Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Quality Assurance and Academic Accreditation Department
Accreditation Department

Academic Program and Course Description Guide Department of Computer Engineering Technology

2024

The Introduction:

The educational program is a coordinated and organized package of courses that include procedures and experiences organized in the form of study vocabulary, the main purpose of which is to build and refine the skills of graduates, making them qualified to meet the requirements of the labor market. It is reviewed and evaluated annually through internal or external audit procedures and programs such as the external examiner program.

The academic program description provides a brief summary of the main features of the program and its courses, indicating the skills that are being worked on to acquire for students based on the objectives of the academic program. The importance of this description is evident as it represents the cornerstone in obtaining program accreditation and is written by teaching staff under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments and changes in the educational system in Iraq, which included a description of the academic program in its traditional form (annual, semester) system, in addition to adopting the description of the academic program circulated under the letter of the Department of Studies TM3/2906 dated 5/3/2023 regarding programs that adopt the Bologna path as a basis for their work .

In this regard, we cannot but emphasize the importance of writing a description of academic programs and courses to ensure the smooth running of the educational process.

Concepts and terms:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected from the student to achieve, demonstrating whether he has made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture of the future of the academic program to be an advanced, inspiring, motivating, realistic and applicable program.

Program Mission: Clarifies the goals and activities necessary to achieve them in a concise manner, and identifies the program's development paths and directions.

Program Objectives: These are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (semester, annual, Bologna track) whether they are required (ministry, university, college and scientific department) with the number of academic units.

Learning outcomes: A consistent set of knowledge, skills and values acquired by the student after successfully completing the academic program. The learning outcomes for each course must be specified in a way that achieves the program objectives.

Teaching and learning strategies: These are the strategies used by the faculty member to develop the student's teaching and learning. They are plans that are followed to achieve the learning objectives. That is, they describe all the classroom and extracurricular activities to achieve the learning outcomes of the program.

Republic of Iraq

Ministry of Higher Education & Scientific Research

Supervision and Scientific Evaluation Directorate

Quality Assurance and Academic Accreditation

Academic Program Specification Form for the Academic

University: Northern Technical University

College: Technical Engineering College of Kirkuk

Department: Computer Engineering Department

Date of Form Completion: 1/11/2024

Dean's Name

Dr. Sami R Aslan

Date: 1 / 11 /2024

Dean's Assistant for

Dr. Muntadher.A.Shareef

Date: 1/ 11 /2024

Tech.Comp.Eng.Dep

قسم هندسة تقنيات الحاسوب

Name of the Head of Department:

Signature:

أ.د. محمد مصطفى صديق

رئيس قسم هندسة تقنيات الحاسوب

Quality Assurance and University Performance Manager: Dr. Rana Hilmi Abduljabbar

Date: 1 / 11 /2024

Signature

1. Program vision

The department aims to be a pioneer in the field of computer engineering and information technology by preparing competent engineers, supporting scientific research, providing technical advice in the field of specialization, and working to serve the community.

2. Program message

Preparing competent engineers capable of meeting the needs of the labor market (government institutions and the private sector) in the field of computer engineering technologies by providing consultation, design and implementation in the specialization of computer engineering technologies and information technology.

3. Goals

- Graduating engineering cadres with a high level of understanding, knowledge and psychological preparation capable of building, analyzing and developing computer systems, with follow-up of these cadres after graduation.
- Organizing seminars, holding scientific conferences and workshops with other colleges, government institutions and the private sector, and providing academic consultations in the fields of computer engineering to solve problems and develop the work of these institutions.
- Continuous updating of curricula to keep pace with scientific developments in a manner that suits the needs of the labor market by providing an appropriate environment for theoretical and practical teaching using the latest means and devices and adopting quality standards and academic accreditation.
- Providing academic consultations in the fields of computer engineering.
- Raising the scientific and technological level by adopting the correct method in the field of scientific research and building a solid research base.
- Adopting global quality standards and academic accreditation.

4. Program accreditation

The program has not received software accreditation yet.

5. Other external influences

Nothing

6. Program Structure

Program Structure	Number of Courses	Study unit	Percentage	Notes *

Institutional Requirements	8			Core Course, Elective Course
College Requirements	11			Core Course, Elective Course
Department Requirements	36			Core Course, Elective Course
Summer Training	There is			Core
Other	nothing			

* Notes may include whether the course is basic or optional.

7. Program Description

Academic year	Course code	Subject	Credit hours			the total	Number of units
			th	pr	tu		
Level 1 – First Course (Bologna)	TECK102	Engineering Drawing	-	3	-	3	5
	TECK101	Calculus	4	-	2	6	6
	COE113	Electrical Engineering Foundations	4	4	-	8	8
	COE114	Computer Programming	4	4	-	8	7
	NTU 100	Human Rights and Democracy	2	-	-	2	2
	NTU 101	English Language	2	-	-	2	2
the total			16	11	2	29	30

Academic year	Course code	Subject	Credit hours			the total	Number of units
			th	pr	tu		
Level 1 - Course 2 (Bologna)	COE124	Electrical Circuits	4	4	-	8	6
	COE125	Digital Logic	4	4	-	8	5
	COE123	Computer Structure	2	2	-	4	5
	NTU 102	Computer Applications	2	2	-	4	3
	NTU 103	Arabic Language	2	-	-	2	2
	TECK103	Workshops	-	3	-	3	4
	TECK104	Physics	2	-	-	2	5
the total			16	15	-	31	30

Academic year	Course code	Subject	Credit hours			Number of units
			th	pr	total	

Level 2 – First Course (Courses)	COE207	Communications Fundamentals 1	2	2	4	3
	COE201	Microprocessor Architecture 1	2	2	4	3
	COE209	Operating Systems 2	2	2	4	3
	COE203	Computer Programming 2	1	2	3	2
	COE205	Electronics 1	2	2	4	3
	COE204	Measurements and Sensors 3	2	2	4	3
	TECK201	Mathematics 3	3	-	3	3
	NTU200	English Language 2	2	-	2	2
	NTU202	Baath Party Crimes	2	-	2	2
the total			18	12	30	24

Academic year	**Course code**	**Subject**	**Credit hours**			**Number of units**
			th	**pr**	**total**	
Level 2 - Course 2 (Courses)	COE208	Communications Fundamentals 2	2	2	4	3
	COE202	Microprocessor Architecture 2	2	2	4	3
	COE210	Databases	2	2	4	3
	COE2011	Object Oriented Programming	1	2	3	2
	COE206	Electronics 2	2	2	4	3
	NTU201	Professional Ethics	2	-	2	2
	TECK202	Mathematics 4	3	-	3	3
	TECK203	Physics	2	-	2	2
	TECK204	Summer Training	-	-	-	-
the total			18	12	30	16

		Subject	**Credit hours**	**Number of units**

Academic year	Course code		th	pr	total	
Level Three - Computer Networks and Communications Branch - First Course	COE307	Computer Networks1	2	2	4	3
	TECK300	Engineering Analysis	2	2	4	3
	COE301	Fundamentals of Control Engineering1	2	2	4	3
	COE304	Design of Real-Time Systems	2	2	4	3
	COE309	Digital Controllers1	2	2	4	3
	COE306	Digital Signal Processing	2	2	4	3
	NTU300	English3	2	-	2	2
the total			14	12	26	20

Academic year	Course code	Subject	Credit hours			Number of units
			th	pr	total	
Level Three - Computer Electronics Branch - First Course	TECK300	Engineering Analysis	2	2	4	3
	COE301	Fundamentals of Control Engineering1	2	2	4	3
	COE305	Power Electronics1	2	2	4	3
	COE304	Design of Real-Time Systems	2	2	4	3
	COE309	Digital Controllers1	2	2	4	3
	COE306	Digital Signal Processing	2	2	4	3
	NTU300	English3	2	-	2	2
the total			14	12	26	20

		Subject	Credit hours	Number of units

Academic year	Course code		th	pr	total	
Level Three - Computer Networks and Communications Branch - Second Course	COE312	Computer Networks 2	2	2	4	3
	TECK301	Numerical Analysis	2	2	4	3
	COE302	Fundamentals of Control Engineering 2	2	2	4	3
	COE306	Computer Network Simulators	1	2	3	2
	COE307	Cyber Security	2	2	4	3
	COE308	Digital Controllers 2	2	2	4	3
	COE305	Digital Communications	2	2	4	3
	TECK302	Summer Training	-	-	-	-
the total			13	14	27	20

Academic year	Course code	Subject	Credit hours			Number of units
			th	pr	total	
Level Three - Computer Electronics Branch - Second Course		Electronic Systems Simulators	1	2	3	2
	TECK301	Numerical Analysis	2	2	4	3
	COE302	Fundamentals of Control Engineering 2	2	2	4	3
	COE304	Power Electronics 2	2	2	4	3
	COE300	Internet of Things	2	2	4	3
	COE308	Digital Controllers 2	2	2	4	3
	COE305	Digital Communications	2	2	4	3
	TECK302	Summer Training	-	-	-	-
the total			13	14	27	20

		Subject	Credit hours	Number of units

Academic year	Course code		th	pr	total	
2023-2024 / Fourth Phase - Computer Networks and Communications Branch (Annual)	COE401	Intelligent systems modeling	2	2	4	6
	COE403	project management	2	2	4	6
	COE402	Multimedia computing	2	2	4	6
	COE404	Computer networking protocols	2	2	4	6
	COE407	Information theory and coding	2	2	4	6
	COE406	Computer and network security	2	2	4	6
	COE405	Mobile communications systems	2	2	4	6
	COE409	English language4	2	-	2	2
	COE408	Graduation Project	-	3	3	4
the total			16	17	33	48

Academic year	Course code	Subject	Credit hours			Number of units
			th	pr	total	
2023-2024 / Fourth Stage - Computer Electronics Branch (Annual)	COE401	Intelligent systems modeling	2	2	4	6
	COE403	project management	2	2	4	6
	COE402	Multimedia computing	2	2	4	6
	COE410	Advanced digital electronics	2	2	4	6
	COE411	Advanced computer technology	2	2	4	6
	COE412	Computer adapter circuits	2	2	4	6
	COE413	computer networks	2	2	4	6
	COE409	English language4	2	-	2	2
	COE408	Graduation Project	-	3	3	4
the total			16	17	33	48

8. Expected learning outcomes of the program

Knowledge

Education outcomes 1 1. Ability to apply knowledge in mathematics and computer science. 2. Ability to design technical systems, components, a process that is both theoretical and practical to meet the required needs within the specialized field within a realistic framework that imposes environmental, economic, social, political, and health constraints. 3. Teaching leadership skills and the value of commitment, quality, ethical behavior, and respect for others.	Statement of education outcomes 1
Skills	
Education outcomes 2 1. Ability to design and conduct experiments. 2. Ability to implement and maintain systems. 3. Ability to design using design and simulation software. 4. Ability to use modern technical methods, tools, and skills necessary for technical work.	Statement of education outcomes 2
Education outcomes 3 1. Brainstorming 2. Problem-solving skills 3. Deductive reasoning	Statement of education outcomes 3
Ethics	
Education outcomes 4 1. Ability to work within a team. 2. Effective communication skills. 3. Ability to adapt to related specialties (Computer Engineering Techniques). 4. Effective impact on society and the job market through training and development programs related to the specialty at different levels.	Statement of education outcomes 4

9. Teaching and Learning Strategies

Teaching and learning strategies aim to ensure understanding of lectures and engaging students in learning. This is achieved through: -

1. Explaining the scientific material to students in detail.
2. Involving students in solving mathematical problems.
3. Discussion and dialogue about vocabulary related to the topic.
4. Writing programs and algorithms for problems in different topics.
5. Brainstorming strategy.
6. - Group work strategy.
7. Learning strategy by identifying models and previous experiences.
8. Discussion and exchange strategy.
9. Self-learning strategy

10- Evaluation methods

Daily class exams, questions for groups of students, reports, monthly and semester exams and a final exam. In the practical part of the semester, the evaluation of the laboratory grade depends on the experiments and reports, and in the graduation stage there is an evaluation of the final year project.

11- Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Computer Science	Image Processing			1	
Assistant Professor	Computer science	Information technology			2	
Assistant Professor	Math	Math			1	
Assistant Professor	Plant Sciences	Plant Sciences			1	
Teacher	Computer science	Information Security			3	

assistant teacher	Control and system engineering	Computer engineering			3	
assistant teacher	Engineering	Computer engineering			10	
Assistant Teacher	General Math	Math			1	
Assistant Teacher	Law	Law				1

12. Professional Development

Mentoring new faculty members

1. Introducing new faculty staff to the university's vision (environments), mission, organizational structure, policies, and procedures.
2. Empowering new faculty staff to gain a better understanding of their rights and responsibilities.
3. Providing new faculty staff with detailed information about university facilities and services.

Professional development of faculty members

Professional development for faculty members is essential for academic excellence. There is a need for effective development opportunities to achieve academic advancement, which can be accomplished through participation in the following scientific activities: Workshops Seminars

lectures, Scientific research, summer courses community, community activities

Conferences

13- Acceptance Criterion

The admission mechanism depends on the procedures of the Ministry of Higher Education and Scientific Research and its directives at the beginning of each year and regarding the academic year 2023-2024. The following mechanism was adopted: A- Graduates of the preparatory stage, scientific branch - - Scientific average 65 B- Graduates of the industrial preparatory school: Computer maintenance, electricity and electronics branch Scientific average 70

14- The most important sources of information about the program

Department, College and University Documents and Guide
Department website within the university website

15- Program Development Plan

1- Using educational techniques by applying comprehensive quality management in education and relying on Association of Arab Universities (AAU).

2- Activating educational platforms that keep pace with technological development.

3- Connecting the educational institution to the surrounding environment, qualifying its graduates according to the requirements of the internal and external labor market, and giving these graduates the ability to plan and implement small projects.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	CET 2101	computer applications	secondary	*	*	*	*	*	*	*	*	*	*	*	
	CET 2102	Mathematics (II)	secondary	*	*	*	*	*	*	*	*	*	*	*	
	CET 2103	Microprocessor architecture	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 2104	Instrumentation and measurement	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 2105	Computer	Specialized	*	*	*	*	*	*	*	*	*	*	*	
		Programming (II)													
	CET 2106	Foundations of communications	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 2107	Electronic	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 2108	summer training	Interpolation	*	*	*	*	*	*	*	*	*	*	*	
	CET 2109	English	secondary	*	*	*	*	*	*	*	*	*	*	*	

	CET 3101	Electronic systems simulators	secondary	*	*	*	*	*	*	*	*	*	*	*	
	CET 3102	Engineering analysis	secondary	*	*	*	*	*	*	*	*	*	*	*	
	CET 3103	Fundamentals of control engineering	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 3104	Electronic capacity	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 3105	Design of real time systems	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 3106	Digital signal processing	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 3107	Digital controllers	Specialized	*	*	*	*	*	*	*	*	*	*	*	

	CET 3108	Optional topic	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 3109	summer training	Interpolation	*	*	*	*	*	*	*	*	*	*	*	
	CET 3110	English	secondary	*	*	*	*	*	*	*	*	*	*	*	
	CET 4101	Intelligent systems modeling	secondary	*	*	*	*	*	*	*	*	*	*	*	
	CET 4102	Advanced computer technology	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 4103	Design of computer adaptation circuits	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 4104	Advanced digital electronics	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 4105	project management	secondary	*	*	*	*	*	*	*	*	*	*	*	

	CET 4106	computer networks	secondary	*	*	*	*	*	*	*	*	*	*	*	
	CET 4107	Optional topic	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 4108	graduation project	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 4109	English	Specialized	*	*	*	*	*	*	*	*	*	*	*	
	CET 41010	Professional ethics	Specialized	*	*	*	*	*	*	*	*	*	*	*	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Description of first level courses

MODULE DESCRIPTION FORM

Module Information			
Module Title	**Electrical Engineering Fundamentals**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Ali Mahmoud Salman	**e-mail**	ali.mahmoudsalman23@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	N/A	**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	This course is an introductory course in electric circuit analysis. It mainly deals with the basic concept of electrical circuits and introduces the principles and theories for DC and AC circuit analyses. The course aims: 1. To introduce the basic elements of electrical circuits. 2. To understand voltage, current, and power from a given circuit. 3. To understand and apply various techniques and theorems to analyze electrical circuits. 4. To conduct laboratory experiments to understand practically the fundamental concepts of electrical circuits. 5. To develop problem solving skills and understanding of circuit theory through the application of techniques.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	A student who has successfully completed this course should be able to: 1. Describe electrical charge, current, voltage, and power. 2. Recognize how electricity works in electrical circuits. 3. Identify the basic electrical circuit elements. 4. Understand and apply various techniques and theorems to analyze electric circuits. 5. Discuss the operations of sinusoid and phasors in an electric circuit.

	6. Discuss the various properties of resistors, capacitors, and inductors. 7. Identify the capacitor and inductor phasor relationship with respect to voltage and current. 8. Use systematic problem solving techniques to partition complex problems. 9. Use laboratory instruments such as power supplies, multimeters, oscilloscope, and others. 10. Perform experiments and interpret the obtained results.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following: DC circuits – Current and voltage definitions, passive sign convention and circuit elements, combining resistive elements in series and parallel, voltage and current division. Kirchhoff's laws and Ohm's law. Introduction to mesh and nodal analysis, maximum power transfer. Source transformation, introduction to Thevenin and Norton equivalent circuits. AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The teaching methods will include lectures, class discussion, homework assignments, and Lab reports. Lecture notes, announcements, and Lab manual will be posted on an appropriate communication platform.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	120	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	8
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	80	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	5
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**

Week 1	Introduction – symbols and abbreviations, units, electric circuit and its elements. The direct current network - Ohm's Law, Kirchhoff's laws and their use in network analysis.
Week 2	Series circuits, parallel circuits, series-parallel circuits. Open and short circuits, source transformation, and delta-star transformation.
Week 3	Nodal voltage method, Loop (Mesh) current method.
Week 4	Superposition theorem, Thevenin's theorem, and Norton's theorem.
Week 5	Maximum power transfer theorem, reciprocity theorem.
Week 6	The alternating current network. Types of alternating waveforms, generation of alternating current, definitions related to alternating waveforms, the mean values of current and voltage, the effective values of current and voltage.
Week 7	Mid-term Exam - Circuit elements in the phasor domain, the vector diagram.
Week 8,9	Reviews for complex numbers and their mathematical operations. Series and parallel AC circuits, the instantaneous power and mean power of AC, reactive power, and apparent power.
Week 10,11	Using Kirchhoff's laws to solve AC circuits, using Loop's method to solve AC circuits, using Superposition's method to solve AC circuits, using Thevenin's theorem to solve AC circuits, using Norton's theorem to solve AC circuits.
Week 12,13	Three-phase system, three-phase current, Y connection, delta connection. Solving three-phase networks with balanced loads, solving three-phase networks with unbalanced loads.
Week 14	Electromagnetism, permanent and artificial magnets, the magnetic field, the flux density, the magnetic reluctance, the permeability, the mmf, the magnetic force, the electromagnetic circuits.
Week 15	The implementation of B-H curves for solving electromagnetic circuits. Transformers, the hysteresis losses, the eddy current losses. Direct current machines, direct current generators, asynchronous and synchronous machines.
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Laboratory regulations and safety rules.
Week 2	Introduction to basic lab equipment, circuit tools, dc measurements, pre-lab knowledge.
Week 3	Resistor color code measurement.
Week 4	Ohm's law.
Week 5,6	Series-parallel resistors.
Week 7,8	Kirchhoff's law.
Week 9	Mid-term
Week 10	Norton's theorem.
Week 11	Thevenin's theorem.
Week 12, 13	Superposition theorem.
Week 14,15	Maximum power transfer theorem.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Electric Circuits Fundamentals" by Floyd ISBN: 0130163945 Publisher: Prentice Hall	No
Recommended Texts	"Introductory Circuit Analysis", 13th edition by Boylestad ISBN: 978-0-13-392360-5 Publisher: Prentice Hall	No
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	**Differentiation and Integration**	**Module Delivery**
Module Type	**Core**	• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical**
Module Code	**UoB12345**	
ECTS Credits	**8**	
SWL (hr/sem)	**150**	

			• ☐ **Seminar**
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Isam Rafeq Faeq	**e-mail**	Essam_raffik@ntu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	1. Distinguish the basic principles of the function and its limits. 2. Define the derivative, its applications, and how to solve it.

	3. Distinguish the methods of integration, its applications, and how to solve them. 4. Apply the basic principles of matrix and how to solve linear equations. 5.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Determine the mathematical problem and its solution. 2. Apply basic concepts in mathematics and mathematical analysis. 3. Analyze and interpret the results. 4. Uses laws and rules optimally.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Understands the requirements of the engineering profession and ethical responsibility as well as the need for lifelong learning. Master the mathematical, basic and engineering sciences necessary to analyze and design engineering systems . Electrical and electronic. Develops the student's ability to dialogue and discussion

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Teaching methods: Lectures, class discussions, and homework. Lecture notes and announcements will be posted on an appropriate communication platform.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	90	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem)	30	**Unstructured SWL (h/w)**	2

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation **تقييم المادة الدراسية**					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, and 6
	Assignments	2	10% (10)	Continuous	LO # 1,2,3,4,5, and 6
	Projects / Lab.	0			
	Report	0			LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	30% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Matrices, Determinants & Grammar's Rule
Week 2	Scalars + Vectors, Component of Vector, Vector Algebra, Dot Product
Week 3	Orthogonal Vectors, Cross Product, Vector Calculus
Week 4	Limits, Theory of Derivative & Chain Rule.
Week 5	Derivative of Trigonometric Function

Week 6	Inverse Trigonometric Functions. Exponential Function Derivative Inverse Trigonometric Functions.
Week 7	Derivative of Logarithmic Function, Applications.
Week 8	Theory of Integration (Area Problems). The Definite + Indefinite Integrals
Week 9	Integral of Trigonometric Functions. Integral of Inverse Trigonometric Functions.
Week 10	Integration by Parts. Integral of Trigonometric Substitution
Week 11	Partial Fractions The Substitution z=tan x2
Week 12	Volume of Revolution
Week 13	Length of Curves
Week 14	Application of Derivatives L'Hospital's Rule
Week 15	Approximation (trapezoidal and Simpsons rule)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Thomas, Calculus by Anton , Bivens and Davis	Yes

Recommended Texts	- Calculus I. - Advanced Engineering Mathematics by Alan Jeffrey.	No
Websites	Basic Engineering Mathematics tutorials.	

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 1**	**Module Delivery**

Module Type			• ☒ **Theory** • ☒ **Lecture** • ☐ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☒ **Seminar**
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this English Language Lecture is to provide students with a comprehensive understanding of the English language, including its structure, usage, and various linguistic aspects. The lecture aims to enhance students' language skills and improve their overall proficiency in English.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Demonstrate a solid understanding of the fundamental aspects of English grammar, vocabulary, and syntax. 2. Apply effective reading strategies to comprehend and analyze a variety of written texts. 3. Produce coherent and well-structured written pieces using appropriate grammar, vocabulary, and style. 4. Listen actively and comprehend spoken English in various contexts, including formal and informal situations. 5. Engage in meaningful conversations and deliver clear and organized oral presentations in English. 6. Critically evaluate and analyze linguistic elements in literature, media, and other forms of communication. 7. Recognize and appreciate the historical and cultural contexts that have shaped the English language.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to the English language and its global significance. 2. Overview of English grammar, including parts of speech, sentence structure, and verb tenses.

	3. Building vocabulary and word choice for effective communication. 4. Reading comprehension strategies and analysis of different types of texts. 5. Developing writing skills, including organization, coherence, and proper grammar usage. 6. Listening comprehension and effective note-taking techniques. 7. Speaking skills development, including conversation, pronunciation, and presentation skills. 8. Literary analysis and interpretation of English language texts. 9. Historical and cultural influences on the English language. 10. Contemporary issues and challenges in the English language.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Lecture delivery: The instructor will present concepts, explanations, and examples through interactive lectures, incorporating visual aids, multimedia resources, and real-life examples. 2. Group activities: Students will engage in group discussions, peer-to-peer interactions, and collaborative learning tasks to

	reinforce their understanding of concepts and develop their communication skills. 3. Practical exercises: Students will participate in individual and group exercises, such as grammar quizzes, writing assignments, and pronunciation drills, to apply their knowledge and receive feedback. 4. Multimedia resources: The lecture may incorporate audiovisual materials, online resources, and language learning software to provide a dynamic and interactive learning experience. 5. Assessments: Regular assessments, including quizzes, exams, and assignments, will be conducted to gauge students' progress and provide constructive feedback for improvement. 6. Self-directed learning: Students will be encouraged to engage in independent learning outside of the lecture through recommended readings, online resources, and language practice exercises.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	40	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		
Module Evaluation **تقييم المادة الدراسية**			

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	0	0	5, 12	LO #1, 3 and 7
	Assignments	0	30% (30)	4, 13	LO # 2, 4 and 6
	Projects / Lab.	0	0%		
	Report	1	20% (10)	13	All
Summative assessment	Midterm Exam	2 hr.	20% (30)	7	LO # 1-6
	Final Exam	2 hr.	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	• Introduction to the English language • Greetings and basic conversational phrases
Week 2	• Words in English (Book 3)
Week 3	• Basic sentence structure: Subject + verb + object • Words in English (Book 3)
Week 4	• Personal pronouns: I, you, he/she/it • Words in English (Book 3)
Week 5	• Present tense of "to be" • Words in English (Book 3)
Week 6	• Describing oneself and others • Words in English (Book 3)

Week 7	• Mid-term Evaluation
Week 8	• Nouns and articles: A, an, the • Plural nouns
Week 9	• Expressing possession with 's • Words in English (Book 3)
Week 10	• Present tense verbs: Regular verbs • Words in English (Book 3)
Week 11	• Daily routines and activities • Words in English (Book 3)
Week 12	• Adverbs of frequency • Words in English (Book 3)
Week 13	• Time expressions: Days of the week, months, and telling time. • Words in English (Book 3)
Week 14	• Prepositions of time: In, on, at • Words in English (Book 3)
Week 15	• Review and reinforcement of previous topics before final term evaluation

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	

Week 6	
Week 7	

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	English Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	4000 Essential English words 2nd edition	No
Websites	http://www.duolingo.com/ http://www.bbc.co.uk/learningenglish	

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	**Computer Programming 1**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**UoB12345**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.

Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	1. To develop problem solving skills by splitting the problem into small steps. 2. **This course aims to provide the students with an appreciation of the role of computers programming language level 1.** 3. **It aims to provide the students the steps of designing the algorithms and flowcharts to simplified programming in C++.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. An ability to apply C++ program for solve the problems. 2. An ability to analyze a problem, and identify and define the computing requirements appropriate to its C++ solution 3. An ability to design, implements, and evaluate a computer-C++ programming language. 4. An ability to function effectively on teams to accomplish a common goal

	5. An understanding of professional, ethical, legal ways of programming and designing the problem state. 6. An ability to understand and follow the C++ program. 7. An ability to analyze the local and global impact of computing programming on individuals, organizations, and society. 8. Recognition of the need for and an ability to design the algorithms and flowcharts continuing professional development 9. An ability to use current techniques, skills, and tools necessary for computing programming practice. 10. An ability to apply algorithmic principles, and computer science theory in the programming and design of computer-based programming systems. 11. An ability to apply design and development principles in the construction of software systems of varying Programming languages.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A - Algorithms</u> Algorithm converting the problem into steps by using algorithms and the base of analyze the problem into steps. <u>Part B – Flowchart</u> Flowchart makes it easier to spot inconsistencies and perform analysis. Flowcharts are also a great tool to help users maintain proper documentation standards while working on a project. Flowcharts create visual representations of processes. For this reason, they are popular among programmers, decision makers, and problem solvers. Manually creating flowcharts is often quite time consuming. After all, by hand, you have to draw the shapes and other elements. Furthermore, manual revisions often require a substantial amount of effort. Fortunately, flowchart

	software makes flowcharting simple and straightforward. Users can access templates and libraries of shapes and connectors to quickly assemble complicated diagrams that are easily shared and revise. Part C- Programming in C++ The main advantages of C++ are that it is a highly efficient language, has excellent performance, and boasts great memory management. C++ also supports object-oriented programming principles, making development more manageable and organized. C++ is a general-purpose, statically-typed programming language with elements of object-oriented programming (OOP) and functional development. It is part of the C-family of languages, and, in fact, is an extension of C originally conceived of as C with Classes – a nod to the fact that it allows developers to use classes and objects in their code. The actual ++ portion of the name comes from C's ++ or incremental operator, a sort of programmer joke about C++ being an incremental step-up from C. The language was created by Bjarne ,Stroustrup and developed by the ISO/IEC Joint Technical Committee back in 1985.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7

Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	**Introduction to algorithms**
Week 2	**Introduction to flowcharts**
Week 3	**Introduction to C++ (Structure of a program)**

Week 4	**Variables, Data types, Declaration of variables, Scope of variables, Expression and Basic Input /Output.**
Week 5	**String handling, local and global variables**
Week 6	**Operator (Assignment ,Arithmetic operator, Increase and decreased)**
Week 7	**Making decisions (If statement)**
Week 8	**Loop (for loop)**
Week 9	**Loop (while loop)**
Week 10	**Switch statement**
Week 11	**Arrays one dimensional**
Week 12	**Arrays two dimensional**
Week 13	**Pointer**
Week 14	**Library function**
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Introduction to use Dev C++ ver 5.11 application
Week 2	Lab 2: Introduction of running C++ code.
Week 3	Lab 3: C++ program using variables.
Week 4	Lab 4: C++ program using string.
Week 5	Lab 5: Running Examples of mathematic expression.
Week 6	Lab 6: Examples of If statement.
Week 7	Lab 7: Using for loop.
Week 8	Lab 8: Using while loop.
Week 9	Lab 9: Examples of switch statement.
Week 10	Lab 10: Examples of Arrays one dimensional
Week 11	Lab 11: Examples of Arrays two dimensional
Week 12	Lab 12: Examples of Pointer
Week 13	Lab 13: Examples of Library function
Week 14	Lab 14: Examples of Library function
Week 15	Lab 15: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	A Complete Guide to Programming in C++ Ulla Kirch-Prinz Peter Prinz. JONES AND BARTLETT PUBLISHERS. 1.	Yes
Recommended Texts	RENTICE HALL, Englewood Cliffs, New Jersey 07632 AT&T Bell Laboratories Murray Hill, New Jersey Brian W. Kernighan • Dennis M. Ritchie Second Edition PROGRAMMING LANGUAGE C PROGRAMMING TUTORIAL 2. 3.	yes
Websites	Simply Easy Learning by tutorialspoint.com 4.	

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 Drawing Using Computer**		**Module Delivery**
Module Type	**Core**		• ☒ **Lecture**
Module Code			
ECTS Credits	**4**		• ☒ **Lab**
SWL (hr/sem)	**100**		• ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail

Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	1-Enabling students to obtain knowledge and understanding in the subject of engineering drawing and using the computer through the AutoCAD program 2- Understanding and teaching students the basics of engineering drawing related to computer engineering 3- Knowing the correct methods of engineering drawing using the computer and how to apply them in the AutoCAD program in the fields of engineering and computer engineering. 4- Increasing the student's experience in identifying drawing and designing engineering and electronic shapes and drawing connections and electrical circuits.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**A- Cognitive goals** A1- Giving the student sufficient knowledge in the AutoCAD program to employ it in design by developing the students' practical, theoretical and creative abilities in computer design techniques of various types. A2- Developing perception skills and knowing the technique of implementing design using the computer to enrich the students' experience through the use of the various techniques of the AutoCAD program to complete the required design plans. A3- That the student be able to make any design scheme on the program through which he can fully clarify the idea. **b- The program's skill objectives** B1- Providing the student with the skill of computer design easily and easily through using samples from the student's reality and applying them directly. These samples are chosen

	based on the level that the student reaches. Some exercises or projects to be completed in other subjects such as designing electrical circuits and logic can be used. B2- Developing the student's imagination skill to feel the difference between the AutoCAD program environment and the realistic building space, the different areas of the blocks within the proportional system of the total space, and how to draw projections of furniture pieces and interior spaces in easy ways.
Indicative Contents **المحتويات الإرشادية**	1- Enable students to apply a large number of drawings through the AutoCAD program. 2 - Enabling students and providing them with mechanisms to search for information within what is available on scientific sites on the Internet. 3- Raising the student's self-confidence by linking the theoretical material with the practical reality. 4 - Developing students' skills in how to deal with physical and software computer problems and how to deal with them.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1- Providing students with the basics, additional topics, and field experiences related to the outputs of thinking and analysis. 2- Creating panel discussions during or outside the lectures to discuss scientific engineering topics that require thinking and analysis. 3- Asking the students a set of thinking questions during the lectures such as (what, how, when, why) for specific topics. 4- Giving students homework and periodic reports.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	67	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	5
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	33	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation تقييم المادة الدراسية					
As		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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	20% (10)	7	LO # 1-7
	Final Exam	2hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1,2	The use of CAD in engineering drawing, description of menu Bar and toolbars
Week 3	Draw /Text, Dimension, Format/ units, Proprieties
Week 4,5	Drawing commands, drawing tools, modify tools

	drawing Ellipse Rectangle, Line Ray, Circle, Polygon, Point Arc, ---------- etc.
Week 6	Creating elevation and section
Week 7	Creating line sketch to plan and dimensions in layer
Week 8	CAD Electrical and Electronic Mechanical/ Special features The use of various layers,
Week 9	Midterm Exam
Week 10-11	editing commands:copy, cut, paste, erase, move,
Week 12,13	selecting objects,
Week 14.15	Orthogonal projection, Isometric drawing.
Week 16	Final Exam

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	• المحاضرات المقدمة من قبل مدرس المادة • الكتب المتوفرة في مكتبة الكلية • الكتب الموجودة داخل الclass room	No
Recommended Texts	• AutoCAD Beginning and Intermediate • AutoCAD from zero to hero	No
Websites	اي موقع الكتروني له علاقة بدراسة اتوكاد	

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group	**A** - Excellent	**امتياز**	90 - 100	Outstanding Performance

(50 - 100)	**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	**Computer Organization**	**Module Delivery**
Module Type	**Core**	• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code		
ECTS Credits	**6**	
SWL (hr/sem)	**150**	

Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Noor Faisal Mohammed Ahmed Safaa Salman	**e-mail**	noor6faysal@ntu.edu.iq ahmed.safaa23@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	1- Giving the student information about the basic concepts of installing computers, their components and peripheral devices. 2- Proficiency in the use and maintenance of computers. 3- Design and installation of the main memory of the computer and its programming

Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1- A computer is defined as a device internally and externally 2- Explains how the computer is developed and the major components developed over time. 3- Explains the benefit of each part of the computer and its impact on the overall work of the device. 4- Knows how each part of the computer works separately. 5- It expresses the service and operational programs of the computer and how it works. 6- Knows in detail the components of the computer closely by examining them and knowing how to install them and their purpose in the laboratory 7- Windows operating system is used. 8- It is known as the most common and used programs by users that were created by Microsoft, such as Word and PowerPoint.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1- Introducing computer organization. 2- Processor organization. 3- Input/output system. 4- Memory system.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The teaching methods will include theoretical lectures, Practical lectures, homework and practical application in the laboratory.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	90	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation تقييم المادة الدراسية					
As		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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Introduction to computer systems Main parts of computer system, organization and architecture.
Week 2	Von Neumann architecture.
Week 3	Introduction to the main digital component (Registers , buffers , decoder encoder)
Week 4	Memory hierarchy (Internal registers, Cache memory, Primary memory, Secondary memory)
Week 5	System buses
Week 6	Memory addressing
Week 7	CPU basic organization.

Week 8	Input & Output organization**.**
Week 9	Computer s/w (Machine language).
Week 10	Basic concept idea of microprocessor.
Week 11	Introduction to 8085 mp architecture.
Week 12	8085 pin configuration
Week 13	8085addressing mode.
Week 14	Stack memory and subroutine.
Week 15	Video Color Models
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Introduction to computer organization
Week 2	Lab 2: Introduction to computer organization hardware
Week 3	Lab 3: Introduction to computer organization software
Week 4	Lab 4: Understand DOS system
Week 5 +6+7	Lab 5: Understand DOS command

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Computer organization: 5th (fifth) edition by Carl Hamacher, Zvonko G. Vranesic	Yes
Recommended Texts	Computer organization and architecture: design for performance (8th edition) by William stalling	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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	**C**omputer **A**pplications	**Module Delivery**
Module Type	Core	• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical**
Module Code		
ECTS Credits	**8**	
SWL (hr/sem)	**200**	

			• ☐ **Seminar**
Module Level	UGx11 1	**Semester of Delivery**	2
Administering Department		**College**	
Module Leader	**Arkan Raoof Esmael**	**e-mail**	**arkan.raoof23@ntu.edu.iq**
Module Leader's Acad. Title	**Assistant Lecturer**	**Module Leader's Qualification**	**Ms.c**
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	

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**	
Module Aims **أهداف المادة الدراسية**	**M**ATLAB is a widely used programming language and computational tool for numerical analysis, data visualization, and scientific computing. In undergraduate curricula, MATLAB teaching goals include developing students' skills in programming, data analysis, and problem solving, as well as providing them with a practical understanding of mathematical concepts and the analysis of complex computations and algorithms.

	The most crucial goals for teaching MATLAB include learning outcomes, which include: 1. Introduction to Programming: MATLAB is frequently used in academic curriculum as an introductory programming language. The main goal is to familiarize students with fundamental ideas in programming, including variables, data types, control structures, functions, and algorithms. 2. Numerical Computation: MATLAB is frequently used for numerical computation, and one of the primary objectives of the MATLAB study program is to teach students how to conduct mathematical calculations, work with matrices, solve challenging equations, and put algorithms into practice for scientific, engineering, and mathematical applications. 3. Data Analysis and Visualization: MATLAB offers strong tools for data analysis and visualization. The built-in functions, toolboxes, and simulations of MATLAB are used by students to construct plots and graphs, show data in various forms, and do statistical analysis. 4. Simulation and Modeling: Many simulation and modeling jobs are performed using MATLAB. Students will learn how to create mathematical models, simulate systems, and analyze their behavior by utilizing MATLAB's simulation features. 5. Development of applications: MATLAB enables the creation of standalone programs and GUI-based user interfaces. For their projects and scientific research, students can learn how to write interactive programs, publish MATLAB code as standalone applications, and develop user-friendly interfaces. 6. Development of applications: MATLAB enables the creation of standalone programs and GUI-based user interfaces. For their projects and scientific research, students can learn how to write interactive programs, publish MATLAB code as standalone applications, and develop user-friendly interfaces.

	7. Problem-solving abilities are a common topic of MATLAB study programs. Students are encouraged to use their MATLAB and programming expertise to address real-world issues, developing their analytical and critical thinking skills.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	MATLAB is a popular programming language and tool. It has many uses, including biology, engineering, economics, mathematics, data analysis, and complex mathematical equations. As a result, MATLAB learning objectives in undergraduate curricula can change based on the course and level of the student. In academic programs, MATLAB often produces the following learning outcomes: 1. Understanding and Application of Programming Concepts: Students learn the basic structure of the MATLAB programming language, including variables, loops, functions, and conditional statements. They also learn how to write efficient and effective code using best programming practices. 2. Data analysis and visualization using equation solving, engineering diagrams, and visualization are all possible with MATLAB. Students gain knowledge of how to use MATLAB functions to import, modify, and analyze data. In order to visualize outcomes, they also learn how to make plots, charts, and graphs. 3. Modeling and Simulation: MATLAB is often used to model and simulate complex systems in engineering, physics, applied science, and other scientific fields. Students learn how to create mathematical models and simulations using MATLAB functions and tools. 4. Solve complex problems: MATLAB is a useful tool for solving complex problems in many fields. Students learn how to use MATLAB to solve problems related to optimization,

	numerical analysis, and differential and integral equations in advanced mathematics. 5. Interdisciplinary: MATLAB has applications in a wide range of disciplines, including engineering, physics, biology, economics, and mathematics. Students gain knowledge of how to use MATLAB to tackle issues in their particular fields of study. 6. Programming for scientific computing: MATLAB is often used in scientific computing, where efficient and accurate numerical calculations are required. Students learn how to code scientific computing applications using MATLAB's built-in functions and tools to analyze their data. 7. Algorithm development: MATLAB is a useful tool for developing and testing algorithms. Students learn how to develop and test algorithms for various applications using MATLAB. 8. Digital Image and Signal Processing: MATLAB contains built-in functions for processing digital images and signals, which makes it a popular tool in these fields. Students learn how to use MATLAB to analyze and process images and digital signal processors. 9. Machine Learning and Data Science: MATLAB has a variety of tools for machine learning and data science applications, including neural networks, classification algorithms, and data visualization tools. Students learn how to use these tools to solve problems and analyze data in machine learning. 10. Communication and Collaboration: MATLAB is frequently used in joint research projects where a large number of researchers contribute to the same code base. The built-in

	version control and code sharing facilities in MATLAB help students learn how to cooperate productively. Additionally, they gain communication skills by using MATLAB's visualization and simulation tools to present their findings. 11. Control Systems Design: When it comes to planning and assessing control systems, MATLAB is employed in control systems engineering. Students gain knowledge of how to utilize MATLAB to simulate closed-loop systems, create controllers, and assess system stability. 12. Computational finance: MATLAB has built-in functions for financial modeling and analysis, making it a popular tool in computational finance. Students learn how to use MATLAB to model financial markets, analyze financial data, and develop trading strategies. 13. Numerical methods: MATLAB is a powerful tool for numerical methods, such as solving differential equations, performing numerical integration, and solving optimization problems. Students learn how to use MATLAB to apply numerical methods to solve problems in their respective fields of study.
Indicative Contents **المحتويات الإرشادية**	**Indicative content includes the following.** **Part A -** Introduction to MATLAB environment & MATLAB windows, MATLAB commands & elementary mathematical functions **[12 hrs]** Vectors and Matrices **[14 hrs]** Solving basic algebraic equations & quadratic equations **[14 hrs]** Create function in files – MATLAB Introduction to Plotting, Plotting multiple plots & Plotting 3D **[14 hrs]** **Part B-** **For-end** loops, **While- end** loops & **If** statement **[14hrs]**

	Integration, differentiation and Fourier transform **[12 hrs]** Introduction to Simulink and Modeling equations in Simulink **[14 hrs]** Modeling electrical cct. in Simulink, Modeling electronic and communication cct. in Simulink **[14 hrs]**

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Learning and teaching strategies are methods used to help learners acquire knowledge and skills, and for teachers to effectively deliver instruction. There are various types of learning and teaching strategies, including: 1. Active learning entails involving students in tasks that demand their participation, critical thinking, and application of what they have learned. Group discussions, practical exercises, and problem-based learning are a few examples. 2. Collaborative learning: This involves group work and collaboration among learners to achieve a common goal. Examples include group projects and peer learning. 3. Inquiry-based learning: This involves encouraging learners to ask questions, explore topics, and find answers through research and experimentation. Examples and reports include scientific investigations and case studies. 4. Direct instruction: This involves the teacher providing information to learners in a structured and organized manner. Examples include lectures, demonstrations, and tutorials. 5. Differentiated instruction: This involves tailoring instruction to meet the needs of individual learners, based on their learning style, abilities, and interests. 6. Technology-based instruction: This involves using technology tools and resources to enhance instruction and engage

	learners. Examples include online courses, interactive whiteboards, and educational apps. 7. Effective teaching and learning strategies often involve a combination of these approaches, tailored to the needs of the learners and the content being taught.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	108	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	92	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**200**		

Module Evaluation **تقييم المادة الدراسية**					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (10)	7	LO # 1-7
	Final Exam	3hr	40% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Introduction to MATLAB environment & MATLAB windows
Week 2	MATLAB commands & elementary mathematical functions
Week 3	Vectors and Matrices
Week 4	Matrices
Week 5	Solving basic algebraic equations & quadratic equations
Week 6	Create function in files - MATLAB
Week 7	Introduction to Plotting, Plotting multiple plots & Plotting 3D
Week 8	Operational & logical Statements
Week 9	**For-end** loops & **While- end** loops
Week 10	**If** statement
Week 11	Integration & differentiation
Week 12	Fourier transform
Week 13	Introduction to Simulink
Week 14	Modeling equations in Simulink
Week 15	Modeling electrical cct. in Simulink
Week 16	Modeling electronic cct. in Simulink

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Introduction to MATLAB environment
Week 2	MATLAB windows
Week 3	MATLAB commands & elementary mathematical functions
Week 4	Vectors
Week 5	Matrices
Week 6	Solving basic algebraic equations & quadratic equations
Week 7	Create function in files - MATLAB
Week 8	Introduction to Plotting, Plotting multiple plots & Plotting 3D
Week 9	Operational & logical Statements
Week 10	**For-end** loops & **While- end** loops

Week 11	**If** statement
Week 12	Integration & differentiation
Week 13	Fourier transform
Week 14	Introduction to Simulink and Modeling equations in Simulink
Week 15	Modeling electrical cct. in Simulink
Week 16	Modeling electronic cct in Simulink

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	MATLAB An Introduction with Applications.	
Recommended Texts	An Introduction to Programming and Numerical Methods in MATLAB	
Websites	https://www.mathworks.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
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	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 Electronics**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**UoB12345**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail

Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	1. To develop problem solving skills and understanding of digital circuits through the application of techniques. 2. To understand all types of number systems and the conversion between these types. 3. This course deals with the basic concept of digital circuits. 4. This is the basic subject for all logic gates. 5. To understand the basic concepts of arithmetic circuits.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Recognize how digital circuits works. 2. List the various terms associated with digital circuits. 3. Summarize what is meant by a basic digital circuit. 4. List the several of number system.

	5. Have the ability to convert between several number types. 6. Define Karnaugh Map and its application. 7. Identify the basic arithmetic operations (adder, parallel binary adder, subtractor, decoder, encoder). 8. Discuss the operations of all combinational digital circuits and Multiplexer, demultiplexer, comparator, code conversion Discuss the various properties of adders, sub tractors, multiplexer and flip-flops. 9. Explain the Counters ant there types(asynchronous, synchronous, decade, up/down, cascade, counter decoding) 10. List the several of Shift-registers, Shift register counter, Multivibrators and A/D and D/A convertors.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Number systems (decimal, binary, octal, hexadecimal, BCD, excess-3, gray code, conversions, operations, complement's). [30 hrs] Logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR, logicsimplification (Boolean, Demorgan's theorm)). [15 hrs] Karnaugh maps(2-variables, 3-variables, 4-variables, 5-variables, SOP, POS, don't care. [10 hrs] Arithmetic operations (adder, parallel binary adder, subtractor, decoder, encoder, multiplexer, demultiplexer, comparator, code conversion). [30 hrs] Flip-flops (SR latch, D latch, T latch, J-K F.F, edge triggered, conversion from one type to another) [15 hrs] Counters (asynchronous, synchronous, decade, up/down, cascade, counter decoding). [15 hrs]

	Shift-registers(serial in/serial out, serial in/parallel out, parallel in/serial out, parallel in/parallel out, bidirectional, shift register counter(Johnson counter, ring counter)). [15 hrs] Multivibrators (definition, astable, bistable, monostable, 555 timer). [15 hrs] A/D and D/A convertors (R/2R DAC, R/2^{n}R DAC, flash ADC, tacking ADC, slope ADC, successive approximation ADC, digital ramp ADC, delta sigma ADC). [15 hrs]

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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Introduction - Number systems (decimal, binary, octal, hexadecimal, BCD, excess-3, gray code)
Week 2	Conversions between number systems, operations, complement's
Week 3	Logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR)
Week 4	Logic simplification (Boolean, Demorgan's theorm)
Week 5	Karnaugh maps(2-variables, 3-variables, 4-variables, 5-variables, SOP, POS, don't care)
Week 6	Arithmetic operations (adder, parallel binary adder, subtractor, decoder, encoder)
Week 7	Multiplexer, demultiplexer, comparator, code conversion
Week 8	Flip-flops (SR latch, D latch, T latch, J-K F.F, edge triggered)
Week 9	Conversion from one type of flip-flop to another
Week 10	Counters (asynchronous, synchronous, decade, up/down, cascade, counter decoding)
Week 11	Shift-registers(serial in/serial out, serial in/parallel out, parallel in/serial out, parallel in/parallel out, bidirectional)

Week 12	Shift register counter(Johnson counter, ring counter)
Week 13	Multivibrators (definition, astable, bistable, monostable, 555 timer)
Week 14	A/D and D/A convertors (R/2R DAC, R/2^{n}R DAC, flash ADC, tacking ADC, slope ADC
Week 15	Successive approximation ADC, digital ramp ADC, delta sigma ADC)

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Introduction to digital electronic and Digital and analog system
Week 2	Lab 2: AND,OR, NOT gates
Week 3	Lab 3: XOR, XNOR, NAND, NOR gates
Week 4	Lab 4: Logical Equations with examples
Week 5	Lab 5: Karnaugh maps(2-variables, 3-variables, 4-variables, 5-variables, SOP, POS, don't care)
Week 6	Lab 6: Half adder, Full adder, Half subtractor, full subtractor
Week 7	Lab 7: Multiplexer, De-multiplexer
Week 8	Lab 8: Flip-flops (SR latch, D latch, T latch, J-K F.F, edge triggered)
Week 9	Lab 9: Conversion from one type of flip-flop to another
Week 10	Lab 10: Counters (asynchronous, synchronous, decade, up/down, cascade, counter decoding)
Week 11	Lab 11: Shift-registers(serial in/serial out, serial in/parallel out, parallel in/serial out, parallel in/parallel out, bidirectional)
Week 12	Lab 12: Johnson counter, ring counter
Week 13	Lab 13: Astable Multivibrators, bistable, monostable, 555 timer Multivibrators
Week 14	Lab 14: A/D and D/A convertors (R/2R DAC, R/2^{n}R DAC, flash ADC, tacking ADC, slope ADC
Week 15	Lab 15: ADC, digital ramp ADC, delta sigma ADC

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Digital Electronics: Principles, Devices and Applications, Anil K. Maini	No
Recommended Texts	FUNDAMENTALS OF DIGITAL CIRCUITS, fourth edition, A. ANAND KUMAR	No
Websites	https://www.coursera.org/search?query=digital%20electronics &	

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.

مفردات منهج مادة حقوق الانسان والديمقراطية

د. اسامة علي ابراهيم

ت	الموضوع	الملاحظات
الاسبوع الاول	حقوق الانسان في الحضارات القديمة (الاغريقية – الرومانية)	
الاسبوع الثاني	موقف الشرائع السماوية من حقوق الانسان	
الاسبوع	حقوق الانسان في الدساتير الدولية	
الاسبوع الرابع	ميثاق الامم المتحدة وموقفه من حقوق الانسان	
الاسبوع الخامس	حقوق الانسان في المنظمات الدولية	
الاسبوع السادس	حقوق الانسان في المنظمات غير الحكومية	
الاسبوع السابع	ضمانات حقوق الانسان	
الاسبوع الثامن	مفهوم القانون الدولي الانساني وتطوره التاريخي	
الاسبوع التاسع	مفهوم الدميقراطية ونشأتها وتطورها	
الاسبوع العاشر	العلاقة بين الاسلام والديمقراطية	
الاسبوع الحادي عشر	خصائص الديمقراطية	
الاسبوع الثاني عشر	صور الديمقراطية وأنواعها	
الاسبوع الثالث عشر	مقومات الديمقراطية السياسية	
الاسبوع الرابع عشر	الديمقراطية والتربية والتعليم	
الاسبوع الخامس عشر	الاحزاب السياسية	
الاسبوع السادس عشر	دور وسائل الاعلام في ظل النظام الديمقراطي	

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**		
Module Title	**Electrical and Electronics Workshop**	**Module Delivery**
Module Type	**Core**	☒ **Lecture**
Module Code		
ECTS Credits	**4**	☒ **Lab**
SWL (hr/sem)	**100**	

			• ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	The educational objectives of this course are · To focus on Electrical safety & equipment earthing · To address the underlying concepts of wiring of various electrical installations. · To study control & power circuit of different starters
Module Learning Outcomes	By the end of this unit students will be able to: 1. Prepare for and perform safely the assembly of through-hole PCBs

مخرجات التعلم للمادة الدراسية	2. Explore ways in which PCBs are manufactured on an industrial scale. 3. Undertake routine operations on an electrical system using information sources 4. Wire and terminate electrical components
Indicative Contents **المحتويات الإرشادية**	1- Enabling students to write reports on the vocabulary of the subject. 2 - Enabling students and providing them with mechanisms to search for information within what is available on scientific sites on the Internet. 3- Raising the student's self-confidence by linking the theoretical material with the practical reality. 4 - Developing students' skills in how to deal with physical and connectivity circuits problems and how to deal with them.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The main strategy 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**	67	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	5
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	33	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation **تقييم المادة الدراسية**

As		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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	20% (10)	7	LO # 1-7
	Final Exam	2hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	PART 1 ELECTRONICS - Introduction to Electrical and Electronic workshop - Using Manual kits.
Week 2	Solder different components such as resistor, capacitor, diodes and transistors on a PCB.
Week 3	Practice to connected components from Bread board.
Week 4	Familiarity with the multimeter

Week 5	Testing electronic components (resistors, capacitors, diodes, transistors, transformers, relays).
Week 6	Semiconductor Diodes. Setup DC Power Supply Circuit (9V or 12V or 15V).
Week 7	Bridge Diodes and Regulators. - Setup Variable DC Power Supply Circuit (-5V,+5V, -12V and +12V) by using Regulators.
Week 8	Bipolar Junction Transistors, Field-Effect Transistor (FET), Field Effect Transistor (MOSFET), Diac, Triac, Thyrostor. Field Effect Transistor (MOSFET)
Week 9	Midterm Exam
Week 10,11	ELECTRICAL INSTALLATIONS Identify types of circuit breakers and protection devices and current endurance capacity for each device and identify the types of electrical wires and their load on the current
Week 12	design a lamp to the control of a one-way switch
Week 13	Connecting two lamps in series with the control of one way switch
Week 14	Connecting two lamps in parallel with the control of one way switch
Week 15	Staircase lamp design using cycle breaker and one way switch
Week 16	Final Exam

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	• المحاضرات المقدمة من قبل مدرس المادة • الكتب المتوفرة في مكتبة الكلية • الكتب الموجودة داخل الclass room	No
Recommended Texts	• AutoCAD Beginning and Intermediate	No

	• AutoCAD from zero to hero	
Websites	اي موقع الكتروني له علاقة بدراسة اتوكاد	

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.

Description of Second level courses

مقررات الكورس الاول

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Object Oriented Programming**		**Module Delivery**
Module Type	**C**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	COE214		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 2	**Semester of Delivery**	3
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	1. To develop problem solving skills by splitting the problem into small steps. 2. **This course aims to provide the students with an appreciation of the role of computers programming language level 1.** 3. **It aims to provide the students the steps of designing programs in object oriented in in C++.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. An ability to apply C++ using O.O.P program for solve the problems. 2. An ability to analyze a problem, and identify and define the computing requirements appropriate to its C++ solution 3. An ability to design, implements, and evaluate a computer-C++ programming language. 4. An ability to function effectively on teams to accomplish a common goal 5. An understanding of professional, ethical, legal ways of programming and designing the problem state. 6. An ability to understand and follow the O.O.P program. 7. An ability to analyze the local and global impact of computing programming on individuals, organizations, and society. 8. Recognition of the need for and an ability to design the algorithms and flowcharts continuing professional development 9. An ability to use current techniques, skills, and tools necessary for computing programming practice. 10. An ability to apply algorithmic principles, and computer science theory in the programming and design of computer-based programming systems. 11. An ability to apply design and development principles in the construction of software systems of varying Programming languages.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Part A - Review of C++ program C++ is an object-oriented programming language. It has a powerful set of built-in data types and control constructs. Since C++ is a compiled language, all the code written in this language, when run, are translated to machine code by a program called the compiler. Part B – Introduction of O.O.P Techniques OOP stands for Object-Oriented Programming. Procedural programming is about writing procedures or functions that perform operations on the data, while object-oriented programming is about creating objects that contain both data and functions. Part C- Programming in O.O.P in C++ Object-oriented programming – As the name suggests uses objects in programming. Object-oriented programming aims to implement real-world entities like inheritance, hiding, polymorphism, etc. in programming. The main aim of OOP is to bind together the data and the functions that operate on them so that no other part of the code can access this data except that function. There are some basic concepts that act as the building blocks of OOPs i.e. Class ,Objects,Encapsulation,Abstraction,Polymorphism,Inheritance,Dynamic Binding Message Passing

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	**Review of C++**
Week 2	**Functions in C++**
Week 3	**Examples of Functions in C++**
Week 4	**Introduction of O.O.P**

Week 5	**Characteristics of an Object-Oriented Programming Language**
Week 6	**Class + object in O.O.P**
Week 7	**Array of objects**
Week 8	**Examples of Array of objects**
Week 9	**Friend Function**
Week 10	**Constructor And Destructor**
Week 11	**Operator in O.O.P**
Week 12	**Inheritance**
Week 13	**Virtual function**
Week 14	**Examples of Virtual Function**
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Lab 1: Apply C++ examples of using different variables
Week 2	Lab 2: Apply C++ using arrays
Week 3	Lab 3: Apply C++ program using string
Week 4	Lab 4: Apply C++ program using mathematic expression+ If statement
Week 5	Lab 5: Apply C++ program using loop
Week 6	Lab 6: Examples of Arrays
Week 7	Lab 7: Examples of function
Week 8	Lab 8: Examples of using O.O.P(class,object)
Week 9	Lab 9: Examples of friend function
Week 10	Lab 10: Examples of constructor and destructor
Week 11	Lab 11: Examples of operator
Week 12	Lab 12: Examples of inheritance
Week 13	Lab 13: Examples of inheritance
Week 14	Lab 14: Virtual Function
Week 15	Lab 15: Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	A Complete Guide to Programming in C++ Ulla Kirch-Prinz Peter Prinz. JONES AND BARTLETT PUBLISHERS. 1.	Yes
Recommended Texts	RENTICE HALL, Englewood Cliffs, New Jersey 07632 AT&T Bell Laboratories Murray Hill, New Jersey Brian W. Kernighan • Dennis M. Ritchie Second Edition PROGRAMMING LANGUAGE 2. C PROGRAMMING TUTORIAL 3.	yes
Websites	Simply Easy Learning by tutorialspoint.com 4.	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	**امتياز**	90 - 100	Outstanding Performance
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	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	**Computer architecture**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE213**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 2	**Semester of Delivery**	3
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Mohammed H. Rashed	**e-mail**	E-mail Mohammed.rasheed@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	This module aims to: 1. Provide an understanding of the architecture of digital computers, with an emphasis on 8085 and 8086 microprocessors. 2. Teach students about different aspects of microprocessor functioning such as memory addressing, I/O addressing, bus timing, and interrupt types. 3. Introduce students to advanced topics such as software architecture, pipeline, memory segmentation, and data organization. 4. Teach students about the 8086 instruction set, memory interface circuits, and I/O interface circuits.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Upon successful completion of this module, the student should be able to: 2. Understand the general architecture of digital computers. 3. Understand the functioning of 8085 and 8086 microprocessors in detail. 4. Understand different addressing modes, machine language coding, and the 8086 instruction set. 5. Design and implement memory and I/O interface circuits. 6. Understand different types of interrupts and how to handle them.
Indicative Contents **المحتويات الإرشادية**	1. Introduction to digital computer architecture. 2. 8085 and 8086 microprocessors: memory addressing, I/O addressing, bus timing, and interrupt types. 3. Advanced topics in microprocessor architecture: software architecture, pipeline, memory segmentation, and data organization. 4. 8086 instruction set, memory interface circuits, and I/O interface circuits.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: The fundamental concepts of computer architecture and the functioning of microprocessors will be delivered in a structured format with relevant examples. 2. Tutorials: Hands-on experience in designing and implementing different aspects of microprocessors such as memory addressing, I/O addressing, and interface circuits. 3. Assignments & Projects: Regular assignments will be given to students for practicing and reinforcing the concepts learned in class. 4. Exam Preparation: Sample questions and revision sessions will be conducted to prepare students for the final exam.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	General architecture of digital computer, review of 8086 µp
Week 2	8086 memory addressing
Week 3	8086 I/O addressing
Week 4	8086 machine cycle & bus timing
Week 5	8086 Interrupt Types
Week 6	Introduction to 8086 µp
Week 7	Software Architecture, BIU, EU, registers, pipeline
Week 8	Memory segmentation, generating memory address
Week 9	Hardware organization of the 8086 memory address space, Data organization(aligned and misaligned word, double word)
Week 10	Pin configuration, min &max mode,8288 bus controller, 8284 system clock Addressing mode, machine language coding

Week 11	8086 instructions set (Data transfer instructions, Arithmetic instructions, Logic instructions, Shift instructions, Rotate instructions, Control Flow instructions, LOOPS & LOOP instructions, String instructions) Stack memory, POP & PUSH instructions
Week 12	Memory read & write Bus Cycles, Idle & wait state
Week 13	Memory Interface Circuits, bus transceivers, Bank Write and Bank Read Control Logic, memory expansion.
Week 14	I/O Interface Circuits (Isolated input/output & Memory input/output, I/O instructions, Input/Output Bus Cycles)
Week 15	8086 Interrupt Types
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Introduction to 8086 emulator
Week 2	Lab 2: Assembly language addressing mode using MOV
Week 3	Lab 3: cont. Assembly language addressing mode using MOV
Week 4	Lab 4: memory addressing modes
Week 5	Lab 5: 8086 data movement Instructions
Week 6	Lab 6: 8086 mathematical Instructions and flags
Week 7	Lab 7: 8086 logical instructions
Week 8	Lab 8: Loop Instructions
Week 9	Lab 9: problem solving using assembly language
Week 10	Lab 10: practice

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Douglas V. Hall, "Microprocessors and Interfacing", McGraw Hill Education, 2nd Edition, 2006.	Yes
Recommended Texts	William Stallings, "Computer Organization and Architecture: Designing for Performance", Pearson, 10th Edition, 2015	No
Websites		

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
	A - Excellent	**امتياز**	90 - 100	Outstanding Performance

Success Group (50 - 100)	**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	**Mathematics**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**UoB12345**		
ECTS Credits	**8**		
SWL (hr/sem)	**150**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Isam Rafeq Faeq	**e-mail**	Essam_raffik@ntu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	1. Define vectors and how to solve them. 2. Acquire the theoretical concepts of dealing with linear and nonlinear differential equations and solving them. 3. .Apply the integration of two or more variables and relate it to solving differential equations. 4. .Understand matrices and their applications in solving mathematical equations. 5. Define the complex number and use it to derive the analytic function.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Determine the mathematical problem and its solution. 2. Apply basic concepts in mathematics and mathematical analysis. 3. Analyze and interpret the results. 4. Uses laws and rules optimally.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Understands the requirements of the engineering profession and ethical responsibility as well as the need for lifelong learning. Master the mathematical, basic and engineering sciences necessary to analyze and design engineering systems . Electrical and electronic. Develops the student's ability to dialogue and discussion

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching methods: Lectures, class discussions, and homework. Lecture notes and announcements will be posted on an appropriate communication platform.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	90	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	30	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2

Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150

Module Evaluation **تقييم المادة الدراسية**					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, and 6
	Assignments	2	10% (10)	Continuous	LO # 1,2,3,4,5, and 6
	Projects / Lab.	0			
	Report	0			LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	30% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Complex Numbers. (Polar & Cartesian form)
Week 2	Vector Field.
Week 3	Infinite Series
Week 4	Power Series
Week 5	Taylor's Series and Maclaurian's Series.
Week 6	Complex Variables.
Week 7	Cauchy-Riemann Equations
Week 8	The Double Integrals, Multiple Integrations
Week 9	Applications of Multiple Integrations
Week 10	Matrices, Inverse of Matrix
Week 11	Eigenvalues and Eigenvectors
Week 12	1st Order Ordinary Differential Equations
Week 13	Applications
Week 14	2st Order Ordinary Differential Equations
Week 15	Applications
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas, Calculus by Anton , Bivens and Davis	Yes
Recommended Texts	- Calculus I. - Advanced Engineering Mathematics by Alan Jeffrey.	No
Websites	Basic Engineering Mathematics tutorials.	

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 2**		**Module Delivery**
Module Type			• ☒ **Theory** • ☒ **Lecture** • ☐ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☒ **Seminar**
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 2	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this English Language Lecture is to provide students with a comprehensive understanding of the English language, including its structure, usage, and various linguistic aspects. The lecture aims to enhance students' language skills and improve their overall proficiency in English.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Demonstrate a solid understanding of the fundamental aspects of English grammar, vocabulary, and syntax. 2. Apply effective reading strategies to comprehend and analyze a variety of written texts. 3. Produce coherent and well-structured written pieces using appropriate grammar, vocabulary, and style. 4. Listen actively and comprehend spoken English in various contexts, including formal and informal situations. 5. Engage in meaningful conversations and deliver clear and organized oral presentations in English. 6. Critically evaluate and analyze linguistic elements in literature, media, and other forms of communication. 7. Recognize and appreciate the historical and cultural contexts that have shaped the English language.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to the English language and its global significance. 2. Overview of English grammar, including parts of speech, sentence structure, and verb tenses. 3. Building vocabulary and word choice for effective communication. 4. Reading comprehension strategies and analysis of different types of texts. 5. Developing writing skills, including organization, coherence, and proper grammar usage. 6. Listening comprehension and effective note-taking techniques. 7. Speaking skills development, including conversation, pronunciation, and presentation skills. 8. Literary analysis and interpretation of English language texts. 9. Historical and cultural influences on the English language. 10. Contemporary issues and challenges in the English language.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lecture delivery: The instructor will present concepts, explanations, and examples through interactive lectures, incorporating visual aids, multimedia resources, and real-life examples.

	2. Group activities: Students will engage in group discussions, peer-to-peer interactions, and collaborative learning tasks to reinforce their understanding of concepts and develop their communication skills. 3. Practical exercises: Students will participate in individual and group exercises, such as grammar quizzes, writing assignments, and pronunciation drills, to apply their knowledge and receive feedback. 4. Multimedia resources: The lecture may incorporate audiovisual materials, online resources, and language learning software to provide a dynamic and interactive learning experience. 5. Assessments: Regular assessments, including quizzes, exams, and assignments, will be conducted to gauge students' progress and provide constructive feedback for improvement. 6. Self-directed learning: Students will be encouraged to engage in independent learning outside of the lecture through recommended readings, online resources, and language practice exercises.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	40	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation
تقييم المادة الدراسية

As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	0	0	5, 12	LO #1, 3 and 7
	Assignments	0	30% (30)	4, 13	LO # 2, 4 and 6
	Projects / Lab.	0	0%		
	Report	1	20% (10)	13	All
Summative assessment	**Midterm Exam**	2 hr.	20% (30)	7	LO # 1-6
	Final Exam	2 hr.	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	• Review of basic grammar: Verb tenses (present, past, future) • Words in English (Book 4)
Week 2	• Present perfect tense • Words in English (Book 4)
Week 3	• Modal verbs: Can, could, may, might, must, should • Words in English (Book 4)
Week 4	• writing letters and emails. • Words in English (Book 4)
Week 5	• Conditional sentences (Type 1) • Words in English (Book 4)
Week 6	• Reported speech (statements and questions) • Words in English (Book 4)
Week 7	• Mid-term Evaluation
Week 8	• Comparative and superlative adjectives and adverbs • Words in English (Book 4)
Week 9	• Passive voice • Words in English (Book 4)
Week 10	• Phrasal verbs • Words in English (Book 4)
Week 11	• Future forms: Going to, will, and present continuous. • Words in English (Book 4)
Week 12	• Prepositions: Time, place, and movement • Words in English (Book 4)
Week 13	• Reported speech (commands and requests) • Words in English (Book 4)
Week 14	• Relative clauses • Words in English (Book 4)
Week 15	• Review and reinforcement of previous topics before final term evaluation

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	English Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	4000 Essential English words 2nd edition	No
Websites	http://www.duolingo.com/ http://www.bbc.co.uk/learningenglish	

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	**Database**		**Module Delivery**
Module Type			• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☒ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 2	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this Database Lecture is: 1. To provide students with a comprehensive understanding of the fundamental concepts and principles of databases. 2. To familiarize students with the importance and applications of databases in various domains. 3. To enable students to design, develop, and manage relational databases effectively. 4. To introduce students to database management systems (DBMS) and their role in data organization and retrieval. 5. To explore emerging trends and advancements in the field of databases.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	By the end of the lecture, students should be able to: 1. Define and explain key database concepts, such as data models, schemas, and instances. 2. Understand the significance of databases in real-world scenarios and various industries. 3. Design and create a relational database schema using appropriate modeling techniques. 4. Utilize SQL (Structured Query Language) to manipulate and query databases effectively. 5. Apply normalization techniques to improve the efficiency and integrity of a database. 6. Recognize and evaluate different types of database management systems. 7. Discuss and analyze the advantages and disadvantages of various database architectures. 8. Recognize and discuss emerging trends in the field of databases, such as NoSQL databases and big data.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to Databases • Definition and importance of databases • Types of data and their representation • Evolution of databases and their applications 2. Data Models and Schemas • Hierarchical, network, relational, and object-oriented models • Conceptual, logical, and physical schemas • Entity-relationship (ER) modeling and diagramming 3. Relational Database Management Systems (RDBMS) • Relational model and relational algebra • SQL: data definition, manipulation, and query statements • Relational database design principles and normalization

	4. Database Design and Implementation • Steps involved in database design • Entity-relationship (ER) modeling and normalization techniques • Translating ER diagrams into relational schemas 5. Database Management Systems (DBMS) • Overview of DBMS architecture • Functionality and components of DBMS • Comparison of different DBMS types (e.g., hierarchical, network, relational) 6. Advanced Database Concepts • Indexing and query optimization • Transactions and concurrency control • Backup and recovery strategies 7. Emerging Trends in Databases • NoSQL databases and their characteristics • Big data and distributed databases • Cloud-based databases and their advantages

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Teaching Strategy 1. Lectures: The instructor will deliver interactive lectures to introduce and explain key database concepts, principles, and techniques. They will use visual aids, examples, and real-world case studies to enhance understanding and engagement. 2. Practical Sessions: Hands-on practical sessions will be conducted to allow students to apply the concepts learned during lectures. These sessions may involve exercises and assignments related to database design, SQL queries, and implementation using a DBMS. 3. Discussions: Group discussions and debates will be encouraged to foster critical thinking and deeper understanding of complex topics. Students can share their perspectives, ask questions, and engage in problem-solving activities related to databases. 4. Case Studies: Real-world case studies will be presented to demonstrate the practical applications of databases in different industries. Students will analyze and discuss these case studies to gain insights into database design and management challenges. 5. Assessments: Regular assessments, including quizzes, assignments, and exams, will be conducted to evaluate students' understanding of the lecture material. These assessments will test theoretical knowledge as well as practical skills related to database design and SQL querying. 6. Resources: Recommended textbooks, research papers, and online resources will be provided to supplement the lecture content.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	-	-	-	-
	Assignments	2	5% (10)	4, 13	1-8
	Projects / Lab.	2	15% (10)	2-12	1-8
	Report	-	-	-	-
Summative assessment	Midterm Exam	4 hr.	20% (20)	7	LO # 1-6
	Final Exam	4 hr.	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	• Introduction to Databases • Types of Data and Data Representation
Week 2	• Data Models and Schemas • Hierarchical and Network Models
Week 3	• Relational Model and Relational Algebra • Entity-Relationship (ER) Modeling
Week 4	• Conceptual, Logical, and Physical Schemas • Translating ER Diagrams into Relational Schemas
Week 5	• SQL: Data Definition Language (DDL) • SQL: Data Manipulation Language (DML)

Week 6	• SQL: Querying and Retrieving Data • Relational Database Design Principles
Week 7	• Normalization Techniques (1NF, 2NF, 3NF) • Database Design Case Studies
Week 8	• Mid-term Assessment (Exam or Project)
Week 9	• Introduction to Database Management Systems (DBMS) • DBMS Architecture and Components
Week 10	• Relational Database Management Systems (RDBMS) • Transaction Processing and Concurrency Control
Week 11	• Indexing and Query Optimization • Backup and Recovery Strategies
Week 12	• Advanced Topics in Database Management • Emerging Trends: NoSQL Databases
Week 13	• Big Data and Distributed Databases • Cloud-Based Databases
Week 14	• Database Security and Privacy • Data Warehousing and Data Mining
Week 15	• Review and Recap • Second-term Assessment (Exam or Project)

Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	• Introduction to Lab Environment and Tools • Setting up a Database Management System (DBMS)
Week 2	• Creating and Manipulating Databases using SQL • Basic SQL Queries: SELECT, INSERT, UPDATE, DELETE
Week 3	• Creating Tables and Defining Relationships • Implementing Entity-Relationship (ER) Diagrams in a DBMS
Week 4	• Querying and Retrieving Data using SQL • Filtering and Sorting Data in SQL Queries
Week 5	• Joining Tables: Inner Joins, Outer Joins • Complex SQL Queries: Subqueries and Aggregates
Week 6	• Database Design and Normalization • Implementing Normal Forms in a DBMS
Week 7	Mid-term Lab Assessment (Lab Exam or Project)

Week 8	• Indexing and Query Optimization Techniques • Improving Performance of Database Queries
Week 9	• Transactions and Concurrency Control • Ensuring Data Consistency and Integrity in a DBMS
Week 10	• Database Backup and Recovery Strategies • Ensuring Data Availability and Reliability
Week 11	• Implementing Security Measures in a Database • User Access Control and Permissions
Week 12	• Implementing Advanced SQL Queries
Week 13	• Introduction to NoSQL Databases
Week 14	• Working with Big Data and Distributed Databases
Week 15	• Review and Recap of Lab Exercises • Final Lab Assessment (Lab Exam or Project)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	SQL Cookbook" by Anthony Molinaro	No
Websites	• Derek Banas: YouTube channel with tutorials on various database topics, including SQL • SQLZoo: YouTube channel with video tutorials on SQL concepts and hands-on exercises • W3Schools SQL Tutorial: A free online tutorial covering SQL syntax and concepts	

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.

مقررات الكورس الثاني

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Physics**		**Module Delivery**
Module Type	Core		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx1 2	**Semester of Delivery**	2
Administering Department		**College**	
Module Leader	**Arkan Raoof Esmael**	**e-mail**	**arkan.raoof23@ntu.edu.iq**
Module Leader's Acad. Title	**Assistant Lecturer**	**Module Leader's Qualification**	**Ms.c**
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Instrumentation and Measurements	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	The objectives of the subject of electrical and electronic physics in university and college curricula typically include the following: 1. It aims to provide students with a solid foundation in the basic principles and concepts of electrical and electronic physics. It covers topics such as electric fields, magnetic fields, electromagnetic waves, and semiconductor physics. The aim is to ensure that students have a clear understanding of the basic principles that govern electrical and electronic phenomena. 2. Develop students' analytical and problem-solving skills. By studying electrical and electronic physics, students learn to apply mathematical techniques and tools to analyze and solve engineering problems. They become adept at using formulas, equations, and mathematical models to understand and predict the behavior of electrical and electronic circuits and devices. 3. Introducing students to the design and analysis of electrical and electronic circuits. Students learn how to apply the principles of electrical and electronic physics to design circuits for specific applications. They gain knowledge of circuit components, such as resistors, capacitors, inductors, and transistors, and learn how to combine them to create functional circuits. 4. Practical Application: This subject aims to bridge the gap between theory and practice by providing students with practical experience. Laboratory work is an integral part of electrical and electronic physics courses, allowing students to apply theoretical concepts to real-world scenarios. They learn to use laboratory equipment, conduct experiments, and perform measurements to verify theoretical predictions and deepen their understanding of electrical and electronic phenomena. 5. Preparation for advanced studies: Electrical and electronic physics serves as a basis for more advanced courses in electrical engineering or related fields. The aim of this subject is to prepare students for further studies by providing them with the necessary knowledge and skills. This includes providing the conceptual framework and problem-solving capabilities that will be necessary to address advanced topics and applications in areas such as power systems, communications, control systems, and electronic devices. 6. Develop students' ability to communicate and present their ideas clearly and effectively. Through assignments, reports, and presentations,

	students learn to express their understanding of electrical and electronic physics, explain complex concepts, and present their findings in a concise and structured manner
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	Specific learning outcomes in electrical and electronic physics can vary depending on the institution, course level (undergraduate or graduate), and curriculum. Through this, it is possible to provide a general set of learning outcomes that are usually associated with the study of electrical and electronic physics in universities, colleges and institutes: 1. Understanding of Basic Principles: Gain a comprehensive understanding of the basic principles and laws that govern electrical and electronic phenomena. This includes concepts related to electric fields, magnetic fields, electromagnetic waves, and semiconductor physics. 2. Develop strong analytical and problem-solving skills, enabling the ability to apply mathematical techniques and tools to analyze and solve electrical and electronic engineering problems. This involves using mathematical formulas, equations, and models to understand and predict the behavior of electrical circuits and devices. 3. Gain the necessary knowledge and skills to design and analyze electrical and electronic circuits. This includes selecting appropriate components, understanding circuit behavior under various conditions, and being able to create circuits that meet specific requirements and constraints. 4. Gain hands-on experience through laboratory work, including conducting experiments, making measurements, and analyzing data. Develop proficiency in using laboratory equipment and techniques to verify theoretical predictions and deepen understanding of electrical and electronic phenomena. 5. Familiarity with electrical and electronic components and devices and develop a working knowledge of electrical components and devices commonly used in electrical engineering. This includes understanding the properties and behavior of resistors, capacitors, inductors, transistors, diodes, and other basic electronic components. 6. Apply the principles of electrical and electronic physics to real-world engineering problems and applications. This includes understanding how electrical and electronic concepts are used in areas such as power systems, communications, control systems, and electronic devices. 7. Communication and Presentation Skills: Develop effective communication and presentation skills, both written and oral, for technical information related to electrical and electronic physics. This includes the ability to articulate understanding, explain complex concepts, and present results in a clear and structured manner.

Indicative Contents **المحتويات الإرشادية**	**Indicative content includes the following.** **Part A –** ***** Introduction to materials science and engineering, Energy levels, Atomic structure and Polymer **[**12 **hrs.]** ***** Electrıcal source voltage and current, Types of impedances, their characteristics and methods of connection **[12hrs]** ***** Semiconductors Fundamentals, Extrinsic Semiconductors **[8 hrs.]** **Part B-** * The P-N Junction, The P-N Junction diode, diode application **[**10 **hrs.]** ***** Type of diode (Zener diode, Light Emitting Diodes, Tunnel Diode) **[10 hrs.]** ***** Transistor, Bipolar transistor biasing, field effect transistor FET **[**10 **hrs.]**

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Learning and teaching techniques are tools used by teachers to provide instruction successfully and by learners to acquire knowledge and skills. There are many different kinds of teaching and learning techniques, such as: **1.** Engaging students in activities that require their participation, critical thinking, and application of what they have learned is active learning. Examples include case studies, hands-on activities, and problem-based learning. **2-** Collaborative learning: This type of learning involves students working together in groups to accomplish a common goal. Peer learning and group projects are two examples. **3.** Inquiry-based learning: This entails motivating students to pose queries, investigate subjects, and discover solutions via study and experimentation. Scientific research and case studies are examples and reports. **4-** Direct instruction: In this method, the teacher presents knowledge to the students in a planned and systematic way. Examples include tutorials, lectures, and shows. **5-** Differentiated instruction: This refers to adjusting instruction to fit the needs of certain students depending on their interests, learning preferences, and learning styles. **6-** Technology-based instruction: This method involves enhancing instruction and involving students by using technology tools and resources. Online classes, interactive whiteboards, and instructional apps are a few examples. **7-** Effective teaching and learning tactics frequently combine these methods in ways that are suited to the needs of the students and the subject matter being covered.

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**	38	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2.5
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**100**		

Module Evaluation
تقييم المادة الدراسية

As		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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (10)	7	LO # 1-7
	Final Exam	3hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1-2	Introduction to materials science and engineering, Energy levels, Atomic structure and Polymer
Week 3-4	Internal structure of cell, Resistance of Material and resistivity
Week 5-6	Electrıcal source voltage, current Types of impedances, their characteristics and methods of connection
Week 7-8	Semiconductors Fundamentals, Extrinsic Semiconductors
Week 9-10	The P-N Junction, The P-N Junction diode, diode application
Week 11-12	Type of diode (Zener diode, Light Emitting Diodes, Tunnel Diode)
Week 13-14-15	Transistor, Biploar transistor biasing, field effect transistor FET

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	-Electronic devices - Thomas L. Floyd, -Electronic devices and Circuits - Jimme J. Cathy- second edition	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

اسم المادة اخلاقيات المهنة Professional) (Ethics	السنة الدراسية الثانية	الساعات الأسبوعية		
		ن	ع	الوحدات
		2		2
لغة التدريس : العربية	عنوان الكتاب المنهجي : أخلاقيات المهنة Professional Ethics لطلبة المعاهد التقنية (الهندسية،الطبية،الادارية، الفنون التطبيقية،الزراعية،اعداد المدربين التقنيين)			

الهدف العام : يهدف المقرر الى تعريف طلبة المعاهد التقنية بأخلاقيات المهنة حسب تخصصهم التقني ، واكسابهم القواعد الاخلاقية المهنية التي تعزز التزامهم بها ، في مجال عملهم المتوقع بعد التخرج.

الأهداف المحددة : توضع من قبل مدرسو المادة (كأهداف سلوكية) في إطار خطة الدرس على مستوى المحاضرة الواحدة.

المفردات

الأسبوع	تفاصيل المفردات
الأول و الثاني	**الوحدة (1) – الأخلاق** • مفهوم الأخلاق و منشأها. • القواعد العامة للأخلاقيات. • مصادر الاخلاقيات. • القيم الاخلاقية. • أهمية الأخلاق للفرد والمجتمع.
الثالث	**الوحدة (2) – العمل والمهنة** • العمل واهميته. • سلوكيات العمل. • مفهوم المهنة. • تعريف المهنة. • الفرق بين مفهوم العمل و المهنة والحرفة. • المعايير التي يجب ان تقوم عليها المهنة.
	<u>الوحدة (3) – اخلاقيات المهنة</u> • ماهية أخلاقيات المهنة.

الرابع	• المردودات الايجابية للالتزام بأخلاقيات المهنة. • خصائص أخلاقيات العمل. • صفات اخلاقيات المهنة. • خطوات المستوى المقبول من اخلاقيات المهنة.
الخامس والسادس	**الوحدة (4) – القيم واخلاقيات المهنة** • الأمانة. • الصدق. • النصح. • العدل. • حسن التعامل. • الإتقان العمل.
السابع و الثامن	**الوحدة (5) – أنماط السلوك الغير أخلاقي في المهنة** • **الفساد الاداري.** • السلوك الاداري الغير أخلاقي. • تعريف الفساد الاداري . • أنواع الفساد الاداري. • **الرشوة.** • مفهوم الرشوة. • انواع الرشوة. • الفرق بين الهدية والرشوة. • الاسباب والدوافع التي تقف وراء الرشوة. • **الغش.** • مفهوم الغش. • طبيعة الغش في العمل. • مظاهر الغش في أداء الوظيفة.
التاسع والعاشر	**الوحدة (6) – وسائل واساليب ترسيخ قيم اخلاقيات المهنة** • اسلوب ترسيخ اخلاقيات المهنة. • مستويات بناء وترسيخ أخلاقيات المهنة. • وسائل واساليب ترسيخ أخلاقيات المهنة. • الامور التي يجب مراعاتها في صياغة الميثاق الاخلاقي للمهنة . • الكيفية التي يتم بها تعزيز السلوك الاخلاقي في العمل وفق ل(كريتنر وكينيكي).
الحادي عشر **الثاني عشر** **الثالث عشر**	**اخلاقيات ممارسة المهن الهندسية** (خاصة بالمعاهد التقنية التكنولوجية) **الوحدة (7) - اخلاقيات مهنة الهندسة**

الرابع و الخامس عشر	• اهمية التقني (الفني) في المجتمع. • الاخلاق الفنية والتكنولوجية . • شروط التقني (الفني) المحترف. • سمات التقني (الفني) المحترف. • بنود لائحة مزاولة المهنة لنقابة العمال. • النظرة الاسلامية للاخلاقيات المهنة ، مقارنة بالنظرة الغربية والامريكية.
	الوحدة (8) - ميثاق اتحاد المهندسين العرب (نموذج اخلاقيات مهنة الهندسة) • المرتكزات الأساسية لميثاق أخلاق مهنة الهندسة. • علاقة التقني(الفني) مع ذاته وزملائه . • طبيعة علاقة التقني(الفني) مع مؤسسته. • علاقة التقني(الفني) مع صاحب العمل. • علاقة التقني(الفني) مع عمله الهندسي. • دور التقني(الفني) وعلاقته بالمجتمع. • طبيعة علاقة التقني(الفني) مع البيئة والتنمية المستدامة والصحة والسلامة العامة. • علاقة التقني(الفني) مع القوانين والتشريعات والانظمة، و قوانيين العمل والعمال. • علاقة التقني(الفني) مع قضايا الوطن والأمة والقضايا الانسانية.
	الوحدة (9) - اخلاقيات التقني (الفني) في التعليم والتدريب المستمر • اهمية المشاركة في التعليم والتدريب المستمر اخلاقياً. • قواعد السلوك الواجب ان يلتزم بها التقني(الفني) نحو ذاته في مجال التعليم . • قواعد سلوك التقني(الفني) نحو مرؤوسيه في مجال التعليم والتدريب المستمر. • قواعد سلوك التقني(الفني) نحو النقابات في مجال التعليم والتدريب المستمر. • قواعد سلوك التقني(الفني) نحو مراكز التدريب في مجال التعليم والتدريب المستمر.

الحادي عشر	**اخلاقيات ممارسة المهن الطبية** (خاصة بالمعاهد والاقسام الطبية) **الوحدة(10) – خصائص وواجبات التقني الطبي** • الصفات التي يجب ان يتحلى بها التقني الطبي. • واجبات التقني الطبي تجاه مهنته. • واجبات التقني الطبي تجاه المريض. • واجبات التقني الطبي تجاه المجتمع.
الثاني عشر	**الوحدة(11) - حقوق المريض** • مفهوم حقوق المريض. • اهمية احترام حقوق المريض. • اهم حقوق المريض. • كيفية الحصول على الموافقة المسبقة.
الثالث عشر	**الوحدة(12) -علاقة التقني الطبي مع المجتمع ومسوؤليته تجاه البيئة والسلامة العامة** • اهمية دور التقني الطبي في المجتمع. • المجالات التي يمكن للتقني الطبي ان يؤدي من خلالها دور فعال في المجتمع. • مصطلح تعزيز الصحة. • دور التقني الطبي في تعزيز الصحة.
الرابع عشر	**الوحدة(13) - العلاقات المهنية:علاقة التقني الطبي مع زملائه في المؤسسة الصحية** • اهمية العلاقات المهنية. • اهم ركائز العلاقات المهنية السليمة.
الخامس عشر	**الوحدة(14) - أخلاقيات التعليم والتعلم على المرضى** 1. المبادئ الرئيسية لاخلاقيات التعلم على المرضى. 2. كيفية مراعاة الموازنة بين عملية التدريب وتوفير الرعاية والعلاج اللازم للمرضى. 3. السبل التي تحفظ كرامة المتدرب امام المرضى.
الحادي عشر **الثاني عشر**	**اخلاقيات ممارسة المهن الادارية** (خاصة بالمعاهد والاقسام الادارية) **الوحدة(15) - اخلاقيات المهنة لمنظمات الاعمال** • مفهوم العمل والمهنة الإدارية. • مفهوم اخلاقيات مهنة الإدارة. • أهمية اخلاقيات مهنة الإدارة للمجتمع والمنظمة والفرد. • الأخلاقيات الواجب توافرها في مهنة الإداري. • أنماط السلوك غير الأخلاقي المرفوض في مهنة الإدارة.

	• مصادر أخلاقيات مهنة الإدارة. • العوامل المؤثرة في السلوك الأخلاقي الاداري. • محددات اخلاقيات مهنة الاعمال.
الثالث عشر	**الوحدة(16) - السلوك المهني والعلاقات الوظيفة** • السلوك الوظيفي لقادة الإداريين (المدراء ورؤساء العمل). • السلوك الوظيفي للموظفين والعاملين والعلاقات المهنية مع رؤساء وزملاء العمل. • السلوك المهني والتعامل مع المواطنين.
الرابع عشر	**الوحدة(17) - اثار التعاقد الوظيفي والعمل الاداري** • الحقوق المالية الموظف الإداري. • الحقوق الوظيفية للموظف الإداري. • جزاءات اخلال الموظف بواجباته.
الخامس عشر	**الوحدة(18) – نماذج من اخلاقيات المهنة وفق التخصصات الإدارية** • اخلاقيات مهنة المدير الإداري اتجاه الموظفين(العاملين). • الاخلاقيات المهنية للموظف المحامي. • يوضح واجبات المحامي تجاه نقابته / القضاء/ زملائه / موكله/ كمستشار قانوني.
الحادي عشر **الثاني عشر**	**اخلاقيات ممارسة الفنون التطبيقية** (خاصة بمعهد الفنون التطبيقية) **الوحدة(19) - المحددات الاخلاقية لمهن الفنون التطبيقية** • طبيعة العلاقة بين الفنون التطبيقية واخلاقيات المهنة. • مفهوم السرقة الفكرية كوسيلة غير اخلاقية. • مفهوم الملكية الفكرية. • مصطلح حق المؤلف. • مفهوم براءة الاختراع. • ميزة العلامة التجارية. • فكرة النماذج الصناعية.فكرة النماذج الصناعية. • تميز الجزء المسروق من العمل الفني ومعرفة الاصلي من المسروق.
الثالث عشر	**الوحدة (20) - خلق المبادرة** • مفهوم المبادرة وصورها . • كيفية التخلق بحسن المعاملة في البيئة العملية. • كيف يطبق خلق التعاون في الحياة مع زملاء العمل.
	الوحدة (21) - علاقة الفنان بالبيئة المحيطة • اوجه تأثر وتأثير الفنان ببيئته.

الرابع عشر	• اهمية دور الفنان في نقل الموروث الحضاري. • علاقة التذوق الجمالي بالقيمة الأخلاقية في بيئة معينة.
الخامس عشر	**الوحدة (22) - وظيفة الفنان الاخلاقية** • دور الفنان في توجيه المجتمع نحو قيم السعادة. • الغايات الاجتماعية . • الغايات النفسية وكيفية ابرازها من قبل الفنان. • الدور الاخلاقي للفنان في ايجاد تحول روحاني في الانسان.
الحادي عشر	**اخلاقيات ممارسة المهن الزراعية** (خاصة بالاقسام **الزراعية**) **الوحدة (23) - أخلاقيات المهنة فى المجال الزراعى** • المقصود من المحافظة على المصادر الطبيعية للإنتاج الزراعى. • الحاجة الى أخلاقيات المهنة فى حماية الثروة الحيوانية والإنتاج الحيوانى. • الاسباب وراء الاضرار بعملية انتاج الاعلاف. • كيفية الالتزام بالجانب الأخلاقى المهنى يمنع انتشار الأمراض المعدية والوبائية بين الحيوانات. • السبيل الامثل لتطبيق شروط ذبح الحيوانات وتجارة اللحوم.
الثاني عشر **الثالث عشر**	**الوحدة (24) - خصائص التقني الزراعي واخلاقيات علاقاته المهنية** • خصائص وصفات التقني الزراعي. • علاقة التقني الزراعي بذاته. • علاقة التقني الزراعي بزملاء العمل. • علاقة التقني الزراعي بالمؤسسة التي يعمل بها. • علاقة التقني الزراعي بطالب الخدمة الزراعية. • علاقة التقني الزراعي بعمله الزراعي. • علاقة التقني الزراعي بالجمعية الزراعية المنتسب اليها. • علاقة التقني الزراعي بالمجتمع . • علاقة التقني الزراعي بالقوانين والتشريعات والانظمة. • علاقة التقني الزراعي بقوانيين العمل والعمال .
الرابع عشر الخامس عشر	**الوحدة (25) - الواجبات الاخلاقية للتقني الزراعي / قسم الانتاج النباتي** • طبيعية واجبات التقني الزراعي / قسم الانتاج النباتي. • الواجبات الاخلاقية للتقني الزراعي في مجال إدارة التشجير والتجميل. • الواجبات الاخلاقية للتقني الزراعي في إدارة تشغيل وصيانة الحدائق. • الواجبات الاخلاقية للتقني الزراعي في إدارة المشاتل. • الواجبات الاخلاقية للتقني الزراعي في مجال المشاريع الزراعية المنفذة بواسطة المقاولين والمستثمرين. • الاساسيات الاخلاقية للتقني الزراعي في مجال تربية النحل وادارة المناحل.

الحادي عشر **الثاني عشر**	**اخلاقيات مهنة التعليم والتدريب** (خاصة بمعهد اعداد المدربين التقنيين) **الوحدة (26) - اخلاقيات مهنة التعليم والتدريب** • اهمية اخلاقية مهنة التعليم. • تعريف مفهوم اخلاقيات مهنة التعليم. • مستوى فاعلية الأداء التعليمي المطلوبة. • بعض السلوكيات اللاخلاقية لمهنة التدريس والتدريب. • المردودات الايجابية للالتزام بأخلاقيات مهنة التدريس والتدريب.
الثالث عشر **الرابع عشر الخامس عشر**	**الوحدة (27) - المجالات الاخلاقية لمهنة التدريس والتدريب** • اخلاق المهنة في مجال التدريس والتدريب. • اخلاق المهنة في مجال التقييم والامتحانات. • اخلاق المهنة في مجال الأنشطة والعلاقات الطلابية. • اهم الجوانب لاخلاق المهنة في مجال الإدارة. • اخلاق المهنة في مجال للأعمال الإدارية والفنية. • اخلاق المهنة في مجال البحث العلمي .

المصادر : موجودة ضمن قائمة المصادر العربية والاجنبية في نهاية المحاضرات.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Electronic**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE225**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 2	**Semester of Delivery**	4
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Noor F. Mohammed	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	Noor6faysal@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims أهداف المادة الدراسية	This module aims to introduce students to the fundamentals of electronics, with a focus on the principles of semiconductor physics, diodes and transistors, diode equivalent circuits, DC analysis, AC to DC rectifiers, clipper and clamper circuits, and BJT and FET transistor equivalent circuits. It further aims to educate students on transistor amplifiers, power amplifiers, operational amplifiers, and integrated circuits, including oscillators.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental physics of semiconductors. 2. Understand the function and operation of diodes and transistors. 3. Conduct DC analysis of diode equivalent circuits. 4. Understand and implement AC to DC rectifiers. 5. Understand the working of clipper and clamper circuits. 6. Understand the DC equivalent circuits for BJT and FET transistors. 7. Perform DC analysis, load line analysis, and identify Q-Points. 8. Understand transistor amplifiers and their characteristics. 9. Understand the functionality of power amplifiers. 10. Understand the operation of operational amplifiers and their use in different circuits. 11. Understand the structure and functionality of integrated circuits, including oscillators.
Indicative Contents المحتويات الإرشادية	The module will cover the following key areas: 1. Physics of semiconductors 2. Diodes and transistors 3. Diode equivalent circuits and DC analysis 4. AC to DC rectifiers 5. Clipper and clamper circuits 6. BJT transistor DC equivalent circuits 7. FET transistor DC equivalent circuits 8. Load line analysis and Q-Points 9. Transistor amplifiers 10. Power amplifiers 11. Operational amplifiers circuits 12. Integrated circuits and oscillators

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will employ a combination of strategies including: 1. Lectures: To provide theoretical foundations on electronics. 2. Group Discussions: To facilitate understanding through the exchange of ideas. 3. Problem-Solving Sessions: To apply theoretical concepts to practical problems. 4. Practical Demonstrations: To illustrate key concepts, such as transistor amplifiers, operational amplifiers circuits, etc. 5. Tutorials: To delve into complex topics like integrated circuits and oscillators.

	6. Mid-term and final exams: To assess the understanding and application of knowledge. 7. Preparatory Week: To give students time to revise and clarify any difficulties before the final exam.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Physic Of semiconductor
Week 2	Diode and Transistor.
Week 3	Diode Equivalent Circuits. DC analysis
Week 4	ac to DC Rectifier (HWR and FWR)
Week 5	Clipper, Clamper cct.

Week 6	BJT Transistor DC Equivalent Circuits, (C.B, C.C and C.E)
Week 7	DC analysis, Load line and Q-Points
Week 8	Mid-term
Week 9	BJT Transistor ac Equivalent Circuits h-parameters and re- model
Week 10	Transistor Amplifier
Week 11	FET Transistor DC Equivalent Circuits, (C.G, C.S and C.D)
Week 12	DC analysis, Load line and Q-Points.
Week 13	Power Amplifiers.
Week 14	Operational Amplifiers cct. (Inverter, non-inverter, summing, subsector, integration, and diff.)
Week 15	Integrated Circuits, Oscillators
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Introduction to Electronics Lab
Week 2	Lab 2: Working with Semiconductors and Diodes
Week 3	Lab 3: Exploring Transistors
Week 4	Lab 4: Circuit Analysis
Week 5	Lab 5: Operational Amplifiers
Week 6	Lab 6: Power Amplifiers and Oscillators
Week 7	Lab 7: Revision and Troubleshooting

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Sedra, A. S., & Smith, K. C. (2017). "Microelectronic Circuits". Oxford University Press	No
Recommended Texts	Neamen, D. (2018). "Semiconductor Physics and Devices". McGraw-Hill Education.	No
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	**Communications fundamental**		**Module Delivery** • ☒ Theory • ☒ Lecture • ☒ Lab • ☐ Tutorial • ☐ Practical • ☐ Seminar
Module Type	**Core**		
Module Code	**COE222**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 2	**Semester of Delivery**	4
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Abrar Khalid	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	abraralshareef@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	This module aims to provide a comprehensive understanding of the fundamentals of communication, focusing primarily on signals and systems. It will delve into signal and system classifications, energy and power considerations, and in-depth exploration of Fourier series and transforms. The module will also introduce key aspects of modulation and demodulation, covering both amplitude and angle modulation, and their corresponding frequency and phase modulation techniques.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Upon successful completion of this module, students should be able to: 2. 3. Understand and define signals and systems. 4. Classify different types of signals and systems. 5. Understand and differentiate between energy and power in signal classification. 6. Understand and apply the Fourier series to analyze signal spectrums. 7. Understand the Fourier transform relationship, transform pairs, and its properties. 8. Understand and apply amplitude modulation techniques, including DSBSC generation, large carrier AM generation, and detection. 9. Calculate power in amplitude modulation. 10. Understand and apply angle modulation techniques, including frequency modulation and phase modulation.
Indicative Contents **المحتويات الإرشادية**	The module will cover the following key areas: 1. Introduction to signals and systems 2. Signal classifications 3. System classifications 4. Energy and power in signal classification 5. Fourier series and signal spectrum 6. Fourier transform relationships 7. Transform pairs for selected functions 8. Properties of Fourier transforms 9. Amplitude modulation techniques 10. Power calculations in amplitude modulation 11. Angle modulation techniques

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will employ a combination of strategies including but not limited to: 1. Lectures: To provide theoretical foundations on communication fundamentals. 2. Group Discussions: To facilitate understanding through the exchange of ideas. 3. Problem-Solving Sessions: To apply theoretical concepts to practical problems. 4. Practical Demonstrations: To illustrate key concepts, such as modulation and demodulation techniques. 5. Tutorials: To delve into complex topics like Fourier series and transforms.

	6. Mid-term and final exams: To assess the understanding and application of knowledge. 7. Preparatory Week: To give students time to revise and clarify any difficulties before the final exam.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to Signals and Systems: signals and system definitions,
Week 2	Signal classifications , System Classifications
Week 3	Signal classifications ” energy-Power”
Week 4	Signal classifications ” energy-Power”
Week 5	Fourier Series: Complex (exponential) and signal Spectrum (Amplitude and Phase).
Week 6	Fourier Series: Complex (exponential) and signal Spectrum (Amplitude and Phase).
Week 7	Fourier Series: Complex (exponential) and signal Spectrum (Amplitude and Phase).

Week 8	Mid-term
Week 9	Fourier Transform relationship, Transform Pairs for selected functions, Properties of Fourier Transform,
Week 10	Fourier Transform relationship, Transform Pairs for selected functions, Properties of Fourier Transform,
Week 11	Fourier Transform relationship, Transform Pairs for selected functions, Properties of Fourier Transform,
Week 12	Modulation and Demodulation : Amplitude Modulation: DSBSC Generation , Large Carrier AM Generation, Power Calculation and Detection,
Week 13	Modulation and Demodulation : Amplitude Modulation: DSBSC Generation , Large Carrier AM Generation, Power Calculation and Detection,
Week 14	Angle Modulation: Frequency Modulation , Phase Modulation, Instantaneous Frequency
Week 15	Angle Modulation: Frequency Modulation , Phase Modulation, Instantaneous Frequency
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Communication Systems Principles
Week 2	Lab 2: Experiment 1 Computing the energy and power of signals using Matlab.
Week 3	Lab 3: Experiment 2 Computing the exponential Fourier series using Matlab.
Week 4	Lab 4: Experiment 3 Computing Fourier transform using Matlab.
Week 5	Lab 5: Experiment 4 Implementation of AM modulation and demodulation
Week 6	Lab 6: Experiment 5 effect of modulation index on AM modulation
Week 7	Lab 7: Experiment 6 Implementation of FM modulation and demodulation

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Lathi, B. P., & Ding, Zhi (2009). "Modern Digital and Analog Communication Systems". Oxford University Press	No
Recommended Texts	Proakis, John G. & Salehi, Masoud (2008). "Communication Systems Engineering". Prentice Hall	No
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	**Operating System**		**Module Delivery**
Module Type			• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☒ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 2	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this Operating system Lecture is: 1. To introduce students to the fundamental concepts and principles of operating systems. 2. To familiarize students with the key components and functionalities of operating systems. 3. To develop students' understanding of operating system design principles and management techniques. 4. To equip students with practical skills in implementing, managing, and troubleshooting operating systems. 5. To foster critical thinking and problem-solving abilities in the context of operating system-related challenges.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	By the end of the lecture, students should be able to: 1. Explain the fundamental concepts and principles underlying operating systems. 2. Identify and describe the key components and functionalities of operating systems. 3. Design and implement basic operating system functionalities. 4. Apply management techniques for process, memory, file, and device management. 5. Analyze and evaluate the performance of operating systems. 6. Troubleshoot common operating system problems and errors. 7. Demonstrate critical thinking and problem-solving skills in the context of operating systems.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to Operating Systems • Definition and role of operating systems • History and evolution of operating systems • Types of operating systems 2. Operating System Structures and Components • Kernel and user modes • Process management and scheduling • Memory management and virtual memory • File systems and storage management • Device management and I/O operations 3. Process Management • Process states and lifecycle • Process scheduling algorithms • Interprocess communication and synchronization • Deadlock detection and prevention 4. Memory Management • Memory hierarchy and management techniques

	• Address translation and segmentation • Page replacement algorithms • Virtual memory concepts and techniques 5. File Systems • File system architecture and organization • File operations and directory structures • File allocation and access methods • Disk management and optimization 6. Input/Output Management • I/O devices and device drivers • I/O operations and buffering • Disk scheduling algorithms • RAID and data redundancy 7. Operating System Performance • Performance metrics and benchmarks • Profiling and optimization techniques • Resource utilization and monitoring • Performance evaluation and tuning 8. Operating System Security • Threats and vulnerabilities • Access control and authentication • Encryption and secure communication • Security policies and mechanisms 9. Operating System Case Studies • Analysis of real-world operating systems • Comparative study of different operating systems • Current trends and future directions in operating systems

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching Strategy 1. Lectures: The course will include interactive lectures to introduce and explain key concepts, theories, and principles related to operating systems. The lectures will provide a foundation for further exploration and understanding of the subject matter. 2. Practical Exercises: Students will engage in practical exercises to reinforce their learning and develop hands-on skills in operating system implementation, management, and troubleshooting. These exercises may involve programming assignments, simulations, or working with operating system tools and utilities. 3. Case Studies and Discussions: Case studies and discussions will be utilized to deepen students' understanding of real-world operating systems, their design choices, and their impact on various applications and industries. Students will be encouraged to analyze and critically evaluate different operating systems in light of the course concepts. 4. Group Projects: Collaborative group projects will be assigned to encourage teamwork and the application of

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	64	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	36	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation
تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	-	-	-	-
	Assignments	2	5% (10)	4, 13	1-8
	Projects / Lab.	2	15% (10)	2-12	1-8
	Report	-	-	-	-
Summative assessment	Midterm Exam	4 hr.	20% (20)	7	LO # 1-6
	Final Exam	4 hr.	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	• Introduction to Operating Systems • Role and importance of operating systems • Evolution of operating systems • Types of operating systems
Week 2	• Operating System Structures and Components • Kernel and user modes • Process management and scheduling
Week 3	• Memory Management • Memory hierarchy and management techniques • Address translation and segmentation
Week 4	• Memory Management (continued) • Page replacement algorithms • Virtual memory concepts and techniques
Week 5	• File Systems

	• File system architecture and organization • File operations and directory structures
Week 6	• File Systems (continued) • File allocation and access methods • Disk management and optimization
Week 7	• Mid-term Assessment (in-class exam)
Week 8	• Input/Output Management • I/O devices and device drivers • I/O operations and buffering
Week 9	• Input/Output Management (continued) • Disk scheduling algorithms • RAID and data redundancy
Week 10	• Process Management • Interprocess communication and synchronization • Deadlock detection and prevention
Week 11	• Operating System Performance • Performance metrics and benchmarks • Profiling and optimization techniques
Week 12	• Operating System Security (Threats and vulnerabilities) • Access control and authentication
Week 13	• Operating System Security (continued) • Encryption and secure communication
Week 14	• Operating System Case Studies • Analysis of real-world operating systems • Comparative study of different operating systems
Week 15	• Current trends and future directions in operating systems • Review and exam preparation

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	1. Introduction to Ubuntu OS • Installation of Ubuntu OS • Basic system configuration and settings 2. Navigating the Terminal • Basic commands (ls, cd, pwd, etc.)

	• File and directory operations
Week 2	1. User and File Permissions • User management and permissions • Changing ownership and permissions of files and directories 2. Package Management • Installing, updating, and removing software packages using APT
Week 3	1. File System Operations • Creating, copying, moving, and deleting files and directories • Working with file permissions and ownership 2. Process Management • Managing processes using command-line tools • Monitoring and terminating processes
Week 4	1. Text Processing Tools • Working with text files using commands like grep, sed, and awk • Text file manipulation and searching 2. Bash Scripting Basics • Introduction to shell scripting • Writing and executing basic Bash scripts
Week 5	1. Networking Basics • Configuring network interfaces • Troubleshooting network connectivity issues 2. Remote Access via SSH • Enabling SSH server • Remote login and file transfer using SSH
Week 6	1. Working with Package Managers • Exploring additional package managers (Snap, Flatpak) • Installing and managing software using alternative package managers 2. System Monitoring and Performance • Monitoring system resources (CPU, memory, disk usage) • Performance optimization techniques

Week 7	1. Backup and Restore • Creating backups using command-line tools • Restoring files and directories from backups 2. Disk Management • Partitioning disks • Mounting and unmounting file systems
Week 8	• Mid-term Assessment (in-class exam or lab-based assessment)
Week 9	1. File Compression and Archiving • Compressing and decompressing files and directories • Creating and extracting archives (tar, zip) 2. Shell Customization • Customizing the shell prompt • Creating aliases and shell functions
Week 10	1. Introduction to Cron Jobs • Scheduling recurring tasks using cron • Managing cron jobs 2. Basic Network Services • Setting up a web server (Apache) • Configuring a DNS server (Bind)
Week 11	1. Introduction to Containers (Docker) • Installing Docker and basic container management • Running and managing containerized applications 2. System Logs and Log Management • Understanding system log files • Analyzing and managing log files
Week 12	1. System Updates and Upgrades • Updating the system and installed packages • Performing system upgrades 2. System Recovery and Rescue • Troubleshooting and recovering from system failures • Emergency boot options and system rescue tools
Week 13	1. File Sharing and Permissions

	• Setting up file sharing (Samba) • Managing shared directories and user access 2. Security Tools and Techniques • Introduction to security tools (firewall, antivirus) • Basic security configurations and best practices
Week 14	1. Virtualization Basics (VirtualBox) • Installing and configuring VirtualBox • Creating and managing virtual machines 2. Backup Strategies and Automation • Implementing automated backup solutions • Developing backup strategies for data protection
Week 15	• Lab Wrap-up and Review • Final Examination (lab-based assessment)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne	No
Recommended Texts	• "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne	No
Websites	• Coursera: "Operating Systems" by University of Washington • YouTube: "Operating Systems" playlist by Neso Academy	

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	**Instrumentation and Measurements**		**Module Delivery**
Module Type	Core		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx1 2	**Semester of Delivery**	2
Administering Department		**College**	
Module Leader	**Arkan Raoof Esmael**	**e-mail**	**arkan.raoof23@ntu.edu.iq**
Module Leader's Acad. Title	**Assistant Lecturer**	**Module Leader's Qualification**	**Ms.c**
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Electrical and electronic physics	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	In university curricula, the subject of electrical and electronic devices and measurements typically aims to provide students with a fundamental understanding of electrical and electronic systems, devices, and the techniques used to measure and analyze them. The main objectives of this subject can vary depending on the specific program and level of study, but some common objectives include: 1. Understanding Electrical and Electronic Systems: The subject aims to familiarize students with the basic principles, components, and operation of electrical and electronic systems. This includes concepts such as circuit analysis, electronic components, power sources, amplifiers, digital logic, and communication systems. 2. Device Characteristics and Behavior: Students learn about the characteristics and behavior of various electrical and electronic devices such as resistors, capacitors, inductors, diodes, transistors, operational amplifiers, and integrated circuits. They explore topics like device modeling, behavior under different operating conditions, and limitations. 3. Measurement Techniques: Students are introduced to measurement techniques used to assess the performance, characteristics, and behavior of electrical and electronic devices and systems. This involves understanding measurement instruments, signal generation and analysis, data acquisition, and techniques for troubleshooting and debugging. 4. Laboratory Skills: Practical laboratory sessions are often an integral part of this subject. The objective is to develop hands-on skills in working with electrical and electronic devices, measurement instruments, and experimental setups. Students learn to design, assemble, test, and analyze circuits and systems, and interpret the results obtained from measurements. 5. Data Analysis and Interpretation: The subject emphasizes the importance of data analysis and interpretation in electrical and electronic measurements. Students learn statistical analysis methods, error analysis, and how to draw meaningful conclusions from experimental data. They also develop skills in documenting and presenting measurement results effectively. 6. Safety and Standards: Students are educated about safety practices, standards, and regulations relevant to working with electrical and electronic devices and measurement equipment. They learn to identify potential hazards, follow safety protocols, and adhere to industry standards and guidelines.
Module Learning Outcomes	The learning outcomes for the subject of devices and measurements in universities and colleges can vary depending on the specific institution and

مخرجات التعلم للمادة الدراسية	program. However, here are some common learning outcomes associated with this subject: 1. Knowledge and Understanding: Demonstrate a strong understanding of principles, theories and concepts related to electrical and electronic instrumentation and measurements. The student should be familiar with the characteristics and behavior of various devices and have knowledge of measurement techniques and tools. 2. Analysis and Problem Solving: Ability to analyze electrical and electronic circuits and systems, apply appropriate measurement techniques, and interpret measurement data to solve problems. Also identifying and diagnosing problems in the circuits and proposing effective solutions. 3. Experimental skills: Design, build and test electrical and electronic circuits and systems. and the ability to use measurement tools correctly, follow experimental procedures, and troubleshoot problems encountered during experimentation 4. Data acquisition and analysis: the ability to obtain accurate measurement data using appropriate tools and techniques. As well as analyzing and interpreting measurement results, identifying sources of error, and applying statistical methods to analyze data. 5. Documentation and Reporting: Students should be able to effectively document their experimental work, including circuit diagrams, measurement procedures, and results. They should be able to present their findings in a clear and concise manner, both orally and in written reports. 6. Teamwork and Communication: Students are to work effectively as part of a team, particularly during laboratory experiments or group projects. They must be able to communicate their ideas, collaborate with others, and present their findings in a professional and coherent manner. 7. Instrumentation and Measurement Techniques: Use a variety of measurement tools such as gauges, oscilloscopes, signal generators, power analyzers, and spectrum analyzers. Understanding of the operating principles of these instruments and the ability to choose the right instrument for a particular measurement task. 8. Calibration and Metrology: Knowledge of calibration procedures and metrological principles associated with electrical and electronic measurements. Must understand the importance of traceability, accuracy and precision in measurement results, and be able to apply calibration techniques to ensure reliable measurements. 9. Signal analysis and processing: Analyzing different types of signals that are encountered in electrical and electronic systems, such as analog signals, digital signals, and various modulation techniques. They should understand signal processing techniques, such as filtering, Fourier analysis, and time domain analysis. 10. Advanced Measurement Techniques: Students should be exposed to advanced measurement techniques used in specialized areas, such as RF

	(Radio Frequency) measurements, microwave measurements, high-speed digital measurements, and power system measurements. They should understand the unique challenges associated with these measurements and the specific instrumentation and techniques required. 11. Emerging Technologies: Students should be aware of the latest advancements and emerging technologies in the field of electrical and electronic devices and measurements. They should have knowledge of topics such as Internet of Things (IoT), sensors, wireless communication, and data acquisition systems. 12. Critical Thinking and Evaluation: Develop critical thinking skills to evaluate the accuracy, reliability, and limitations of measurement results. The ability to identify sources of uncertainty, analyze measurement errors, and make informed judgments about the quality of measurement data.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **Part A –** ***** System of Unit and Standards of Measurement **[12 hrs]** ***** Accuracy and precision types of error statistical analysis of data **[14 hrs]** ***** nstruments for measuring basic electrical parameters (electromechanical and electric instruments: design and dynamic characteristics. Meter, reading, error and compensation) **[14 hrs]** ***** Electronic measuring instrument **[14 hrs]** **Part B-** * Bridges (**DC** and **AC** Bridges : basic electrical parameters measurement, frequency measurement). **[14 hrs]** ***** Oscilloscopes (**CRT** deflection, probes and functions, measuring techniques, types) **[12 hrs]** ***** Signal Generation (Introduction, The sine wave generator, frequency synthesized signal generator, frequency divider generator) **[14 hrs]**

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Learning and teaching techniques are tools used by teachers to provide instruction successfully and by learners to acquire knowledge and skills. There are many different kinds of teaching and learning techniques, such as: **1.** Engaging students in activities that require their participation, critical thinking, and application of what they have learned is active learning. Examples include case studies, hands-on activities, and problem-based learning.

	2- Collaborative learning: This type of learning involves students working together in groups to accomplish a common goal. Peer learning and group projects are two examples. **3.** Inquiry-based learning: This entails motivating students to pose queries, investigate subjects, and discover solutions via study and experimentation. Scientific research and case studies are examples and reports. **4-** Direct instruction: In this method, the teacher presents knowledge to the students in a planned and systematic way. Examples include tutorials, lectures, and shows. **5-** Differentiated instruction: This refers to adjusting instruction to fit the needs of certain students depending on their interests, learning preferences, and learning styles. **6-** Technology-based instruction: This method involves enhancing instruction and involving students by using technology tools and resources. Online classes, interactive whiteboards, and instructional apps are a few examples. **7-** Effective teaching and learning tactics frequently combine these methods in ways that are suited to the needs of the students and the subject matter being covered.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**150**		

Module Evaluation **تقييم المادة الدراسية**					
As		**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	All

	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (10)	7	LO # 1-7
	Final Exam	3hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1-2	System of Unit and Standards of Measurement.
Week 3-4-5	Accuracy and precision types of error statistical analysis of data.
Week 6-7-8	Instruments for measuring basic electrical parameters (**electromechanical** and **electric instruments**: design and dynamic characteristics. Meter, reading, error and compensation).
Week 9-10-11	Electronic measuring instrument.
Week 12-13-14	Bridges (**DC** and **AC** Bridges: basic electrical parameters measurement, frequency measurement).
Week 15	Oscilloscopes (**CRT** deflection, probes and functions, measuring techniques, types).
Week 16	Signal Generation (Introduction, The sine wave generator, frequency synthesized signal generator, frequency divider generator).

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1-2-3	Accuracy and precision types of error statistical analysis of data
Week 4-5-6	Instruments for measuring basic electrical parameters (electromechanical and electric instruments: design and dynamic characteristics. Meter, reading, error and compensation)
Week 7-8-9	Electronic measuring instrument

Week 10-11-12	Bridges (DC and AC Bridges: basic electrical parameters measurement, frequency measurement).
Week 13-14	Oscilloscopes (CRT deflection, probes and functions, measuring techniques, types)
Week 15	Signal Generation (Introduction, The sine wave generator, frequency synthesized signal generator, frequency divider generator)

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts	MODERN ELECTRONIC INSTRUMENTATION AND MEASUREMNT TECHNIQUES	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

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Description of third level courses

مقررات الكورس الاول

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Digital Signal Processing**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE315**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 3	**Semester of Delivery**	5
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Farooq Safauldeen Omar Noor Faisal Mohammed	**e-mail**	fkutalar@ntu.edu.iq noor6faysal@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail

Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	1. To describe signals mathematically and understand how to perform mathematical operations on signals. 2. It will provide knowledge of Digital filter. 3. To discuss word length issues, multi rate signal processing and application. 4. Understand and classify digital signal processing systems. 5. Understanding how to convert an analogue signal into digital. 6. Understand the pulse and frequency analysis of intermittent signals. 7. Designing digital filters and studying their response.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Illustrate digital signals, systems, and their significance. 2.Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP. 3. Analyze the digital signals using various digital transforms DFT, FFT etc. 4. Design and develop the basic digital system. 5. Interpret the finite word length effects on functioning of digital filters. 6. Be able to design and implement a variety of DSP algorithms in MATLAB. 7. Understanding standard of discrete time signals (sequences): Unit sample sequence, unit step sequence, Unit ramp sequence 8. Understanding convolution and correlation 9. understanding Z transform
Indicative Contents المحتويات الإرشادية	The module will cover the following key areas: 1. Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP. 2.. Standard of discrete time signals (sequences): Unit sample sequence, 3. Unit step sequence, Unit ramp sequence. classification of discrete time signals) system properties: Static and dynamic system, shift invariant and shift variant system. 4. Convolution: Direct from method, graphical method, slide rule method. 5. Correlation of discrete time sequence cross correlation and auto correlation. 6. Discrete Fourier transform (DFT) 7. Introduction to Z transform Definition of Z transform and Roc

	8. Properties of Z transform.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The module will utilize a variety of strategies including: 1. Lectures: To provide the theoretical aspects of network simulation. 2. Group Discussions: To facilitate learning through the exchange of ideas. 3. Practical Assignments: To provide hands-on experience in network simulation. 4. Lab Sessions: To provide practical understanding and experience of network elements, implementation, and troubleshooting. 5. Mid-term and final exams: To evaluate the understanding and application of the knowledge acquired. 6. Preparatory Week: To allow students to revise and consolidate their knowledge before the final exam.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	3
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP.
Week 2	Application of DSP, continues time signals vs. discrete time signals.
Week 3	Discrete time signals and sequences.
Week 4	Standard of discrete time signals (sequences): Unit sample sequence, Unit step sequence.
Week 5	Standard of discrete time signals (sequences): Unit ramp sequence
Week 6	(classification of discrete time signals) system properties: Static and dynamic system, shift invariant and shift variant system,
Week 7	Causal and non-causal system, linear and nonlinear system, stable and unstable
Week 8	Convolution: Direct from method, graphical method, slide rule method
Week 9	Correlation of discrete time sequence cross correlation.
Week 10	Correlation of discrete time sequence auto correlation.
Week 11	Frequency domain representation: Find frequency response
Week 12	Discrete Fourier transform (DFT): Linear convolution using DFT.
Week 13	Discrete Fourier transform (DFT): Invers Discrete Fourier transform IDFT
Week 14	Introduction to Z transform Definition of Z transform and Roc
Week 15	Properties of Z transform, Inverse z transform, application of Z transform (pole & zero plot
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP.
Week 2	Application of DSP, continues time signals vs. discrete time signals.
Week 3	Discrete time signals and sequences.
Week 4	Standard of discrete time signals (sequences): Unit sample sequence, Unit step sequence.

Week 5 +6+7	Standard of discrete time signals (sequences): Unit ramp sequence and Unit .

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Hwei P. Hsu, "Schaum's Outlines of Theory and Problems of Signals and Systems", McGraw- Hill Companies.	Yes
Recommended Texts	Computer organization and architecture: design for performance (8th edition) by William stalling	No
Websites	https://www.tutorialspoint.com/dip/signals_and_system_introduction.htm	

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	**امتياز**	90 - 100	Outstanding Performance
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	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 3**		**Module Delivery**
Module Type			• ☒ Theory • ☒ Lecture • ☐ Lab • ☐ Tutorial • ☐ Practical • ☒ Seminar
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 3	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this English Language Lecture is to provide students with a comprehensive understanding of the English language, including its structure, usage, and various linguistic aspects. The lecture aims to enhance students' language skills and improve their overall proficiency in English.

Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Demonstrate a solid understanding of the fundamental aspects of English grammar, vocabulary, and syntax. 2. Apply effective reading strategies to comprehend and analyze a variety of written texts. 3. Produce coherent and well-structured written pieces using appropriate grammar, vocabulary, and style. 4. Listen actively and comprehend spoken English in various contexts, including formal and informal situations. 5. Engage in meaningful conversations and deliver clear and organized oral presentations in English. 6. Critically evaluate and analyze linguistic elements in literature, media, and other forms of communication. 7. Recognize and appreciate the historical and cultural contexts that have shaped the English language.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to the English language and its global significance. 2. Overview of English grammar, including parts of speech, sentence structure, and verb tenses. 3. Building vocabulary and word choice for effective communication. 4. Reading comprehension strategies and analysis of different types of texts. 5. Developing writing skills, including organization, coherence, and proper grammar usage. 6. Listening comprehension and effective note-taking techniques. 7. Speaking skills development, including conversation, pronunciation, and presentation skills. 8. Literary analysis and interpretation of English language texts. 9. Historical and cultural influences on the English language. 10. Contemporary issues and challenges in the English language.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Lecture delivery: The instructor will present concepts, explanations, and examples through interactive lectures, incorporating visual aids, multimedia resources, and real-life examples. 2. Group activities: Students will engage in group discussions, peer-to-peer interactions, and collaborative learning tasks to reinforce their understanding of concepts and develop their communication skills. 3. Practical exercises: Students will participate in individual and group exercises, such as grammar quizzes, writing assignments, and pronunciation drills, to apply their knowledge and receive feedback. 4. Multimedia resources: The lecture may incorporate audiovisual materials, online resources, and language learning software to provide a dynamic and interactive learning experience. 5. Assessments: Regular assessments, including quizzes, exams, and assignments, will be conducted to gauge students' progress and provide constructive feedback for improvement.

	6. Self-directed learning: Students will be encouraged to engage in independent learning outside of the lecture through recommended readings, online resources, and language practice exercises.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	40	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation
تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	0	0	5, 12	LO #1, 3 and 7
	Assignments	0	30% (30)	4, 13	LO # 2, 4 and 6
	Projects / Lab.	0	0%		
	Report	1	20% (10)	13	All
Summative assessment	Midterm Exam	2 hr.	20% (30)	7	LO # 1-6
	Final Exam	2 hr.	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنـهاج الاسبوعي النظري

Week	Material Covered
Week 1	• Review of verb tenses: Present, past, and future • Words in English (Book 5)
Week 2	• Listening and speaking practice: Discussing recent experiences • Words in English (Book 5)
Week 3	• Modal verbs: Review and advanced usage • Words in English (Book 5)
Week 4	• Gerunds, infinitives, and participles: Review and advanced usage

	• Words in English (Book 5)
Week 5	• Conditional sentences: Review and introduction to advanced conditionals (Type 2 and Type 3) • Words in English (Book 5)
Week 6	• Reported speech: Review and introduction to advanced reported speech (mixed tenses, requests, commands) • Words in English (Book 5)
Week 7	• Mid-term Evaluation
Week 8	• Passive voice: Advanced usage and transformations • Words in English (Book 5)
Week 9	• Understanding subtle meanings and nuances • Words in English (Book 5)
Week 10	• Expressing future actions and possibilities • Words in English (Book 5)
Week 11	• Describing people, things, and places with precision. • Words in English (Book 5)
Week 12	• Role-playing: Giving directions and describing locations with precision • Words in English (Book 5)
Week 13	• Listening and speaking practice: Delivering coherent and organized presentations • Words in English (Book 5)
Week 14	• Words in English (Book 5)
Week 15	• Review and reinforcement of previous topics before final term evaluation

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	English Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	4000 Essential English words 2nd edition	No
Websites	http://www.duolingo.com/ http://www.bbc.co.uk/learningenglish	

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	**Real time systems**	**Module Delivery**
Module Type	**Core**	• ☒ Theory • ☒ Lecture • ☒ Lab • ☐ Tutorial • ☐ Practical • ☒ Seminar
Module Code	**COE314**	
ECTS Credits	**6**	
SWL (hr/sem)	**150**	

Module Level	UGx11 1	**Semester of Delivery**	5
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Mohammed Nisham Anwer	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	Mohammed.sefer@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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**	
Module Aims **أهداف المادة الدراسية**	The aim of this module is to provide students with a comprehensive understanding of real-time systems design, including their definitions, types, operational mechanisms, and related components. Through this module, students will gain insight into both analog and digital systems, their signal properties, and the conversion between them. They will also learn about basic interfacing devices and techniques to control data transfer in real-time systems.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Define and distinguish between different types of real-time systems. 2. Prepare a coherent design proposal for a real-time system. 3. Understand the functioning of real-time systems, including the role of signals. 4. Differentiate between analog and digital signals and understand their applications in real-time systems. 5. Understand the components of analog and digital systems and their functions. 6. Identify and comprehend the specifications of ADC and DAC. 7. Understand basic interfacing devices and their roles in real-time systems. 8. Apply techniques to control data transfer in real-time systems. 9. Demonstrate practical knowledge through assignment presentation.
Indicative Contents	Introduction and definitions of real-time systems design Different types of real-time systems

المحتويات الإرشادية	Design models and proposal preparation Operational mechanisms of real-time systems Introduction to signals and systems Exploration of analog and digital signals Examination of analog computer components Introduction to digital systems Overview of ADC and DAC Understanding of basic interfacing devices Techniques of data transfer control

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The module will employ a combination of strategies including but not limited to: 1. Lectures: To provide the theoretical foundations of real-time systems design. 2. Tutorials: To allow students to apply the theoretical knowledge in practical contexts. 3. Group Discussions: To facilitate understanding through the exchange of ideas. 4. Practical Assignments: To provide hands-on experience in the design and operation of real-time systems. 5. Mid-term and final exams: To assess the understanding and application of knowledge. 6. Assignment Presentations: To develop students' communication skills and provide an opportunity to demonstrate their understanding. 7. Preparatory Week: To give students time to revise and clarify any difficulties before the final exam.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation
تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (5)	3, 14	All
	Assignments	2	5% (5)	2, 15	LO # 3 and 6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	15	LO # 3, 4 and 9
Summative assessment	**Midterm Exam**	2 hr	20% (20)	9	LO # 1-9

	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction – Definitions of real-time systems design
Week 2	Types
Week 3	Design models, preparing a design proposal
Week 4	How real-time systems works
Week 5	Signals and systems
Week 6	Analog and digital signals
Week 7	Analog computer components,
Week 8	Introduction to Digital systems
Week 9	Mid-term exams
Week 10	ADC:{Definitions, type, specifications}
Week 11	DAC :{Definitions, type, specifications}
Week 12	Basic Interfacing devices
Week 13	Basic Interfacing devices
Week 14	Data transfer controlling
Week 15	Assignment Presentation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Lab 1: Time.h, Library Variables
Week 2	Lab 2: Date And Time Functions
Week 3	Lab 3: ctime
Week 4	Lab 4: gmtime
Week 5	Lab 5: localtime
Week 6	Lab 6: strftime
Week 7	Lab 7: asctime
Week 8	Lab 8: mktime
Week 9	Lab 9: difftime
Week 10	Lab 10: clock

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Liu, Jane W. S. (2000). "Real-Time Systems". Prentice Hall.	No

Recommended Texts	Kopetz, Hermann (2011). "Real-Time Systems: Design Principles for Distributed Embedded Applications". Springer.	No
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 analysis**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE312**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 3	Semester of Delivery	5
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Huda Hamza Abdulkhudhur	e-mail	hudahamza.abdulkhudhur@ntu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Ms.c
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

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	
Module Aims **أهداف المادة الدراسية**	1. The course curriculum aims to introduce the student to the skills of scientific mathematical foundations, qualify him with basic information, and teach him solutions to engineering problems using multiple numerical and engineering methods. 2. The student understands mathematical theories and laws that enable the student to apply them in the fields of engineering, whether in engineering analyzes or other applications. 3. The course also aims to teach students solutions to ordinary and partial differential equations, their applications, Fourier series, Laplace transformations, numerical methods, linear interpolation, numerical integration, and solutions to nonlinear equations.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Identify different analytical and numerical methods for solving mathematical problems. 2. Familiarity with the basic concepts of engineering and numerical analyses. 3. Learn the skills of using mathematical laws. 4. Learn how to analyze engineering mathematical issues. 5. Linking realistic physical problems and ways to solve them by formulating them in a mathematical framework and within their boundary conditions. 6. The ability to choose the optimal solution method. 7. Developing and developing the student's ability and ability to use computer programs in the field of engineering analysis. 8. Developing and developing the student's ability and ability to translate academic information into practical reality.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. **Part A** Laplace transform & inverse Laplace transform **[12 hrs]** First & Second order differential equations and their applications **[14 hrs]** Fourier series for Periodic functions, Even & odd functions and Half range expansion **[12 hrs]** Power Series & Solution of ODE by Power Series, Partial differential equations**[9 hrs]** **Part B** numerical solution of non-linear equations:Newton-Raphson method & Secant Method **[10hrs]** Interpolation & Lagrange Interpolation, Newton's divided difference interpolation **[10 hrs]** Numerical methods for solving integration: Trapezoidal and Simpson's rules **[9hrs]** Numerical method for solving ordinary differential eq. Euler method , Numerical method for solving ordinary differential eq. Rung-Kutta method **[10hrs]** Newton Method for Curve Editing **[8 hrs]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Learning and teaching strategies are methods used to help learners acquire knowledge and skills, and for teachers to effectively deliver instruction. There are various types of learning and teaching strategies, including: 1. Active learning entails involving students in tasks that demand their participation, critical thinking, and application of what they have learned. Group discussions, practical exercises, and problem-based learning are a few examples. 2. Collaborative learning: This involves group work and collaboration among learners to achieve a common goal. Examples include group projects and peer learning. 3. Inquiry-based learning: This involves encouraging learners to ask questions, explore topics, and find answers through research and experimentation. Examples and reports include scientific investigations and case studies. 4. Direct instruction: This involves the teacher providing information to learners in a structured and organized manner. Examples include lectures, demonstrations, and tutorials. 5. Differentiated instruction: This involves tailoring instruction to meet the needs of individual learners, based on their learning style, abilities, and interests. 6. Technology-based instruction: This involves using technology tools and resources to enhance instruction and engage learners. Examples include online courses, interactive whiteboards, and educational apps. 7. Effective teaching and learning strategies often involve a combination of these approaches, tailored to the needs of the learners and the content being taught.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation **تقييم المادة الدراسية**					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الأسبوعي النظري**	
Week	**Material Covered**
Week 1	Laplace transform
Week 2	inverse Laplace transform
Week 3	First order differential equations and their applications
Week 4	Second order differential equations and their applications
Week 5	Higher order Linear differential equations
Week 6	Partial differential equations
Week 7	Fourier series for Periodic functions
Week 8	Even & odd functions and Half range expansion
Week 9	Power Series & Solution of ODE by Power Series
Week 10	numerical solution of non-linear equations : Newton-Raphson method, Secant Method
Week 11	Interpolation , Lagrange Interpolation , Newton's divided difference interpolation
Week 12	Numerical methods for solving integration: Trapezoidal and Simpson's rules
Week 13	Numerical method for solving ordinary differential eq.(Euler method)
Week 14	Numerical method for solving ordinary differential eq. (Rung-Kutta method)
Week 15	Newton Method for Curve Editing
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الأسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Laplace transform & inverse Laplace transform
Week 2	Lab 2: First & Second & Higher order differential equations
Week 3	Lab 3: Partial differential equations
Week 4	Lab 4: Fourier series
Week 5	Lab 5: Power Series
Week 6	Lab 6: Newton-Raphson method, Secant Method
Week 7	Lab 7: Interpolation , Lagrange Interpolation
Week 8	Lab 8: Newton's divided difference interpolation
Week 9	Lab 9: Trapezoidal and Simpson's rules
Week 10	Lab 10: Euler method and Rung-Kutta method

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Advanced Engineering Mathematics", by Erwin Kreyszig. "Advanced Mathematics for Engineers", by W. Ertel.	
Recommended Texts	"Advanced Engineering Mathematics", by C. Ray Wylie. "Fundamentals of Differential Equations", by Nagle. Staff. Snider. "Numerical Methods of Engineers", by Chapra & Canale. "Applied Numerical Analysis", by Gerald & Wheatley.	
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	**Control Engineering Fundamentals**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Ali Mahmoud Salman	**e-mail**	ali.mahmoudsalman23@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	N/A	**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	This course is an introductory course on linear control systems. It introduces the fundamentals and concepts of modeling and control of linear time invariant systems. The course aims: 1. To build foundations of time and frequency analyses of systems. 2. To provide solid knowledge on feedback control principles of the linear time invariant systems. 3. To understand and apply various analysis tools to determine the performance of the control systems. 4. To provide the necessary skills for the design of feedback control systems. 5. Use computer simulation software such as MATLAB to perform time domain analysis, frequency domain analysis, and control system design.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	A student who has successfully completed this course should be able to: 1. Model simple electrical and mechanical systems using ordinary differential equations. 2. Represent LTI systems in the form of transfer functions, block diagrams and signal-flow graphs. 3. Obtain the system response characteristics, i.e., both the transient response and steady-state response. 4. Understand the concept and methods of stability analysis. 5. Design of PID controller. 6. To understand and apply the concept of root-locus technique and Nyquist's criterion. 7. Design a feedback control system to obtain specified objectives. 8. Use computer simulation software such as MATLAB and Simulink to apply and verify the concepts of linear control systems.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following: Mathematical modelling of systems, Laplace transforms, transfer functions, block diagram representation. Block diagram reduction, time response characteristics. System stability, Routh Hurwitz stability criterion, root locus plots, stability margins. Frequency response analysis, Nyquist stability criterion, bode plots and stability margins in frequency domain. Control design, the proportional, derivative and integral actions. Design using Root Locus, design using Bode plots.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The teaching methods will include lectures, in-class examples and exercises, class discussion, homework assignments, and Lab reports. Lecture notes, announcements, and Lab manual will be posted on an appropriate communication platform.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to control systems, open and closed loop system.
Week 2, 3, 4	Mathematical modeling of physical systems and transfer functions. Mathematical modeling of D.C. Servo Motor.
Week 5	Block diagrams.
Week 6	Time-domain analysis of closed loop control systems and error analysis.
Week 7, 8	P, PI, PD and PID modes of feedback control, realization of PID controller using active and passive elements.

Week 9	Stability analysis and Rouths Stability criterion. Root Locus technique.
Week 10	Analysis of control system in frequency domain and Bode Diagrams.
Week 11, 12	Design of control systems and compensation concepts.
Week 13	Control system design using Root Locus method.
Week 14	Control system design using Bode Diagrams.
Week 15	Definitions of non-linear systems.
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Laboratory regulations and safety rules
Week 2	Introduction to MATLAB Simulink
Week 3,4	Electrical Systems mathematical modelling using SimScape
Week 4	Mechanical Systems mathematical modelling using SimScape
Week 5,6	System Identification: first order System
Week 7,8	System Identification: second order System
Week 9, 10, 11	PID controller
Week 12	Stability analysis
Week 13	Control system design using Root Locus method.
Week 14, 15	Control system design using Bode Diagrams
Week 16	**Preparatory week before the final exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Modern Control Systems" by R. C. Dorf and R. H. Bishop ISBN: 0132270285 Publisher: Prentice Hall, 2008	No
Recommended Texts	"Control Systems Engineering", 8th edition by Norman S. Nise Publisher: Wiley Inc., 2019	No
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.

مقررات الكورس الثاني

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Power Electronics**		**Module Delivery**
Module Type	**Core**		• ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	The student will understand: · The characteristics of power electronic devices with gate firing circuits various forced commutation techniques. · The operation of single-phase voltage controller, converters and Inverters circuits with R and RL loads. Analyze the TPS7A4901, TPS7A8300 and TPS54160 buck regulators.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	After completion of this course, the student is able to · Understand the operating principles of various power electronic converters. · Use power electronic simulation packages& hardware to develop the power converters. · Analyze and choose the appropriate converters for various applications.
Indicative Contents **المحتويات الإرشادية**	Come to the laboratory in time. Students, who are late more than 15 min., will not be allowed to attend the lab. · Students need to maintain 100% attendance in lab if not a strict action will be taken. · All students must follow a Dress Code while in the laboratory · Foods, drinks are NOT allowed. · All bags must be left at the indicated place. · The objective of the laboratory is learning. The experiments are designed to illustrate phenomena in different areas of Physics and to expose you to measuring instruments, conduct the experiments with interest and an attitude of learning · You need to come well prepared for the experiment. · Work quietly and carefully · Be honest in recording and representing your data. · If a particular reading appears wrong repeat the measurement carefully, to get a better fit for a graph · All presentations of data, tables and graphs calculations should be neatly and carefully done · Graphs should be neatly drawn with pencil. Always label graphs and the axes and display units · If you finish early, spend the remaining time to complete the calculations and drawing graphs. Come equipped with calculator, scales, pencils etc. · Do not fiddle with apparatus. Handle instruments with care. Report any breakage to the Instructor. Return all the equipment you have signed out for the purpose of your experiment. experiment.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy 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**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	8
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	5
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation
تقييم المادة الدراسية

As		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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	20% (10)	7	LO # 1-7
	Final Exam	2hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Principle of power electronic, Power electronics devices, diode, thyristor, traie.
Week 2	Power transistor power MOSFET ,,IGBT DIAC
Week 3,4,5	Rectifier circuits Single phase rectifier :uncontrolled half controlled and fully controlled Three-phase rectifier uncontrolled, half controlled and fully controlled Diode circuits with Re, RL and RLC (transient analysis)
Week 6,7	Diode circuits with Re, RL and RLC (transient analysis) transient analysis of AC line with RI load
Week 8	Problems and solutions
Week 9	Midterm Exam
Week 10	DC line commutation technique, Parallel capacitors
Week 11	Complementary commutation
Week 12	AC voltage controller on-off and single phase angle controller
Week 13	Dimmer using DIAC thy. And DIAC , TRIAC

Week 14	DC-chopper principle of switch mode power supply, Step-down convertor buck, Step up convertor boost and Step up-down convertor buck boost
Week 15	Inverter De- to- AC convertor Single phase half inverter, Single phase bridge inverter Three phase inverter
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Study of characteristics of SCR
Week 2	Study of characteristics of DIAC
Week 3	Study of characteristics of MOSFET
Week 4	Study of characteristics of transfer transistor IGBT
Week 5	Thyristor trigger angle & conduction angle
Week 6	SCR half –wave rectifier with load resistance
Week 7	SCR half wave rectifier with inductive load
Week 8	SCR full - wave rectifier with load resistance
Week 9	Midterm Exam
Week 10,11	Light dimmer circuit by using one SCR
Week 12	Single phase ac voltage control
Week 13	Single phase fully controlled converter
Week 14	Study of commutation circuits
Week 15	Speed control of dc motor
Week 16	Final Exam

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	• المحاضرات المقدمة من قبل مدرس المادة • الكتب المتوفرة في مكتبة الكلية • الكتب الموجودة داخل الclass room	No
Recommended Texts	• AutoCAD Beginning and Intermediate • AutoCAD from zero to hero	No
Websites	https://www.vssut.ac.in/lecture_notes/lecture1424354515.pdf https://library.uoh.edu.iq/admin/ebooks/62729-crc-press---the-power-electronics-handbook---t.-skvarenia-(2002)-ww.pdf	

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	**Microcontrollers**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE322**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 3	**Semester of Delivery**	6
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Shyamma Jaffar	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	shaymaaj.alzangana@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	This module aims to provide students with a comprehensive understanding of microcontrollers and Programmable Logic Controllers (PLCs). It will explore the architecture, programming, and application of microcontrollers, with a special focus on PIC microcontrollers. Furthermore, the module introduces the principles, input-output modules, number systems, logic fundamentals, and programming aspects of PLCs. Students will gain hands-on experience in PLC wiring diagrams, ladder logic programs, and the application of sensors and actuators in industrial settings.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Understand the concepts of microcontrollers, their types, and the difference between microprocessors and microcontrollers. 2. Comprehend the architecture of PIC microcontrollers. 3. Program microcontrollers for various applications. 4. Apply microcontrollers in real-world project contexts. 5. Understand the principles of PLC and its input-output modules. 6. Recognize different number systems and codes relevant to PLC. 7. Understand the logic fundamentals in PLC programming. 8. Construct a PLC wiring diagram and ladder logic program. 9. Apply sensors and actuators in industrial applications. 10. Implement a PLC project.
Indicative Contents **المحتويات الإرشادية**	The module will cover the following key areas: Introduction to Microcontrollers PIC Microcontroller Architecture Microcontroller Programming Application projects of Microcontrollers Principles of PLC Input-Output modules of PLC Numbers systems and codes Fundamentals of logic in PLC Basics of PLC programming PLC-wiring diagram and ladder logic program Sensors and actuators for industrial applications PLC projects

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will utilize a variety of strategies including: 1. Lectures: To provide the theoretical aspects of microcontrollers and PLCs. 2. Practical Programming Sessions: To apply the theoretical knowledge in programming microcontrollers and PLCs. 3. Group Discussions: To facilitate learning through the exchange of ideas. 4. Practical Assignments: To provide hands-on experience in PLC wiring diagrams and ladder logic programs. 5. Mid-term and final exams: To evaluate the understanding and application of the knowledge acquired. 6. Project Work: To provide an opportunity to implement real-world PLC projects.

	7. Preparatory Week: To allow students to revise and consolidate their knowledge before the final exam.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to Microcontroller, Types of Microcontrollers, difference between MP and Microcontroller
Week 2	Architecture of PIC Microcontroller
Week 3	Architecture of PIC Microcontroller
Week 4	Programming the Microcontroller
Week 5	Programming the Microcontroller
Week 6	Application projects of Microcontroller.
Week 7	Mid-Term
Week 8	Principle of PLC
Week 9	Input-Output modules of PLC
Week 10	Numbers systems and codes

Week 11	Fundamentals of logic in PLC
Week 12	Basic of PLC programming
Week 13	PLC-wiring diagram and ladders logic program and sensors
Week 14	Sensors and Actuators for Industrial Applications.
Week 15	PLC projects
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Microcontroller Basics
Week 2	Lab 2: Exploring PIC Microcontroller Architecture
Week 3	Lab 3: Basic Microcontroller Programming
Week 4	Lab 4: Advanced Microcontroller Programming
Week 5	Lab 5: Microcontroller Application Project
Week 6	Lab 6: PLC Basics and I/O Modules
Week 7	Lab 7: PLC Programming

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	PICmicro Microcontrollers". McGraw-Hill. This is an essential text for learning about PIC microcontroller architecture and programming.	No
Recommended Texts	Bates, Martin P. (2011). "Interfacing PIC Microcontrollers: Embedded Design by Interactive Simulation". Newnes. This text gives a hands-on experience of application projects of Microcontrollers.	No
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	**IOT (Internet of Things)**		**Module Delivery**
Module Type			• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☒ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 3	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this IOT Lecture is: 1. To introduce the fundamental concepts and principles of the Internet of Things (IoT). 2. To provide an understanding of the components and technologies involved in IoT systems. 3. To explore the potential applications and benefits of IoT in various domains. 4. To discuss the challenges and considerations related to the security, privacy, and ethical aspects of IoT. 5. To foster critical thinking and analytical skills in evaluating IoT solutions and their impact on society.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	By the end of the lecture, students should be able to: 1. Define the Internet of Things and explain its significance in the context of a connected world. 2. Describe the key components and technologies used in IoT systems. 3. Identify and analyze potential IoT applications in different domains such as healthcare, transportation, and smart cities. 4. Evaluate the benefits and challenges associated with IoT implementation. 5. Discuss security, privacy, and ethical considerations in IoT design and deployment. 6. Apply critical thinking skills to assess the societal impact of IoT solutions.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to IoT • Definition and basic principles • Historical context and evolution of IoT • Overview of IoT architecture and communication protocols 2. IoT Components and Technologies • Sensors and actuators • Embedded systems and microcontrollers • Communication technologies (e.g., Wi-Fi, Bluetooth, RFID) • Cloud computing and edge computing in IoT • Data analytics and machine learning for IoT 3. IoT Applications • Smart homes and home automation • Industrial IoT (IIoT) and Industry 4.0 • Healthcare and telemedicine • Transportation and smart cities • Agriculture and environmental monitoring 4. Benefits and Challenges of IoT • Enhanced efficiency and productivity • Improved decision-making and resource management • Security and privacy concerns • Ethical considerations and societal impact 5. Security, Privacy, and Ethics in IoT

	• IoT security threats and vulnerabilities • Data privacy and protection • Ethical implications of IoT data collection and usage • Legal and regulatory frameworks

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching Strategy 1. Lecture presentations with visuals and examples to introduce concepts and theories. 2. Case studies and real-world examples to illustrate the applications and challenges of IoT. 3. Group discussions and class debates to encourage critical thinking and analysis. 4. Hands-on activities or demonstrations involving IoT devices and sensors. 5. Guest speakers from relevant industries or research institutions to share practical insights and experiences. 6. Assignments or projects that require students to design and evaluate IoT solutions. 7. Continuous assessment through quizzes, tests, or presentations to gauge understanding and progress. 8. Note: The specific duration, order, and depth of coverage for each topic may vary depending on the course's time constraints and the target audience's background and interests.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	64	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	36	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	-	-	-	-
	Assignments	2	5% (10)	4, 13	1-8
	Projects / Lab.	2	15% (10)	2-12	1-8
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	4 hr.	20% (20)	7	LO # 1-6
	Final Exam	4 hr.	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	• Introduction to IoT • Definition and basic principles of IoT • Historical context and evolution of IoT • Overview of IoT architecture and communication protocols
Week 2	• IoT Components and Technologies • Sensors and actuators • Embedded systems and microcontrollers
Week 3	• IoT Components and Technologies (continued) • Communication technologies (e.g., Wi-Fi, Bluetooth, RFID)
Week 4	• IoT Components and Technologies (continued) • Cloud computing and edge computing in IoT
Week 5	• IoT Applications: Smart Homes and Home Automation • Examples and case studies • Discussion on benefits and challenges
Week 6	• IoT Applications: Industrial IoT (IIoT) and Industry 4.0 • Examples and case studies • Discussion on benefits and challenges
Week 7	• Mid-term Assessment (in-class exam)
Week 8	• IoT Applications: Healthcare and Telemedicine • Examples and case studies • Discussion on benefits and challenges
Week 9	• IoT Applications: Transportation and Smart Cities • Examples and case studies • Discussion on benefits and challenges
Week 10	• IoT Applications: Agriculture and Environmental Monitoring • Examples and case studies • Discussion on benefits and challenges
Week 11	• Benefits and Challenges of IoT • Enhanced efficiency and productivity • Improved decision-making and resource management • Security and privacy concerns • Ethical considerations and societal impact
Week 12	• Security, Privacy, and Ethics in IoT • IoT security threats and vulnerabilities • Data privacy and protection • Ethical implications of IoT data collection and usage

Week 13	• Security, Privacy, and Ethics in IoT (continued)
Week 14	• Evaluation of IoT Solutions • Critical evaluation of real-world IoT solutions • Case studies and group discussions
Week 15	• Final Assessment: Project or Presentation on an IoT-related topic • Review of key concepts and takeaways • Course wrap-up and feedback session

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Subject: Introduction to Python for IoT • Setting up Anaconda environment and IDE • Basic Python syntax and data types Writing and executing Python programs
Week 2	Subject: Working with Sensors • Overview of commonly used sensors in IoT projects • Reading sensor data using Python and Arduino • Processing and analyzing sensor data
Week 3	Subject: Actuators and Device Control • Introduction to actuators and their applications in IoT • Controlling actuators using Python and Arduino • Implementing device control logic and automation
Week 4	Subject: Wireless Communication - Wi-Fi • Connecting Arduino to Wi-Fi networks • Implementing Wi-Fi communication using Python • Developing IoT applications with Wi-Fi-enabled devices
Week 5	Subject: IoT Data Protocols - MQTT • Overview of MQTT protocol and its role in IoT • Setting up MQTT broker and clients • Publishing and subscribing to MQTT topics using Python and Arduino
Week 6	Subject: IoT Data Visualization • Introduction to data visualization in IoT applications

	• Using Python libraries (e.g., Matplotlib, Plotly) for IoT data visualization • Creating interactive dashboards for monitoring and analyzing IoT data
Week 7	Mid-term Assessment (in-class exam)
Week 8	Subject: Cloud Integration - AWS IoT Core • Introduction to AWS IoT Core and its features • Registering devices and managing IoT data in AWS IoT Core • Integrating Python-based IoT applications with AWS IoT services
Week 9	Subject: Cloud Integration - Google Cloud IoT Core • Overview of Google Cloud IoT Core platform • Device provisioning and data management with Google Cloud IoT Core • Developing Python-based IoT applications with Google Cloud services
Week 10	Subject: Edge Computing with Raspberry Pi • Introduction to Raspberry Pi and its role in edge computing • Setting up Raspberry Pi as an edge device • Implementing edge computing solutions with Python and Raspberry Pi
Week 11	Subject: IoT Security and Privacy • Understanding IoT security threats and vulnerabilities • Implementing security measures in Python-based IoT applications • Privacy considerations and best practices in IoT
Week 12	Subject: IoT in Smart Home Automation • Exploring IoT applications in smart home automation • Developing Python-based solutions for home automation • Integration of sensors, actuators, and voice assistants in smart homes
Week 13	Subject: IoT in Agriculture • Understanding the role of IoT in agriculture and smart farming • Developing Python-based IoT solutions for agriculture monitoring and automation • Implementing soil moisture sensing, weather data collection, and crop monitoring
Week 14	Subject: IoT in Healthcare • Exploring IoT applications in healthcare and telemedicine • Developing Python-based IoT solutions for remote patient monitoring

	• Integration of wearables, sensors, and data analytics in healthcare IoT
Week 15	• Review and Recap of Lab Exercises • Final Lab Assessment (Lab Exam or Project)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• "Internet of Things for Architects" by Perry Lea: This book covers IoT architecture, technologies, and best practices for designing and implementing IoT solutions.	No
Recommended Texts	• "Getting Started with Arduino" by Massimo Banzi: This book provides a beginner-friendly introduction to Arduino and IoT projects. • "Raspberry Pi Cookbook" by Simon Monk: This book offers a collection of practical Raspberry Pi projects for various IoT applications.	No
Websites	• YouTube Channels: Explore IoT-focused YouTube channels, such as "Core Electronics," "The Hook Up," "Makers Gonna Learn," and "Andreas Spiess," which provide detailed tutorials and project demonstrations. • Online Platforms: Websites like Adafruit, Hackster.io, Instructables, and Hackaday offer a wealth of tutorials, projects, and step-by-step guides for various IoT applications and microcontrollers.	

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
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	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 3**		**Module Delivery**
Module Type			• ☒ Theory • ☒ Lecture • ☐ Lab • ☐ Tutorial • ☐ Practical • ☒ Seminar
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 3	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this English Language Lecture is to provide students with a comprehensive understanding of the English language, including its structure, usage, and various linguistic aspects. The lecture aims to enhance students' language skills and improve their overall proficiency in English.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Demonstrate a solid understanding of the fundamental aspects of English grammar, vocabulary, and syntax. 2. Apply effective reading strategies to comprehend and analyze a variety of written texts. 3. Produce coherent and well-structured written pieces using appropriate grammar, vocabulary, and style. 4. Listen actively and comprehend spoken English in various contexts, including formal and informal situations. 5. Engage in meaningful conversations and deliver clear and organized oral presentations in English. 6. Critically evaluate and analyze linguistic elements in literature, media, and other forms of communication. 7. Recognize and appreciate the historical and cultural contexts that have shaped the English language.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to the English language and its global significance. 2. Overview of English grammar, including parts of speech, sentence structure, and verb tenses. 3. Building vocabulary and word choice for effective communication. 4. Reading comprehension strategies and analysis of different types of texts. 5. Developing writing skills, including organization, coherence, and proper grammar usage. 6. Listening comprehension and effective note-taking techniques. 7. Speaking skills development, including conversation, pronunciation, and presentation skills. 8. Literary analysis and interpretation of English language texts. 9. Historical and cultural influences on the English language. 10. Contemporary issues and challenges in the English language.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lecture delivery: The instructor will present concepts, explanations, and examples through interactive lectures, incorporating visual aids, multimedia resources, and real-life examples. 2. Group activities: Students will engage in group discussions, peer-to-peer interactions, and collaborative learning tasks to reinforce their understanding of concepts and develop their communication skills.

	3. Practical exercises: Students will participate in individual and group exercises, such as grammar quizzes, writing assignments, and pronunciation drills, to apply their knowledge and receive feedback. 4. Multimedia resources: The lecture may incorporate audiovisual materials, online resources, and language learning software to provide a dynamic and interactive learning experience. 5. Assessments: Regular assessments, including quizzes, exams, and assignments, will be conducted to gauge students' progress and provide constructive feedback for improvement. 6. Self-directed learning: Students will be encouraged to engage in independent learning outside of the lecture through recommended readings, online resources, and language practice exercises.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	40	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation
تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	0	0	5, 12	LO #1, 3 and 7
	Assignments	0	30% (30)	4, 13	LO # 2, 4 and 6
	Projects / Lab.	0	0%		
	Report	1	20% (10)	13	All
Summative assessment	Midterm Exam	2 hr.	20% (30)	7	LO # 1-6
	Final Exam	2 hr.	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	• Review of verb tenses: Present, past, and future • Words in English (Book 5)

Week 2	• Listening and speaking practice: Discussing recent experiences • Words in English (Book 5)
Week 3	• Modal verbs: Review and advanced usage • Words in English (Book 5)
Week 4	• Gerunds, infinitives, and participles: Review and advanced usage • Words in English (Book 5)
Week 5	• Conditional sentences: Review and introduction to advanced conditionals (Type 2 and Type 3) • Words in English (Book 5)
Week 6	• Reported speech: Review and introduction to advanced reported speech (mixed tenses, requests, commands) • Words in English (Book 5)
Week 7	• Mid-term Evaluation
Week 8	• Passive voice: Advanced usage and transformations • Words in English (Book 5)
Week 9	• Understanding subtle meanings and nuances • Words in English (Book 5)
Week 10	• Expressing future actions and possibilities • Words in English (Book 5)
Week 11	• Describing people, things, and places with precision. • Words in English (Book 5)
Week 12	• Role-playing: Giving directions and describing locations with precision • Words in English (Book 5)
Week 13	• Listening and speaking practice: Delivering coherent and organized presentations • Words in English (Book 5)
Week 14	• Words in English (Book 5)
Week 15	• Review and reinforcement of previous topics before final term evaluation

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	English Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	4000 Essential English words 2nd edition	No
Websites	http://www.duolingo.com/ http://www.bbc.co.uk/learningenglish	

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 Communications**	**Module Delivery**
Module Type	**Core**	• **☒ Theory**

Module Code	**COE321**		• ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 3	**Semester of Delivery**	6
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Huda Hamza & Ahmed Safaa Salman	**e-mail**	ahmed.safaa23@ntu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	Ms.c
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

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**	
Module Aims **أهداف المادة الدراسية**	1. Understand and classify digital communication technologies 2. Clarifying the basic concept of digital communication system circuits through a set of tools 3. Enhancing students' analytical abilities and problem-solving 4. Preparing students for extensive knowledge of digital inclusion systems 5. Enable students to perform this knowledge in the field of computer technology
Module Learning Outcomes	1. Determine the basic elements of the communication system 2. Understand the principles and theories of digital communication

مخرجات التعلم للمادة الدراسية	3. Familiarity with the basic concepts, principles and theories on which digital communication is based 4. Identify the types of signals and the general block diagram 5. Understanding the unit pulse and the Fourier transform 6. Discussion of sampling theory, PAM, TDM PWM, PPM and S/N in analog pulse modulation 7. Discussion of pulse code modulation and consideration of noise in PCM 8. Learn about digital modulation techniques 9. Learn about the modulation format
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. • Introduction to digital communication, Signal types, Advantage and disadvantage of digital modulation **[3 hrs]** • Unit impulse signal and Fourier Transform **[6 hrs]** • Sampling theorem **[4 hrs]** • Pulse Amplitude Modulation (PAM) **[6 hrs]** • Pulse Code Modulation (PCM) **[6 hrs]** • Noise consideration in PCM **[5 hrs]** • Limitation and Modification of PCM **[3 hrs]** • Delta Modulation, Delta-Sigme modulation, Adaptive delta modulation **[9 hrs]** • Digital Base-Band Transmission **[7 hrs]** • Inter-symbol Interference (ISI) Pulse shaping to reduce ISI **[5 hrs]** • Amplitude Shift Keying (ASK) **[7 hrs]** • Frequency Shift Keying (FSK) **[7 hrs]** • Quadrature Shift Keying (QPSK) , Offset QPSK **[10 hrs]** • Minimum Shift Keying, M-ary PSK and M-ray QAM **[11 hrs]** • Spread Spectrum System SSS, Frequency Hopping FH Spread Spectrum **[5 hrs]**

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	There are various types of learning and teaching strategies, including: 1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to digital communication, Signal types, Advantage and disadvantage of digital modulation
Week 2	Unit impulse signal and Fourier Transform
Week 3	Sampling theorem
Week 4	Pulse Amplitude Modulation (PAM)
Week 5	Pulse Code Modulation (PCM)
Week 6	Noise consideration in PCM
Week 7	Limitation and Modification of PCM
Week 8	Delta Modulation, Delta-Sigme modulation, Adaptive delta modulation
Week 9	Digital Base-Band Transmission
Week 10	Inter-symbol Interference (ISI) Pulse shaping to reduce ISI
Week 11	Amplitude Shift Keying (ASK)
Week 12	Frequency Shift Keying (FSK)
Week 13	Quadrature Shift Keying (QPSK) , Offset QPSK
Week 14	Minimum Shift Keying , M-ary PSK and M-ray QAM
Week 15	Spread Spectrum System SSS, Frequency Hopping FH Spread Spectrum
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Lab1: Simulation of Amplitude Modulation (AM) using simulink
Week 2	Lab2: Matlab simulink - Sampling theorem and Fourier transform
Week 3	Lab3: Pulse Code Modulation (PCM)
Week 4	Lab4: Amplitude shift keying (ASK) using simulink
Week 5	Lab5: Frequency shift keying (FSK) using simulink
Week 6	Lab6: Binary Phase shift keying (BPSK) using simulink
Week 7	Lab7: Quadrature PSK (QPSK)
Week 8	Lab8: Building a direct sequence spread spectrum model

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Carlson, A. B., Communication Systems (4th Edition), Mc Graw-Hill, 2003	
Recommended Texts	Leon W. Couch, II, Digital and analog communication systems, Pearson Education Asia, 2001	
Websites	http://www.tutorialspoint.com/dip/signals_and_system_introduction.htm	

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.

مقررات الكورس الاول

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Digital Signal Processing**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE315**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 3	**Semester of Delivery**	5
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Farooq Safauldeen Omar Noor Faisal Mohammed	**e-mail**	fkutalar@ntu.edu.iq noor6faysal@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	1. To describe signals mathematically and understand how to perform mathematical operations on signals. 2. It will provide knowledge of Digital filter. 3. To discuss word length issues, multi rate signal processing and application. 4. Understand and classify digital signal processing systems. 5. Understanding how to convert an analogue signal into digital. 6. Understand the pulse and frequency analysis of intermittent signals. 7. Designing digital filters and studying their response.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Illustrate digital signals, systems, and their significance. 2.Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP. 3. Analyze the digital signals using various digital transforms DFT, FFT etc. 4. Design and develop the basic digital system. 5. Interpret the finite word length effects on functioning of digital filters. 6. Be able to design and implement a variety of DSP algorithms in MATLAB. 7. Understanding standard of discrete time signals (sequences): Unit sample sequence, unit step sequence, Unit ramp sequence 8. Understanding convolution and correlation 9. understanding Z transform
Indicative Contents المحتويات الإرشادية	The module will cover the following key areas: 1. Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP. 2.. Standard of discrete time signals (sequences): Unit sample sequence, 3. Unit step sequence, Unit ramp sequence. classification of discrete time signals) system properties: Static and dynamic system, shift invariant and shift variant system. 4. Convolution: Direct from method, graphical method, slide rule method. 5. Correlation of discrete time sequence cross correlation and auto correlation. 6. Discrete Fourier transform (DFT) 7. Introduction to Z transform Definition of Z transform and Roc 8. Properties of Z transform.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will utilize a variety of strategies including: 1. Lectures: To provide the theoretical aspects of network simulation. 2. Group Discussions: To facilitate learning through the exchange of ideas.

	3. Practical Assignments: To provide hands-on experience in network simulation. 4. Lab Sessions: To provide practical understanding and experience of network elements, implementation, and troubleshooting. 5. Mid-term and final exams: To evaluate the understanding and application of the knowledge acquired. 6. Preparatory Week: To allow students to revise and consolidate their knowledge before the final exam.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	3
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP.
Week 2	Application of DSP, continues time signals vs. discrete time signals.
Week 3	Discrete time signals and sequences.
Week 4	

	Standard of discrete time signals (sequences): Unit sample sequence, Unit step sequence.
Week 5	Standard of discrete time signals (sequences): Unit ramp sequence
Week 6	(classification of discrete time signals) system properties: Static and dynamic system, shift invariant and shift variant system,
Week 7	Causal and non-causal system, linear and nonlinear system, stable and unstable
Week 8	Convolution: Direct from method, graphical method, slide rule method
Week 9	Correlation of discrete time sequence cross correlation.
Week 10	Correlation of discrete time sequence auto correlation.
Week 11	Frequency domain representation: Find frequency response
Week 12	Discrete Fourier transform (DFT): Linear convolution using DFT.
Week 13	Discrete Fourier transform (DFT): Invers Discrete Fourier transform IDFT
Week 14	Introduction to Z transform Definition of Z transform and Roc
Week 15	Properties of Z transform, Inverse z transform, application of Z transform (pole & zero plot
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Introduction to digital signal processing. Basic elements of DSP, DSP vs. ASP.
Week 2	Application of DSP, continues time signals vs. discrete time signals.
Week 3	Discrete time signals and sequences.
Week 4	Standard of discrete time signals (sequences): Unit sample sequence, Unit step sequence.
Week 5 +6+7	Standard of discrete time signals (sequences): Unit ramp sequence and Unit .

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Hwei P. Hsu, "Schaum's Outlines of Theory and Problems of Signals and Systems", McGraw- Hill Companies.	Yes
Recommended Texts	Computer organization and architecture: design for performance (8th edition) by William stalling	No

Websites	https://www.tutorialspoint.com/dip/signals_and_system_introduction.htm

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	**امتياز**	90 - 100	Outstanding Performance
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	F – Fail	**راسب**	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**English Language 3**		**Module Delivery**
Module Type			• ☒ **Theory** • ☒ **Lecture** • ☐ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☒ **Seminar**
Module Code			
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 3	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	The aim of this English Language Lecture is to provide students with a comprehensive understanding of the English language, including its structure, usage, and various linguistic aspects. The lecture aims to enhance students' language skills and improve their overall proficiency in English.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Demonstrate a solid understanding of the fundamental aspects of English grammar, vocabulary, and syntax. 2. Apply effective reading strategies to comprehend and analyze a variety of written texts. 3. Produce coherent and well-structured written pieces using appropriate grammar, vocabulary, and style. 4. Listen actively and comprehend spoken English in various contexts, including formal and informal situations. 5. Engage in meaningful conversations and deliver clear and organized oral presentations in English. 6. Critically evaluate and analyze linguistic elements in literature, media, and other forms of communication. 7. Recognize and appreciate the historical and cultural contexts that have shaped the English language.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to the English language and its global significance. 2. Overview of English grammar, including parts of speech, sentence structure, and verb tenses. 3. Building vocabulary and word choice for effective communication. 4. Reading comprehension strategies and analysis of different types of texts. 5. Developing writing skills, including organization, coherence, and proper grammar usage. 6. Listening comprehension and effective note-taking techniques. 7. Speaking skills development, including conversation, pronunciation, and presentation skills. 8. Literary analysis and interpretation of English language texts. 9. Historical and cultural influences on the English language. 10. Contemporary issues and challenges in the English language.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lecture delivery: The instructor will present concepts, explanations, and examples through interactive lectures, incorporating visual aids, multimedia resources, and real-life examples. 2. Group activities: Students will engage in group discussions, peer-to-peer interactions, and collaborative learning tasks to reinforce their understanding of concepts and develop their communication skills.

	3. Practical exercises: Students will participate in individual and group exercises, such as grammar quizzes, writing assignments, and pronunciation drills, to apply their knowledge and receive feedback. 4. Multimedia resources: The lecture may incorporate audiovisual materials, online resources, and language learning software to provide a dynamic and interactive learning experience. 5. Assessments: Regular assessments, including quizzes, exams, and assignments, will be conducted to gauge students' progress and provide constructive feedback for improvement. 6. Self-directed learning: Students will be encouraged to engage in independent learning outside of the lecture through recommended readings, online resources, and language practice exercises.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	40	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation
تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	0	0	5, 12	LO #1, 3 and 7
	Assignments	0	30% (30)	4, 13	LO # 2, 4 and 6
	Projects / Lab.	0	0%		
	Report	1	20% (10)	13	All
Summative assessment	Midterm Exam	2 hr.	20% (30)	7	LO # 1-6
	Final Exam	2 hr.	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	• Review of verb tenses: Present, past, and future • Words in English (Book 5)

Week 2	• Listening and speaking practice: Discussing recent experiences • Words in English (Book 5)
Week 3	• Modal verbs: Review and advanced usage • Words in English (Book 5)
Week 4	• Gerunds, infinitives, and participles: Review and advanced usage • Words in English (Book 5)
Week 5	• Conditional sentences: Review and introduction to advanced conditionals (Type 2 and Type 3) • Words in English (Book 5)
Week 6	• Reported speech: Review and introduction to advanced reported speech (mixed tenses, requests, commands) • Words in English (Book 5)
Week 7	• Mid-term Evaluation
Week 8	• Passive voice: Advanced usage and transformations • Words in English (Book 5)
Week 9	• Understanding subtle meanings and nuances • Words in English (Book 5)
Week 10	• Expressing future actions and possibilities • Words in English (Book 5)
Week 11	• Describing people, things, and places with precision. • Words in English (Book 5)
Week 12	• Role-playing: Giving directions and describing locations with precision • Words in English (Book 5)
Week 13	• Listening and speaking practice: Delivering coherent and organized presentations • Words in English (Book 5)
Week 14	• Words in English (Book 5)
Week 15	• Review and reinforcement of previous topics before final term evaluation

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	English Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	4000 Essential English words 2nd edition	No
Websites	http://www.duolingo.com/ http://www.bbc.co.uk/learningenglish	

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	**Real time systems**	**Module Delivery**

Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☒ **Seminar**
Module Code	**COE314**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 1	**Semester of Delivery**	5
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Mohammed Nisham Anwer	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	Mohammed.sefer@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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**	
Module Aims **أهداف المادة الدراسية**	The aim of this module is to provide students with a comprehensive understanding of real-time systems design, including their definitions, types, operational mechanisms, and related components. Through this module, students will gain insight into both analog and digital systems, their signal properties, and the conversion between them. They will also learn about basic interfacing devices and techniques to control data transfer in real-time systems.
Module Learning Outcomes	1. Define and distinguish between different types of real-time systems. 2. Prepare a coherent design proposal for a real-time system. 3. Understand the functioning of real-time systems, including the role of signals.

مخرجات التعلم للمادة الدراسية	4. Differentiate between analog and digital signals and understand their applications in real-time systems. 5. Understand the components of analog and digital systems and their functions. 6. Identify and comprehend the specifications of ADC and DAC. 7. Understand basic interfacing devices and their roles in real-time systems. 8. Apply techniques to control data transfer in real-time systems. 9. Demonstrate practical knowledge through assignment presentation.
Indicative Contents المحتويات الإرشادية	Introduction and definitions of real-time systems design Different types of real-time systems Design models and proposal preparation Operational mechanisms of real-time systems Introduction to signals and systems Exploration of analog and digital signals Examination of analog computer components Introduction to digital systems Overview of ADC and DAC Understanding of basic interfacing devices Techniques of data transfer control

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The module will employ a combination of strategies including but not limited to: 1. Lectures: To provide the theoretical foundations of real-time systems design. 2. Tutorials: To allow students to apply the theoretical knowledge in practical contexts. 3. Group Discussions: To facilitate understanding through the exchange of ideas. 4. Practical Assignments: To provide hands-on experience in the design and operation of real-time systems. 5. Mid-term and final exams: To assess the understanding and application of knowledge. 6. Assignment Presentations: To develop students' communication skills and provide an opportunity to demonstrate their understanding. 7. Preparatory Week: To give students time to revise and clarify any difficulties before the final exam.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation
تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	3, 14	All
	Assignments	2	5% (5)	2, 15	LO # 3 and 6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	15	LO # 3, 4 and 9
Summative assessment	Midterm Exam	2 hr	20% (20)	9	LO # 1-9
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction – Definitions of real-time systems design
Week 2	Types
Week 3	Design models, preparing a design proposal
Week 4	How real-time systems works
Week 5	Signals and systems
Week 6	Analog and digital signals
Week 7	Analog computer components,
Week 8	Introduction to Digital systems
Week 9	Mid-term exams
Week 10	ADC:{Definitions, type, specifications}
Week 11	DAC :{Definitions, type, specifications}
Week 12	Basic Interfacing devices
Week 13	Basic Interfacing devices
Week 14	Data transfer controlling
Week 15	Assignment Presentation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Lab 1: Time.h, Library Variables
Week 2	Lab 2: Date And Time Functions
Week 3	Lab 3: ctime
Week 4	Lab 4: gmtime
Week 5	Lab 5: localtime

Week 6	Lab 6: strftime
Week 7	Lab 7: asctime
Week 8	Lab 8: mktime
Week 9	Lab 9: difftime
Week 10	Lab 10: clock

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Liu, Jane W. S. (2000). "Real-Time Systems". Prentice Hall.	No
Recommended Texts	Kopetz, Hermann (2011). "Real-Time Systems: Design Principles for Distributed Embedded Applications". Springer.	No
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 analysis**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE312**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 3	Semester of Delivery	5
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Huda Hamza Abdulkhudhur	e-mail	hudahamza.abdulkhudhur@ntu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Ms.c
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

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	
Module Aims **أهداف المادة الدراسية**	1. The course curriculum aims to introduce the student to the skills of scientific mathematical foundations, qualify him with basic information, and teach him solutions to engineering problems using multiple numerical and engineering methods. 2. The student understands mathematical theories and laws that enable the student to apply them in the fields of engineering, whether in engineering analyzes or other applications. 3. The course also aims to teach students solutions to ordinary and partial differential equations, their applications, Fourier series, Laplace transformations, numerical methods, linear interpolation, numerical integration, and solutions to nonlinear equations.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Identify different analytical and numerical methods for solving mathematical problems. 2. Familiarity with the basic concepts of engineering and numerical analyses. 3. Learn the skills of using mathematical laws. 4. Learn how to analyze engineering mathematical issues. 5. Linking realistic physical problems and ways to solve them by formulating them in a mathematical framework and within their boundary conditions. 6. The ability to choose the optimal solution method. 7. Developing and developing the student's ability and ability to use computer programs in the field of engineering analysis. 8. Developing and developing the student's ability and ability to translate academic information into practical reality.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. **Part A** Laplace transform & inverse Laplace transform **[12 hrs]** First & Second order differential equations and their applications **[14 hrs]** Fourier series for Periodic functions, Even & odd functions and Half range expansion **[12 hrs]** Power Series & Solution of ODE by Power Series, Partial differential equations**[9 hrs]** **Part B** numerical solution of non-linear equations:Newton-Raphson method & Secant Method **[10hrs]** Interpolation & Lagrange Interpolation, Newton's divided difference interpolation **[10 hrs]** Numerical methods for solving integration: Trapezoidal and Simpson's rules **[9hrs]** Numerical method for solving ordinary differential eq. Euler method , Numerical method for solving ordinary differential eq. Rung-Kutta method **[10hrs]** Newton Method for Curve Editing **[8 hrs]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Learning and teaching strategies are methods used to help learners acquire knowledge and skills, and for teachers to effectively deliver instruction. There are various types of learning and teaching strategies, including: 1. Active learning entails involving students in tasks that demand their participation, critical thinking, and application of what they have learned. Group discussions, practical exercises, and problem-based learning are a few examples. 2. Collaborative learning: This involves group work and collaboration among learners to achieve a common goal. Examples include group projects and peer learning. 3. Inquiry-based learning: This involves encouraging learners to ask questions, explore topics, and find answers through research and experimentation. Examples and reports include scientific investigations and case studies. 4. Direct instruction: This involves the teacher providing information to learners in a structured and organized manner. Examples include lectures, demonstrations, and tutorials. 5. Differentiated instruction: This involves tailoring instruction to meet the needs of individual learners, based on their learning style, abilities, and interests. 6. Technology-based instruction: This involves using technology tools and resources to enhance instruction and engage learners. Examples include online courses, interactive whiteboards, and educational apps. 7. Effective teaching and learning strategies often involve a combination of these approaches, tailored to the needs of the learners and the content being taught.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation **تقييم المادة الدراسية**					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الأسبوعي النظري**	
Week	**Material Covered**
Week 1	Laplace transform
Week 2	inverse Laplace transform
Week 3	First order differential equations and their applications
Week 4	Second order differential equations and their applications
Week 5	Higher order Linear differential equations
Week 6	Partial differential equations
Week 7	Fourier series for Periodic functions
Week 8	Even & odd functions and Half range expansion
Week 9	Power Series & Solution of ODE by Power Series
Week 10	numerical solution of non-linear equations : Newton-Raphson method, Secant Method
Week 11	Interpolation , Lagrange Interpolation , Newton's divided difference interpolation
Week 12	Numerical methods for solving integration: Trapezoidal and Simpson's rules
Week 13	Numerical method for solving ordinary differential eq.(Euler method)
Week 14	Numerical method for solving ordinary differential eq. (Rung-Kutta method)
Week 15	Newton Method for Curve Editing
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الأسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Laplace transform & inverse Laplace transform
Week 2	Lab 2: First & Second & Higher order differential equations
Week 3	Lab 3: Partial differential equations
Week 4	Lab 4: Fourier series
Week 5	Lab 5: Power Series
Week 6	Lab 6: Newton-Raphson method, Secant Method
Week 7	Lab 7: Interpolation , Lagrange Interpolation
Week 8	Lab 8: Newton's divided difference interpolation
Week 9	Lab 9: Trapezoidal and Simpson's rules
Week 10	Lab 10: Euler method and Rung-Kutta method

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Advanced Engineering Mathematics", by Erwin Kreyszig. "Advanced Mathematics for Engineers", by W. Ertel.	
Recommended Texts	"Advanced Engineering Mathematics", by C. Ray Wylie. "Fundamentals of Differential Equations", by Nagle. Staff. Snider. "Numerical Methods of Engineers", by Chapra & Canale. "Applied Numerical Analysis", by Gerald & Wheatley.	
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
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	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	**Control Engineering Fundamentals**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Ali Mahmoud Salman	**e-mail**	ali.mahmoudsalman23@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	N/A	**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	This course is an introductory course on linear control systems. It introduces the fundamentals and concepts of modeling and control of linear time invariant systems. The course aims: 1. To build foundations of time and frequency analyses of systems. 2. To provide solid knowledge on feedback control principles of the linear time invariant systems. 3. To understand and apply various analysis tools to determine the performance of the control systems. 4. To provide the necessary skills for the design of feedback control systems. 5. Use computer simulation software such as MATLAB to perform time domain analysis, frequency domain analysis, and control system design.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	A student who has successfully completed this course should be able to: 1. Model simple electrical and mechanical systems using ordinary differential equations. 2. Represent LTI systems in the form of transfer functions, block diagrams and signal-flow graphs. 3. Obtain the system response characteristics, i.e., both the transient response and steady-state response. 4. Understand the concept and methods of stability analysis. 5. Design of PID controller. 6. To understand and apply the concept of root-locus technique and Nyquist's criterion. 7. Design a feedback control system to obtain specified objectives. 8. Use computer simulation software such as MATLAB and Simulink to apply and verify the concepts of linear control systems.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following: Mathematical modelling of systems, Laplace transforms, transfer functions, block diagram representation. Block diagram reduction, time response characteristics. System stability, Routh Hurwitz stability criterion, root locus plots, stability margins. Frequency response analysis, Nyquist stability criterion, bode plots and stability margins in frequency domain. Control design, the proportional, derivative and integral actions. Design using Root Locus, design using Bode plots.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The teaching methods will include lectures, in-class examples and exercises, class discussion, homework assignments, and Lab reports. Lecture notes, announcements, and Lab manual will be posted on an appropriate communication platform.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to control systems, open and closed loop system.
Week 2, 3, 4	Mathematical modeling of physical systems and transfer functions. Mathematical modeling of D.C. Servo Motor.
Week 5	Block diagrams.
Week 6	Time-domain analysis of closed loop control systems and error analysis.
Week 7, 8	P, PI, PD and PID modes of feedback control, realization of PID controller using active and passive elements.

Week 9	Stability analysis and Rouths Stability criterion. Root Locus technique.
Week 10	Analysis of control system in frequency domain and Bode Diagrams.
Week 11, 12	Design of control systems and compensation concepts.
Week 13	Control system design using Root Locus method.
Week 14	Control system design using Bode Diagrams.
Week 15	Definitions of non-linear systems.
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Laboratory regulations and safety rules
Week 2	Introduction to MATLAB Simulink
Week 3,4	Electrical Systems mathematical modelling using SimScape
Week 4	Mechanical Systems mathematical modelling using SimScape
Week 5,6	System Identification: first order System
Week 7,8	System Identification: second order System
Week 9, 10, 11	PID controller
Week 12	Stability analysis
Week 13	Control system design using Root Locus method.
Week 14, 15	Control system design using Bode Diagrams
Week 16	**Preparatory week before the final exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Modern Control Systems" by R. C. Dorf and R. H. Bishop ISBN: 0132270285 Publisher: Prentice Hall, 2008	No
Recommended Texts	"Control Systems Engineering", 8th edition by Norman S. Nise Publisher: Wiley Inc., 2019	No
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.

مقررات الكورس الثاني

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Networks simulators**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE324**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	UGx11 3	**Semester of Delivery**	6
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Noor F. Mohammed	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	This module aims to provide students with an in-depth understanding of network simulation. The course covers various aspects including simulator and emulator differences, advantages and limitations of network simulation, and simulation techniques. It introduces networking basics, terminologies, and common topologies. The course also delves into network architectures, protocols, and the OSI model. Furthermore, students will learn about different network elements, implementation strategies, IP addressing, network management, and troubleshooting techniques.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Upon completion of this module, students should be able to: 2. Understand the basic concepts of network simulation. 3. Distinguish between simulators and emulators. 4. Understand the advantages and limitations of network simulation. 5. Use simulation techniques for analyzing, planning, and building networks. 6. Understand the basics of networking and associated terminologies. 7. Identify common physical and logical network topologies. 8. Understand networking architectures and protocols, network connections, and the OSI model. 9. Understand the functionality of various network elements. 10. Implement networks using simulation, including both static and dynamic routing techniques. 11. Understand IP addressing and its importance. 12. Apply network management and remote management techniques. 13. Use network monitoring tools to optimize network performance. 14. Troubleshoot common network issues.
Indicative Contents **المحتويات الإرشادية**	The module will cover the following key areas: 1. Introduction to network simulation 2. Simulator vs. Emulator 3. Benefits and limitations of network simulation 4. Simulation techniques 5. Event-driven vs. Time-driven simulation techniques 6. Networking basics and terminology 7. Common physical and logical topologies 8. Networking architectures and protocols 9. OSI model 10. Network elements 11. Network implementation using simulation 12. IP addressing 13. Network management and remote management 14. Network monitoring tools 15. Network troubleshooting

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	The module will utilize a variety of strategies including: 1. Lectures: To provide the theoretical aspects of network simulation. 2. Group Discussions: To facilitate learning through the exchange of ideas. 3. Practical Assignments: To provide hands-on experience in network simulation. 4. Lab Sessions: To provide practical understanding and experience of network elements, implementation, and troubleshooting. 5. Mid-term and final exams: To evaluate the understanding and application of the knowledge acquired. 6. Preparatory Week: To allow students to revise and consolidate their knowledge before the final exam.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	64	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	36	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to Networks Simulation
Week 2	Simulator vs Emulator
Week 3	Benefits and limitations

Week 4	Simulation techniques as an engineering tool for analyzing, planning, dimensioning, monitoring, and building real operating networks.
Week 5	Event driven vs Time driven simulation techniques
Week 6	Networking basics , Networking terminology
Week 7	Common physical and logical topologies.
Week 8	Mid-term
Week 9	Networking architectures and protocols, network connections, and the Open Systems Interconnection (OSI) model.
Week 10	Network Elements (HUBS, SWITCHS (L2, L3), ROUTERS, etc..)
Week 11	Network Implementation with simulation , Implementing Routing techniques (static and dynamic).
Week 12	Understanding IP addressing, assigning IP addresses, mapping logical host names to IP addresses, routing, and accessing the Internet. Why IPv6 is necessary and how multicasting works.
Week 13	Network Management, Remote management.
Week 14	Network monitoring tools, and elements to optimize the performance of the network (Solar winds, PRTG, etc..).
Week 15	Troubleshooting
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Introduction to Network Simulation Tools
Week 2	Lab 2: Networking Basics and Topologies
Week 3	Lab 3: Implementing Network Protocols
Week 4	Lab 4: Routing Techniques
Week 5	Lab 5: Network Management and Monitoring Tools
Week 6	Lab 6: Implementing Network Elements
Week 7	Lab 7: Troubleshooting Network Issues

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Park, J. S., & Kim, T. (2015). "Network Simulation Experiments Manual". Morgan Kaufmann	No
Recommended Texts	Banks, J., Carson, J. S., Nelson, B. L., & Nicol, D. M. (2010). "Discrete-Event System Simulation"	No
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	**Microcontrollers**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE322**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 3	**Semester of Delivery**	6
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Shyamma Jaffar	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	shaymaaj.alzangana@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	This module aims to provide students with a comprehensive understanding of microcontrollers and Programmable Logic Controllers (PLCs). It will explore the architecture, programming, and application of microcontrollers, with a special focus on PIC microcontrollers. Furthermore, the module introduces the principles, input-output modules, number systems, logic fundamentals, and programming aspects of PLCs. Students will gain hands-on experience in PLC wiring diagrams, ladder logic programs, and the application of sensors and actuators in industrial settings.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Understand the concepts of microcontrollers, their types, and the difference between microprocessors and microcontrollers. 2. Comprehend the architecture of PIC microcontrollers. 3. Program microcontrollers for various applications. 4. Apply microcontrollers in real-world project contexts. 5. Understand the principles of PLC and its input-output modules. 6. Recognize different number systems and codes relevant to PLC. 7. Understand the logic fundamentals in PLC programming. 8. Construct a PLC wiring diagram and ladder logic program. 9. Apply sensors and actuators in industrial applications. 10. Implement a PLC project.
Indicative Contents **المحتويات الإرشادية**	The module will cover the following key areas: Introduction to Microcontrollers PIC Microcontroller Architecture Microcontroller Programming Application projects of Microcontrollers Principles of PLC Input-Output modules of PLC Numbers systems and codes Fundamentals of logic in PLC Basics of PLC programming PLC-wiring diagram and ladder logic program Sensors and actuators for industrial applications PLC projects

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will utilize a variety of strategies including: 1. Lectures: To provide the theoretical aspects of microcontrollers and PLCs. 2. Practical Programming Sessions: To apply the theoretical knowledge in programming microcontrollers and PLCs. 3. Group Discussions: To facilitate learning through the exchange of ideas. 4. Practical Assignments: To provide hands-on experience in PLC wiring diagrams and ladder logic programs. 5. Mid-term and final exams: To evaluate the understanding and application of the knowledge acquired. 6. Project Work: To provide an opportunity to implement real-world PLC projects.

	7. Preparatory Week: To allow students to revise and consolidate their knowledge before the final exam.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to Microcontroller, Types of Microcontrollers, difference between MP and Microcontroller
Week 2	Architecture of PIC Microcontroller
Week 3	Architecture of PIC Microcontroller
Week 4	Programming the Microcontroller
Week 5	Programming the Microcontroller
Week 6	Application projects of Microcontroller.
Week 7	Mid-Term
Week 8	Principle of PLC
Week 9	Input-Output modules of PLC
Week 10	Numbers systems and codes

Week 11	Fundamentals of logic in PLC
Week 12	Basic of PLC programming
Week 13	PLC-wiring diagram and ladders logic program and sensors
Week 14	Sensors and Actuators for Industrial Applications.
Week 15	PLC projects
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Microcontroller Basics
Week 2	Lab 2: Exploring PIC Microcontroller Architecture
Week 3	Lab 3: Basic Microcontroller Programming
Week 4	Lab 4: Advanced Microcontroller Programming
Week 5	Lab 5: Microcontroller Application Project
Week 6	Lab 6: PLC Basics and I/O Modules
Week 7	Lab 7: PLC Programming

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	PICmicro Microcontrollers". McGraw-Hill. This is an essential text for learning about PIC microcontroller architecture and programming.	No
Recommended Texts	Bates, Martin P. (2011). "Interfacing PIC Microcontrollers: Embedded Design by Interactive Simulation". Newnes. This text gives a hands-on experience of application projects of Microcontrollers.	No
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	**Computer networks**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE323**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 3	**Semester of Delivery**	6
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Mohammed Nisham, Mohammed Hamid	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	Mohammed.sefer@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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	
Module Aims **أهداف المادة الدراسية**	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling

	capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to Networks, Protocol layers and service models. OSI and Internet protocols.
Week 2	What is the Internet and Networks Structure according to the OSI and TCP/IP refrence model.
Week 3	Application layer protocols (HTTP, DNS, FTP, SMTP) and client-server model.
Week 4	Packet Switched Networks data link layer operation (ARP).
Week 5	Adressing in Packet Switched Network: Introduction to IP addresses, MAC Addresses and Port Addresses.
Week 6	Adressing in Packet Switched Network: Introduction to IP addresses, MAC Addresses and Port Addresses.
Week 7	Adressing in Packet Switched Network: IP Subnetting, VLSM and network Design.
Week 8	Adressing in Packet Switched Network: IP Subnetting, VLSM and network Design.
Week 9	Reliable data transfer. Stop-and-Wait evaluation. TCP and UDP semantics and syntax.
Week 10	Transport Layer Protocols TCP and UDP
Week 11	Principles of routing. Static and Dynamic Routing. Midterm Exam.
Week 12	IP semantics and syntax.Link-state and distance vector routing
Week 13	Data Link layer. Error detection. Multiple access protocols. IEEE 802.3 Ethernet.
Week 14	Virtual LANS
Week 15	Review for comprehensive final exam.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Computer_Networking_A_Top-Down_Approach	Yes
Recommended Texts		No
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
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	F – Fail	**راسب**	(0-44)	Considerable amount of work required

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Introduction to Cybersecurity Engineering -I PROGRAMME COURSE DESCRIPTION

Code BCYSCCET 108-S2	Name of the Course Unit	Semester	In-Class Hours (T+P)	Credit	ECTS Credit
	Introduction to Cybersecurity	1	2+2	3	5

GENERAL INFORMATION	
Language of Instruction :	English
Level of the Course Unit :	BACHELOR'S DEGREE
Type of the Course :	Compulsory
Mode of Delivery of the Course Unit	Face to Face
Coordinator of the Course Unit	Dr. Razan Abdulhammed
Instructor(s) of the Course Unit	Dr. Razan Abdulhammed

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	1. Understanding the fundamental concepts of cybersecurity. 2. Identifying common cybersecurity threats and vulnerabilities, such as malware, phishing, and social engineering. 3. Learning about different types of cyber-attacks and how they can be prevented or mitigated. **4.** Understanding the importance of risk management and incident response in cybersecurity.
Contents of the Course Unit:	1. Introduction to Cybersecurity 2. Data security 3. Software security 4. Societal security 5. Hardware security 6. Risk assessment and management 7. Incident Response and Recovery
Textbooks	Introduction to Cybersecurity by Ajay Singh

WEEK	KEY LEARNING OUTCOMES OF THE COURSE UNIT (On successful completion of this course unit, students/learners will or will be able to)
1	Basic concepts and definitions. Historical context. Cybersecurity frameworks, importance of cybersecurity, Cyber security threats and attacks.
2	Data Security: Basic cryptography concepts, methods for data integrity and authentication, information storage security.
3	Software security: software design with security requirements, testing, configuration management.
4	Component security: Design, procurement, analysis, and maintenance of tangible components that are integrated into larger systems.

WEEK	KEY LEARNING OUTCOMES OF THE COURSE UNIT (On successful completion of this course unit, students/learners will or will be able to)
5	Connection security: Security for networked systems, secure transmission models, common types of connection and transmission attacks.
6	System security: System thinking, common system architectures, system management, access, control, and testing.
7	Human security: identity management; personal awareness, understanding and compliance; human behavioral factors; personal data privacy and security.
8	Organizational security: governance and policy strategies for organizations; cybersecurity risk management; legal and regulatory issues.
9	Societal security: cybercrime, cyberlaw, cyber ethics, cyber policy, privacy.
10	Hardware security: What Is Hardware Security? Definition, Overview of hardware security, types of Hardware attacks.
11	Threat and threat modeling, Threats, Hardware Impacted in Cyberattack
12	Infrastructure security: What Is Infrastructure security? Critical Infrastructure Security, Overview of critical infrastructure, Types of critical infrastructure, Threats to critical infrastructure,
13	Risk assessment and management for critical infrastructure, Security policies and standards for critical infrastructure.
14	Incident Response and Recovery, Incident response planning, Incident detection and analysis, Incident containment and eradication, Business continuity and disaster recovery
15	Final Exam

WeeK	Practical Part
1	Lab 1: Getting Started
2	Lab 2: Introduction to Wireshark
3	Lab 3: Configuration of Firewalls
4	Lab 4: Wireshark_SSL
5	Lab 5: Port scanning
6	Lab 6: Cyber security threats
7	Lab7: Cyber security attacks
8	Lab 8: Risk assessment
9	Lab 9: Incident response planning
10	Lab 10: Hardware attacks
11	Lab 11: personal data security
12	Lab 12: Social Engineering
13	Lab 13 Protecting social accounts
14	Lab14: Project and Presentation

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT Computer Networksالرمز			
Workload for Learning & Teaching Activities			
Type of the Learning Activates	**Learning Activities (# of week)**	**Duration (hours, h)**	**Workload (h)**
Lecture & In-Class Activities	14	4	56

Preliminary & Further Study	NA	NA	NA
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	11	1	11
Reading	1	1	1
Assignment (Homework)	2	2	4
Project Work	NA	NA	NA
Seminar	1	1	1
Internship	NA	NA	NA
Technical Visit	NA	NA	NA
Web Based Learning	2	1	2
Implementation/Application/Practice	NA	NA	NA
Practice at a workplace	NA	NA	NA
Occupational Activity	NA	NA	NA
Social Activity	NA	NA	NA
Thesis Work	NA	NA	NA
Field Study	NA	NA	NA
Report Writing	1	3	3
Final Exam	1	3	3
Preparation for the Final Exam	1	20	20
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	14	14
Short Exam (Quizzes)	6	0.5	3
Preparation for the Short Exam	6	1	6
Total Workload of the Course Unit	**48**	**53.5**	**126**

Workload (h) / 25	**5.04**
ECTS Credits allocated for the Course Unit	**5**

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Digital Communications**		**Module Delivery**
Module Type	**Core**		• ☒ Theory • ☒ Lecture • ☒ Lab • ☐ Tutorial • ☐ Practical • ☐ Seminar
Module Code	**COE321**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 3	**Semester of Delivery**	6
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Huda Hamza & Ahmed Safaa Salman	**e-mail**	ahmed.safaa23@ntu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	Ms.c
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

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	
Module Aims **أهداف المادة الدراسية**	1. Understand and classify digital communication technologies 2. Clarifying the basic concept of digital communication system circuits through a set of tools 3. Enhancing students' analytical abilities and problem-solving 4. Preparing students for extensive knowledge of digital inclusion systems 5. Enable students to perform this knowledge in the field of computer technology
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Determine the basic elements of the communication system 2. Understand the principles and theories of digital communication 3. Familiarity with the basic concepts, principles and theories on which digital communication is based 4. Identify the types of signals and the general block diagram 5. Understanding the unit pulse and the Fourier transform 6. Discussion of sampling theory, PAM, TDM PWM, PPM and S/N in analog pulse modulation 7. Discussion of pulse code modulation and consideration of noise in PCM 8. Learn about digital modulation techniques 9. Learn about the modulation format
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. • Introduction to digital communication, Signal types, Advantage and disadvantage of digital modulation **[3 hrs]** • Unit impulse signal and Fourier Transform **[6 hrs]** • Sampling theorem **[4 hrs]** • Pulse Amplitude Modulation (PAM) **[6 hrs]** • Pulse Code Modulation (PCM) **[6 hrs]** • Noise consideration in PCM **[5 hrs]** • Limitation and Modification of PCM **[3 hrs]** • Delta Modulation, Delta-Sigme modulation, Adaptive delta modulation **[9 hrs]** • Digital Base-Band Transmission **[7 hrs]** • Inter-symbol Interference (ISI) Pulse shaping to reduce ISI **[5 hrs]** • Amplitude Shift Keying (ASK) **[7 hrs]** • Frequency Shift Keying (FSK) **[7 hrs]** • Quadrature Shift Keying (QPSK) , Offset QPSK **[10 hrs]** • Minimum Shift Keying, M-ary PSK and M-ray QAM **[11 hrs]** • Spread Spectrum System SSS, Frequency Hopping FH Spread Spectrum **[5 hrs]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	There are various types of learning and teaching strategies, including: 1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction to digital communication, Signal types, Advantage and disadvantage of digital modulation
Week 2	Unit impulse signal and Fourier Transform

Week 3	Sampling theorem
Week 4	Pulse Amplitude Modulation (PAM)
Week 5	Pulse Code Modulation (PCM)
Week 6	Noise consideration in PCM
Week 7	Limitation and Modification of PCM
Week 8	Delta Modulation, Delta-Sigme modulation, Adaptive delta modulation
Week 9	Digital Base-Band Transmission
Week 10	Inter-symbol Interference (ISI) Pulse shaping to reduce ISI
Week 11	Amplitude Shift Keying (ASK)
Week 12	Frequency Shift Keying (FSK)
Week 13	Quadrature Shift Keying (QPSK) , Offset QPSK
Week 14	Minimum Shift Keying , M-ary PSK and M-ray QAM
Week 15	Spread Spectrum System SSS, Frequency Hopping FH Spread Spectrum
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Lab1: Simulation of Amplitude Modulation (AM) using simulink
Week 2	Lab2: Matlab simulink - Sampling theorem and Fourier transform
Week 3	Lab3: Pulse Code Modulation (PCM)
Week 4	Lab4: Amplitude shift keying (ASK) using simulink
Week 5	Lab5: Frequency shift keying (FSK) using simulink
Week 6	Lab6: Binary Phase shift keying (BPSK) using simulink
Week 7	Lab7: Quadrature PSK (QPSK)
Week 8	Lab8: Building a direct sequence spread spectrum model

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Carlson, A. B., Communication Systems (4th Edition), Mc Graw-Hill, 2003	
Recommended Texts	Leon W. Couch, II, Digital and analog communication systems, Pearson Education Asia, 2001	
Websites	http://www.tutorialspoint.com/dip/signals_and_system_introduction.htm	

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.

Description for Fourth Class

Network Part

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**		
Module Title	**English Language 4**	**Module Delivery**
Module Type		• ☒ **Theory** • ☒ **Lecture** • ☐ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☒ **Seminar**
Module Code		
ECTS Credits	**4**	
SWL (hr/sem)	**100**	

Module Level	UGx11 4	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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**	
Module Aims **أهداف المادة الدراسية**	The aim of this English Language Lecture is to provide students with a comprehensive understanding of the English language, including its structure, usage, and various linguistic aspects. The lecture aims to enhance students' language skills and improve their overall proficiency in English.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Demonstrate a solid understanding of the fundamental aspects of English grammar, vocabulary, and syntax. 2. Apply effective reading strategies to comprehend and analyze a variety of written texts.

	3. Produce coherent and well-structured written pieces using appropriate grammar, vocabulary, and style. 4. Listen actively and comprehend spoken English in various contexts, including formal and informal situations. 5. Engage in meaningful conversations and deliver clear and organized oral presentations in English. 6. Critically evaluate and analyze linguistic elements in literature, media, and other forms of communication. 7. Recognize and appreciate the historical and cultural contexts that have shaped the English language.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. 1. Introduction to the English language and its global significance. 2. Overview of English grammar, including parts of speech, sentence structure, and verb tenses. 3. Building vocabulary and word choice for effective communication. 4. Reading comprehension strategies and analysis of different types of texts. 5. Developing writing skills, including organization, coherence, and proper grammar usage. 6. Listening comprehension and effective note-taking techniques. 7. Speaking skills development, including conversation, pronunciation, and presentation skills.

	8. Literary analysis and interpretation of English language texts. 9. Historical and cultural influences on the English language. 10. Contemporary issues and challenges in the English language.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Lecture delivery: The instructor will present concepts, explanations, and examples through interactive lectures, incorporating visual aids, multimedia resources, and real-life examples. 2. Group activities: Students will engage in group discussions, peer-to-peer interactions, and collaborative learning tasks to reinforce their understanding of concepts and develop their communication skills. 3. Practical exercises: Students will participate in individual and group exercises, such as grammar quizzes, writing assignments, and pronunciation drills, to apply their knowledge and receive feedback. 4. Multimedia resources: The lecture may incorporate audiovisual materials, online resources, and language learning software to provide a dynamic and interactive learning experience. 5. Assessments: Regular assessments, including quizzes, exams, and assignments, will be conducted to gauge students' progress and provide constructive feedback for improvement. 6. Self-directed learning: Students will be encouraged to engage in independent learning outside of the lecture through

	recommended readings, online resources, and language practice exercises.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	40	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	0	0	5, 12	LO #1, 3 and 7
	Assignments	0	30% (30)	4, 13	LO # 2, 4 and 6
	Projects / Lab.	0	0%		
	Report	1	20% (10)	13	All
Summative assessment	**Midterm Exam**	2 hr.	20% (30)	7	LO # 1-6
	Final Exam	2 hr.	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	• Writing: Crafting well-developed thesis statements • Words in English (Book 6)
Week 2	• Vocabulary expansion: Academic vocabulary and formal expressions. • Words in English (Book 6)
Week 3	• Identifying main ideas, supporting evidence, and author's tone. • Words in English (Book 6)
Week 4	• Advanced speaking skills: Debate and discussion techniques. • Words in English (Book 6)
Week 5	• Listening: Extracting information from lectures and presentations. • Words in English (Book 6)
Week 6	• Advanced grammar: Complex sentence structures and subordination. • Words in English (Book 6)
Week 7	• Mid-term Evaluation
Week 8	• Vocabulary expansion: Academic and domain-specific terminology. • Words in English (Book 6)
Week 9	• Writing: Incorporating sources and creating citations. • Words in English (Book 6)

Week 10	• Advanced speaking skills: Oral presentations and public speaking. • Words in English (Book 6)
Week 11	• Reading: Exploring advanced literature and poetry. • Words in English (Book 6)
Week 12	• Advanced grammar: Complex verb forms and sentence constructions. • Words in English (Book 6)
Week 13	• Advanced listening skills: Understanding accents and dialects. • Words in English (Book 6)
Week 14	• Writing: Crafting short stories or creative essays
Week 15	• Review and reinforcement of previous topics before final term evaluation

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**

Required Texts	English Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	4000 Essential English words 2nd edition	No
Websites	http://www.duolingo.com/ http://www.bbc.co.uk/learningenglish	

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	Multimedia Computing		Module Delivery
Module Type	Core		• ☒ Theory • ☒ Lecture • ☒ Lab • ☐ Tutorial • ☐ Practical • ☐ Seminar
Module Code	COE413		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	UGx11 4	Semester of Delivery	7
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Professor Dr. Mohammed M. Siddeq	e-mail	mohammed.siddeq@ntu.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	PhD
Module Tutor	Name (if available)	e-mail	mohammed.siddeq@ntu.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	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	
Module Aims **أهداف المادة الدراسية**	This module aims to: 1. Provide an understanding of the fundamental concepts and components of multimedia computing. 2. Teach students about different multimedia applications, multimedia research topics, and multimedia on the web. 3. Expose students to different multimedia data basics such as graphics, image data representation, audio, and video basics. 4. Teach techniques and methods for multimedia data compression and transmission over networks.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Upon successful completion of this module, the student should be able to: 2. Understand the fundamental concepts, components, and applications of multimedia computing. 3. Understand and implement different image operations and image file formats. 4. Understand the basics of sound and audio, including digitization, synthetic sound, and compression. 5. Understand the basics of video, including color models, types of video signals, and video compression. 6. Understand and implement different methods for multimedia transmission over networks.
Indicative Contents **المحتويات الإرشادية**	1. Introduction to Multimedia: Hyper Text, Hyper Media, and Components of Multimedia.

	2. Multimedia Data Basics: Graphics and Image Data Representation, Image digitization, Spatial resolution and quantization. 3. Image Operations: Arithmetic operation on images, Logical operation on images, Image histogram modification and equalization. 4. Sound and Audio: Basics, Digitization of sound, Synthetic sound, Quantization and transmission of Audio. 5. Video Basics: Video color models, Types of video signals, Video compression. 6. Multimedia Over Networks.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	*1. Lectures: Fundamental concepts of multimedia computing will be delivered in a structured format with relevant examples.* *2. Tutorials: Hands-on experience in manipulating different multimedia data types such as images, sound, and video.* *3. Research Presentation: Students will be exposed to the latest research topics in multimedia computing and will present on selected topics.* *4. Assignments & Projects: Regular assignments will be given to students for practicing and reinforcing the concepts learned in class.* *5. Exam Preparation: Sample questions and revision sessions will be conducted to prepare students for the final exam.*

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction to Multimedia. Hyper Text and Hyper Media.
Week 2	Components of Multimedia. Multimedia applications.

Week 3	Multimedia Research Topics and Projects. Multimedia on the web.
Week 4	Multimedia Data Basics Graphics and Image Data Representation
Week 5	Image digitization. Spatial resolution and quantization.
Week 6	Type of image Image file formats
Week 7	Arithmetic operation on image Logical operation on image
Week 8	Image histogram Histogram modification and Histogram equalization.
Week 9	Image compression
Week 10	techniques Sound and Audio
Week 11	Basics Digitization of sound Nyquist theorem
Week 12	Synthetic sound Quantization and transmission of Audio
Week 13	Compression of audio Video Basics
Week 14	Video color models Type of video signals
Week 15	Video compression Multimedia over networks
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1 Image digitization and quantization
Week 2	Lab 2: Arithmetic operation
Week 3	Lab 3: Image histogram Histogram modification
Week 4	Lab 4: Image enhancement
Week 5	Lab 5: image Compression
Week 6	Lab 6: image segmentation
Week 7	Lab 7: Video processing (motion detection)

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Vaughan Tay, "Multimedia: Making It Work", McGraw-Hill/Osborne, 9th Edition, 2010.	Yes

Recommended Texts	Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia", Pearson/Prentice Hall, 2nd Edition, 2014.	No
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	Computer Network Protocols		Module Delivery
Module Type	Core		• ☒ Theory • ☐ Lecture • ☒ Lab • ☐ Tutorial • ☐ Practical • ☐ Seminar
Module Code	COE414		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGx11 4	Semester of Delivery	Seven
Administering Department	Technical Computer Engineering	College	Technical College - Kirkuk
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	1. To develop knowledge about the network reference models OSI and TCP/IP. 2. To understand the used Protocols in each network layer. 3. How the network model completes its work by using the protocols? 4. The Fundamental concepts of the protocol. 5. To understand each used protocol and its details. 6. Deal with networking strategies.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. To develop knowledge about Introduction of OSI Reference Model and TCP/IP reference model. Protocol Hierarchies in these models. 2. To understand the used Protocols in application layer, transport layer, network layer, datalink layer and physical layer. 3. How the network model completes its work by using the protocols? 4. The Fundamental concepts of the protocol used in reference model. 5. Understanding of each used protocol and its job.
Indicative Contents	Introduction the OSI Reference Mode and TCP/IP reference model. Protocol Hierarchies in these models.[10 hrs]

المحتويات الإرشادية	
	Application layer protocols: • WWW (HTTP, HTTPs, FTP) • Electronic Mail (SMTP, POP) • DHCP, DNS, SNMP, SSH, Telnet, BGP, RIP.[30 hrs]
	Transport layer Protocols: • Congestion control, Flow Control • End to End Protocols(UDP,TCP, RPC) .[20 hrs]
	Network Layer Protocols: • Routing algorithms • Shortest path routing • Link sate routing • Hierarchical routing • Broadcast and multicast routings • Routing in the internet • Path vector routing • OSPF routing • EIGRP routing. • IPv4, IPv6, IPsec • ICMP, IGMP. [60 hrs]
	Data Link Layer Protocols • Error control and flow control algorithms • ARP, L2TP, PPP • MAC (Ethernet, DSL, ISDN, FDDI) • STP

	• CSMA/CD • Check Sum algorithms • CRC [20 hrs]
	Physical layer Protocols • The Bluetooth Protocol Stack • OTN, SONET/SDH [10 hrs]

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Display the Network reference models and how to use the protocol in connection the network

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

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

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Introduction the OSI Reference Mode and TCP/IP reference model. Protocol Hierarchies in these models.
Weeks 2, 3 and 4	Application layer protocols: • WWW (HTTP, HTTPs, FTP) • Electronic Mail (SMTP, POP) • DHCP, DNS, SNMP, SSH, Telnet, BGP, RIP
Weeks 5 and 6	Transport layer Protocols: • Congestion control, Flow Control • End to End Protocols(UDP,TCP, RPC)
Weeks 7,8,9,10,11 and 12	Network Layer Protocols: • Routing algorithms • Shortest path routing • Link sate routing

	• Hierarchical routing • Broadcast and multicast routings • Routing in the internet • Path vector routing • OSPF routing • EIGRP routing • IPv4, IPv6, IPsec • ICMP, IGMP
Week 13 AND 14	Data Link Layer Protocols • Error control and flow control algorithms • ARP, L2TP, PPP • MAC (Ethernet, DSL, ISDN, FDDI) • STP • CSMA/CD • Check Sum algorithms • CRC
Week 15	Physical layer Protocols • The Bluetooth Protocol Stack • OTN, SONET/SDH

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: connect a local network
Week 2	Lab 2: display the HTTP details in networking
Week 3	Lab 3: DNS Protocol
Week 4	Lab 4: Routing algorithm

Week 5	Lab 5: IPv4 , IPv6
Week 6	• Lab 6: Error control and flow control algorithms • ARP, L2TP, PPP • MAC(Ethernet, DSL, ISDN, FDDI) • CRC
Week 7	• Lab 7: Lab 9: STP • CSMA/CD Check Sum algorithms.
Week 8	Lab 8: VHDL Data Types : pre-defined data types, user-defined data types
Week 9	Lab 9: The Bluetooth Protocol Stack
Week 10	Lab 10: OTN, SONET/SDH

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts	• **TCP/IP Protocol Suite**, Behrouz A. Forouzan *Fourth Edition, 2010*	Yes
	Computer Networking: A Top Down Approach, Jim Kurose, Keith Ross, *6th edition, 2012*	Yes
Websites	https://www.manageengine.com/network-monitoring/network-protocols.html	
	https://www.techtarget.com/searchnetworking/definition/protocol	
	https://www.techtarget.com/searchnetworking/feature/12-common-network-protocols-and-their-functions-explained	
	https://www.cloudflare.com/learning/network-layer/what-is-a-protocol/	
	https://www.tutorialspoint.com/communication_technologies/communication_technologies_network_protocols.htm	

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	**Smart systems modelling**	**Module Delivery**
Module Type	**Core**	• ☒ **Theory** • ☒ **Lecture**
Module Code		
ECTS Credits	**8**	

SWL (hr/sem)	**200**		• **☒ Lab** • **☐ Tutorial** • **☐ Practical** • **☐ Seminar**
Module Level	UGx11 4	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Amel Saeed Tuama	**e-mail**	Amel.tuama@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	• Biological inspiration for artificial neural networks (ANNs), neurons, synapses, axons, dendrites ,action potentials, Hebbian learning.

	• Underpinning data structures, including directed graphs, nodes (artificial neurons), edges, weights, layers (input, output, hidden), thresholds, propagation functions, learning rules, topologies, activation functions. • Problem domains such as classification, pattern recognition, data mining, medical diagnosis and gaming. Alternative neural network architectures: feedforward, radial basis function network, Hopfield, Boltzmann machines, recurrent, spiking neural networks. • Supervised/unsupervised learning approaches. • Approaches to validation: training/testing sets, k-folds cross validation, leave-one-out cross validation.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Knowledge and Understanding : Demonstrate an understanding the core principles and concepts underpinning artificial neural networks. 2. Demonstrate knowledge of the most common neural network architectures, understand the strengths and weaknesses of each approach, and appreciate the problem domains for which each networktype is best suited. 3. Intellectual, practical, affective and transferrable skills Using the features of a library in a high-level programming language, implement a neural network to solve a given computational problem of moderate size and complexity. 4. Use experimental methods and numerical validation techniques to evaluate the efficacy of the network and to assess overfitting.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A - Circuit Theory</u>

	DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation تقييم المادة الدراسية					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10

Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	**Introduction to Artificial neural networks, Overview of Biological Neurons**
Week 2	**Fundamental Concepts of Artificial Neural Networks** Models of ANNs; Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule.
Week 3	**Single layer Perception Classifier** Classification model, Features & Decision regions; training & classification using discrete perceptron, algorithm, single layer continuous perceptron networks for linearly seperable classifications.
Week 4	**Multi-layer Feed forward Networks** Linearly non-seperable pattern classification, Delta learning rule for multi-perceptron layer, Generalized delta learning rule, Error back-propagation training, learning factors, Examples.

Week 5	**Single layer feed back Networks** Basic Concepts, Hopfield networks, Training & Examples.
Week 6	**Associative memories** Linear Association, Basic Concepts of recurrent Auto associative memory: rentrieval algorithm, storage algorithm; By directional associative memory, Architecture, Association encoding & decoding, Stability.
Week 7	**Self organizing networks** UN supervised learning of clusters, winner-take-all learning, recall mode, Initialisation of weights, seperability limitations
Week 8	Backpropagation learning algorithm
Week 9	
Week 10	
Week 11	
Week 12	Introduction to genetic algorithms, search problem, advantages and disadvantages.
Week 13	Applications of genetic algorithms.
Week 14	GA operators, population, selection, crossover mutation.
	Population, Selection, crossover mutation algorithms

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	python language
Week 2	Operators and variables
Week 3	Loops and recursion

Week 4	Functions a	
Week 5-10	Neural networ	
Week 11-12	Genetic al	
Week 13-15	Convolutional n proj	
Week 15		

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	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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	**Computer and Network Security**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory**
Module Code	**COE422**		
ECTS Credits	**8**		• ☐ **Lecture**
SWL (hr/sem)	**200**		• ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Level	UGx11 4	**Semester of Delivery**	**Seven**
Administering Department	Technical Computer Engineering	**College**	Technical College - Kirkuk

Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية**	
Module Aims **أهداف المادة الدراسية**	1. To understand the classic and modern encryption, decryption algorithms 2. To develop knowledge about the security of OSI and TCP/IP. 3. To understand many types of encryption, decryption algorithms. 4. How the to protect network completes while it works? 5. The Fundamental concepts security for computer and network. 6. To understand each used algorithm and its details.

	7. Deal with classic and modern encryption, decryption algorithms.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Understanding the classic and modern encryption, decryption algorithms 2. How the to protect network completes while it works? 3. The Fundamental concepts security for computer and network. 4. To understand each used algorithm and its details. 5. Deal with classic and modern encryption, decryption algorithms. 6. To develop knowledge about the security of OSI and TCP/IP. 7. To understand many types of encryption, decryption algorithms.
Indicative Contents **المحتويات الإرشادية**	Introduction , Symmetric Ciphers model: plaintext, encryption algorithm, secret key, cipher text, decryption algorithm, a model of conventional encryption, Cryptography, Cryptanalysis, Block and stream cipher. [10 hrs]
	Ceaser cipher The affine cipher Mono alphabetic substitution cipher Shift cipher. [20 hrs]
	• Hill cipher • Playfair cipher. [10 hrs]
	• Polyalphbetic Ciphers • Vigenere cipher • Transportion Cipher. [10 hrs]

	• Affine Cipher • One Time Pad. [10 hrs]
	• Cryptanalysis of a Symmetric Key. [10 hrs]
	Symmetric Key algorithm DES –the Data Encryption Standard 16 round fesitel system. [20 hrs]
	Public Key algorithm RSA - and other Symmetric Key algorithms. [10 hrs]
	Authentication Protocols • Authentication Based on a Shared Secret Key • Establishing a Shared Key: The Diffie- Hellman Key Exchange • Authentication Using Key Distribution Center • Authentication Using Keberos Authentication Using Public Key Cryptography. [20 hrs]
	OSI Security Architecture, a model for network security Email Security PGP-Pretty Good Privacy S/MIME. [10 hrs]
	Protocols of computer networks Protection Services • OS protection Services: protected objects and methods of OS Protection security of OS, memory and addressing Protection, fence Protection • Database Protection Services • Network Protection Services_ IP and E-Commerce Protection, VPN and next generation network Protection. [20 hrs]

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**

Strategies	Display the Network reference models and how to use the protocol in connection the network

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	8
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction , Symmetric Ciphers model: plaintext, encryption algorithm, secret key, cipher text, decryption algorithm, a model of conventional encryption, Cryptography, Cryptanalysis, Block and stream cipher
Weeks 2 and 3	Ceaser cipher The affine cipher Mono alphabetic substitution cipher Shift cipher
Weeks 4	• Hill cipher • Playfair cipher
Weeks 5	• Polyalphbetic Ciphers • Vigenere cipher • Transportion Cipher
Week 6	• Affine Cipher • One Time Pad
Week 7	• Cryptanalysis of a Symmetric Key
Week 8,9	Symmetric Key algorithm DES –the Data Encryption Standard 16 round fesitel system
Week 10	Public Key algorithm RSA - and other Symmetric Key algorithms
Week 11, 12	Authentication Protocols • Authentication Based on a Shared Secret Key • Establishing a Shared Key: The Diffie- Hellman Key Exchange • Authentication Using Key Distribution Center

	• Authentication Using Keberos Authentication Using Public Key Cryptography
Week 13	OSI Security Architecture, a model for network security Email Security PGP-Pretty Good Privacy S/MIME
Week 14, 15	Protocols of computer networks Protection Services • OS protection Services: protected objects and methods of OS Protection security of OS, memory and addressing Protection, fence Protection • Database Protection Services • Network Protection Services_ IP and E-Commerce Protection, VPN and next generation network Protection\

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Simple encryption , use a simple key to encrypt a text
Week 2	Lab 2: Ceaser cipher The affine cipher
Week 3	Lab 3:Mono alphabetic substitution cipher Shift cipher
Week 4	Lab 4: Hill cipher Playfair cipher
Week 5	Lab 5: Polyalphbetic Ciphers Vigenere cipher Transportion Cipher
Week 6	Lab 6: Cryptanalysis of a Symmetric Key
Week 7,8	Lab 7: Symmetric Key algorithm DES –the Data Encryption Standard
Week 9	Lab 8: Public Key algorithm RSA
Week 10	Lab 10: Public Key algorithm RSA - and other Symmetric Key algorithms
Week 10	Lab 10: OTN, SONET/SDH

Weeks 11,12	Lab 11: Authentication Protocols
Week 13	Lab 12: Email Security PGP-Pretty Good Privacy S/MIME
Week 15	Lab 13: Protocols of computer networks Protection Services

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	*J. SEBERRY AND J. PIEPRZYK, Cryptography: An Introduction to Computer Security, Prentice-Hall, Upper Saddle River, New Jersey, 1989.*	Yes
Recommended Texts	*J. RIVES CHILDS, General Solution of the ADFGVX Cipher System, Aegean Park Press, Laguna Hills, California, 2001.*	Yes
	Computer Networking: A Top Down Approach, Jim Kurose, Keith Ross, 6th edition, 2012	Yes
Websites	https://cs155.stanford.edu/	
	https://books.ifers.org/?gclid=EAIaIQobChMI__GBuqqx_wIVidV3Ch18RQ1MEAAYASAAEgLuuPD_BwE	

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	**Information Theory**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE421**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 4	**Semester of Delivery**	8
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Professor Dr. Mohammed M. Siddeq	**e-mail**	mohammed.siddeq@ntu.edu.iq

Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Phd
Module Tutor	Name (if available)	**e-mail**	mohammed.siddeq@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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**	
Module Aims **أهداف المادة الدراسية**	This module aims to: 1. Provide a foundational understanding of information theory and its application in digital communication systems. 2. Provide students with knowledge of the theoretical limits and practical methods for data compression and error correction. 3. Teach students about information sources, entropy, and the various properties of information channels. 4. Enable students to understand and apply concepts like source coding, channel coding, and data compression techniques.
Module Learning Outcomes	1. Upon successful completion of this module, the student should be able to:

مخرجات التعلم للمادة الدراسية	2. Understand the concepts of random variables, alphabets, joint probabilities, and conditional probabilities. 3. Understand the principles and measures of information and entropy. 4. Understand and calculate the capacities of discrete and continuous channels. 5. Implement various source and channel coding methods like Fano coding, Shannon-Fano coding, Huffman coding, and block codes. 6. Understand and apply principles of data compression in different domains such as file, image, and speech compression. 7. Evaluate performance measures in digital communication systems.
Indicative Contents **المحتويات الإرشادية**	1. Basics of Information Theory: Random variables, joint and conditional probabilities, Bayes' rule, etc. 2. Measure of Information: Self-information, average mutual information, entropy of discrete and continuous sources. 3. Information Channels: Properties, capacities, efficiency, and redundancy of discrete and continuous channels. 4. Source and Channel Coding: Fixed and variable length codes, Fano coding, Shannon-Fano coding, Huffman coding, block codes. 5. Data Compression: Lossless compression, Run-Length Encoding (RLE), JPEG, ZIP.

	6. Error Correction: Forward Error Correction (FEC), Cyclic Redundancy Check (CRC), Repetition Codes, Single Parity Check Codes.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. *Lectures*: Theoretical concepts and principles of information theory will be taught using lectures. Real-world examples will be used to explain complex concepts. 2. *Problem-Solving Sessions*: Practical problems will be solved in groups to enhance understanding of course material. 3. *Assignments*: Students will be given assignments to work on individually to reinforce their understanding of the topics covered in class. 4. *Exam Preparation*: Sample questions, review sessions, and discussions will be used to prepare students for examinations.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation **تقييم المادة الدراسية**

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Definition of random variable, definition of Alphabet, definition of joint probability.
Week 2	Conditional probabilities and Bayes rule .Independence of two random variables.Venn's diagram. Model of information transmission system. Common sense definition of information Logarithmic measure of information.
Week 3	Model of information transmission system. Common sense definition of information Logarithmic measure of information. Self-information. Definition of information for noisy channel .Posteriori probabilities. Average mutual information for noisy channel. Shannon representation diagram of information source. Parameters of discrete channel.
Week 4	Average information (entropy) of a discrete and continuous source, maximum source entropy. Source efficiency.

	Entropy for continuous uniform distribution source. Entropy for continuous Gaussian distribution source. Entropy for continuous Triangular distribution source. Entropy for continuous Exponential distribution source.
Week 5	Transition probability matrix of channel, discrete noiseless and noisy channel models, uniform channel. Ternary symmetric channel. Information transmission over symmetric channel, noiseless channel, binary symmetric channel, ternary symmetric channel. Memory and memory less information channels. Binary Erasure channel (BEC).
Week 6	Capacity of discrete channel, channel capacity for noiseless channel. Channel efficiency and redundancy. Channel capacity for symmetric channels. Channel capacity for nonsymmetrical channels .binary nonsymmetrical channel. Mutual information of continuous channel.
Week 7	Capacity of continuous channels. Efficiency and redundancy of continuous channel. Sampling of continuous source . Sampling Theorem. Nyquist theorem for transmission over band limited continuous channel. Shannon-Hartly channel capacity theorem. Cascaded information channels .Parallel information channels.
Week 8	Mid-term
Week 9	Source encoding; fixed and variable length codes. Prefix property.Average length of source code. Source code efficiency and redundancy. Fano coding method. Shannon Fano coding method.
Week 10	Huffman Coding. Hamming distance
Week 11	Channel Coding in Digital Communication Systems. Forward Error Correction (FEC)
Week 12	Block codes. Cyclic Redundancy Check (CRC)
Week 13	Repetition Codes, Single Parity Check Codes.
Week 14	Why do we need to compress?. Data compression basics. Lossless Compression. Run-Length Encoding (RLE) Principles of example of Coding Methods used in file and image compression .ZIP JPEG

Week 15	Speech coding and compression techniques overview (LPC block diagram). Delta modulation. Vocoder Principle. Performance measuring.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: encoding
Week 2	Lab 2: RLE
Week 3	Lab 3: probability computation
Week 4	Lab 4: Fix-length coding (Compression)
Week 5	Lab 5: Shannon Fano coding method
Week 6	Lab 6: Huffman Coding
Week 7	Lab 7: Arithmetic Coding

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Thomas M. Cover, Joy A. Thomas, "Elements of Information Theory", Wiley-Interscience, 2nd Edition, 2006.	Yes
Recommended Texts	Robert G. Gallager, "Information Theory and Reliable Communication", Wiley, 1968	No
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	**Mobile communication systems**	**Module Delivery**
Module Type	**Core**	• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial**
Module Code		
ECTS Credits	**8**	
SWL (hr/sem)	**200**	

			• ☐ **Practical** • ☐ **Seminar**
Module Level	UGx11 4	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Farooq Safauldeen Omar	**e-mail**	fkutalar@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Lec.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	1. To promote the international exchange of information related to communication systems. 2. To bridge gaps existing between users, telecommunication operators, service providers and computer and equipment manufacturers.

	3. To establish working contacts with international bodies concerned with data communication
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Understand the new trends in mobile/wireless communications networks. 2. Understand multiple radio access techniques. 3. Analyze various routing algorithms used in mobile/wireless networks. 4. identify the issues in transport and application layers.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. • Fundamental theory of communications, mobile communications, and wireless networks. • Mobile Propagation Channel & Physical Impairments • Interferences and Competition • Energy efficiency • Air-Interface, Waveforms & Multiple-access • Resource Allocation & Optimization • Densification & Heterogeneous Network • Cooperative communication

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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**

Week 1	Introduction to Wireless Communication System: Evolution of mobile communications, Mobile Radio System around the world
Week 2	Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication
Week 3	Second generation (2G) systems. Evolved Second-Generation Systems (2.5G). Third-Generation (3G) Systems. Fourth-Generation (4G) Systems. Fifth-Generation (5G) Systems
Week 4	The Cellular Concept-System Design Fundamentals: Cellular system, Hexagonal geometry cell and concept of frequency reuse
Week 5	Channel Assignment Strategies Distance to frequency reuse ratio
Week 6	Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Handoff Strategies, Umbrella Cell Concept
Week 7	Traffic Engineering: Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization
Week 8	Large scale path loss: Free Space Propagation loss equation, Path-loss of NLOS and LOS systems, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design
Week 9	Small scale multipath propagation: Impulse model for multipath channel, Delay spread, Feher's delay spread, upper bound Small scale
Week 10	Multipath Measurement parameters of multipath channels, Types of small scale Fading, Rayleigh and Rician distribution
Week 11	Modulation Techniques for Mobile Radio: Review for basic digital modulation techniques, QPSK,MSK,GMSK
Week 12	Multiple Access Techniques: Frequency Division Multiple Access (FDMA). Time Division Multiple Access (TDMA). Spread Spectrum Multiple Access. Space Division Multiple Access (SDMA)
Week 13	Wireless Systems: GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding
Week 14	Concept of spread spectrum, Architecture of IS-95 CDMA system, Air interface, CDMA forward channels, CDMA reverse channels, Power control in CDMA, cellular technology, GPRS system architecture
Week 15	Recent trends: Wi-Fi, WiMAX, ZigBee Networks, Software Defined Radio, UWB Radio, Wireless Ad-hoc Network and Mobile Portability, Security issues and challenges in a Wireless network.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Installation of MATLAB, introduction of MATLAB & Simulink, Basic MATLAB operations
Week 2	Continuous & Discrete Signals, Signal types & plotting operations
Week 3	Signal generation, Sampling
Week 4	Quantization
Week 5	Encoding
Week 6	Modulation
Week 7	Transmission using AWGN channel receiver filter
Week 8	Demodulation
Week 9	Decoding & Signal Reconstruction
Week 10	Simplified LTE System, Bit generation
Week 11	FEC Encoder
Week 12	Interleaving (Block interleaving)
Week 13	Modulation (BPSK, 4QAM & 16QAM)
Week 14	Channels (AWGN & Reyleigh)
Week 15	Demodulation (BPSK, 4QAM & 16QAM)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Wireless Communication Systems, Ke-Lin Du, M. N. S. Swamy	No
Recommended Texts	Wireless Communications and Networks, William Stallings	No
Websites	https://www.coursera.org/learn/foundations-of-advanced-wireless-communication	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group	**A** - Excellent	**امتياز**	90 - 100	Outstanding Performance

(50 - 100)	**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

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MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**		
Module Title	**Project Management**	**Module Delivery**
Module Type	**Core**	• ☒ **Lecture**
Module Code		
ECTS Credits	**4**	• ☒ **Lab**
SWL (hr/sem)	**100**	• ☒ **Tutorial** • ☐ **Practical**

			• ☐ **Seminar**
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	The student will understand: • Define different aspects of project management • Clarify the general concept in the way of managing the exception • Determine the usefulness of using computers in project management • Presentation of the example project
Module Learning Outcomes	1-Enable students to obtain knowledge and understanding of the intellectual framework of project management. 2- Introducing students to the basic concepts of project management and its importance in the business environment

مخرجات التعلم للمادة الدراسية	3- Introducing the methods used in planning and developing industrial and service projects 4- Acquaintance with the concepts and tools of project design, management, implementation and oversight 5- The student recognizes and addresses the concepts and tools used in project planning 6- Enable students to study and analyze decisions related to project management and oversight.
Indicative Contents **المحتويات الإرشادية**	Come to the laboratory in time. Students, who are late more than 15 min., will not be allowed to attend the lab. · Students need to maintain 100% attendance in lab if not a strict action will be taken. · All students must follow a Dress Code while in the laboratory · Foods, drinks are NOT allowed. · All bags must be left at the indicated place. · The objective of the laboratory is learning. The experiments are designed to illustrate phenomena in different areas of Physics and to expose you to measuring instruments, conduct the experiments with interest and an attitude of learning · You need to come well prepared for the experiment. · Work quietly and carefully · Be honest in recording and representing your data. · If a particular reading appears wrong repeat the measurement carefully, to get a better fit for a graph · All presentations of data, tables and graphs calculations should be neatly and carefully done · Graphs should be neatly drawn with pencil. Always label graphs and the axes and display units · If you finish early, spend the remaining time to complete the calculations and drawing graphs. Come equipped with calculator, scales, pencils etc.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The main strategy 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**	64	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	36	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	3
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation تقييم المادة الدراسية					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (10)	7	LO # 1-7
	Final Exam	2hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Project Management
Week 2	Economics and management for the engineers
Week 3	Layout of factories and workshops
Week 4	Productivity
Week 5	Networks
Week 6	Critical path method(CPM)
Week 7	Pet technique (Time and cost)
Week 8	The resource allocation problems
Week 9	Linear programming (graphical method, simplex method
Week 10	Inventory models (Economic order quantity)(EOQ)
Week 11	The break-even point
Week 12	The cost of inventory
Week 13	Maintenance policy and concepts
Week 14	Quality control
Week 15	Employer management

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Ability to create and format worksheets, charts, and graphs.
Week 2	Knowledge of formulas and functions, such as VLOOKUP, SUMIF, and COUNTIF.
Week 3	Understanding of data analysis techniques, such as sorting, filtering, and pivot tables.
Week 4	Proficiency in data visualization tools, such as sparklines and conditional formatting.
Week 5	Ability to use macros and VBA to automate tasks.
Week 6	Knowledge of data validation and protection techniques.

Week 7	Understanding of database concepts, such as queries and relational databases.
Week 8	Design project
Week 9	Midterm Exam
Week 10,11	Ability to use advanced features, such as Power Query and Power Pivot.
Week 12	Proficiency in creating and managing workbooks and worksheets.
Week 13,14	Knowledge of data import and export techniques.
Week 15	Final project
Week 16	Final Exam

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	• المحاضرات المقدمة من قبل مدرس المادة • الكتب المتوفرة في مكتبة الكلية • الكتب الموجودة داخل الclass room	No
Recommended Texts	• AutoCAD Beginning and Intermediate • AutoCAD from zero to hero	No
Websites	https://www.vssut.ac.in/lecture_notes/lecture1424354515.pdf https://library.uoh.edu.iq/admin/ebooks/62729-crc-press---the-power-electronics-handbook---t.-skvarenia-(2002)-ww.pdf	

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
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	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.

Description for Fourth Class

Electric Part

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**		
Module Title	**English Language 4**	**Module Delivery**
Module Type		• ☒ **Theory** • ☒ **Lecture** • ☐ **Lab** • ☐ **Tutorial**
Module Code		
ECTS Credits	**4**	
SWL (hr/sem)	**100**	

			• ☐ **Practical** • ☒ **Seminar**
Module Level	UGx11 4	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Muamar Almani Jasim	**e-mail**	
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Master
Module Tutor	Name (if available)	**e-mail**	muamar78@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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**	
Module Aims **أهداف المادة الدراسية**	The aim of this English Language Lecture is to provide students with a comprehensive understanding of the English language, including its structure, usage, and various linguistic aspects. The lecture aims to enhance students' language skills and improve their overall proficiency in English.
Module Learning Outcomes	

مخرجات التعلم للمادة الدراسية	1. Demonstrate a solid understanding of the fundamental aspects of English grammar, vocabulary, and syntax. 2. Apply effective reading strategies to comprehend and analyze a variety of written texts. 3. Produce coherent and well-structured written pieces using appropriate grammar, vocabulary, and style. 4. Listen actively and comprehend spoken English in various contexts, including formal and informal situations. 5. Engage in meaningful conversations and deliver clear and organized oral presentations in English. 6. Critically evaluate and analyze linguistic elements in literature, media, and other forms of communication. 7. Recognize and appreciate the historical and cultural contexts that have shaped the English language.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to the English language and its global significance. 2. Overview of English grammar, including parts of speech, sentence structure, and verb tenses. 3. Building vocabulary and word choice for effective communication. 4. Reading comprehension strategies and analysis of different types of texts. 5. Developing writing skills, including organization, coherence, and proper grammar usage.

	6. Listening comprehension and effective note-taking techniques. 7. Speaking skills development, including conversation, pronunciation, and presentation skills. 8. Literary analysis and interpretation of English language texts. 9. Historical and cultural influences on the English language. 10. Contemporary issues and challenges in the English language.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Lecture delivery: The instructor will present concepts, explanations, and examples through interactive lectures, incorporating visual aids, multimedia resources, and real-life examples. 2. Group activities: Students will engage in group discussions, peer-to-peer interactions, and collaborative learning tasks to reinforce their understanding of concepts and develop their communication skills. 3. Practical exercises: Students will participate in individual and group exercises, such as grammar quizzes, writing assignments, and pronunciation drills, to apply their knowledge and receive feedback. 4. Multimedia resources: The lecture may incorporate audiovisual materials, online resources, and language learning software to provide a dynamic and interactive learning experience.

	5. Assessments: Regular assessments, including quizzes, exams, and assignments, will be conducted to gauge students' progress and provide constructive feedback for improvement. 6. Self-directed learning: Students will be encouraged to engage in independent learning outside of the lecture through recommended readings, online resources, and language practice exercises.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	60	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	40	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	2
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation **تقييم المادة الدراسية**					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	0	0	5, 12	LO #1, 3 and 7
	Assignments	0	30% (30)	4, 13	LO # 2, 4 and 6
	Projects / Lab.	0	0%		
	Report	1	20% (10)	13	All
Summative assessment	**Midterm Exam**	2 hr.	20% (30)	7	LO # 1-6

	Final Exam	2 hr.	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	• Writing: Crafting well-developed thesis statements • Words in English (Book 6)
Week 2	• Vocabulary expansion: Academic vocabulary and formal expressions. • Words in English (Book 6)
Week 3	• Identifying main ideas, supporting evidence, and author's tone. • Words in English (Book 6)
Week 4	• Advanced speaking skills: Debate and discussion techniques. • Words in English (Book 6)
Week 5	• Listening: Extracting information from lectures and presentations. • Words in English (Book 6)
Week 6	• Advanced grammar: Complex sentence structures and subordination. • Words in English (Book 6)
Week 7	• Mid-term Evaluation
Week 8	• Vocabulary expansion: Academic and domain-specific terminology.

	• Words in English (Book 6)
Week 9	• Writing: Incorporating sources and creating citations. • Words in English (Book 6)
Week 10	• Advanced speaking skills: Oral presentations and public speaking. • Words in English (Book 6)
Week 11	• Reading: Exploring advanced literature and poetry. • Words in English (Book 6)
Week 12	• Advanced grammar: Complex verb forms and sentence constructions. • Words in English (Book 6)
Week 13	• Advanced listening skills: Understanding accents and dialects. • Words in English (Book 6)
Week 14	• Writing: Crafting short stories or creative essays
Week 15	• Review and reinforcement of previous topics before final term evaluation

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	English Grammar in Use by Raymond Murphy 5th edition	No
Recommended Texts	4000 Essential English words 2nd edition	No
Websites	http://www.duolingo.com/ http://www.bbc.co.uk/learningenglish	

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	**Advanced Digital Electronics**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☐ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE416**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGx11 4	**Semester of Delivery**	**Seven**
Administering Department	Technical Computer Engineering	**College**	Technical College - Kirkuk
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronic	**Semester**	Four
	Logic circuits	**Semester**	two
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	1. To develop programming of digital electronic skills and understanding of FPGA and its branches. 2. To understand programming technologies for digital electronic. 3. Introduce the FPGA architecture. 4. The Fundamental of VHDL parts. 5. To understand the data types, the operands, concurrent code and state machine. 6. Deal with function, procedures of VHDL. 7. Design an electronic circuits and give the output of it.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Knowledge of the FPGA. 2. Using FPGA to design electronic circuits. 3. Summarizing of Programming technologies used in FPGA.

	4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe Types of FPLDS. 6. Define FPGA architecture AND ITS DETAILS. 7. Programming (configuring) an FPGA. 8. Identify the VHDL and its Fundamental units. 9. Discuss the various data types of VHDL. 10. PROGRAMMING with using concurrent code, Sequential code. 11. Design many electronic circuit using VHDL.
Indicative Contents **المحتويات الإرشادية**	Introduction – what is FPGA? And Where it used.[10 hrs]
	Programming technologies: fusible link technologies, Anti fuse technologies, mask programming, PROMs, EPROM-based technologies, EEPROM-based technologies, FLASH-based technologies, SRAM-based technologies[10 hrs]
	Types of FPLDS: 1.SPLDswhich include: PROMs, PALAs, PALs and GALs, 2.CPLDs. [10 hrs]
	FPGA architecture: configurable logic block, configurable I/O standards, additional features of modern FPGAs: embedded RAMs, embedded multiplier, adders, MACs, clockes trees and clock managers. [10 hrs]
	Programming (configuring) an FPGA. [10 hrs]
	INTODUCTION to VHDL: Fundamental VHDL units: library, entity and architecture. [10 hrs]
	Mid-term Exam + VHDL Data Types : pre-defined data types, user-defined data types [10 hrs]
	Operators, data attributes, signal attributes [10 hrs]
	Concurrent code: WHEN (simple and selected), GENERATE: FOR/GENERAT, IF/GENERAT [10 hrs]
	Sequential code: process: IF, WAIT, CASE, LOOP. [10 hrs]
	State machine. [10 hrs]

	Packages and components. [10 hrs]
	Functions and procedures. [10 hrs]
	Design examples. [20 hrs]

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Display the FPGA DETAILS and how to use it to design the electronic circuits and show the VHDL LANGUAGE and how to design the electronic circuits.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	94	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	6
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	56	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	150		

Module Evaluation **تقييم المادة الدراسية**					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10

Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Introduction – what is FPGA? And Where it used.
Week 2	Programming technologies: fusible link technologies, Anti fuse technologies, mask programming, PROMs, EPROM-based technologies, EEPROM-based technologies, FLASH-based technologies, SRAM-based technologies
Week 3	Types of FPLDS: 1.SPLDswhich include: PROMs, PALAs, PALs and GALs, 2.CPLDs
Week 4	FPGA architecture: • configurable logic block • configurable I/O standards • additional features of modern FPGAs: embedded RAMs, embedded multiplier, adders, MACs, clockes trees and clock managers.
Week 5	Programming (configuring) an FPGA
Week 6	INTODUCTION to VHDL: Fundamental VHDL units: library, entity and architecture.
Week 7	Mid-term Exam + VHDL Data Types : pre-defined data types, user-defined data types
Week 8	Operators, data attributes, signal attributes
Week 9	Concurrent code: • WHEN (simple and selected) • GENERATE: FOR/GENERAT, IF/GENERAT

Week 10	Sequential code: process: IF, WAIT, CASE , LOOP
Week 11	State machine
Week 12	Packages and components
Week 13	Functions and procedures
Week 14	Design examples
Week 15	

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: FPGA introduction
Week 2	Lab 2: CONFIGURING of FPGA
Week 3	Lab 3: DESINGN circuits in FPGA 1
Week 4	Lab 4: DESINGN circuits in FPGA 2
Week 5	Lab 5: DESINGN circuits in FPGA 3
Week 6	Lab 6: embedded multiplier, adders, MACs, clockes trees and clock managers.
Week 7	Lab 7: Fundamental VHDL units: library, entity and architecture.
Week 8	Lab 8: VHDL Data Types : pre-defined data types, user-defined data types
Week 9	Lab 9: Operators, data attributes, signal attributes
Week 10	Lab 10: Concurrent code: • WHEN (simple and selected) • GENERATE: FOR/GENERAT, IF/GENERAT
Week 11	Lab 11 :Sequential code: process: IF, WAIT, CASE , LOOP
Week 12	Lab 12: State machine
Week 13	Lab 13: Packages and components
Week 14	Lab 14: Functions and procedures
Week 15	Lab 15: Design examples

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	VHDL Language Reference	Yes
Recommended Texts	FPGA PROTOTYPING BY VHDL EXAMPLES Xilinx SpartanTm-3 Version Pong P. Chu Cleveland State University	Yes
	IEEE Standard VHDL Language Reference Manual IEEE 3 Park Avenue New York, NY 10016-5997, USA 26 January 2009 IEEE Computer Society Sponsored by the Design Automation Standards Committee	Yes
Websites	https://www.fpgarelated.com/books.php	
	https://learn.sparkfun.com/tutorials/programming-an-fpga/all	
	https://fpgatutorial.com/	
	https://www.youtube.com/watch?v=OUNrGLgx9h4	

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	**Multimedia Computing**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	**COE413**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 4	**Semester of Delivery**	7
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Professor Dr. Mohammed M. Siddeq	**e-mail**	mohammed.siddeq@ntu.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	PhD
Module Tutor	Name (if available)	**e-mail**	mohammed.siddeq@ntu.edu.iq

Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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**	
Module Aims **أهداف المادة الدراسية**	This module aims to: 1. Provide an understanding of the fundamental concepts and components of multimedia computing. 2. Teach students about different multimedia applications, multimedia research topics, and multimedia on the web. 3. Expose students to different multimedia data basics such as graphics, image data representation, audio, and video basics. 4. Teach techniques and methods for multimedia data compression and transmission over networks.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Upon successful completion of this module, the student should be able to: 2. Understand the fundamental concepts, components, and applications of multimedia computing. 3. Understand and implement different image operations and image file formats.

	4. Understand the basics of sound and audio, including digitization, synthetic sound, and compression. 5. Understand the basics of video, including color models, types of video signals, and video compression. 6. Understand and implement different methods for multimedia transmission over networks.
Indicative Contents **المحتويات الإرشادية**	1. Introduction to Multimedia: Hyper Text, Hyper Media, and Components of Multimedia. 2. Multimedia Data Basics: Graphics and Image Data Representation, Image digitization, Spatial resolution and quantization. 3. Image Operations: Arithmetic operation on images, Logical operation on images, Image histogram modification and equalization. 4. Sound and Audio: Basics, Digitization of sound, Synthetic sound, Quantization and transmission of Audio. 5. Video Basics: Video color models, Types of video signals, Video compression. 6. Multimedia Over Networks.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	*1. Lectures: Fundamental concepts of multimedia computing will be delivered in a structured format with relevant examples.* *2. Tutorials: Hands-on experience in manipulating different multimedia data types such as images, sound, and video.*

	3. Research Presentation: Students will be exposed to the latest research topics in multimedia computing and will present on selected topics. *4. Assignments & Projects: Regular assignments will be given to students for practicing and reinforcing the concepts learned in class.* *5. Exam Preparation: Sample questions and revision sessions will be conducted to prepare students for the final exam.*

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation **تقييم المادة الدراسية**					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	5, 10	LO #1, 2,7
	Assignments	2	5% (5)	2, 12	LO # 2, 4, 6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8
	Midterm Exam	2 hr	20% (20)	8	LO # 1-7

Summative assessment	**Final Exam**	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Introduction to Multimedia. Hyper Text and Hyper Media.
Week 2	Components of Multimedia. Multimedia applications.
Week 3	Multimedia Research Topics and Projects. Multimedia on the web.
Week 4	Multimedia Data Basics Graphics and Image Data Representation
Week 5	Image digitization. Spatial resolution and quantization.
Week 6	Type of image Image file formats
Week 7	Arithmetic operation on image Logical operation on image
Week 8	Image histogram Histogram modification and Histogram equalization.
Week 9	Image compression
Week 10	techniques Sound and Audio
Week 11	Basics Digitization of sound Nyquist theorem
Week 12	Synthetic sound Quantization and transmission of Audio
Week 13	Compression of audio Video Basics
Week 14	Video color models Type of video signals
Week 15	Video compression Multimedia over networks
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1 Image digitization and quantization
Week 2	Lab 2: Arithmetic operation
Week 3	Lab 3: Image histogram Histogram modification
Week 4	Lab 4: Image enhancement
Week 5	Lab 5: image Compression

Week 6	Lab 6: image segmentation
Week 7	Lab 7: Video processing (motion detection)

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Vaughan Tay, "Multimedia: Making It Work", McGraw-Hill/Osborne, 9th Edition, 2010.	Yes
Recommended Texts	Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia", Pearson/Prentice Hall, 2nd Edition, 2014.	No
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	**Smart systems modelling**		**Module Delivery**
Module Type	**Core**		• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code			
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGx11 4	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Amel Saeed Tuama	**e-mail**	Amel.tuama@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules 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	
Module Aims **أهداف المادة الدراسية**	• Biological inspiration for artificial neural networks (ANNs), neurons, synapses, axons, dendrites ,action potentials, Hebbian learning. • Underpinning data structures, including directed graphs, nodes (artificial neurons), edges, weights, layers (input, output, hidden), thresholds, propagation functions, learning rules, topologies, activation functions. • Problem domains such as classification, pattern recognition, data mining, medical diagnosis and gaming. Alternative neural network architectures: feedforward, radial basis function network, Hopfield, Boltzmann machines, recurrent, spiking neural networks. • Supervised/unsupervised learning approaches. • Approaches to validation: training/testing sets, k-folds cross validation, leave-one-out cross validation.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Knowledge and Understanding : Demonstrate an understanding the core principles and concepts underpinning artificial neural networks. 2. Demonstrate knowledge of the most common neural network architectures, understand the strengths and weaknesses

	of each approach, and appreciate the problem domains for which each networktype is best suited. 3. Intellectual, practical, affective and transferrable skills Using the features of a library in a high-level programming language, implement a neural network to solve a given computational problem of moderate size and complexity. 4. Use experimental methods and numerical validation techniques to evaluate the efficacy of the network and to assess overfitting.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals

	Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation تقييم المادة الدراسية					
As		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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	**Introduction to Artificial neural networks, Overview of Biological Neurons**
Week 2	**Fundamental Concepts of Artificial Neural Networks** Models of ANNs; Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule.
Week 3	**Single layer Perception Classifier**

	Classification model, Features & Decision regions; training & classification using discrete perceptron, algorithm, single layer continuous perceptron networks for linearly seperable classifications.
Week 4	**Multi-layer Feed forward Networks** Linearly non-seperable pattern classification, Delta learning rule for multi-perceptron layer, Generalized delta learning rule, Error back-propagation training, learning factors, Examples.
Week 5	**Single layer feed back Networks** Basic Concepts, Hopfield networks, Training & Examples.
Week 6	**Associative memories** Linear Association, Basic Concepts of recurrent Auto associative memory: rentrieval algorithm, storage algorithm; By directional associative memory, Architecture, Association encoding & decoding, Stability.
Week 7	**Self organizing networks** UN supervised learning of clusters, winner-take-all learning, recall mode, Initialisation of weights, seperability limitations
Week 8	Backpropagation learning algorithm
Week 9	
Week 10	
Week 11	
Week 12	Introduction to genetic algorithms, search problem, advantages and disadvantages.
Week 13	Applications of genetic algorithms.
Week 14	GA operators, population, selection, crossover mutation.

Week 15	Population, Selection, crossover mutation algorithms

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	python language
Week 2	Operators and variables
Week 3	Loops and recursion
Week 4	Functions and libraries
Week 5-10	Neural networks algorithms
Week 11-12	Genetic algorithms
Week 13-15	Convolutional neural networks project

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	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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	**Advanced Computer Technology**	**Module Delivery**
Module Type	**C**	• ☒ **Theory**
Module Code	COE426	
ECTS Credits	**8**	• ☒ **Lecture**
SWL (hr/sem)	**200**	• ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical**

			• ☐ **Seminar**
Module Level	UGx11 2	**Semester of Delivery**	8
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	**1. To study the computer architecture and the type of addressing and the type of memory.** **2. This course aims to provide the students with an appreciation of the role of advanced computers technology.** **3. Study of the advanced internal architecture of the 80386 microprocessor.** **4. Study addressing methods.**

	5. Studying the types and methods of storage in the main, temporary and virtual memories. **6. Studying the modus operandi of the processor that operates on the system of fragmentation and imports.** **7. Architectural study and features of some designs of recent generations of** **Processors.** **8. Architectural study and features of some designs of recent generations of processors Parallel processing capability.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1 - Understand how the parts of a computer interact to carry out a command. 2 - Understanding how to exploit the active parts of the computer in determining the speed of execution of program commands, to reach to optimum performance. 3 - Understanding how to develop a more comprehensive and understanding measure of processor speed than processor speed 4 - Understanding the basics of the hierarchical memory system and its performance measures. 5 - Understand how the components of a hierarchical memory system interact when executing program commands. 6 - Understanding the impact of fragmentation and supply system, and rationing orders in designing processors that operate at the fastest possible performance 7 - Understanding the effect of the parallel processing system and the multiplicity (cores) of the microprocessor in increasing the speed of the computer. 8 - Understanding how a skilled programmer can take advantage of the appropriate addressing system to reach the optimum exploitation available memory size, and the maximum speed of accessing stored variables.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Outline syllabus

	This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ. • Context for modem computer systems engineering, including: • Dimensions for the classification of computer systems • Persistent trends in embedded systems • Forms of parallelism, Performance evaluation • Architectural developments • Advanced topics in memory systems, for example: Interleaved memory - structure, performance Virtual memory - utilisation, locality of reference, performance Paged memory - structure, challenges, address translation, optimization Cache memory - structure, performance, implementation, optimization. • Advanced topics in processor architecture, possibly including: CPU control issues Instruction sequencing and clock cycle grouping Instruction-level parallelism - data dependency, exploitation, measurement Branch predication and speculative execution Micro-operations and control signals - relationship, control signal generation, hardware design consideration, implementations, microprogrammed control Principles of Pipelining - instruction pipelines, hazards, pipeline analysis Thread-level parallelism - multithreading to improve uniprocessor throughput, Common approaches, granularity issues, thread scheduling, measurement.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation تقييم المادة الدراسية					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
	Midterm Exam	2 hr	10% (10)	7	LO # 1-7

Summative assessment	**Final Exam**	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	**Introduction to computer –Internal organization of computer**
Week 2	**Introduction to assembly programming**
Week 3	**Introduction to assembly programming**
Week 4	**The architecture of Microprocessor 8086 ,Segment in 80x86**
Week 5	**Protected mode memory addressing** **. Selectors and descriptors** **. Local and global descriptor tables**
Week 6	**Descriptor and page table entries** **- Program – invisible registers**
Week 7	**Memory paging** **- Virtual memory**
Week 8	**Paging mechanism** **. Segment translation** **. Page translation**
Week 9	**Major changes in the 80386**
Week 10	**Pipelining design Techniques**
Week 11	**Cache memory** **Cache memory used for 80386** **- Direct Maps** **- Two-way set associative**
Week 12	**Intel's Pentium** **. Features of the Pentium** **. Intel's overdrive technology**
Week 13	**Pentium pro** **. Out of order execution**
Week 14	**Other Pentium processors** **- Core Processor**
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Lab 1: Apply Emu8086 assembler
Week 2	Lab 2: Example of movement registers.
Week 3	Lab 3: Example of Arithmetic instructions.
Week 4	Lab 4: Example of Logical Instructions.
Week 5	Lab 5: Examples of Logical Instructions.
Week 6	Lab 6: Examples of Arrays in emu8086.
Week 7	Lab 7: Examples of procedure in emu8086.
Week 8	Lab 8: Examples of using Macro in emu8086.
Week 9	Lab 9: Examples of using string.
Week 10	Lab 10: Examples of Branching and Machine Instructions.
Week 11	Lab 11: Examples of moving block in emu8086.
Week 12	Lab 12: Examples of copying block in emu8086.
Week 13	Lab 13: Example of building menu.
Week 14	Lab 14: Example of building application.
Week 15	Lab 15: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Advanced Computer Architecture :Parallelism , Scalability, programmability . Author :K.Hwang. Publisher :McGraw Hill 1993	Yes
Recommended Texts	Advanced Computer Architecture and Parallel Processing :by Hesham El-Rewini & Mostafa Abd-El-Barr \ Copyright © 2005 by John Wiley & Sons .	yes
Websites	Principles of computer architecture :by Miles J. Murdocca \ CLASS TEST EDITION – AUGUST 1999 \ Copyright©1999 Prentice Hall , Intel 80386 hardware reference manual \ @INTEl CORPORATION 1986. Simply Easy Learning by tutorialspoint.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	**Computer Interfacing**	**Module Delivery**
Module Type	**Core**	• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab**
Module Code	**COE427**	
ECTS Credits	**8**	
SWL (hr/sem)	**200**	

			• ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Level	UGx11 4	**Semester of Delivery**	8
Administering Department		**College**	
Module Leader	Ahmed Safaa Gona Mohammed	**e-mail**	Ahmed.safaa23@ntu.edu.iq gonamohammed201@ntu.edu.iq
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.c
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

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**	
Module Aims	

أهداف المادة الدراسية	1. Learn how to design computer compatibility circuits and use the main computer ports in computer interfacing task. 2. To develop problem solving skills and understanding of circuit theory through the application of techniques. 3. To understand the use of signal generation circuits and port protection circuits. 4. Student will also gain a range of practical skills in the application and construction of computer components that are capable of interfacing with microprocessors. 5. This course deals with the role of computer interfacing compatibility in designing and building computer circuits and keeping abreast of developments in this field. As well as, trying to use and apply them scientifically and practically in different fields of life.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Recognize how DC power supply and Voltage converters works in computer interfacing circuits design. 2. Describe the centronic port internal hardware organization. 3. Identify the expanding parallel interfacing. 4. Discuss the pin configuration of centronic and RS232 serial interface. 5. Summarize what is meant by digital and analog signal generator. 6. List the groups of parallel centronic port interface. 7. Define and distinguish between analog to digital convertor and digital to analog convertor.

Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following: • DC power supply, Voltage converters, Digital and Analog signal generator [8 hrs] • Pin configuration of centronic (parallel) port, Internal hardware organization [8 hrs] • Groups (status, data and control) [8 hrs] • centronic experiment board design [8 hrs] • expanding the parallel interfacing [8 hrs] • RS232 serial interface [8 hrs] • serial data transmission [8 hrs] • RS232 pin configuration and internal organization [8 hrs] • RS232 experiment board design, RS232 to PIC microcontroller interface [9 hrs] • Universal serial Bus (USB) interface, USB to parallel converter design [9 hrs] • Parallel to serial interface, serial to parallel interface [10 hrs] • Analog to digital convertor [9 hrs] • A/Ds convertor with parallel and serial I/O interface [10 hrs] • Digital to analog convertor [9 hrs] • Application project [4 hrs]

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Lectures.

	2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. Discussions. 7. Seminars. 8. Reports. 9. Presentations, and Posters.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	124	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	8
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	76	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	5
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

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

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	DC power supply, Voltage converters, Digital and Analog signal generator
Week 2	Pin configuration of centronic (parallel) port, Internal hardware organization
Week 3	Groups (status, data and control)
Week 4	centronic experiment board design
Week 5	expanding the parallel interfacing
Week 6	RS232 serial interface
Week 7	serial data transmission
Week 8	RS232 pin configuration and internal organization
Week 9	RS232 experiment board design, RS232 to PIC microcontroller interface
Week 10	Universal serial Bus (USB) interface, USB to parallel converter design
Week 11	Parallel to serial interface, serial to parallel interface
Week 12	Analog to digital convertor
Week 13	A/Ds convertor with parallel and serial I/O interface
Week 14	Digital to analog convertor
Week 15	Application project
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**

Week	Material Covered
Week 1	Lab 1: Introduction to Arduino microcontroller board
Week 2	Lab 2: LED interfacing with Arduino
Week 3	Lab 3: Interface LED and Switch with Arduino
Week 4	Lab 4: Introduction to the serial monitor and reading from Arduino serial monitor
Week 5	Lab 5: Interfacing LDR sensor with Arduino
Week 6	Lab 6: Controlling the light system with joystick
Week 7	Lab 7: Controlling servo motors with an Arduino and joystick

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Serial Port Complete: COM Ports, USB Virtual COM Ports, and Ports for Embedded Systems" by Jan Axelson.	
Recommended Texts	A Practical Guide to Building IO Devices" by John Hyde	
Websites	https://www.tutorialspoint.com/search/computer%20interfacing	

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	**Computer networks**	**Module Delivery**
Module Type	**Core**	• ☒ **Theory** • ☒ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical**
Module Code	**COE323**	
ECTS Credits	**8**	
SWL (hr/sem)	**200**	

			• ☐ **Seminar**
Module Level	UGx11 3	**Semester of Delivery**	6
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Mohammed Nisham, Mohammed Hamid	**e-mail**	E-mail
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ms.C
Module Tutor	Name (if available)	**e-mail**	Mohammed.sefer@ntu.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**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**	
Module Aims **أهداف المادة الدراسية**	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit.

	3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements

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

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation تقييم المادة الدراسية					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10

Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Introduction to Networks, Protocol layers and service models. OSI and Internet protocols.
Week 2	What is the Internet and Networks Structure according to the OSI and TCP/IP refrence model.
Week 3	Application layer protocols (HTTP, DNS, FTP, SMTP) and client-server model.
Week 4	Packet Switched Networks data link layer operation (ARP).
Week 5	Adressing in Packet Switched Network: Introduction to IP addresses, MAC Addresses and Port Addresses.
Week 6	Adressing in Packet Switched Network: Introduction to IP addresses, MAC Addresses and Port Addresses.
Week 7	Adressing in Packet Switched Network: IP Subnetting, VLSM and network Design.
Week 8	Adressing in Packet Switched Network: IP Subnetting, VLSM and network Design.
Week 9	Reliable data transfer. Stop-and-Wait evaluation. TCP and UDP semantics and syntax.
Week 10	Transport Layer Protocols TCP and UDP
Week 11	Principles of routing. Static and Dynamic Routing. Midterm Exam.
Week 12	IP semantics and syntax.Link-state and distance vector routing
Week 13	Data Link layer. Error detection. Multiple access protocols. IEEE 802.3 Ethernet.
Week 14	Virtual LANS

Week 15	Review for comprehensive final exam.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Computer_Networking_A_Top-Down_Approach	Yes
Recommended Texts		No
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	**Electrical Circuits**	**Module Delivery**
Module Type	**Core**	• ☒ **Theory**
Module Code	**UoB12345**	
ECTS Credits	**8**	• ☒ **Lecture**
SWL (hr/sem)	**200**	• ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical**

			• ☐ **Seminar**
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits.

	5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs]

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

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	

	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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**	109	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	7
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	91	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	6
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	200		

Module Evaluation **تقييم المادة الدراسية**					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	Logic Design with MSI components and Programmable Logic Devices Combinational Logic Circuits: Comparators, Decoders, Encoders and Multiplexers
Week 2	Programmable Logic Devices (PLDs)
Week 3	Programmable Logic Arrays (PLAs)
Week 4	Programmable Arrays Logic (PALs)
Week 5	Synchronous Sequential Networks: Structure and operation of clock synchronous sequential networks
Week 6	Analysis of clock synchronous sequential networks
Week 7	Modeling clock synchronous sequential networks behavior and state table reduction
Week 8	**Midterm exam**
Week 9	Algorithm State Machines (ASM): ASM Charts and state assignment
Week 10	ASM Tables
Week 11	Asynchronous Sequential Networks: Structure and operation of clock synchronous sequential networks
Week 12	Analysis of Asynchronous Sequential Networks
Week 13	Flow tables in Asynchronous Sequential Networks
Week 14	Races in Asynchronous Sequential Networks
Week 15	Static and dynamic Hazards in Combinational Networks
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Lab 1: Combinational circuits: Comparators, Decoders, Encoders and Multiplexers
Week 2	Lab 2: Logic circuits with programmable logic devices (PLD)

Week 3	Lab 3: Flip Flops: JK Flip-flops, SR flip-flops, D flip-flops and T flip-flops
Week 4	Lab 4: Design and simulation of 4-bit Synchronous Up counter using JK flip-flops
Week 5	Lab 5: BCD to Seven Segment Conversion
Week 6	Lab 6: Design and simulation of 3-bit synchronous counter
Week 7	Lab 7: Design and simulation of 4-bit synchronous counter

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Digital Fundamentals, ELEVENTH EDITION Thomas L. Floyd	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**			
Module Title	**Project Management**		**Module Delivery**
Module Type	**Core**		• ☒ **Lecture**
Module Code			
ECTS Credits	**4**		• ☒ **Lab**
SWL (hr/sem)	**100**		• ☒ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Level	UGx11 1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Name	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.

Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules **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**	
Module Aims **أهداف المادة الدراسية**	The student will understand: • Define different aspects of project management • Clarify the general concept in the way of managing the exception • Determine the usefulness of using computers in project management • Presentation of the example project
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1-Enable students to obtain knowledge and understanding of the intellectual framework of project management. 2- Introducing students to the basic concepts of project management and its importance in the business environment 3- Introducing the methods used in planning and developing industrial and service projects 4- Acquaintance with the concepts and tools of project design, management, implementation and oversight 5- The student recognizes and addresses the concepts and tools used in project planning 6- Enable students to study and analyze decisions related to project management and oversight.
Indicative Contents	Come to the laboratory in time. Students, who are late more than 15 min., will not be allowed to attend the lab.

المحتويات الإرشادية	· Students need to maintain 100% attendance in lab if not a strict action will be taken. · All students must follow a Dress Code while in the laboratory · Foods, drinks are NOT allowed. · All bags must be left at the indicated place. · The objective of the laboratory is learning. The experiments are designed to illustrate phenomena in different areas of Physics and to expose you to measuring instruments, conduct the experiments with interest and an attitude of learning · You need to come well prepared for the experiment. · Work quietly and carefully · Be honest in recording and representing your data. · If a particular reading appears wrong repeat the measurement carefully, to get a better fit for a graph · All presentations of data, tables and graphs calculations should be neatly and carefully done · Graphs should be neatly drawn with pencil. Always label graphs and the axes and display units · If you finish early, spend the remaining time to complete the calculations and drawing graphs. Come equipped with calculator, scales, pencils etc.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The main strategy 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**	64	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem)	36	**Unstructured SWL (h/w)**	3

الحمل الدراسي غير المنتظم للطالب خلال الفصل		**الحمل الدراسي غير المنتظم للطالب أسبوعيا**	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation **تقييم المادة الدراسية**					
As		**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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (10)	7	LO # 1-7
	Final Exam	2hr	40% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
	Material Covered
Week 1	Project Management
Week 2	Economics and management for the engineers
Week 3	Layout of factories and workshops
Week 4	Productivity

Week 5	Networks
Week 6	Critical path method(CPM)
Week 7	Pet technique (Time and cost)
Week 8	The resource allocation problems
Week 9	Linear programming (graphical method, simplex method
Week 10	Inventory models (Economic order quantity)(EOQ)
Week 11	The break-even point
Week 12	The cost of inventory
Week 13	Maintenance policy and concepts
Week 14	Quality control
Week 15	Employer management

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	Ability to create and format worksheets, charts, and graphs.
Week 2	Knowledge of formulas and functions, such as VLOOKUP, SUMIF, and COUNTIF.
Week 3	Understanding of data analysis techniques, such as sorting, filtering, and pivot tables.
Week 4	Proficiency in data visualization tools, such as sparklines and conditional formatting.
Week 5	Ability to use macros and VBA to automate tasks.
Week 6	Knowledge of data validation and protection techniques.
Week 7	Understanding of database concepts, such as queries and relational databases.
Week 8	Design project
Week 9	Midterm Exam
Week 10,11	Ability to use advanced features, such as Power Query and Power Pivot.
Week 12	Proficiency in creating and managing workbooks and worksheets.
Week 13,14	Knowledge of data import and export techniques.
Week 15	Final project
Week 16	Final Exam

Learning and Teaching Resources **مصادر التعلم والتدريس**

	Text	Available in the Library?
Required Texts	• المحاضرات المقدمة من قبل مدرس المادة • الكتب المتوفرة في مكتبة الكلية • الكتب الموجودة داخل الclass room	No
Recommended Texts	• AutoCAD Beginning and Intermediate • AutoCAD from zero to hero	No
Websites	https://www.vssut.ac.in/lecture_notes/lecture1424354515.pdf https://library.uoh.edu.iq/admin/ebooks/62729-crc-press---the-power-electronics-handbook---t.-skvarenia-(2002)-ww.pdf	

Grading Scheme **مخطط الدرجات**				
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