Systems and Conversion between different number systems.** **2. Mathematical Operations of different number systems.** **3. Principles and laws of Boolean algebra.** **4. Simplification logical functions using K-Map.** **5. Design the Logic circuits.** **6. Coding systems.**
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	**1. Recognize the numbering systems (binary, decimal numbers, octal, hexadecimal and etc.).** **2. Identify the methods of conversion between the number systems.** **3. Identify the mathematical Operations of different number systems (Add, Subtract, Multiply and Division).** **4. Identify the basics and rules of Boolean algebra.** **5. Identify on the Karnaugh- Maps and using them in simplification the logic circuits.** **6. Identify the codes and the conversion between them.**
Indicative Contents ***المحتويات الإرشادية***	**Indicative content includes the following.** **1. Knowledge of number systems and conversion between them.** ***[6 hrs]*** **2. Knowledge of the mathematical Operations of different number systems.** ***[6 hrs]*** **3. Knowledge of Complements of different Number systems and knowledge of Binary Logic Gates.** ***[3 hrs]*** **4. Knowledge the basics and the laws of Boolean algebra and using it to simplify logic circuits.** ***[6 hrs]*** **5. Knowledge the implementation of the logic functions as the canonical forms SoP and Pos.** ***[3 hrs]*** **6. Discussion.** ***[3 hrs]*** **7. Knowledge the design of Karnaugh- maps and Don't care terms.** ***[6 hrs]*** **8. Using the Karnaugh- maps to simplify and design the logic circuits.** ***[3 hrs]*** **9. Knowledge of types of Codes, mathematical operations on them and conversion between them.** ***[6 hrs]*** **10. Discussion.** ***[3 hrs]***

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Explanation and clarification using the class lectures.** **2. Tutorials hours.** **3. Self-learning using homework and small projects.** **4. Short tests (quizzes).** **5. Reports.** **6. Mid-terms and final exams.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	78	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 12**	**LO #1, 2, 5 and 7**
	Assignments	**3**	**15% (15)**	**2, 6, 10**	**LO # 1, 3, 5 and 6**
	Projects / Lab.	**-**	**-**	**-**	**-**
	Report	**1**	**15% (15)**	**13**	**LO # 1, 4, 5 and 6**
Summative assessment	**Midterm Exam**	**1.5 hr**	**10% (10)**	**7**	**LO # 1-7**
	Final Exam	**2hr**	**50% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Digital Systems [Decimal, Binary, Octal, Hexadecimal, etc.] and Number – Base Conversions.**
Week 2	**Arithmetic operations.**
Week 3	**Complements of Numbers.**
Week 4	**Binary Logic Gates and Discussion.**
Week 5	**Basic Definition and Rules of Boolean Algebra.**
Week 6	**Canonical and Standard Forms [sum of products, product of sums].**
Week 7	**Mid-term Exam + Discussion.**
Week 8	**The Karnough Map Method.**
Week 9	**Don't-Care Terms.**
Week 10	**NAND and NOR Implementation.**
Week 11	**Logic Circuits.**
Week 12	**Discussion.**
Week 13	**Weighted Codes [BCD, etc.].**
Week 14	**Ex – n Codes and Gray code.**
Week 15	**Design of different codes.**
Week 16	***Preparatory week before the final Exam***

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Fundamentals of logic design. Cengage Learning by Roth Jr, Charles H., Larry L. Kinney, and Eugene B. John.**	**Yes**
Recommended Texts	**Digital computer fundamentals. McGraw-Hill, Inc, by Bartee, Thomas C.**	**Yes**
Websites	***https://www.coursera.org/lecture/build-a-computer/unit-1-3-logic-gates-Aqrh6***	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Programming and Problem Solving**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CoE113**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Dr. Raid Labi Lafta		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Calculus II	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	The Programming and Problem-Solving module focuses on developing skills in programming and problem-solving techniques. This module aims to provide students with a solid foundation in computer programming concepts and the ability to apply these concepts to solve real-world problems. Throughout the module, students will learn various programming languages, such as C++. They will gain a thorough understanding of fundamental programming concepts like variables, data types, control structures (loops and conditionals) and functions. The module may cover the following topics: 1- Introduction to programming: Basic programming concepts, syntax, and logic. 2- Data types and variables: Working with different data types such as numbers, strings, and boolean values. Understanding variables and their usage. 3- Control structures: Implementing decision-making statements (if-else, switchcase) and loops (for, while) to control program flow. 4- Functions and modular programming: Creating reusable code blocks through functions and organizing code into modules. Throughout the module, students will have hands-on programming assignments and projects to reinforce their understanding of the concepts taught. They will practice problem-solving skills by tackling programming challenges and implementing solutions using the learned programming techniques. By the end of the module, students should be proficient in at least one programming language and have the ability to approach and solve complex problems using programming and problem-solving strategies. These skills are essential for further studies in computer science and for careers in software development and related fields.
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	Upon completing the Programming and Problem-Solving module, students should be able to demonstrate the following learning outcomes: 1- Programming Skills: Students will acquire proficiency in at least one programming language and demonstrate the ability to write well-structured and functional code. They should be able to understand and apply programming concepts, syntax, and language features. 2- Problem-Solving Abilities: Students will develop effective problem-solving skills by analyzing complex problems, breaking them down into smaller components, and designing step-by-step solutions using programming techniques. They should be able to apply appropriate algorithms and data structures to solve different types of problems efficiently. 3- Logical Thinking: Students will develop logical thinking abilities by understanding and implementing control structures, such as loops and conditionals, to control the flow of a program. They should be able to reason about the behavior of a program and identify potential errors or bugs. 4 -Modularity and Reusability: Students will learn to create modular and reusable code through the use of functions or methods. They should understand the benefits of code organization and be able to effectively use modular programming techniques to enhance the maintainability and readability of their code. These learning outcomes collectively equip students with the necessary skills and knowledge to apply programming and problem-solving techniques effectively in various contexts, including further studies in computer science and careers in software development or related fields.

Indicative Contents ***المحتويات الإرشادية***	The indicative contents of the Programming and Problem-Solving module may include the following topics: 1- Introduction to Programming •Basic programming concepts and terminology •Introduction to programming languages (e.g., Python, Java, C(++ •Setting up the development environment 2- Data Types and Variables •Primitive data types (e.g., integers, floats, strings, booleans(•Variable declaration and assignment •Type conversions and casting 3- .Control Structures •Conditional statements (if-else, switch-case(•Looping structures (for, while, do-while(•Nested loops and loop control statements (break, continue(4- Functions and Modular Programming •Defining and calling functions •Function parameters and return values •Modular code organization and reuse 5- .Algorithms and Problem-Solving Techniques •Introduction to algorithm analysis and efficiency (time complexity، space complexity) • Searching algorithms (linear search, binary search) •Sorting algorithms (selection sort, insertion sort, merge sort، quicksort) •Recursion and recursive algorithms 6- Error Handling and Debugging •Common types of errors (syntax errors, runtime errors) •Debugging techniques and tools •Exception handling (try-except blocks) •Error messages and logging •Software Development Practices 7- Software development life cycle (SDLC) •Version control systems (e.g., Git) •Testing methodologies (unit testing, integration testing) •Code documentation and commenting 8- .Problem-Solving Strategies and Patterns •Breaking down complex problems into manageable components •Problem-solving patterns (e.g., brute force, divide and conquer، dynamic programming) •Applying appropriate algorithms and data structures to solve Problems

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**In the Programming and Problem-Solving module, students can employ various strategies to enhance their learning experience and improve their programming and problem-solving skills. Some effective strategies include:** **1- .Practice and Hands-on Coding: Regular practice is crucial for mastering programming concepts. Students should actively engage in coding exercises، programming assignments, and projects. Practicing coding helps reinforce understanding, improves syntax familiarity, and builds problem-solving skills.** **2- .Break Down Problems: Encourage students to break down complex problems into smaller, manageable components. This strategy helps in understanding the problem better and enables step-by-step solutions. Students can use techniques like pseudocode or flowcharts to visualize and plan their approach.** **3- .Debugging and Troubleshooting: Debugging is an essential skill for programmers. Students should develop the ability to identify and fix errors in their code systematically. Encourage them to use debugging tools, print statements, and step-through debugging techniques to locate and rectify issues.** **4- .Collaborative Learning: Foster a collaborative learning environment where students can work together, share ideas, and discuss solutions. Group projects or coding exercises can facilitate collaboration, allowing students to learn from each other, solve problems collectively, and gain exposure to different perspectives and approaches.** **5- .Seek Help and Resources: Encourage students to seek help when needed. They can consult the course instructor, teaching assistants, or online resources such as documentation, tutorials, and programming forums. Encouraging them to explore different resources broadens their understanding and exposes them to different problem-solving techniques.** **6- Test and Debug Incrementally: Advise students to test and debug their code incrementally as they develop their solutions. By testing and verifying smaller parts of the code before proceeding to the next section, they can identify and fix errors early, reducing the complexity of debugging later.** **7- Analyze and Optimize Algorithms: Teach students to analyze algorithms in terms of time and space complexity. They should understand the efficiency trade-offs of different algorithms and data structures and be able to select the most appropriate solution for a given problem.** **8- Read and Analyze Code Examples: Encourage students to read and analyze code examples, both simple and complex. This practice helps them understand different programming techniques, coding patterns, and best practices employed by experienced programmers. They can also gain insights into problem-solving approaches.** **9- Reflect and Review: Incorporate regular opportunities for students to reflect on their learning progress and review their code. This reflection and review process helps them identify areas for improvement, reinforce concepts, and solidify their understanding of programming principles.** **10- .Stay Updated and Explore Further: Programming languages and technologies evolve rapidly. Encourage students to stay updated with the latest developments and explore additional resources beyond the curriculum. They can explore new programming languages, libraries, frameworks, or online coding challenges to expand their skills and knowledge.** **By employing these strategies, students can enhance their learning experience،**

	strengthen their programming and problem-solving skills, and become more proficient and confident programmers.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly lab Syllabus) المنهاج الاسبوعي المختبري	
	Material Covered
Week 1	**Programming Environment Setup**
Week 2	**Structure of the Program**
Week 3	**Basic Syntax and Output Statements (Declaration and Initialization)**
Week 4	**Variables and Data Types (Constant, Strings, and Operators)**
Week 5	**Conditional Statements (IF and Else)**
Week 6	**Loops and Iteration (While Loop, Do Wile Loop, For Loop)**
Week 7	**Arrays and List Data Structures**
Week 8	**Functions and Modular Programming**
Week 9	**Parameters and Return Values**

Week 10	**Debugging Techniques**
Week 11	**Introduction to algorithm analysis and efficiency (time complexity, space complexity)**
Week 12	**Searching algorithms (linear search, binary search)**
Week 13	**Sorting algorithms (selection sort, insertion sort, merge sort, quicksort)**
Week 14	**Recursion and recursive algorithms**
Week 15	**Error Handling and Debugging**
Week 16	

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Programming**
Week 2	**Programming Environment Setup**
Week 3	**Basic Syntax and Output Statements**
Week 4	**Variables and Data Types**
Week 5	**Input and Conditional Statements**
Week 6	**Loops and Iteration**
Week 7	**Arrays and List Data Structures**
Week 8	**Functions and Modular Programming**
Week 9	**Parameters and Return Values**
Week 10	**Debugging Techniques**
Week 11	**Introduction to algorithm analysis and efficiency (time complexity, space complexity)**
Week 12	**Searching algorithms (linear search, binary search)**
Week 13	**Sorting algorithms (selection sort, insertion sort, merge sort, quicksort)**
Week 14	**Recursion and recursive algorithms**
Week 15	**Error Handling and Debugging**
Week 16	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**C++ Primer, 5th Edition by Stanley B. Lippman, Josée Lajoie, Barbara E. Moo**	**Yes**
Recommended Texts	**C++ Programming: From Problem Analysis to Program Design. Fifth Edition. D.S Malik**	**No**
Websites	**1. https://www.geeksforgeeks.org/ 2. https://github.com/ 3. https://www.khanacademy.org/ 4. https://www.codecademy.com/**	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Device Physics**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CoE 125**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims *أهداف المادة الدراسية*	1. Gain a basic understanding of semiconductor material properties. Determine the properties of a pn junction including the ideal current–voltage characteristics of the pn junction diode. Examine dc analysis techniques for diode circuits. Develop an equivalent circuit for a diode that is used when a small, time-varying signal is applied to a diode circuit. 2. Determine the operation of diode rectifier circuits, Zener diode voltage regulator circuit, clipper and clamper circuits. Analyze circuits that contain more than one diode. Understand the operation and characteristics of photodiode and light-emitting diode circuits. 3. Study the structure, operation, and characteristics of MOSFETs and become familiar with the dc analysis of MOSFET circuits. Understand the operation and characteristics of the junction field-effect transistor and and analyze the dc response of JFET circuits. 4. Develop the small-signal models of MOSFETs and analyze the common-source, source-follower, and common-gate amplifiers. 5. Discuss the physical structure and operation of the bipolar junction transistor. Understand and become familiar with the dc analysis of BJT. 6. Develop the small-signal models of BJTs and analyze the common-emitter, emitterfollower, and common-base amplifiers. Discuss the general frequency response characteristics of MOSFET and BJT amplifiers.
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	1. Understand the concept of intrinsic carrier concentration, the difference between n-type and p-type materials, and the concept of drift and diffusion currents. Analyze a diode circuit using the piecewise linear model for the diode. Determine the smallsignal characteristics of a diode using the small-signal equivalent circuit. 2. Analyze diode rectifier circuits, Zener diode circuits, clipper and clamper circuits, and circuits with multiple diodes. 3. Describe the structure and general operation of n-channel and p-channel MOSFETs. Apply the (non)ideal current–voltage relations in the dc analysis of MOSFET circuits. Understand the dc analysis and design of a multistage MOSFET circuit. Understand the general operation and characteristics of junction FETs. 4. Describe the small-signal equivalent circuit of the MOSFET and determine the values of the small-signal parameters. Apply the MOSFET small-signal equivalent circuit in the analysis of multistage amplifier circuits. Describe the operation and analyze basic JFET amplifier circuits. 5. Describe the structure and general current–voltage characteristics for both the npn and pnp bipolar transistors. Define the four modes of operation of a bipolar transistor. Apply the dc analysis to multistage transistor circuits. 6. Describe the small-signal equivalent circuit of the bipolar transistor and determine the values of the small-signal parameters. Apply the small-signal equivalent circuit to various bipolar amplifier circuits. Apply the bipolar small-signal equivalent circuit in the analysis of multistage amplifier circuits. Construct the Bode plots for the frequency response of MOSFET and BJT.

Indicative Contents ***المحتويات الإرشادية***	Indicative content includes the following. .1Semiconductor Materials and Properties: Intrinsic and extrinsic semiconductors، drift and diffusion currents, excess carriers. .2The pn Junction: Reverse-biased pn Junction, forward-biased pn Junction, ideal current–voltage relationship. Diode DC Analysis: Piecewise linear model. Diode AC Equivalent Circuit: Small-signal equivalent circuit. - 3Diode Circuits: Rectifier circuits, Zener diode circuits, clipper and clamper circuits، Multiple-diode circuits, photodiode and LED circuits. .4MOSFET: Structure, regions of operation, ideal and non-ideal current-voltage characteristics, common-source circuit, cascade and cascode configurations. Junction Field-Effect Transistor: pn JFET and MESFET Operation, current-voltage characteristics, DC analysis. MOSFET as a switch. .5The MOSFET Amplifier: Small-signal equivalent circuit, common-source amplifier، common-drain amplifier, common-gate configuration, cascade and cascode circuits. Basic JFET Amplifiers: Small-signal equivalent circuit. .6Basic Bipolar Junction Transistor: Structure, operation modes, ideal current-voltage characteristics. DC Analysis of BJT circuits, common emitter circuit, BJT biasing. Multistage BJT circuits. BJT as a switch. .7The Bipolar Linear Amplifier: Small-signal equivalent circuit. Basic Transistor Amplifier Configurations: Common-emitter, common-collector, common-base and amplifiers, cascade cand cascode configurations. 8. Amplifier Frequency Response: MOSEFT and BJT.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Class lectures. 2. Tutoring. 3. Homework. 4. quizzes 5. Mid-term and final exams.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.86
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Semiconductor Materials and Properties: Intrinsic and extrinsic semiconductors, drift and diffusion currents, excess carriers.
Week 2	The pn Junction: Reverse-biased pn Junction, forward-biased pn Junction, ideal current–voltage relationship. Diode DC Analysis: Piecewise linear model. Diode AC Equivalent Circuit: Small-signal equivalent circuit.
Week 3	Diode Circuits: Rectifier circuits, Zener diode circuits, clipper and clamper circuits.
Week 4	Diode Circuits: Multiple-diode circuits, photodiode and LED circuits.
Week 5	MOSFET: Structure, operation modes, ideal and non-ideal current-voltage characteristics.
Week 6	MOSFET DC Circuit Analysis: Common-source circuit.
Week 7	Multistage MOSFET Circuits: Cascade and cascode configurations. Junction Field-Effect Transistor: pn JFET and MESFET operation, current-voltage characteristics, DC analysis.
Week 8	The MOSFET Amplifier: Small-signal equivalent circuit. Basic Transistor Amplifier Configurations: Common-source amplifier.
Week 9	Basic Transistor Amplifier Configurations: Common-drain amplifier and common-gate configuration.
Week 10	Multistage Amplifiers: Cascade and cascode circuits. Basic JFET Amplifiers: Small-signal equivalent circuit.
Week 11	Basic Bipolar Junction Transistor: Structure, operation modes, ideal current-voltage characteristics. DC Analysis of Transistor Circuits: Common emitter circuit.
Week 12	Bipolar Transistor Biasing. Multistage BJT Circuits.
Week 13	The Bipolar Linear Amplifier: Small-signal equivalent circuit. Basic Transistor Amplifier Configurations: Common-emitter amplifiers.
Week 14	Basic Transistor Amplifier Configurations: Common-collector amplifier and common-base amplifier.
Week 15	Multistage Amplifiers: Cascade and cascode configurations. Amplifier Frequency Response: MOSEFT and BJT.
Week 16	*Preparatory week before the final Exam*

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**D. A. Neamen, "Microelectronics: Circuit Analysis and Design". USA: McGraw-Hill, 4th ed., 2010.**	**Yes**
Recommended Texts	**A. Sedra and K. C. Smith, ``Microelectronics Circuits". New York, USA: Oxford Univ. Press, 7th ed., 2015.**	**Yes**
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering design /Auto CAD**			**Module Delivery**	
Module Type	**Basic**			☐ *Theory* ☒ *Lecture* ☒ *Lab* ☐ *Tutorial* ☒ *Practical* ☐ *Seminar*	
Module Code	**CoE 123**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Dr. Mustafa Jabar		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	This course aims to introduce students to the basic concepts of computer engineering drawing. AutoCAD software is used to draw engineering designs. The course includes knowledge about AutoCAD tools and their properties for developing different software designs in different applications. After completing this course, students are expected to become proficient in the main topics of Computer Drawing by AutoCAD and have the opportunity to explore current topics in the field. The course introduces the principles of: 1. Introduction to AutoCAD software, explaining the status bar, command line, and drawing area. 2. Introducing the two-dimensional drawing. Explain the drawing commands, line, circle, Arc, ellipse, polygon, polyline, etc. 3. Explaining the modify commands, mirror, array, rotate, fillet/ chamfer. 4. Explaining the concepts of adding text, dimensions.
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	1. Explain the basic concepts of AutoCAD software. 2. Acquiring new skills in designing computer engineering drawings. 3. Gain a basic understanding of many coordinate systems. 4. Acquiring basic skills in designing various systems. 5. The ability to design 2D and 3D drawings and translate problems into software and application designs. 6. The ability to visualize a design and translate it into appropriate commands to get a solution easily and quickly in solving a problem.
Indicative Contents ***المحتويات الإرشادية***	Indicative content includes the following. *1. Introduction to AutoCAD software. [2 hrs.]* *2. 2D drawings, Auxiliary drawing tools [4 hrs.]* *3. Drawing commands. [12 hrs.]* *4. Modify commands. [12 hrs.]* *5. Text and dimensions. [4 hrs.]* 6. *3D computer drawings. [10 hrs.]*

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Explanation and clarification using the class lectures.** **2. Tutorials hours.** **3. Self-learning using homework and small projects.** **4. Short tests (quizzes).** **5. Reports** **7. Mid-terms and final exams.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	53	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**3**	**10% (15)**	**5, 12**	**LO #1, 2, 5 and 7**
	Assignments	**3**	**15% (15)**	**2, 6, 10**	**LO # 1, 3, 5 and 6**
	Projects / Lab.	**1**	**10% (10)**	**2,3,5**	**LO # 1, 4, 6 and 8**
	Report	**-**	**-**	**-**	**-**
Summative assessment	**Midterm Exam**	**1.5 hr**	**30% (30)**	**7**	**LO # 1-7**
	Final Exam	**2hr**	**30% (30)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to AutoCAD software**
Week 2	**Auxiliary drawing tools, Zoom, drawing limits**
Week 3	**Coordinate systems and show methods for entering points**
Week 4	**2D drawing: Draw commends; line, circle, and rectangle**
Week 5	**Arc, ellipse, polygon, and polyline**
Week 6	**Modify commands: copy, move, Rotate, Mirror**
Week 7	**Offset, Fillet, Chamfer**
Week 8	**Break, Trim and extend**
Week 9	**Array commands; polar and rectangular array**
Week 10	***Add text and dimension on the design***
Week 11	**Inserted Dimensions; linear and aligned**
Week 12	**Add leader dimension and Hatch**
Week 13	**3D drawings; UCS, Box, Cylinder**
Week 14	**Draw Sphere, Cone, wedge**
Week 15	**Extrude, Revolve, subtract, union , slice, and section**
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**AutoCAD 2014 Fundamentals**	**No**
Recommended Texts	**AutoCAD 2021 Tutorial First Level 2D Fundamentals**	**No**
Websites	**websites.** **Solved examples in AutoCAD.** **Libraries sites in international universities.**	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Calculus II			**Module Delivery**	
Module Type	**Basic**			☒ ***Theory*** ☐ ***Lecture*** ☐ ***Lab*** ☒ ***Tutorial*** ☐ ***Practical*** ☐ ***Seminar***	
Module Code	**CoE 121**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Khalid Farhan kafil		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CoE111	**Semester**	1
Co-requisites module	CoE111	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims *أهداف المادة الدراسية*	Calculus II demands familiarity with mathematical concepts from Calculus I: integration, differentiation, limits, integrals, trigonometric properties, the fundamental theorem of calculus, and graphing techniques. The goal of the semester is to improve students' problem-solving abilities through examples and problems covered in lectures, problem sets, exams, and quizzes. The semester expounds and focuses on the topics: Coordinates, determinants, matrices, multiple Integrals, and functions of two or more variables. The students apply basic concepts and more difficult problems to develop students critical thinking skills
Module Learning Outcomes *مخرجات التعلم للمادة الدراسية*	1- Illustrate the extended principle in Calculus II from Calculus I. 2- Improve the ability to analyze and problem-solving approach. 3- Gain the required mathematical skills to solve different problems. 4- Cognitive development of the student by improving his/her learning through adopting a deep learning approach (focusing and understanding). 5- Improve the essential skills to treat with different mathematical problems. 6- Help students grasp the development of knowledge as a process. 7- Improve the writing of scientific reports. 8- Gain the required experience to deal with real-time and industrial systems applications mathematically.
Indicative Contents *المحتويات الإرشادية*	Course Topics: 1- Coordinates: • Polar coordinates: areas and lengths in polar coordinates. (4hrs) • Equivalent points and equivalent equations. (4hrs) • The relation between the Cartesian and the polar systems, areas, other applications. (4hrs) • Three-dimensional coordinates: Cartesian, cylindrical, and spherical. (4hrs) **2-** Determinants and Matrices: • Matrix basics add and subtract matrices, multiply a matrix by a scalar. (4hrs) • Multiply matrices, and take the transpose of a matrix, special types of matrices, matrix properties. (4hrs) • Some properties of determinants, system of linear equations, Gramer's rule, matrices, some and product of matrices. (4hrs) • Inverse of matrix, solution of linear equations by matrices. (4hrs) **3-** Multiple Integrals: • Double integrals over rectangles, double integrals over general regions. (4hrs) • Double integrals in polar coordinates. (4hrs) • Applications of double integrals. (4hrs) • Triple integrals, triple integrals in cylindrical coordinates, triple integrals in spherical coordinates, change of variables in multiple integrals. (4hrs) 4- Functions of two or more variables: • Partial differentiation. (4hrs) • Total differential. (4hrs) • Multiple integrals. (4hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Explanation and clarification using the class lectures. **2-** Tutorials hours. 3- Reading and self-learning. 4- Home Works. 5- Discussions and workshops 6- Reports. 7- Presentation. 8- Short tests (quizzes). 9- Training and activities during lecture. 10- Mid-terms and final exams. 11- Encourage the student to: • Fully present in class. • Asking the questions that help to understand the material better. • Interaction during lectures • Practicing the examples, homework, and problems.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	113	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**10% (15)**	**5, 12**	**LO #1, 2, 5 and 7**
	Assignments	**3**	**15% (15)**	**2, 6, 10**	**LO # 1, 3, 5 and 6**
	Projects / Lab.				
	Report	1	**15% (15)**	14	**LO # 4, 5, 7 and 8**
Summative assessment	**Midterm Exam**	**1.5 hr**	**10% (10)**	**7**	**LO # 1-7**
	Final Exam	**2hr**	**50% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Coordinates: Polar coordinates areas and lengths in polar coordinates.
Week 2	Coordinates: Equivalent points and equivalent equations.
Week 3	Coordinates: The relation between the Cartesian and the polar systems, areas, other applications.
Week 4	Coordinates: Three-dimensional coordinates: Cartesian, cylindrical, and spherical.
Week 5	Determinants and Matrices: Matrix basics add and subtract matrices, multiply a matrix by a scalar.
Week 6	Determinants and Matrices: Multiply matrices, and take the transpose of a matrix, special types of matrices, matrix properties.
Week 7	Determinants and Matrices: Some properties of determinants, system of linear equations, Gramer's rule, matrices, some and product of matrices.
Week 8	Determinants and Matrices: Inverse of matrix, solution of linear equations by matrices.
Week 9	Multiple Integrals: Double integrals over rectangles, double integrals over general regions.
Week 10	Multiple Integrals: Double integrals in polar coordinates.
Week 11	Multiple Integrals: Applications of double integrals
Week 12	Triple integrals, triple integrals in cylindrical coordinates, triple integrals in spherical coordinates, change of variables in multiple integrals.
Week 13	Functions of two or more variables: Partial differentiation.
Week 14	Functions of two or more variables: Total differential.
Week 15	Functions of two or more variables: Multiple integrals.
Week 16	*Preparatory week before the final Exam*

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Calculus, By Anton Bivens Davis, 2002 Anton Textbooks, Inc**	***Yes***
Recommended Texts	**Advanced Engineering Mathematics, By Erwin Kreyszig, 1999, John Wiley & Sons, Inc**	***Yes***
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language II**			**Module Delivery**	
Module Type	**Support or related learning activity**			☒ ***Theory*** ☐ ***Lecture*** ☐ ***Lab*** ☐ ***Tutorial*** ☐ ***Practical*** ☐ ***Seminar***	
Module Code	**CoE126**				
ECTS Credits	**3**				
SWL (hr/sem)	**32**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Kamal Kadhim Shamal		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CoE116	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	**The main aim of this module is to enable the student *to communicate effectively and appropriately in real life situation using the English Language.*** **Also*, pronounce English Correctly and intelligibly.*** **The module presents the following principles that related to both listening and speaking skills:** **1. The ability to understand English when it is spoken.** **2. Understanding the meaning of words, phrases, and sentences in context.** **3. Understanding statements, questions, instructions, and commands.** **4. Following simple narratives and descriptions, also grasp the substance and central idea of what is heard.** **5. *Speak intelligibly while making statements, asking question, giving instructions and commands, reporting events.*** ***6. Put ideas in proper sequence.*** ***7. Describe accurately what he/she observes and experiences .***
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	***1.Make meaning by organizing language and using appropriate grammatical patterns.*** ***2.Students will learn how to orally present information in a coherent and logical manner.*** ***3.Students will learn useful expressions to be used in presentations.*** ***4.Students will learn how to respond to questions and enquires.*** ***5. Recognize real life spoken English***
Indicative Contents ***المحتويات الإرشادية***	**Indicative content includes the following.** 1. Grammars. [10 hrs] 2. Speaking. [6 hrs] 3. Listening. [10 hrs] 4. Pronunciation . [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Explanation and clarification using the class lectures.** **2. Tutorials hours.** **3. Self-learning using homework and small projects.** **4. Short tests (quizzes).** **5. Reports.** **6. Mid-terms and final exams.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.87
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 12**	**LO #1, 2, and 3**
	Assignments	**3**	**15% (10)**	**2, 6, 10**	**LO # 1, 2, 3 and 4**
	Projects / Lab.	**-**	**-**	**-**	**-**
	Report	**1**	**15% (15)**	**13**	**LO # 1, 2, 3 and 4**
Summative assessment	**Midterm Exam**	**1.5 hr**	**10% (10)**	**7**	**LO # 1-4**
	Final Exam	**2hr**	**50% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Greetings and Farewell
Week 2	Conjunctions in English
Week 3	Articles in English
Week 4	Singular and Plural nouns
Week 5	Countable and Uncountable nouns
Week 6	Pronouns Part I
Week 7	Pronouns Part II
Week 8	Four Conditionals Part I
Week 9	Four Conditionals Part II
Week 10	Speaking Skills
Week 11	Self-introducing
Week 12	Pronunciation
Week 13	Vocabulary Development: formal and informal vocabulary
Week 14	Listening and Making notes Part I
Week 15	Listening and Making notes Part II
Week 16	*Preparatory week before the final Exam*

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Headway Academic Skills**	**Yes**
Recommended Texts	**All versions of Headway**	**Yes**
Websites	**British Council, Learn English online**	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Logic Circuits**			**Module Delivery**	
Module Type	**Core**			☒ *Theory* ☐ *Lecture* ☒ *Lab* ☒ *Tutorial* ☐ *Practical* ☐ *Seminar*	
Module Code	**CoE122**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Taiseer Muhsan Dohi		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CoE114	**Semester**	1
Co-requisites module	CoE214	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	1. Analyze and design the combinational logic circuits like (adder circuits, subtractor circuits, comparator circuits, multiplexer, and etc.). 2. Analyze and implement the sequential logic circuits (Latches and Flip - Flops). 3. Analyze and design a different types of register circuits (shift register). 4. Analyze and design the counter circuits (synchronous counters and asynchronous counters).
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	1. Recognize the combinational logic circuits like (adder circuits, subtractor circuits, comparator circuits, multiplexer, and etc.). 2. Identify the design combinational logic circuits like (adder circuits, subtractor circuits, comparator circuits, multiplexer, and etc.). 3. Identify the design of sequential logic circuits (Latches and Flip - Flops). 4. Identify the design of shift register circuit. 5. Identify the design of counter circuits (synchronous counters and asynchronous counters).
Indicative Contents ***المحتويات الإرشادية***	ndicative content includes the following. Part A: (Theoretical and Tutorial Hours) 1. Knowledge the adder circuits, subtractor circuits and their design. [4 hrs] 2. Knowledge the comparator circuits and their design. [2 hrs] 3. Knowledge the multiplexer and de multiplexer circuits and their design. [6 hrs] 4. Knowledge the decoder and encoder circuits and their design. [3 hrs] 5. Discussion. [3 hrs] 6. Knowledge the sequential logic circuits and latches. [3 hrs] 7. Knowledge the design of different types of flip – flops. [3 hrs] 8. Knowledge the different types of register and shift register. [6 hrs] 9. Knowledge the design of synchronous counter circuits. [6 hrs] 10. Knowledge the design of asynchronous counter circuits. [3 hrs] 11. Knowledge the design of sequence generator and the sequence count. [3 hrs] 12. Discussion. [3 hrs] Part B: (Lab Hours) 1. Introduction to the Basic Logic gates (AND, OR, NOT, XOR and XNOR GATES). [2 hrs] 2. Introduction to the other Logic gates (NAND, NOR GATES). [2 hrs] 3. Introduction to the design of logic circuit using Boolean Algebra. [2 hrs] 4. Introduction to the design of logic circuit using Karnough Maps. [4 hrs] 5. Introduction to the design of Adder circuits. [2 hrs] 6. Introduction to the design of Subtractor circuits. [2 hrs] 7. Introduction to the design of Comparator circuits. [2 hrs] 8. Discussion and repairing for Mid Exam. [2 hrs] 9. Introduction to the design of Multiplexer circuits. [2 hrs] 10. Introduction to the design of Multiplexer and De Multiplexer circuits. [2 hrs] 11. Introduction to the design of Decoder and Encoder circuits. [2 hrs] 12. Introduction to the design of Flip – Flops. [2 hrs] 13. Introduction to the design of synchronous and asynchronous counters. [4hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Explanation and clarification using the class lectures. 2. Tutorials hours. 3. Self-learning using homework and small projects. 4. Laboratories. 5. Short tests (quizzes). 6. Reports. 7. Mid-terms and final exams for both theoretical and Lab subjects.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Binary Adder–Subtractor [Half and Full adders, Half and Full subtractors].
Week 2	Comparator circuits.
Week 3	Multiplexer.
Week 4	Multiplexer & Demultiplexer.
Week 5	Decoder & Encoders.
Week 6	Sequential Circuits.
Week 7	Mid-term Exam + Discussion.
Week 8	Flip – Flops.
Week 9	Latches.
Week 10	Discussion.
Week 11	Shift Registers.
Week 12	Synchronous Counters.
Week 13	Asynchronous Counters.
Week 14	Sequence Generator.
Week 15	Discussion.
Week 16	*Preparatory week before the final Exam*

Delivery Plan (Weekly lab Syllabus) المنهاج الاسبوعي امختبري	
	Material Covered
Week 1	Introduction to the Basic Logic gates (AND, OR, NOT, XOR and XNOR GATES)
Week 2	Introduction to the other Logic gates (NAND, NOR GATES).
Week 3	Introduction to the design of logic circuit using Boolean Algebra.
Week 4	Introduction to the design of logic circuit using Karnough Maps.
Week 5	Introduction to the design of Adder circuits.
Week 6	Introduction to the design of Subtractor circuits.
Week 7	Introduction to the design of Comparator circuits.
Week 8	**Introduction to the design of Multiplexer circuits.**
Week 9	**Introduction to the design of Multiplexer and De Multiplexer circuits.**
Week 10	**Introduction to the design of Decoder and Encoder circuits.**
Week 11	**Introduction to the design of Flip – Flops.**
Week 12	**Introduction to the design of synchronous and asynchronous counters.**
Week 13	**Continuous to Introduction to the design of synchronous and asynchronous counters.**

Week 14	**Mixed of experiments of previous topics.**
Week 15	**Mixed of experiments of previous topics.**
Week 16	***Preparatory week before the final Exam***

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of logic design. Cengage Learning by Roth Jr, Charles H., Larry L. Kinney, and Eugene B. John.	***Yes***
Recommended Texts	Digital computer fundamentals. McGraw-Hill, Inc, by Bartee, Thomas C.	***Yes***
Websites	*https://www.coursera.org/lecture/build-a-computer/unit-1-3-logic-gates-Aqrh6*	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Object Oriented Programming**			**Module Delivery**	
Module Type	**Core**			☒ *Theory* ☐ *Lecture* ☒ *Lab* ☒ *Tutorial* ☐ *Practical* ☐ *Seminar*	
Module Code	**CoE123**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**Computer Engineering**		**College**	**Collage of Engineering**	
Module Leader	Dr. Raid Labi Lafta		**e-mail**		
Module Leader's Acad. Title	. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CoE113	**Semester**	1
Co-requisites module	CoE224	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims ***أهداف المادة الدراسية***	The Object-Oriented Programming (OOP) module aims to introduce students to the fundamental concepts and principles of object-oriented programming and enable them to apply these concepts in software development. The specific aims of the module may include: 1. Understanding OOP Principles: The module aims to provide a solid understanding of the core principles of object-oriented programming, such as encapsulation, inheritance, polymorphism, and abstraction. Students will learn how these principles contribute to code organization, reusability, and maintainability. 2. Applying OOP Concepts: The module aims to develop students' ability to apply OOP concepts in practical programming scenarios. Students will learn how to define classes, create objects, and use inheritance and polymorphism to model and solve real-world problems. 3. Designing and Implementing Classes: The module aims to enhance students' skills in designing and implementing classes effectively. Students will learn how to define class attributes and methods, manage access levels, and establish relationships between classes. 4. Implementing Inheritance and Polymorphism: The module aims to enable students to understand and utilize inheritance and polymorphism effectively. Students will learn how to create class hierarchies, derive subclasses from base classes, and override methods to achieve specialized behavior. 5. Managing Object State: The module aims to equip students with techniques for managing object state using instance variables and methods. Students will learn how to ensure data integrity, apply access modifiers, and implement appropriate getter and setter methods. 6. Utilizing Design Patterns: The module aims to introduce students to common design patterns and their application in OOP. Students will learn about design patterns such as the Singleton pattern, Factory pattern, and Observer pattern, and how they can be used to solve recurring design problems. 7. Debugging and Troubleshooting OOP Code: The module aims to develop students' skills in debugging and troubleshooting object-oriented code. Students will learn techniques for identifying and fixing errors, handling exceptions, and ensuring the correctness of their OOP implementations. 8. Applying OOP in Software Development: The module aims to provide students with practical experience in applying OOP principles and techniques in software development projects. Students will work on OOP-based projects, applying concepts such as inheritance, polymorphism, and encapsulation to design and implement robust and scalable software solutions. 9. Understanding OOP Best Practices: The module aims to familiarize students with industry best practices and coding standards in object-oriented programming. Students will learn about topics such as code organization, naming conventions, documentation, and code reusability, to develop clean and maintainable code. Overall, the Object-Oriented Programming module aims to equip students with a solid foundation in object-oriented programming concepts, enabling them to design and implement efficient, modular, and scalable software solutions using OOP principles
Module Learning Outcomes ***مخرجات التعلم للمادة الدراسية***	The Object-Oriented Programming (OOP) module is designed to achieve specific learning outcomes that demonstrate students' proficiency in the subject matter. The module learning outcomes may include: 1. Knowledge and Understanding: Students will acquire a solid understanding of the fundamental concepts, principles, and techniques of object-oriented programming. They will demonstrate knowledge of topics such as encapsulation, inheritance, polymorphism, and abstraction.

	2. Application of OOP Concepts: Students will be able to apply object-oriented programming concepts and techniques to design and implement software solutions. They will demonstrate proficiency in creating classes, defining attributes and methods, managing object relationships, and utilizing inheritance and polymorphism effectively. 3. Design and Implementation Skills: Students will develop skills in designing and implementing object-oriented solutions to real-world problems. They will be able to design class hierarchies, implement encapsulation and information hiding, and create reusable and maintainable code structures. 4. Problem-Solving and Analytical Skills: Students will enhance their problemsolving and analytical abilities by applying object-oriented principles to analyze, design, and implement software solutions. They will demonstrate the ability to break down complex problems into manageable components and utilize appropriate OOP techniques to solve them. 5. Debugging and Troubleshooting: Students will develop proficiency in debugging and troubleshooting object-oriented code. They will demonstrate the ability to identify and fix errors, handle exceptions, and ensure the correctness of their OOP implementations. 6. Collaboration and Communication: Students will learn to collaborate effectively in team-based software development projects. They will demonstrate the ability to communicate and discuss OOP concepts, share code, and work together to solve programming challenges. 8. OOP Best Practices: Students will understand and apply best practices in object-oriented programming. They will demonstrate knowledge of coding standards, code organization, documentation, and code reusability to develop clean, readable, and maintainable code. 8. Critical Thinking and Evaluation: Students will develop critical thinking skills in evaluating different design choices and making informed decisions in objectoriented programming. They will demonstrate the ability to analyze trade-off and make design decisions based on factors such as performance, maintainability, and extensibility. 9. Lifelong Learning: Students will develop a passion for lifelong learning and professional development in the field of object-oriented programming. They will demonstrate the ability to stay updated with emerging trends and technologies, explore advanced OOP concepts, and adapt to evolving programming paradigms. By achieving these learning outcomes, students will have a strong foundation in objectoriented programming principles and be prepared to apply their knowledge and skills in practical software development contexts.

Indicative Contents ***المحتويات الإرشادية***	The indicative contents for the Object-Oriented Programming (OOP) module m include the following topics: 1- . Introduction to Object-Oriented Programming: • Overview of programming paradigms • Benefits and principles of OOP • Objects, classes, and their relationships • Encapsulation, inheritance, and polymorphism 2- Classes and Objects: • Class definition and structure • Attributes and methods • Constructors and destructors • Access modifiers (public, private, protected) • Static and instance variables/methods 3- Inheritance and Polymorphism: • Inheritance hierarchy and relationships • Single and multiple inheritance • Method overriding and overloading • Abstract classes and interfaces • Polymorphism and dynamic binding 4- Object-Oriented Analysis and Design: • UML (Unified Modeling Language) basics • Use case diagrams, class diagrams, and sequence diagrams • Object-oriented design principles (SOLID) •Design patterns and their application 5- .Exception Handling: •Exception types and handling mechanisms •try-catch blocks •Throwing and propagating exceptions •Custom exception classes 6- Collections and Generics: •Overview of collection frameworks •Lists, sets, and maps •Iterators and foreach loops •Generics and type safety 7- .File Handling and Input/Output Operations: •Reading and writing data from/to files •Streams and file handling classes •Serialization and deserialization 8- Event-driven Programming: •Introduction to event-driven programming •Event handlers and listeners •GUI (Graphical User Interface) development using OOP 9- .Software Development Principles: •Code organization and modularization •Documentation and comments •Version control and collaborative development (e.g., Git(•Testing and debugging techniques 10- .Advanced OOP Concepts: •Nested classes and inner classes •Reflection and introspection •Designing for reusability and maintainability •Advanced topics such as generics, lambdas, and streams (language dependent) These indicative contents provide a comprehensive coverage of essential topics in object-oriented programming.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Object-oriented programming (OOP) is a programming paradigm that organizes code into objects, which are instances of classes that encapsulate data and behavior. OOP provides several strategies and principles that help in designing and implementing effective and maintainable software solutions. Here are some commonly used strategies in object-oriented programming: 1- . Encapsulation: Encapsulation is the practice of bundling data and methods together within a class. It hides the internal details of an object and provides a clean interface to interact with it. Encapsulation promotes information hiding and helps maintain the integrity of the object's data. 2- . Inheritance: Inheritance allows you to create new classes based on existing classes, inheriting their attributes and behaviors. It promotes code reuse, as common attributes and methods can be defined in a base class and shared among derived classes. Inheritance supports the "is-a" relationship between classes, where a derived class is a specialized version of the base class. 3- . Polymorphism: Polymorphism allows objects of different classes to be treated as instances of a common base class. It enables the use of the same interface for different objects, providing flexibility and extensibility. Polymorphism is often achieved through method overriding and method overloading. 4- . Abstraction: Abstraction focuses on defining essential properties and behaviors while hiding unnecessary details. It simplifies complex systems by providing a high-level view and reducing complexity. Abstract classes and interfaces are used to define common behavior and serve as blueprints for concrete classes. 5- . Composition: Composition involves building complex objects by combining simpler objects. It emphasizes the "has-a" relationship between classes. Instead of inheriting behavior, an object is composed of other objects as components or parts. This approach offers flexibility, as components can be easily added, removed, or replaced. 6- . Association: Association represents a relationship between two or more classes. It can be a one-to-one, one-to-many, or many-to-many relationship. Associations are established through instance variables, and they define how objects interact and communicate with each other. 7- . SOLID principles: SOLID is an acronym for a set of five principles that guide software design in OOP. These principles are Single Responsibility Principle (SRP), Open-Closed Principle (OCP), Liskov Substitution Principle (LSP), Interface Segregation Principle (ISP), and Dependency Inversion Principle (DIP). Adhering to these principles helps create modular, maintainable, and extensible code. These strategies and principles provide a foundation for designing and implementing object-oriented systems. They promote code reusability, modularity, maintainability, and flexibility, enabling developers to build robust and scalable software solutions

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to OOP principles and concepts.
Week 2	Overview of class, object, and method.
Week 3	Implementing a simple class in a programming language.
Week 4	Encapsulation and data hiding.
Week 5	Access modifiers (public, private, protected).
Week 6	Inheritance and the "is-a" relationship.
Week 7	Base classes and derived classes.
Week 8	Method overriding and inheritance hierarchy.
Week 9	Polymorphism and the "one interface, multiple implementations" concept.
Week 10	Method overloading and overriding.
Week 11	Using abstract classes and interfaces.
Week 12	Composition and the "has-a" relationship.
Week 13	Building complex objects using composition
Week 14	Comparing composition with inheritance.
Week 15	Exception handling in OOP.
Week 16	

Delivery Plan (Weekly lab Syllabus) المنهاج الاسبوعي امختبري	
	Material Covered
Week 1	Class, object, and method.
Week 2	Implementing a simple class in a programming language.
Week 3	Constructors and destructors
Week 4	Encapsulation and data hiding.
Week 5	Access modifiers (public, private, protected).
Week 6	Inheritance and the "is-a" relationship.
Week 7	Base classes and derived classes.
Week 8	Method overriding and inheritance hierarchy.
Week 9	Polymorphism and the "one interface, multiple implementations" concept.
Week 10	Method overloading and overriding.
Week 11	Using abstract classes and interfaces.
Week 12	Composition and the "has-a" relationship.
Week 13	Building complex objects using composition

Week 14	Comparing composition with inheritance.
Week 15	Exception handling in OOP.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	C++ Primer, 5th Edition by Stanley B. Lippman, Josée Lajoie, Barbara E. Moo	**Yes**
Recommended Texts	C++ Programming: From Problem Analysis to Program Design. Fifth Edition. D.S Malik	**No**
Websites	1. https://www.geeksforgeeks.org/ 2. https://github.com/ 3. https://www.khanacademy.org/ 4. https://www.codecademy.com/	

Grading Scheme مخطط الدرجات				
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