Northern Technical University

الجامعة التقنية الشمالية

First Cycle – Bachelor's degree (B.Sc.) – Department of Information Technology and Computer Network Engineering

بكالوريوس هندسة تقنيات المعلومات وشبكات الحاسوب

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1. Mission & Vision Statement

***Vision*:**

The Information and Computer Networks Engineering Department aims to be one of the most distinguished scientific departments and to be a pioneering and active department within the college in the field of computer engineering. Making it scientifically prominent, raising the quality of higher education and academic research by using advanced technologies to contribute to the development and service of the local and regional community by providing competent and qualified personnel, highly qualified in acquiring knowledge and using the latest scientific technologies in the presence of an open competitive market. It also aims to develop scientific research that contributes to the effectiveness of education.

Mission Statement

Mission**:**

The mission of the Computer Engineering Department is to provide high-quality education, research, and innovation in the field of computer engineering. We strive to equip our students with the knowledge, skills, and ethical values necessary to excel in the rapidly evolving technology-driven world. We are committed to fostering a stimulating and inclusive learning environment that promotes critical thinking, problem-solving, and teamwork. Through collaboration with industry partners and engagement in cutting-edge research, we aim to contribute to the advancement of computer engineering and address the societal needs of the digital era**.**

2. Program Specification

Program code	ICNE	ECTS	240
Duration	4 levels, 8 Semesters	Method of Attendance	Full Time

The Information Technology and Computer Networks Engineering Program Specification outlines the knowledge and skills required for individuals who are interested in pursuing a career in the Computer Engineering field. The program focuses on developing technical expertise in the areas of hardware design, programming techniques, computer network design and management. The program typically includes a mix of classroom lectures, practical training, and on-site field experience. Courses may cover topics such as digital system, computer organization, microprocessor architectural design principles, programming techniques, embedded system design, computer network and security.

The program also emphasizes the development of technical skills such as low and high level languages (such as assembly language, Python, C++ language, Visual studio, C sharp language, Matlab program,..etc), maintenance of computers and electronic devices, and construction and management of computer networks. Graduates of the program are expected to have the skills necessary to work as computer engineering I a real environment.

3. Program Objectives

The program goals of Information and Computer Networks technical engineering typically include:

1. Recruiting a high number of technical engineers with high levels of understanding, knowledge, and psychological abilities to deal with electronic and control systems using computers, in addition to communications and computer networks, and implementing quality in the field of computer engineering technology.
2. Continual development of study programs through cooperation with related departments to adapt to local development program requirements and market needs, and providing a suitable environment for theoretical and practical teaching using the latest educational means and equipment, and adopting quality measurement and academic accreditation.
3. Acquiring students' knowledge related to developing large and medium-sized software projects within a specified time and towards set objectives.
4. The graduate is able to evaluate alternative solutions to problems encountered in their work and is able to use information technology in applying the solution.
5. Activating programs that serve the specialty and are supported by official sponsors at the international level in order to provide the graduate with international certificates in addition to their academic certificate.
6. Understanding the reasons and how technology affects the working environment.
7. Acquiring sound educational foundations for interacting with future developments in the field of computers and communications.
8. Making practical and scientific research and applying them in the field of specialization.
9. Continual development of the capabilities of teaching staff, technicians, and administrators in the department through participation in workshops, conferences, and work sessions organized by the department or related departments in local universities.
10. Preparing and qualifying specialists to meet the requirements of the public and private sector job market in the field of computer engineering through diversifying ways of learning, teaching and training students to apply acquired knowledge and skills to solve real-world problems, to ensure active contribution to community service after graduation according to a future-oriented development and expansion plan of community participation.
11. Adopting an effective, realistic perspective for developing the department's capabilities in conducting research and studies, and preparing advanced study requirements to comply with quality standards in the Ministry of Higher Education and Scientific Research, and Community Service through graduates who possess various knowledge, qualify them for excellence in their field of work, and are able to adapt to various work conditions, and keep up with rapid developments in the field of specialization with respect to professional ethics.

12. Preparing scientific and specialized leadership through postgraduate studies programs to provide the community with scientific and technical qualifications. Overall, the goal of building and construction technical engineering programs is to prepare students for careers in the construction industry by providing them with the skills and knowledge they need to succeed.

13. Student Learning Outcomes

The Information and Computer Network Engineering Department has defined the following Student Learning Outcomes (SLOs) to ensure that students acquire the necessary knowledge, skills, and competencies in the field of computer engineering:

Outcome 1:

- Technical Knowledge: Graduates will demonstrate a solid understanding of the fundamental principles and concepts in computer engineering, including computer architecture, digital systems design, software engineering, algorithms, and data structures.

Outcome 2:

- Problem-solving Skills: Graduates will possess strong problem-solving skills and the ability to apply their technical knowledge to analyze, design, and implement solutions for complex engineering problems in Information and Computer Networks engineering. They will demonstrate proficiency in algorithmic thinking, system modeling, and the use of appropriate tools and methodologies.

Outcome 3:

- Design and Implementation: Graduates will be able to design and implement computer systems, hardware components, and software applications. They will demonstrate proficiency in the design and integration of digital circuits, embedded systems, computer networks, and software systems, considering performance, reliability, and scalability.

Outcome 4:

- Laboratory and Experimental Skills: Graduates will have hands-on experience in laboratory settings, gaining skills in the operation of hardware and software tools, measurement techniques, and experimental methodologies. They will be proficient in conducting experiments, analyzing data, and drawing conclusions based on empirical evidence.

Outcome 5:

- Teamwork and Collaboration: Graduates will be effective team members and collaborators, capable of working in multidisciplinary teams to achieve common goals. They will demonstrate effective communication skills, active listening, and the ability to contribute constructively to team discussions and decision-making processes.

Outcome 6:

- Lifelong Learning: Graduates will recognize the importance of lifelong learning and professional development. They will have the skills and motivation to engage in continuous learning, keeping pace with advancements in computer engineering and adapting to evolving technologies and practices throughout their careers.

Outcome 7:

• Ethical and Professional Behavior: Graduates will demonstrate ethical conduct, professionalism, and a commitment to social responsibility. They will adhere to ethical standards, consider the societal impact of their work, and demonstrate an understanding of professional and ethical responsibilities within the field of computer engineering.

Outcome 8:

• Communication Skills: Graduates will possess strong written and oral communication skills, enabling them to effectively communicate technical information, ideas, and project outcomes to diverse audiences. They will demonstrate the ability to document their work, write technical reports, and deliver effective presentations.

14. Academic Staff

No	Name	Degree	Title	General specialization	Precise specialization	e-mail
1	**د.آن زكي أبلحد Program Manager**	Ph.D.	Assistant Prof.	Computer Science	Cyber security	drann@ntu.edu.iq
2	**د.اسراء تحسين علي**	PHD	Assistant Prof.	Computer Sciences	Network Security	israa.ali24@ntu.edu.iq
3	أ.د محمد مصطفى صديق	Ph.D.	Prof.	Computer Science	Image Processing	mohammed.siddeq@ntu.edu.iq
4	**د.ابتهال صباح مجيد**	Ph.D.	Lecturer	Mathmatics	Mathmatics	ebtehal.sabah23@ntu.edu.iq
5	عمر محمد صالح	Msc	Lecturer	Electrical Engineering	Computer Network	omar.alsabaawi@ntu.edu.iq
6	فاروق صفاء الدين	Msc	Assistant Prof.	Software Engineering	Image Processing	fkutalar@ntu.edu.iq
7	محمد حميد رشيد	Msc	Lecturer	Computer Engineering	Networking	mohammed.rasheed@ntu.edu.iq
8	سزين طه عبدالرزاق	Msc	Lecturer	Software Engineering	Image Processing	sazeentaha4@ntu.edu.iq
9	نور فيصل محمد	Msc	Lecturer	Software Egineering	Networking	noor6faysal@ntu.edu.iq
10	محمد نشام انور	Msc	Lecturer	Computer Science	Information Security	Mohammed.sefer@ntu.edu.iq
11	بركان احمد عباس	Msc	Lecturer	Computer Engineering	Electronic / Computer	borkan.a@ntu.edu.iq
12	كوليهان صباح نجم الدين	Msc	Lecturer	Business & Management	Marketing	kolhan.sabah25@ntu.edu.iq
13	كونة محمد ظاهر	Msc	Lecturer	Computer Eng.	A.I	gonamohammed201@ntu.edu.iq

15. Credits, Grading and GPA

Credits

Credits in the Information Technology and Computer Networks Engineering Department are following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS

is 240, 30 ECTS per semester. 1 ECTS is equivalent to 27 student workloads, including structured and unstructured workload.

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

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

Calculation of the Grade Point Average (GPA)

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

GPA of 4-year B.Sc. degrees:

GPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

Calculation of the Cumulative Grade Point Average (CGPA)

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

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

16. Curriculum/Modules

1. Undergraduate Courses/Modules 2025-2026

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية
UGI	One	1	ICNE-101	Introduction to Computing & Problem Solving	مقدمة في الحوسبة وحل المشكلات
		2	ICNE-102	Engineering Mathematics	الرياضيات الهندسية
		3	ICNE-103	Engineering Drawing	الرسم الهندسي
		4	ICNE-104	Digital Logic Design	تصميم المنطق الرقمي
		5	ICNE-105	DC Circuit Analysis	تحليل دوائر التيار المستمر
		6	NTU-100	Democracy and Human Rights	الديمقراطية وحقوق الإنسان
		7	NTU-101	English Language	اللغة الإنجليزية

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية
Two	1	ICNE-106	Programming Language	لغة البرمجة
	2	ICNE-107	AC Circuit Analysis	تحليل دوائر التيار المتناوب
	3	ICNE-108	Introduction to Computer Network	مدخل الى شبكات الحاسوب
	4	CAIK-100	Physics	الفيزياء

		5	**NTU-102**	**Computer**	الحاسوب
		6	**NTU-103**	**Arabic Language**	اللغة العربية
		7			

Republic of Iraq - Ministry of Higher Education and Scientific Research
Northern Technical University/Technical Engineering colleage for Computer & Al- Kirkuk
Bachelor's degree in Information Technology and Computer Networks Engineering
Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr
Program Curriculum (2025 - 2026)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي
الجامعة التقنية الشمالية/ الكلية التقنية للحاسوب والذكاء الاصطناعي- كركوك
بكالوريوس في هندسة تقنيات المعلومات والشبكات (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - قل وحدة اوربية = ٢٥ ساعة
المنهاج الدراسي للعام ٢٠٢٥-٢٠٢٦

Level	Semester	No.	Module Code	Module Name In English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	ect (hr/w)	Lab (hr/w	Pr (hr/w)	Tut (hr/w)	emn (hr/w	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGI	One	1	ICNE-101	Introduction to Computing & Proble	مقدمة في الحوسبة وحل المشكلات	English	4		4			8	3	123	77	200	8.00	C	5
		2	ICNE-102	Engineering Mathematics	الرياضيات الهندسية	English	3				1	4	3	63	37	100	4.00	B	5
		3	ICNE-103	Engineering Drawing	الرسم الهندسي	English	2		2			4	3	63	37	100	4.00	C	5
		4	ICNE-104	Digital Logic Design	تصميم المنطق الرقمي	English	2		2			4	3	63	37	100	4.00	C	6
		5	ICNE-105	DC Circuit Analysis	تحليل دوائر التيار المستمر	English	2		2			4	3	63	87	150	6.00	B	5
		6	NTU-100	Democracy and Human Rights	الديمقراطية وحقوق الإنسان	Arabic	2					2	3	33	17	50	2.00	B	5
		7	NTU-101	English Language	اللغة الإنجليزية	English	2					2	3	33	17	50	2.00	B	2
						Total	17	0	10	0	1	28	21	441	309	750	30.00		33

Level	Semester	No.	Module Code	Module Name In English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	ect (hr/w	Lab (hr/w	Pr (hr/w)	Tut (hr/w)	emn (hr/w	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
	Two	1	ICNE-106	Programming Language	لغة البرمجة	English	4		4			8	3	123	77	200	8.00	C	5
		2	ICNE-107	AC Circuit Analysis	تحليل دوائر التيار المتناوب	English	2		2			4	3	63	87	150	6.00	B	5
		3	ICNE-108	Introduction to Computer Network	مدخل الى شبكات الحاسوب	English	2		2			4	3	63	137	200	8.00	C	5
		4	CAIK-100	Physics	الفيزياء	English	2					2	3	33	17	50	2.00	B	5
		5	NTU-102	Computer	الحاسوب	English	2		2			4	3	63	37	100	4.00	C	3
		6	NTU-103	Arabic Language	اللغة العربية	Arabic	2					2	3	33	17	50	2.00	B	2
						Total	14	0	10	0	0	18	18	378	372	750	30.00		25

Level	Semester	No.	Module Code	Module Name In English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	ect (hr/w	Lab (hr/w	Pr (hr/w)	Tut (hr/w)	emn (hr/w	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
	Three	1	ICNE-201	Computer Networks	شبكات الحاسوب	English	2		2			4	3	63	87	150	6.00	C	5
		2	ICNE-202	Analatical Mathematics	الرياضيات التحليلية	English	2		2			4	3	63	87	150	6.00	C	5
		3	ICNE-203	Computer Architecture	معمارية الحاسوب	English	2		2			4	3	63	87	150	6.00	C	6
		4	ICNE-204	Object-Oriented Programming	البرمجة الكائنية	English	4		4			8	3	123	77	200	8.00	C	5
		5	NTU-200	Baath Regime Crimes in Iraq	جرائم نظام البعث في العراق	Arabic	2					2	3	33	17	50	2.00	B	5
		6	NTU-201	English Language	اللغة الإنجليزية	English	2					2	3	33	17	50	2.00	B	2
						Total	14	0	10	0	0	24	18	378	372	750	30.00		30

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						Total	14	0	10	0	0	24	18	378	372	750	30.00		30
UGII	Four	1	ICNE-205	Data Communication and Networking	اتصالات البيانات والشبكات	English	2		2			4	3	63	87	150	6.00	C	5
		2	ICNE-206	Electronic Engineering	الهندسة الإلكترونية	English	2		2			4	3	63	37	100	4.00	C	5
		3	ICNE-207	Database Design and Management	تصميم و إدارة قواعد البيانات	English	2		2			4	3	63	87	150	6.00	C	5
		4	ICNE-208	Object-Oriented Software Developmen	تطوير البرمجيات الكينونية التوجّه	English	4		4			8	3	123	77	200	8.00	C	5
		5	NTU-202	Computer	الحاسوب	English	2		2			4	3	63	37	100	4.00	C	5
		6	NTU-203	Arabic Language	اللغة العربية	Arabic	2					2	3	33	17	50	2.00	B	3
		7	CAIK-201	Summer Training1	التدريب الصيفي١	Arabic			2			2							
						Total	14	0	14	0	0	26	18	408	342	750	30.00		28

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIII	Five	1	ICNE-301	Digital Signal Processing	معالجة الإشارة الرقمية	English	2		2			4	3	63	87	150	6.00	C	5
		2	ICNE-302	Engineering Analysis	التحليلات الهندسية	English	2		2			4	3	63	37	100	4.00	C	5
		3	ICNE-303	Web Systems Programming	برمجة أنظمة الويب	English	4		4			8	3	123	27	150	6.00	C	5
		4	ICNE-304	Linux & Server Administration	إدارة الخوادم ونظام لينُكس	English	2		2			4	3	63	37	100	4.00	C	5
		5	CAIK-301	Entrepreneurial Capacity Building	بناء القدرات الريادية	English	2		2			4	3	63	87	150	6.00	C	5
		6	ICNE-305	Elective	اختيارية	English	2		2			4	3	63	37	100	4.00	B	3
						Total	14	0	14	0	0	28	18	438	312	750	30.00	E	28

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIII	Six	1	ICNE-307	Wireless & IoT Networks	الشبكات اللاسلكية وإنترنت الأشياء	English	2		2			4	3	63	87	150	6.00	C	6
		2	ICNE-308	Data and Network Security	أمنية البيانات و الشبكات	English	2		2			4	3	63	37	100	4.00	C	5
		3	ICNE-309	DevOps & Network Automation	ديف أوبس وأتمتة الشبكات	English	2		2			4	3	63	87	150	6.00	C	5
		4	ICNE-310	Blockchain Fundamentals	أساسيات سلسلة الكتل (البلوك تشين)	English	4		4			8	3	123	27	150	6.00	C	4
		5	ICNE-311	Distributed Systems	الانظمة الموزعة	English	2		2			4	3	63	37	100	4.00	B	5
		6	ICNE-312	Elective	اختيارية	English	2		2			4	3	63	37	100	4.00	E	5
		7	CAIK-302	Summer Training2	التدريب الصيفي٢	Arabic			2										
							14	0	16	0	0	28	18	438	312	750	30.00		30

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIV	Seven	1	ICNE-401	IT Service Management (ITIL)	إدارة خدمات تقنية المعلومات (ITIL)	English	2		2			4	3	63	37	100	4.00	B	6
		2	ICNE-402	Research Methodology	منهجية البحث العلمي	English	2		2			4	3	63	87	150	6.00	C	6
		3	ICNE-403	Enterprise Network Design	تصميم الشبكات المؤسسية	English	4		4			8	3	123	27	150	6.00	C	6
		4	ICNE-404	Cloud Computing	الحوسبة السحابية	English	2		2			4	3	63	37	100	4.00	C	2
		5	ICNE-405	Graduation Project	مشروع التخرج	English			6			6		90	60	150	6.00	C	6
		6	ICNE-406	AI for Networks	الذكاء الاصطناعي – (AIOps	English	2		2			4	3	63	37	100	4.00	C	4
						Total	12	0	18	0	0	30	15	465	285	750	30.0		30

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIV	Eight	1	ICNE-407	Intelligent Networking Systems	انظمة الشبكات الذكية	English	4		4			8	3	123	27	150	6.00	C	4
		2	ICNE-408	Edge & 5G Networks	الشبكات الطرفية وشبكات الجيل الخامس (	English	2		2			4	3	63	87	150	6.00	C	5
		3	ICNE-409	Software Engineering	هندسة برامجيات	English	2		2			4	3	63	37	100	4.00	C	4
		4	ICNE-410	Multimedia	الوسائط المتعددة	English	2		2			4	3	63	37	100	4.00	C	5
		5	ICNE-411	Technical Elective	مقرر اختياري	English	2		2			4	3	63	37	100	4.00	E	4
		6	ICNE-412	Graduation Project	مشروع التخرج	English			6			6		90	60	150	6.00	C	4
						Total	12	0	18	0	0	30	15	465	285	750	30.0		26
						Total	111	0	110	0	1	212	141	3411	2589	6000	240.0		Must be 240 ECTS
							111	0	110	0	1	212	141	3411	2589	6000	240		

Note: The student should complete 4 weeks of Summer Internships to fulfil the requirements of the Bachelor's degree

Structured SWL (hr/w) type			Module type				
	CL	Class Lecture		B	Basic learning activities	SWL:	Student Workload
	Lab	Laboratory		C	Core learning activity	SSWL:	Structured SWL
	Pr	Practical Training		S	Suport or related learning act	USSWL:	Unstructured SWL
	Tut	Tutorial		E	Elective learning activity		
	Lect	Online lecture					
	Semn	Seminar					

Note: Columns O, Q and R are progrmaed, protected and should not be edited

Program Course Description

Code	Name of the Course Unit	Semester	In-Class Hours (T+P)	Credit	ECTS Credit

ICNE-104	**Digital Logic Design**	1	4	3	4

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.Ann Zeki Ablahd**
Instructor(s) of the Course Unit	

Objectives And Contents	
Objectives of the Course Unit:	1. To learn the basic techniques and methodologies for designing and analyzing digital systems and how to apply these techniques to build specific circuits. 2. Define the problem (Inputs and Outputs), write its functions 3. Implement functions using Combinational digital circuit. 4. Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh-Map or Tabulation Method). **5.** Have knowledge in analyzing and designing procedures of Combinational digital circuits.
Contents of the Course Unit:	1- Numbers Systems, Operations, and Codes. 2- 2- Logic Gates 3- Boolean Algebra and Logic Simplification 4- Combinational Logic Analysis

Week	**Key Learning Outcomes Of The Course Unit** **On successful completion of this course unit, students/learners will or will be able to dealing with:**
1	**1- Numbers Systems, Operations, and Codes**: Decimal Numbers, Binary numbers.
2	**1- Numbers Systems, Operations, and Codes**: Hexadecimal Numbers, Octal numbers.
3	**1- Numbers Systems, Operations, and Codes**: Data representation (integer and fraction) using different number systems.

	Conversion Between Different Numbers Systems .
4	**1- Numbers Systems, Operations, and Codes:** Arithmetic operations using 9's and 10's Complements of Decimal Numbers. Arithmetic operations using 1's and 2's Complements of Binary Numbers.
5	**1- Numbers Systems, Operations, and Codes:** Signed Numbers, Arithmetic Operations with Signed Numbers.
6	**1- Numbers Systems, Operations, and Codes**: Digital Codes (BCD, Excess-3, Parity, Gray ….. etc.).
7	**2- Logic Gates:** The Inverter (NOT Gate), The AND Gate, The OR Gate.
8	**2- Logic Gates:** The NAND Gate, The NOR Gate, The Exclusive-OR Gate and Exclusive-NOR Gate.
9	**3- Boolean Algebra and Logic Simplification:** Boolean Operations and Expressions.
10	**3- Boolean Algebra and Logic Simplification:** Laws and Rules of Boolean Algebra.
11	**3- Boolean Algebra and Logic Simplification** Simplification Using Boolean Algebra. DeMorgan's theorems.
12	**3- Boolean Algebra and Logic Simplification :** The Karnaugh Map (1, 2 , 3 and 4 variables) , SOP and POS Minimization.
13	**4- Combinational Logic Analysis:** Basic Combinational Logic Circuits. Implementing Combinational Logic.
14	**4- Combinational Logic Analysis:** Combinational Logic Using NAND and NOR Gates. Logic Circuit Operation with Pulse Waveform Inputs.
15	**Final Exam**

No.	**Practical Part**
1	**Lab 1:** Introduction to digital laboratory kit operation
2	**Lab 2:** Logic Gates (AND, OR, NOT, NAND, NOR).

3	**Lab 3:** Logic Gates (XOR, XNOR).
4	**Lab 4:** Design of (AND, OR, NOT) gates Using NAND gates.
5	**Lab 5:** Design of (AND, OR, NOT) gates Using NOR gates.
6	**Lab 6:** Implementation of logic circuits using NANAD-gate only.
7	**Lab 7:** Implementation of logic circuits using NOR-gate only.
8	**Lab 8:** Implementation of DeMorgan theory, 1st Law
9	**Lab 9:** Implementation of DeMorgan theory, 2nd Law
10	**Lab 10**: Design of a combinational logic circuits . Part 1
11	**Lab 11**: Design of a combinational logic circuits. Part 2
12	**Lab 12**: Realization of Boolean equation. Part 1
13	**Lab 13**: Realization of Boolean equation. Part 2
14	**Lab 14**: Review

Workload & ECTS Credits of The Course Unit : ICNE-104 Digital Logic Design

Workload For Learning & Teaching Activities

Type of the Learning Activities	Learning Activities (# of week)	Duration (hours, h)	Workload (h)
Lecture & In-Class Activities	15	2	30
Preliminary & Further Study	4	2	8
Land Surveying	NA	NA	NA
Group Work	5	1	5
Laboratory	14	2	28
Reading	2	3	6
Assignment (Homework)	8	1	8
Project Work	1	3	3
Seminar	3	1	3
Internship	NA	NA	NA
Technical Visit	1	5	5
Web Based Learning	5	2	10
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	8	2	16
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	12	12
Short Exam (Quizzes)	8	0.5	4
Preparation for the Short Exam	8	1.5	12
Total Workload of the Course Unit	**86**	**63**	**175**
Workload (h) / 25			**175÷25**
ECTS Credits allocated for the Course Unit			**7**

Program Course Description

Code	Name of the Course Unit	Semester	In-Class Hours (T+P)	Credit	ECTS Credit
ICNE-105	**DC Circuit Analysis**	1	4	3	7

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.Ann Zeki**
Instructor(s) of the Course Unit	

Objectives And Contents	
Objectives of the Course Unit:	To provide the fundamental concept of DC electrical circuits.

Contents of the Course Unit:	1-General Electric System. 2- DC circuits. 3- Network Theorems

Week	**Key Learning Outcomes Of The Course Unit** **On successful completion of this course unit, students/learners will or will be able to dealing with:**
1	**1- General Electric System:** Constituent parts of an electrical system (source, load, communication & control), Current flow in a circuit, Electromotive force and potential difference, Electrical units.
2	**1- General Electric System:** Ohm's law, Resistors, Resistivity, Temperature rise & Temperature coefficient of resistance, Voltage & Current sources
3	**2- DC circuits**: Series circuits , Parallel circuits.
4	**2- DC circuits**: Kirchhoff's laws.
5	**2- DC circuits**: Power and energy .
6	**3- Network Theorems:** Star-delta & delta-star transformation
7	**3- Network Theorems:** Sources transformations
8	**3- Network Theorems:** Mesh analysis.
9	**3- Network Theorems:** Nodal analysis.
10	**3- Network Theorems:** Superposition theorem.
11	**3- Network Theorems:** Thevnin's theorem
12	**3- Network Theorems:** Nortan's theorem
13	**3- Network Theorems:**

	Maximum power transfer theorem.
14	**3- Network Theorems:** Reciprocity theorem
15	**Final Exam**

No.	**Practical Part**
1	**Lab 1:** Connection of resistances in series and parallel.
2	**Lab 2:** Verification of Ohm's law using hardware .
3	**Lab 3:** Verification of Ohm's law using digital simulation.
4	**Lab 4:** Verification of Kirchhoff's current law and Voltage law using hardware.
5	**Lab 5:** Verification of Kirchhoff's current law and Voltage law using digital simulation.
6	Lab 6: Determination of mesh currents using hardware.
7	Lab 7: Determination of mesh currents using digital simulation.
8	**Lab 8:** Measurement of nodal voltages using hardware and digital simulation.
9	**Lab 9:** Verification of superposition theorem using hardware .
10	**Lab 10:** Verification of superposition theorem using digital simulation.
11	**Lab 11:** Verification of Thevnin's theorem using hardware.
12	**Lab 12:** Verification of Thevnin's theorem using hardware.
13	**Lab 13:** Verification of Nortan's using hardware.
14	**Lab 14:** Verification of Nortan's using digital simulation.

Workload & ECTS Credits of The Course Unit : CTE101 Electrical Engineering Fundamentals			
Workload For Learning & Teaching Activities			
Type of the Learning Activities	Learning Activities (# of week)	Duration (hours, h)	Workload (h)
Lecture & In-Class Activities	15	2	30
Preliminary & Further Study	4	2	8
Land Surveying	NA	NA	NA
Group Work	5	1	5
Laboratory	14	2	28
Reading	2	3	6

Assignment (Homework)	8	1	8
Project Work	1	3	3
Seminar	3	1	3
Internship	NA	NA	NA
Technical Visit	1	5	5
Web Based Learning	5	2	10
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	8	2	16
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	12	12
Short Exam (Quizzes)	8	0.5	4
Preparation for the Short Exam	8	1.5	12
Total Workload of the Course Unit	**86**	**63**	**175**
Workload (h) / 25			**175÷25**
ECTS Credits allocated for the Course Unit			**7**

Program Course Description

Code	Name of the Course Unit	Semester	In-Class Hours (T+P)	Credit	ECTS Credit
ICNE-103	**Engineering Drawing**	1	4	3	4

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.Ann Zeki**
Instructor(s) of the Course Unit	

Objectives And Contents	
Objectives of the Course Unit:	1. Define engineering drawing material, its uses and Engineering drawing tools 2. Introduction to Engineering drawing through AutoCAD software 3. Developing the student's mental and abilities in drawing simple and complex shapes Decomposes 3D shapes into binary projections
Contents of the Course Unit:	1- Introduction to AutoCAD software 2- Draw menu 3- modify menu 4- Layers and properties 5- projection 6- stereoscopic shapes

Week	**Key Learning Outcomes Of The Course Unit** **On successful completion of this course unit, students/learners will or will be able to dealing with:**
1	-Get a quick introduction to AutoCAD -Drawing Setup in AutoCAD -Use precision drawing tools such as Grid, Object Snap, and Limits to create accurate measurements in drawings.
2	Coordinate method (Direct distance method, Absolute coordinate, Relative coordinate, Polar coordinate)
3	Draw menu (line, poly line, polygon, rectangle).
4	Drawing objects of Pentagonal, hexagonal and octagonal shapes
5	Draw menu (arc, circle, ellipse, point and text).
6	Draw several shapes containing circles and texts
7	Modify menu

	(erase, copy, mirror, move offset,)
8	Modify menu (rotate, trim, extend, explode)
9	Properties and Layers in AutoCAD and dimension
10	Orthographic projection
11	Draw the three projection(front, side and top) of some shapes
12	Basics of drawing stereoscopic shapes
13	Draw stereoscopic shape
14	Printing the graphic
15	**Final Exam**

No.	**Practical Part**
1	**Lab 1:** Definition of AutoCAD interface
2	**Lab 2:** Applications of Coordinate method
3	**Lab 3:** Draw figures of lines, polygons and rectangle
4	**Lab 4**: Drawing objects of Pentagonal, hexagonal and octagonal shapes
5	**Lab 5**:Drawing figures of circles and ellipse
6	**Lab 6**: Draw several shapes containing circles and texts
7	**Lab 7:** Applications of some order in modify menu
8	**Lab 8**: Applications of other order in modify menu
9	**Lab 9**: Practicing of using layers
10	**Lab 10:**Practicing of projection of simple figure
11	**Lab 11**: Draw three projection of figure
12	**Lab 12**: Practicing of drawing stereoscopic shapes
13	**Lab 13**: Draw stereoscopic shape
14	**Lab 14:** Practicing of Printing the graphic

Workload & ECTS Credits of The Course Unit :	**ICNE-103**	**Engineering Drawing**	
Workload For Learning & Teaching Activities			
Type of the Learning Activites	Learning Activities (# of week)	Duration (hours, h)	Workload (h)

Lecture & In-Class Activities	14	1	14
Preliminary & Further Study	NA	NA	NA
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	14	2	28
Reading	NA	NA	NA
Assignment (Homework)	5	1	5
Project Work	1	1	1
Seminar	NA	NA	NA
Internship	NA	NA	NA
Technical Visit	NA	NA	NA
Web Based Learning	NA	NA	NA
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	NA	NA	NA
Final Exam	1	3	3
Preparation for the Final Exam	1	10	10
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	5	5
Short Exam (Quizzes)	4	1	4
Preparation for the Short Exam	3	1	3
Total Workload of the Course Unit	**45**	**27**	**75**
Workload (h) / 25			**75÷25**
ECTS Credits allocated for the Course Unit			**3**

Code	Name of the Course Unit	Semester	In-Class Hours (T+P)	Credit	ECTS Credit
NTU100	**Democracy and Human Rights**	1	2	2	2

General Information	
Language of Instruction:	**Arabic**
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. Ann Zeki**
Instructor(s) of the Course Unit	

Objectives And Contents	
Objectives of the Course Unit:	**أهداف مادة حقوق الانسان والديمقراطية:** تعريف الطالب بحقوق الانسان والديمقراطية ومضامينها وتصنيف الحريات العامة
Contents of the Course Unit:	**المحتويات:** تعريف الطالب على مفهوم الحقوق والديمقراطية على الصعيد الوطني والاقليمي والعالمي

Week	**Key Learning Outcomes Of The Course Unit** **On successful completion of this course unit, students/learners will or will be able to dealing with:**
1	حقوق الانسان ، تعريفها ، اهدافها حقوق الانسان في الحضارات القديمة وخصوصا حضارة وادي الرافدين
2	حقوق الانسان في الشرائع السماوية مع التركيز على حقوق الانسان في الاسلام
3	حقوق الانسان في التاريخ المعاصر والحديث : الاعتراف الدولي بحقوق الانسان منذ الحرب العالمية الأولى وعصبة الامم المتحدة
4	الاعتراف الاقليمي بحقوق الانسان : الاتفاقية الاوربية لحقوق الانسان 1950 ، الاتفاقية الامريكية لحقوق الانسان 1969 ، الميثاق الافريقي لحقوق الانسان 1981 ، الميثاق العربي لحقوق الانسان 1994
5	حقوق الانسان الحديثة : الحقائق في التنمية ، الحق في البيئة النظيفة ، الحق في التضامن ، الحق في الدين حقوق الانسان ، المنظمات الوطنية لحقوق الانسان)
6	حقوق الانسان في الدساتير العراقية بين النظرية والواقع
7	حقوق الانسان الاقتصادية والاجتماعية والثقافية و حقوق الانسان المدنية والسياسية
8	حقوق الانسان الحديثة : الحقائق في التنمية ، الحق في البيئة النظيفة ، الحق في التضامن ، الحق في الدين
9	ضمانات احترام وحماية حقوق الانسان على الصعيد الوطنى ، الضمانات في الدستور والقوانين. الضمانات في الرقابة الدستورية ، الضمانات في حرية الصحافة والرأي العام ، دور المنظمات غير الحكومية في احترام وحماية حقوق الانسان

10	ضمانات واحترام وحماية حقوق الانسان على الصعيد الدولي : - دور الأمم المتحدة ووكالاتها المتخصصة في توفير الضمانات - دور المنظمات الاقليمية (الجامعة العربية ، الاتحاد الأوربي ، الاتحاد الافريقي ، منظمة الدول الأمريكية ، منظمة آسيان) دور المنظمات الدولية الاقليمية غير الحكومية والرأي العام في احترام وحماية حقوق الانسان
11	مصطلح الديمقراطية ، نشأته، دلالته، تاريخ الديمقراطية.
12	الاسلام والديمقراطية ومساوئ الحكم الاستبدادي .
13	الانتقادات الموجهة للديمقراطية، ومحاسن النظام الديمقراطي .
14	الديمقراطي الأنظمة الديمقراطية في العالم/الديمقراطية في العالم الثالث/ المشاكل التي تواجه البلدان العربية في التحول
15	الامتحان النهائي

Workload & ECTS Credits of The Course Unit :	**NTU100 Democracy and Human Rights**		
Workload For Learning & Teaching Activities			
Type of the Learning Activites	Learning Activities (# of week)	Duration (hours, h)	Workload (h)
Lecture & In-Class Activities	14	2	28
Preliminary & Further Study	NA	NA	NA
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	NA	NA	NA
Reading	6	0.5	3
Assignment (Homework)	NA	NA	NA
Project Work	NA	NA	NA
Seminar	NA	NA	NA
Internship	NA	NA	NA
Technical Visit	NA	NA	NA
Web Based Learning	NA	NA	NA
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	NA	NA	NA
Final Exam	1	3	3
Preparation for the Final Exam	1	10	10
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	5	5
Short Exam (Quizzes)	3	0.5	1.5
Preparation for the Short Exam	3	0.5	1.5
Total Workload of the Course Unit	**30**	**23.5**	**54**
Workload (h) / 25			**54÷25**
ECTS Credits allocated for the Course Unit			**2**

English Language Program Course Description

Code	Name of the Course Unit	Semester	In-Class Hours (T+P)	Credit	ECTS Credit
NTU101	**English Language**	2	2	2	2

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. Ann Zeki**
Instructor(s) of the Course Unit	

Objectives And Contents	
Objectives of the Course Unit:	Introduce the student to general English through reading, writing, listening, and speaking.
Contents of the Course Unit:	Grammar, Vocabulary, Reading, Speaking, Listening, and Everyday English

Week	Key Learning Outcomes Of The Course Unit On successful completion of this course unit, students/learners will or will be able to dealing with:
1	**Grammar:** Tenses, Questions, Questions words **Vocabulary:** Using a bilingual dictionary, Parts of speech, and Words with more than one meaning. **Everyday English:** Social expressions.
2	**Reading:** the many ways we communicate **Speaking:** Information gap **Listening:** Neighbors
3	**Grammar:** Present tenses: Present Simple, Present Continuous, have/have got **Vocabulary:** Describing countries, Collocation **Everyday English:** Making conversation
4	**Reading:** three people talk about their experiences **Speaking:** people's lifestyles **Listening:** what annoys you about the people in your life?
5	**Grammar:** Past tenses: Past Simple, Past Continuous **Vocabulary:** Irregular verbs, making connections, Nouns, verbs, and adjectives, Making negatives. **Everyday English:** Time expressions
6	**Reading:** Newspaper stories **Speaking:** Telling stories **Listening:** A radio drama
7	**Grammar:** Quantity, Articles **Vocabulary:** Buying things **Everyday English:** Prices and shopping
8	**Reading:** 'The best shopping street in the world' **Speaking**: Town survey, attitudes to shopping **Listening**: Buying things

9	**Grammar:** Verb patterns 1, Future intentions **Vocabulary:** Hot verbs **Everyday English:** How do you feel?
10	**Reading:** Hollywood kids **Speaking:** Being a teenager **Listening:** You've got a friend
11	**Grammar:** Comparative and superlative adjectives **Vocabulary:** Synonyms and antonyms **Everyday English:** Directions
12	**Reading: '**A Tale of two millionaires' **Speaking:** comparing cities **Listening:** Living in another country
13	**Grammar:** Present Perfect and Past Simple **Vocabulary:** Past participles, Adverbs, Word pairs **Everyday English:** Short answers
14	**Reading:** Celebrity interview **Speaking:** Roleplay **Listening:** An interview with the band
15	**Final Exam**

Workload & ECTS Credits of The Course Unit :	**NTU101**	**English Language**	
Workload For Learning & Teaching Activities			
Type of the Learning Activities	Learning Activities (# of week)	Duration (hours, h)	Workload (h)
Lecture & In-Class Activities	14	2	28
Preliminary & Further Study	NA	NA	NA
Land Surveying	NA	NA	NA
Group Work	2	1	2
Laboratory	NA	NA	NA
Reading	NA	NA	NA
Assignment (Homework)	2	1	2
Project Work	NA	NA	NA

Seminar	2	1	2
Internship	NA	NA	NA
Technical Visit	NA	NA	NA
Web Based Learning	1	1	1
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	2	1	2
Final Exam	1	3	3
Preparation for the Final Exam	1	3	3
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	2	2
Short Exam (Quizzes)	2	0.5	1
Preparation for the Short Exam	2	1	2
Total Workload of the Course Unit	**31**	**18.5**	**50**
Workload (h) / 25			**50÷25**
ECTS Credits allocated for the Course Unit			**2**

Engineering Mathematics Course Description

Code	Name of the Course Unit	Semester	In-Class Hours (T+P)	Credit	ECTS Credit
ICNE-102	**Engineering Mathematics**	1	4	3	4

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. Ann Zeki Ablahd**
Instructor(s) of the Course Unit	

Objectives And Contents	**Help the student to understand the laws and issues necessary for the purpose of solving simple and complex electrical circuits.**
Objectives of the Course Unit:	To learn the
Contents of the Course Unit:	1- Matrix and Determinants 2- Review of Functions 3- Derivatives 4- Integration

Week	**Key Learning Outcomes Of The Course Unit** **On successful completion of this course unit, students/learners will or will be able to dealing with:**
1	Matrix, properties, and operations
2	Determinants and properties of determinants Inverse of square matrix by determinants
3	Solving linear System equations using the inverse of the coefficient matrix and Cramer's rule
4	Algebraic functions
5	Review of natural logarithm, the exponential function, trigonometric functions
6	inverse trigonometric functions and hyperbolic functions
7	Derivatives formula and chain rule.
8	Derivatives of natural logarithm, the exponential function, trigonometric functions
9	inverse trigonometric functions and hyperbolic functions.
10	Applications of differentiation.
11	Review of Integration, Indefinite and Definite Integral
12	Integration method
13	Integration method
14	Applications of integration, approximation(trapezoidal rule, Simpson's rule) Area between curves

15	**Final Exam**

Workload & ECTS Credits of The Course Unit :	**ICNE-102**	**Engineering Mathematics**	
Workload For Learning & Teaching Activities			
Type of the Learning Activites	Learning Activities (# of week)	Duration (hours, h)	Workload (h)
Lecture & In-Class Activities	15	3	45
Preliminary & Further Study	NA	NA	NA
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	NA	NA	NA
Reading	NA	NA	NA
Assignment (Homework)	13	1	13
Project Work	NA	NA	NA
Seminar	NA	NA	NA
Internship	NA	NA	NA
Technical Visit	NA	NA	NA
Web Based Learning	5	2	10
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	NA	NA	NA
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	16	16
Short Exam (Quizzes)	8	0.5	4

Preparation for the Short Exam	8	1.5	12
Total Workload of the Course Unit	**53**	**49**	**125**
Workload (h) / 25			**100÷25**
ECTS Credits allocated for the Course Unit			**4**

Module Information **معلومات المادة الدراسية**					
Module Title	**Arabic Language**			**Module Delivery**	
Module Type	**Suplement**			✓ **Theory** ✓ **Lecture** **Lab** **Tutorial** **Practical** ✓ **Seminar**	
Module Code	**NTU-103**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	**2**		**Semester of Delivery**	**2**	
Administering Department	**Department of Information and Computer Network Techniques Engineering**		**College**	**Northern Technical University** **Engineering of Computer and AI Technica College/Kirkuk**	
Module Leader	**Mohanad Kamal**		**e-mail**	**mohanad.kamal25@ntu.edu.iq**	
Module Leader's Acad. Title	**Assist. Prof.**		**Module Leader's Qualification**	**master**	
Module Tutor	**None**		**e-mail**	**None**	
Peer Reviewer Name	**None**		**e-mail**	**None**	
Review Committee Approval	**1/12/2025**		**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 Objectives أهداف المادة الدراسية	نشأ الطالب على حب اللّغة العربيّة لغة القرآن الكريم. التعرّف على مواطن الجمال في اللّغة العربيّة وآدابها، وأن يكتسب طالب القدرة على دراسة فروع اللّغة العربيّة. تعريف الطالب بألفاظ اللّغة العربيّة الصحيحة وتراكيبها وأساليبها سليمة بطريقة مشوقة وجذابة. أن يستغل الطالب وقت فراغه بالقراءة والاطلاع والرجوع إلى المكتبة . تمكين الطالب ن القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتّصال مع الآخرين؛ كالسرعة وجودة لإلقاء وحسن التعبير، وتعويده حسن الاستماع لما يسمع مما ييسّر له أموره ويعينه على قضاء حوائجه. تنمية الذوق لأدبي لدى الطالب حتى يدرك النواحي الجمالية في أساليب الكلام ومعانيه وصوره. تعويد الطالب التعبيرات السليمة واضحة عن أفكاره وما يقع تحت حواسه نطقاً وكتابة وحسن استخدام علامات الترقيم. تنمية قدرة ومهارة الطالب لإملائية والخطية بحيث يستطيع الكتابة الصحيحة من جميع النواحي. إيقاظ وعي الطالب لإدراك شرف الكلمة توجيهه؛ للمحافظة على طهارتها ونقائها حتى لا تستعمل إلا في الخير. مساعدة الطالب على فهم التراكيب المعقدة والأساليب الغامضة .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. معرفة القواعد النحوية والصرفية. 2- التعريف بأبرز المصنفات اللغوية والأدبية. 3- تحديد المشكلات اللغوية والأدبية لدى الدارسين. 4- القراءة المعاصرة للنصوص اللغوية والأدبية. 5- قراءة النصوص الأدبية وكتابتها وفق المعايير النحوية والصرفية 6- تعزيز الثقة بالنفس والجرأة والفصاحة 7- المنافسة والتميز في سوق العمل.
Indicative Contents المحتويات الإرشادية	❖ مقدمة عن الأخطاء اللغوية التاء المربوطة والتاء المفتوحة (4 ساعات) ❖ تطبيقات الأخطاء اللغوية الشائعة واقسام الكلام (6 ساعات) ❖ همزة الوصل والقطع والهمزة المتوسطة والمتطرفة قواعد كتابة الالف الممدودة والمقصورة الحروف الشمسية والقمرية والضاد والظاء (12 ساعة) ❖ المشاكل والمعوقات ونقاشات (6 ساعات)

12

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- تبسيط. المعلومات وتنظيمها - تسهيل. عملية استرجاع المعلومات - ربط المفاهيم الجديدة بالمكتسبات السابقة - إيجاد العلاقة بين المفاهيم 5 - تسهيل تذكر المعارف والمعلومات

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	31	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	19	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1

Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**50**

Module Evaluation

تقييم المادة الدراسية

As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learnin Outcome**
Formative assessment	**Quizzes**	**1**	**10% (10)**	**5, 10**	**LO #1, 2, 10 and 11**
	Assignments	**10**	**10% (10)**	**Continuous**	**All**
	Seminar	**1**	**10% (10)**	**8**	**#10**
	Report	**1**	**10% (10)**	**Continuous**	**All**
Summative assessment	**Midterm Exam**	**2 hr**	**10% (10)**	**7**	**LO # 1-7**
	Final Exam	**3 hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	**Material Covered**
Week 1	**مقدمة عن الأخطاء اللغوية**
Week 2	**التاء المربوطة والتاء المفتوحة**
Week 3	**همزة الوصل والقطع**
Week 4	**الهمزة المتوسطة والمتطرفة**
Week 5	**قواعد كتابة الالف الممدودة والمقصورة**
Week 6	**الحروف الشمسية والقمرية**
Week 7	**الضاد والظاء**
Week 8	**العـدد**
Week 9	**المفاعيل**
Week 10	**أقسام الكلام**
Week 11	**معاني حروف الجر**

Week 12	**تطبيقات الأخطاء اللغوية الشائعة**
Week 13	**النون والتنوين**
Week 14	**مقدمة عن الأخطاء اللغوية**
Week 15	**الامتحان النهائي**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	**الكامل في اللغة والادب لابي عباس المبرد**	**Yes**
Recommended Texts	**أخطاء لغوية شائعة لخالد بن هلال بن ناصر العبري**	**No**
Websites	**https://www.eshamel.ne** **https://www.ektebsa7.com**	

Module Descriptor Form

نموذج وصف المادة الدراسية

APPENDIX:

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**	**مقبول بقرار**	**(45-49)**	**More work required but credit awarded**
	F – Fail	**راسب**	**(0-44)**	**Considerable amount of work required**

Note:

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية					
Module Title	**Computer**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**NTU-102**			☒ **Lecture**	
ECTS Credits	**4**			☒ **Lab**	
SWL (hr/sem)	**200**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	**UGx11**	**Semester of Delivery**	**2**		
Administering Department	**Dr.AnnZeki**	**College**	**Computer and AI**		
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**	**MATLAB 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.** **<u>Part A -</u>** **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]** **<u>Part B-</u>** **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**	**63**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**7**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**37**	**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	**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

Module Information معلومات المادة الدراسية					
Module Title	AC Circuit Analysis			Module Delivery	
Module Type	Core			✓ Theory ✓ Lecture ✓ Lab ✓ Tutorial ✓ Practical ✓ Seminar	
Module Code	ICNE-107				
ECTS Credits	6				
SWL (hr/sem)	140				
Module Level	UGx11 1		Semester of Delivery	2	
Administering Department	Department of Computer Techniques Engineering		College	Northern Technical University Engineering Technical College of Computer ar Al /Kirkuk	
Module Leader	Dr.Ali Mardan		e-mail	ali.qutub@ntu.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	PHD	
Module Tutor	None		e-mail	None	
Peer Reviewer Name	None		e-mail	None	
Review Committee Approval	1/12/2025		Version Number	1.0	

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 DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Relation With Other Modules **العلاقة مع المواد الدراسية الأخرى**			
Prerequisite module	**electrical Circuits**	**Semester**	**2**
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية**	
Module Objectives **أهداف المادة الدراسية**	**1-Understand the fundamental concepts and principles of alternating current (AC) circuits.** **2-Gain knowledge of the mathematical tools and techniques used to analyze AC circuits, including phasors, complex numbers, and impedance.** **3-Develop the ability to solve AC circuit problems using circuit analysis techniques such as mesh analysis, nodal analysis, and Thevenin's theorem.. ect.** **4-Learn how to calculate and analyze voltage and current phasors in AC circuits, including their amplitudes, phases, and frequency relationships.** **5-Explore the behavior and characteristics of AC circuit elements, such as resistors, capacitors, and inductors, and understand their roles in AC circuit analysis.** **6-Investigate the concept of impedance in AC circuits and its relationship to resistance, reactance, and frequency.** **7-Study the principles of AC power and power factor, including real power, reactive power, apparent power, and power factor correction.** **8- Gain a comprehensive understanding of three-phase AC systems, including the generation, transmission, and distribution of power in three-phase circuits.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1-Knowledge Acquisition: Students will acquire a comprehensive understanding of the fundamental concepts and principles of alternating current (AC) circuits.** **2-Circuit Design and Analysis: Students will gain the ability to design and analyze AC circuits, applying their knowledge of impedance, power factor, and component characteristics. They will learn to calculate voltage and current magnitudes, phase differences, and power relationships in AC circuits.** **3-Phasor Diagram Interpretation: Students will be able to construct and interpret phasor diagrams to visualize and analyze the behavior of voltages and currents in AC circuits.** **4-Three-Phase Systems: Students will acquire understanding of three-phase AC systems, including balanced and unbalanced configurations.** **ls: Students will develop practical skills in using circuit simulation software and laboratory design, analyze, and verify the performance of AC circuits.**

Indicative Contents **المحتويات الإرشادية**	**Indicative content includes the following:** • **<u>Part A – Inductance & Capacitance in Electric circuits.</u>** **General concept of capacitance (charge and voltage, capacitors in series and parallel)** **General concept of inductance (inductive and non-inductive circuits, capacitors in series and parallel) [4 hrs]** • **<u>Part B Alternating Quantities.</u>** **Ac systems, waveforms, terms and definitions. Average and R.M.S values of current and voltage. [10 hrs]** • **<u>Part C Single - phase of AC Circuits.</u>** **AC in resistive circuits, current and voltage in inductive circuits, current and voltage in capacitive circuits. Concept of complex impedance and admittance, AC series and parallel circuits. RL, RC and RLC circuit analysis and phasor representation. [12 hrs]** • **<u>Part D Power in AC circuits</u>.** **Power in resistive circuits. power in inductive and capacitive circuits ,power in circuit with resistance and reactance. Power factor, its practical importance, improvement of power factor, measurement of power in a single – phase AC circuits. [16 hrs]** • **<u>Part E Three – phase circuit analysis.</u>** **Basic concept and advantages of three – phase circuit. Phasor representation of star and delta connection. Phase and line quantities. Voltage and current computation in 3-phase balance and unbalance circuits. Real and Reactive power computation, measurement of power and power factor in 3-phase system. [12 hrs]** • **Revision problem classes [4 hrs]**

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	**1-Conceptual Understanding: Explain the differences between AC and DC circuits, introduce the concept of impedance, reactance, and phasors, and highlight the significance of frequency and phase in AC circuits.** **2-Mathematical Foundations: Provide a solid mathematical foundation for AC circuits. Teach students the use of complex numbers and phasor notation to analyze AC circuits.** **3-Problem-Solving Skills: Dedicate adequate time to problem-solving exercises and examples.** **4-Laboratory Experiments: Incorporate laboratory experiments to reinforce theoretical concepts. Allow students to build and analyze AC circuits using oscilloscopes, function generators, and AC power sources.** **5-Simulation Tools: Introduce simulation software tools that allow students to simulate AC circuits and observe their behavior.** **6-Review and Assessment: Regularly review key concepts and provide formative assessments to gauge students' understanding. Offer constructive feedback on their performance to help them identify areas for improvement.**

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	61	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	89	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	3	5% (10)	5,7 ,10	LO #1, 2, 10 and 11
	Assignments	3	5% (10)	2,9 ,12	LO # 3, 4, 6 and 7
	Lab.(mid pract.)	2	10%(30)	Continuous	All
	Projects	3	5% (10)	2,9 ,12	LO # 3, 4, 6 and 7
	Report	6	10% (10)	Continuous	All
	Seminars	3	5% (10)	3,10 ,13	LO # 3, 4, 6 and 7
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	1- Inductance & Capacitance in Electric circuits. 1-General concept of capacitance (charge and voltage, capacitors in series and parallel) 2- General concept of inductance (inductive and non-inductive circuits, capacitors in series ar parallel)

Week 2	**2- Alternating Quantities.** **Ac systems, waveforms, terms and definitions.**
Week 3	**2- Alternating Quantities.** **Average and R.M.S values of current and voltage.**
Week 4	**2- Alternating Quantities.** **Phasor diagram**
Week 5	**3- Single - phase of AC Circuits.** **AC in resistive circuits , current and voltage in inductive circuits, current and voltage in capaciti circuits.**
Week 6	**3- Single - phase of AC Circuits.** **Concept of complex impedance and admittance , AC series and parallel circuits .**
Week 7	**3- Single - phase of AC Circuits.** **RL , RC and RLC circuit analysis and phasor representation.**
Week 8	**4- Power in AC circuits.** **Power in resistive circuits ,power in inductive and capacitive circuits ,power in circuit with resistan and reactance.**
Week 9	**4- Power in AC circuits.** **Power factor ,its practical importance , improvement of power factor , measurement of power in single – phase AC circuits.**
Week 10	**5- Three – phase circuit analysis.** **Basic concept and advantages of three – phase circuit.**
Week 11	**5- Three – phase circuit analysis.** **Phasor representation of star and delta connection.**
Week 12	**5- Three – phase circuit analysis.** **Phase and line quantities.**
Week 13	**5- Three – phase circuit analysis.** **Voltage and current computation in 3-phase balance and unbalance circuits.**
Week 14	**5- Three – phase circuit analysis.** **Real and Reactive power computation , measurement of power and power factor in 3-phase system.**
Week 15	**Final Exam.**

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

Week 1	**Lab 1: Measurement amplitude, frequency and time with oscilloscope using hardware and digit simulation.**
Week 2	**Lab 2: Examine phase relation in RL & RC circuit using hardware and digital simulation.**
Week 3	**Lab 3: Calculate & verify average and RMS value,**
Week 4	**Lab 4: Impedance of series RL and RC circuit using digital simulation..**
Week 5	**Lab 5: Impedance of series RLC circuit using digital simulation..**
Week 6	**Lab 6: Determination of average value, RMS value, form factor, peak factor of sinusoidal wave usi digital simulation.**
Week 7	**Lab 7: Measure currents and voltages in three-phase balanced AC circuits**
Week 8	**Lab 8: Prove Y-Δ transformation,**
Week 9	**Lab 9: Exercise on phasor diagrams for three-phase circuits**
Week 10	**Lab 10: Measurement of voltage, current& power in a three-phase circuit**
Week 11	**Lab 11: Ohm's LAW, KVL AND KCL in AC circuits using digital simulation..**
Week 12	**Lab 12: Determination of mesh currents in AC circuits using digital simulation.**
Week 13	**Lab 13: Measurement of nodal voltages in AC circuits using digital simulation.**
Week 14	**Lab 14: Review**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	**Charles K. Alexander, Matthew N.O. Sdiku Fundamentals of Electrical Engineering, 4th Edition, 2009**	**Yes**
Recommended Texts	**Tony R. Kuphaldt, Lessons In Electric Circuits, Volume II - AC 5th edition, 2002**	**No**
Websites	**AC circuits** **https://byjus.com/physics/ac-circuit/**	

APPENDIX:

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	**FX – Fail**	**مقبول بقرار**	**(45-49)**	**More work required but credit awarded**
(0 – 49)	**F – Fail**	**راسب**	**(0-44)**	**Considerable amount of work required**
Note:				

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**					
Module Title	**Introduction To computing & Problem Solving**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**ICNE-101**			☒ **Lecture**	
ECTS Credits	**8**			☒ **Lab**	
SWL (hr/sem)	**200**			☐ **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 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.** **<u>Part C- Programming in C++</u>** **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	**1. A Complete Guide to Programming in C++ Ulla Kirch-Prinz Peter Prinz. JONES AND BARTLETT PUBLISHERS.**	**Yes**
Recommended Texts	**2. 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** **3. C PROGRAMMING TUTORIAL**	**yes**
Websites	**4. 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**

Module Descriptor Form

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**Introduction to Computer Network**	**Module Delivery**
Module Type	**Core**	✓ **Theory**
Module Code	**ICNE-108**	✓ **Lecture**

ECTS Credits	**8**	✓ **Lab**	
SWL (hr/sem)	**200**	✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Level	**UGx11 3**	**Semester of Delivery**	**1**
Administering Department	**Department of Information and Computer Network Techniques Engineering**	**College**	**Northern Technical University** **Engineering Technical College of Computer an AI /Kirkuk**
Module Leader	**Ihsan Hassan Hussain**	**e-mail**	**Ihsan_hassan@ntu.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Master**
Module Tutor	**None**	**e-mail**	**None**
Peer Reviewer Name	**None**	**e-mail**	**None**
Review Committee Approval	**2/12/2025**	**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 Objectives **أهداف المادة الدراسية**	6. **To understand network architecture: Learning the different components and layers computer networks.** 7. **To analyze network protocols: Studying the various protocols used in comput networks.** 8. **To exploring network security: Understanding the concepts and techniques related network security.** 9. **To investigating network technologies: Exploring various network technologies, such LANs, WANs, wireless networks.** 10. **To understanding network services and applications: Studying network services an applications.** 11. **To enhancing network design and implementation skills: Developing skills in designi and implementing computer networks** 12. **To examine network management: Learning about network management principle tools, and techniques.**

Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1. Understanding Network Concepts** **2. Differentiate between LAN (Local Area Network), WAN (Wide Area Network), and MA (Metropolitan Area Network).** **3. Explain the purpose and components of the OSI model and the TCP/IP model** **4. Understand the hierarchical structure of the layers in both models** **5. Explain the different types of transmission media, encoding, modulation ar multiplexing techniques used for data transmission** **6. Analyzing Network Communication** **7. Compare and contrast different network models, such as the TCP/IP model and the O model.** **8. Applying Network Protocols: understanding how protocols like TCP/IP enable reliab data transmission and how they are used in real-world scenarios.** **9. Understanding the functions and responsibilities of the data link layer in the O model.** **10. Identify and apply error detection mechanisms, such as checksums or cyc redundancy checks (CRC).**
Indicative Contents **المحتويات الإرشادية**	Introduction to Computer Networks: [12 h] Definition of computer networks Network architectures and types (LAN, WAN, MAN) Network components and their functions Network protocols and standards Network Models and Protocols: [14 h] OSI (Open Systems Interconnection) model and TCP/IP model Layers of the OSI and TCP/IP models Protocols and services at each layer Encapsulation and de-encapsulation processes Physical Layer: [20 h] Transmission media (copper, fiber-optic, wireless) Data transmission techniques (analog vs. digital, modulation, multiplexing) Signal encoding (NRZ, Manchester, etc.) Switching (circuit, datagram and virtual). Data Link Layer: [12 h] Framing and error detection Flow control and error control mechanisms Media Access Control (MAC) protocols (Ethernet, Wi-Fi)

	Local Area Networks (LAN) and Ethernet technologies

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**The main strategy that will be adopted in delivering this module is to encourage student participation in the exercises, while at the same time refining and expanding their critic thinking skills. When studying Computer Networks Fundamentals, there are several k strategies that can help you grasp the material effectively. These strategies inclu (Understanding the Fundamentals, Layered Approach, Analyze Network Protocols, Netwo Simulations: Visualize Networks and Practical Problem Solving. This will be achieved throu classes, interactive tutorials and by considering type of simple experiments involving son sampling activities that are interesting to the students.**

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**58**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**4**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**92**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**6.5**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**150**		

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

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

Week 1	**Introduction to data communication and networks:** **Data Representations, Data Flows, and classify the computer networks according to application, siz transmission technology**
Week 2	**Network Models:** **Protocol Layering, The ISO reference Model, and TCP/IP Reference Model**
Week 3	**Connection-Oriented Versus Connectionless Service, and Service Primitives**
Week 4	**LANs Topologies:** **CSMA/CD, Token Access protocols, and IP addressing**
Week 5	**Metropolitan Area Networks, Wide Area Networks, Internetworks, and VPNs**
Week 6	**performance metrics, Bandwidth, Throughput, Latency (Delay),Bandwidth-Delay, Jitter**
Week 7	**Digital signals transmission:** **impairment (attenuation, distortion, noise, data rate limits)** **Channel capacity and Shannon Formula**
Week 8	**Bandwidth-Limited Signals, The Maximum Data Rate of a Channel**
Week 9	**Guided transmission media (twisted-pair cable, coaxial cable, fiber-optic cable), and wirele transmission, transmission modes, Parallel and Serial Transmissions**
Week 10	**Digital Signals and Digital Transmission: Line Coding Baseband, Passband,**
Week 11	**Multiplexing and Demultiplexing: FDM,TDM, and CDM**
Week 12	**Public Switched Telephone Network:** **Structure of the Telephone System, DSL Trunks and Multiplexing**
Week 13	**Switching: Circuit and Datagram Networks, Virtual-Circuit Networks ,Circuit switching, pack switching & virtual switching**
Week 14	**Wired LANs:Ethernet Standards, Bridged Ethernet, Switched Ethernet, Fast Ethernet And Gigab Ethernet**
Week 15	**Final Exam.**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	**Lab 1: Introduction to Network Lab**
Week 2	**Lab 2: Network Transmission media**
Week 3	**Lab 3: Cables and LAN tester**
Week 4	**Lab 4: Network Devices 1**
Week 5	**Lab 5: Network Devices 2**
Week 6	**Lab 6: Peer-to-peer Network**

Week 7	**Lab 7: Building LAN Network using Hub 1**
Week 8	**Lab 8: Building LAN Network using Hub 2**
Week 9	**Lab 9: Network Tools**
Week 10	**Lab 10: Network commands 1**
Week 11	**Lab 11: Network commands 2**
Week 12	**Lab 12: Introduction to Internet Protocol (IP)**
Week 13	**Lab 13: IP addressing 1**
Week 14	**Lab 14: IP addressing 2**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	**Behrouz A. Forouzan. Data communication and Networking, fifth edition**	**Yes**
Recommended Texts	**Michael Duck and Richard Read" Communications and Computer Networks, 2nd edition, Pearson Education 2003**	**No**
Websites	**Digital Systems: From Logic Gates to Processors:** **https://www.coursera.org/learn/computes networks**	

APPENDIX:

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**	**مقبول بقرار**	**(45-49)**	**More work required but credit awarded**
	F – Fail	**راسب**	**(0-44)**	**Considerable amount of work required**

Note:

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**					
Module Title	**Physics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**CAIK-100**			☒ **Lecture**	
ECTS Credits	**4**			☒ **Lab**	
SWL (hr/sem)	**100**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
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.** **<u>Part A –</u>** *** 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.]** **<u>Part B-</u>** *** 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**
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**

Module Information معلومات المادة الدراسية					
Module Title	**Programming Language**			**Module Delivery**	
Module Type	**Core**			✓ **Theory**	
Module Code	**ICNE-106**			✓ **Lecture**	
ECTS Credits	**8**			✓ **Lab**	
SWL (hr/sem)	**200**			✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Level	**UGx11 1**		**Semester of Delivery**	**1**	
Administering Department	**Department of Information and Computer Network Techniques Engineering**		**College**	**Northern Technical University** **Engineering Technical College of Computer an AI /Kirkuk**	
Module Leader	**Suzeen Taha**		**e-mail**	**sazeentaha4@ntu.edu.iq**	
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**	**M.Sc.**	
Module Tutor	**None**		**e-mail**	**None**	
Peer Reviewer Name	**None**		**e-mail**	**None**	
Review Committee Approval	**1/12/2025**		**Version Number**	**1.0**	

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 Descriptor Form

نموذج وصف المادة الدراسية

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**Object Oriented Programming**	**Semester**	**S3**

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives **أهداف المادة الدراسية**	**Introduce the students with computer programming techniques using C++ language, and how can be used to solve problems related to their specialization.**
Module Learning	**The learning outcomes for a module on computer programming in C++ can vary depending**

Outcomes **مخرجات التعلم للمادة الدراسية**	**the specific objectives of the course or program:** **1-Understanding the basics of C++: Students should be able to comprehend the fundament concepts of C++ programming, including syntax, data types, variables, operators, contr structures, and functions.** **2-Proficiency in C++ programming: Students should develop the skills required to writ compile, and execute C++ programs. They should be able to implement various programmi constructs and algorithms using C++.** **3-Problem-solving and algorithm design: Students should gain the ability to analyze problen and design efficient algorithms to solve them using C++. They should be able to break dov complex problems into smaller, manageable tasks and implement them in code.** **4-Debugging and error handling: Students should develop skills in debugging C++ programs ar identifying and fixing errors. They should learn techniques for error handling, exceptio handling, and writing robust code.** **5-Code optimization and efficiency: Students should be able to optimize their C++ code f efficiency, considering factors such as algorithm complexity, data structures, and co organization. They should learn about performance analysis and profiling tools to identi bottlenecks in code.** **6-Software development practices: Students should understand and apply good softwa development practices, including code documentation, version control, and testing. Th should learn how to write readable and maintainable code.**
Indicative Contents **المحتويات الإرشادية**	**Indicative content includes the following:** • **Part A – Introduction to C++.** **[14 hrs]** • **Part B- Operators & Making Decisions** **[12 hrs]** • **Part C- Looping & Arrays** **[16 hrs]** • **Part D- Looping & Arrays** **[10 hrs]** • **Revision problem classes [6 hrs]**

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	**When teaching and learning C++ programming, various strategies can be employed enhance comprehension and mastery of the subject. Here are some effective learning ar teaching strategies for C++ programming:** **Hands-on coding , Step-by-step approach , Visual aids and diagrams , Active learning , Rea world examples and projects , Online resources and coding platforms , Code documentatio and commenting , Debugging and problem-solving techniques , Assessment and feedback**

	Continuous learning and staying updated

Student Workload (SWL) **الحمل الدراسي للطالب**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**59**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**4**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**42**	**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 Learni Outcome**
Formative assessment	**Quizzes**	**4**	**10% (10)**	**5, 10**	**LO #1, 2, 10 and 11**
	Assignments	**6**	**10% (10)**	**2, 12**	**LO # 3, 4, 6 and 7**
	Projects / Lab.	**1**	**10% (10)**	**Continuous**	**All**
	Report	**5**	**10% (10)**	**13**	**LO # 5, 8 and 10**
Summative assessment	**Midterm Exam**	**2 hr**	**10% (10)**	**7**	**LO # 1-7**
	Final Exam	**3 hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus) **المنهاج الاسبوعي النظري**	
Week	**Material Covered**
Week 1	**Introduction to C++ (Structure of a program)**
Week 2	**Variables, Data Types, Declaration of variables, Scope of variables, Initialization of variable Expressions and Basic Input/Output.**
Week 3	**Operators (Assignment, Arithmetic operators, Compound assignment, Increase and decreas Relational and equality operators, Conditional operator)**
Week 4	**Making Decisions (if...else and switch).**
Week 5	**Looping (while loop and for loop).**
Week 6	**Bitwise Operators and Explicit type casting operator**

Week 7	**Arrays (Single Dimensional arrays, Arrays as parameters)**
Week 8	**Arrays (two Dimensional arrays, Arrays as parameters)**
Week 9	**Character Sequences and String handling.**
Week 10	**Structure**
Week 11	**Pointers (Reference operator, dereference operator, Declaring variables of pointer types,)**
Week 12	**Pointers and arrays, Pointers to pointers, void pointers and Pointers to functions**
Week 13	**Functions (Local and global variables, Arguments passed by value and by reference, Default values parameters)**
Week 14	**Overloaded functions and Recursive functions.**
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Week	**Material Covered**
Week 1	**Lab 1: Introduction to C++ program using visual studio .**
Week 2	**Lab 2: my first program and how solve a problem.**
Week 3	**Lab 3: : if...else and switch programs**
Week 4	**Lab 4: while loop and for loop programs**
Week 5	**Lab 5: Bitwise Operators programs**
Week 6	**Lab 6: Single Dimensional arrays**
Week 7	**Lab 7: two Dimensional arrays ..part1**
Week 8	**Lab 8: two Dimensional arrays..part2**
Week 9	**Lab 9: : Character and String programs**
Week 10	**Lab 10: how implement a Structure**
Week 11	**Lab 11: Pointers and arrays**
Week 12	**Lab 12: Functions..part1**
Week 13	**Lab 13: Functions..part2**
Week 14	**Lab 14: Review**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	**The Complete Reference, 4th Edition – Herbert schildt**	**No**
Recommended Texts	**complete c++ programming fundamentals with examples projects- emenwa global**	**No**

Websites	**non**

APPENDIX:

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**	**مقبول بقرار**	**(45-49)**	**More work required but credit awarded**
	F – Fail	**راسب**	**(0-44)**	**Considerable amount of work required**
Note:				
NB 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.				

17. Contact

Program Manager:

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