ENGLISH LANGUAGE Programme 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	**Ms. Hanan Faisal**
Instructor(s) of the Course Unit	**Ms. Hanan Faisal**

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)	3	1	3
Project Work	NA	NA	NA
Seminar	2	1	2
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	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**

Ministry of Higher Education and
Scientific Research - Iraq
Northern Technical University
Technical Engineering College for Computer and AI/ Kirkuk
Department of Artificial Intelligence

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ENGLISH LANGUAGE	**Module Delivery**	
Module Type	SUPPLEMENT	✓ **Theory** ✓ **Lecture** **Lab** **Tutorial** **Practical** ✓ **Seminar**	
Module Code	NTU101		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	**Semester of Delivery**	1
Administering Department	DEPARTMENT OF ARTIFICIAL INTELLIGENCE	**College**	NORTHERN TECHNICAL UNIVERSITY TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND AI/ KIRKUK
Module Leader	Ms. Hanan Faisal	**e-mail**	
Module Leader's Acad. Title	**Assistant Lecturer**	**Module Leader's Qualification**	MsC
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval	15/10/2025	**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 Aims أهداف المادة الدراسية	To enable the learner to communicate effectively and appropriately in real life situation. To use English effectively for study purposes across the curriculum. To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking, and Writing. To revise and reinforce structure already learned.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will heighten their awareness of the correct usage of English grammar in writing and speaking. Students will improve their speaking ability in English both in terms of fluency and comprehensibility. Students will give oral presentations and receive feedback on their performance. Students will increase their reading speed and comprehension of academic articles. Students will improve their reading fluency skills through extensive reading. Students will enlarge their vocabulary by keeping a vocabulary journal.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part 1 – **Grammar** [4 hrs] Tenses, Present tenses: Present Simple, Present Continuous Part 2 – **Vocabulary** [6 hrs] Irregular verbs, making connections, Nouns, verbs, and adjectives, Making negatives. Part 3 – **Speaking** [6 hrs] Information gap, people's lifestyles, comparing cities. Part 4 – **Listening**[4 hrs] Telling stories, Town survey, attitudes to shopping, comparing cities. **Revision [2 hrs]**

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage student's 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 interesting sampling activities for the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	22	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	28	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.12
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	3, 7, 11, 14	LO #1, 2, 10 and 11
	Assignments	0	0	0	0
	Projects / Lab.	0	0	0	0
	Report	4	10% (10)	5, 6, 8, 10, 13	LO # 5, 8 and 12
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	15	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 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.
Week 2	Reading: the many ways we communicate Speaking: Information gap Listening: Neighbors
Week 3	Grammar: Present tenses: Present Simple, Present Continuous, have/have got Vocabulary: Describing countries, Collocation Everyday English: Making conversation
Week 4	Reading: three people talk about their experiences Speaking: people's lifestyles Listening: what annoys you about the people in your life?
Week 5	Grammar: Past tenses: Past Simple, Past Continuous Vocabulary: Irregular verbs, making connections, Nouns, verbs, and adjectives, Making negatives. Everyday English: Time expressions
Week 6	Reading: Newspaper stories Speaking: Telling stories Listening: A radio drama
Week 7	Grammar: Quantity, Articles Vocabulary: Buying things Everyday English: Prices and shopping
Week 8	Reading: 'The best shopping street in the world' Speaking: Town survey, attitudes to shopping Listening: Buying things
Week 9	Grammar: Verb patterns 1, Future intentions Vocabulary: Hot verbs Everyday English: How do you feel?
Week 10	Reading: Hollywood kids Speaking: Being a teenager Listening: You've got a friend
Week 11	Grammar: Comparative and superlative adjectives Vocabulary: Synonyms and antonyms Everyday English: Directions
Week 12	Reading: 'A Tale of two millionaires' Speaking: comparing cities Listening: Living in another country
Week 13	Grammar: Present Perfect and Past Simple Vocabulary: Past participles, Adverbs, Word pairs Everyday English: Short answers
Week 14	Review

Week 15	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New Headway Intermediate Students Book	No
Recommended Texts		
Websites	You can visit the course page at the following link: https://youtube.com/playlist?list=PLzQug2pV17x9JD3wR8mk5qst_1EQ1myF6	

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.

DEMOCRACY AND HUMAN RIGHTS Programme Course Description

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	**Samia Daoud Suleiman + Muhannad Kamal**
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 ١٩٥٠ ، الاتفاقية الامريكية لحقوق الانسان ١٩٦٩ ، الميثاق الافريقي لحقوق الانسان ١٩٨١ ، الميثاق العربي لحقوق الانسان ١٩٩٤
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 الوطني ، 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	الأنظمة الديمقراطية في العالم/الديمقراطية في العالم الثالث/ المشاكل التي تواجه البلدان العربية في التحول الديمقراطي
15	مراجعة

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	3	1	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**	**50**
Workload (h) / 25			**50÷25**
ECTS Credits allocated for the Course Unit			**2**

Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Technical Engineering Collage for Computer and Artificial Intelligence/Kirkuk
Department of Artificial Intelligence Technology Engineering

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**Human rights and Democracy**	**Module Delivery**	
Module Type	SUPLEMENT	✓ **Theory** ✓ **Lecture** **Lab** **Tutorial** **Practical** ✓ **Seminar**	
Module Code	NTU100		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	**Semester of Delivery**	1
Administering Department	DEPARTMENT OF ARTIFICIAL INTELLIGENCE	**College**	NORTHERN TECHNICAL UNIVERSITY TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND AI /KIRKUK
Module Leader	Samia Daoud Suleiman + Muhannad Kamal	**e-mail**	sumaiya.dawood24@ntu.edu.iq mohanad.kamal25@ntu.edu.iq
Module Leader's Acad. Title	Assist Lec.	**Module Leader's Qualification**	Ms.C
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval	15/10/2024	**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	تهدف الديمقراطية وحقوق الانسان للحفاظ على كرامة الفرد وحقوقه الأساسية وتعزيزها كما تحقيق العدالة الاجتماعية وتشجيع التنمية الاقتصادية والاجتماعية للمجتمع وتماسكه فضلا عن توطيد الأمان الوطني وإرساء مناخ مؤات للسلام الدولي وذلك لان حقوق الانسان والديمقراطية مرجعاً أساسياً للجميع لحماية حقوق الإنسان؛ وهي توفر بيئة لحماية حقوق الإنسان وإعمالها إعمالاً فعلياً. واليوم، بعد مضي فترة على تحقيق الديمقراطية في مختلف أنحاء العالم، يبدو أن العديد من النظم الديمقراطية تتراجع. ويظهر أن بعض الحكومات تتعمد إضعاف إجراء عمليات تحقق مستقلة بشأن سلطاتها، والقضاء على أي نقد، وتفكيك الرقابة الديمقراطية وضمان حكمها لمدة طويلة، مع أثر سلبي على حقوق الشعب.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١ - فهم ومعرفة وأدراك حقوقه التي اقرها الله له وللبشر جميعاً وبالتالي فهي هبه وليس مكسب من أحد ولا يحق لأي شخص انتزاعها. ٢- يعبر الطالب بأسلوبه الخاص عن هذه الحقوق ويدافع عنها. ٣- تعليل الظواهر واعطاء التفسيرات لما يحدث امامه من انتهاك لحقوق الانسان وحرياته من خلال تحديد اوجه

	النقص او الثغرات الموجودة في ضوء المعلومات المتوفرة لديه ٤- فهم اهم النظم السياسية والتي تعد ضمانه لحقوق الانسان وحرياته السياسية ومحاولة تطبيقه على ارض الواقع الا وهو النظام الديمقراطي.
Indicative Contents المحتويات الإرشادية	❖ حقوق الانسان في التاريخ المعاصر والحديث: الاعتراف الدولي بحقوق الانسان منذ الحرب العالمية الأولى وعصبة الامم المتحدة (٤ ساعات) ❖ حقوق الانسان، تعريفها، اهدافها وحقوق الانسان في الحضارات القديمة وخصوصا حضارة وادي الرافدين (٦ ساعات) 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 (١٢ ساعة) ❖ المشاكل والمعوقات ونقاشات الطلبة (٦ ساعات)

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	١-استراتيجية التفكير حسب قدرة الطالب ٢-استراتيجية مهارة التفكير العالية ٣-استراتيجية التفكير الناقد في التعلم ٤-العصف الذهني

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	28	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments داخل الكلية	1	10% (10)	6	LO #1-7
	Assignments بيتية	1	10% (10)	8	LO #1-9
	Report	1	10% (10)	15	LO #1-14
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	حقوق الانسان، تعريفها، اهدافها حقوق الانسان في الحضارات القديمة وخصوصا حضارة وادي الرافدين
Week 2	حقوق الانسان في الشرائع السماوية مع التركيز على حقوق الانسان في الإسلام
Week 3	حقوق الانسان في التاريخ المعاصر والحديث : الاعتراف الدولي بحقوق الانسان منذ الحرب العالمية الأولى وعصبة الامم المتحدة
Week 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
Week 5	حقوق الانسان في التاريخ المعاصر والحديث : الاعتراف الدولي بحقوق الانسان منذ الحرب العالمية الأولى وعصبة الامم المتحدة
Week 6	حقوق الانسان في الدساتير العراقية بين النظرية والواقع
Week 7	حقوق الانسان الاقتصادية والاجتماعية والثقافية و حقوق الانسان المدنية والسياسية
Week 8	حقوق الانسان الحديثة : الحقائق في التنمية ، الحق في البيئة النظيفة ، الحق في التضامن ، الحق في الدين
Week 9	ضمانات احترام وحماية حقوق الانسان على الصعيد الوطني ، الضمانات في الدستور والقوانين الضمانات في الرقابة الدستورية ، الضمانات في حرية الصحافة والرأي العام ، دور المنظمات غير الحكومية في احترام وحماية حقوق الانسان
Week 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
Week 11	مصطلح الديمقراطية ، نشأته، دلالته، تاريخ الديمقراطية.
Week 12	الاسلام والديمقراطية ومساوئ الحكم الاستبدادي .
Week 13	الانتقادات الموجهة للديمقراطية، ومحاسن النظام الديمقراطي.
Week 14	الأنظمة الديمقراطية في العالم/الديمقراطية في العالم الثالث/ المشاكل التي تواجه البلدان العربية في التحول الديمقراطي
Week 15	**الامتحان النهائي**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	حقوق الانسان والديمقراطية – المفاهيم والمرتكزات للدكتور سماح مهدي العلياوي والدكتور سلمان كاظم البهادلي	Yes
Recommended Texts	الديمقراطية وحقوق الانسان في الاسلام للدكتور راشد الغنوشي	No
Websites	https://www.neelwafurat.com https://studies.aljazeera.ne	

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.

DC CIRCUIT ANALYSIS

Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK115	**DC Circuit Analysis**	1	4	3	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Dr. Zaid Ahmed Hamid**
Instructor(s) of the Course Unit	**Dr. Zaid Ahmed Hamid**

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:** Thevenin's theorem
12	**3- Network Theorems:** Norton'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 Thevenin's theorem using hardware.
12	**Lab 12:** Verification of Thevenin's theorem using hardware.
13	**Lab 13:** Verification of Norton's using hardware.
14	**Lab 14:** Verification of Norton's using digital simulation.

Workload & ECTS Credits of The Course Unit :	**AIK115**	**DC Circuits Analysis**	
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	2	2	4
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	14	2	28
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	2	2	4
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	6	2	12
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)	3	0.5	1.5
Preparation for the Short Exam	3	1.5	4.5
Total Workload of the Course Unit	**53**	**51**	**125**
Workload (h) / 25			**125÷25**
ECTS Credits allocated for the Course Unit			**5**

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Technical Engineering Collage for Computer and Artificial Intelligence/Kirkuk
Department of Artificial Intelligence Technology Engineering

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**DC CIRCUITS ANALYSIS**	**Module Delivery**	
Module Type	CORE	✓ **Theory** ✓ **Lecture** ✓ **Lab** ✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	AIK115		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	1
Administering Department	**DEPARTMENT OF ARTIFICIAL INTELLIGENCE**	**College**	**NORTHERN TECHNICAL UNIVERSITY/ TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND ARTIFICIAL INTELLIGENCE**
Module Leader	Dr. Zaid Ahmed Hamid	**e-mail**	Zaid.aljawary@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	15/10/2024	**Version Number**	1.0

Relation With Other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This course focuses on direct current (DC) circuit analysis and aims to: 1-Understanding of the fundamental laws and elements of electrical circuits design and application. 2-Understand the techniques to analyze different circuit configuration 3- Analyze resistive circuits and laws/theorems including Kirchhoff's Superposition, Thevenin's, Nortons, and Maximum Power Transfer. 4- Develop students computational skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Having successfully completed the course, students will be able to: 1- Know the various types of electric circuits. 2-Know the Elements of electric circuits and their roles 3-Apply different techniques to analyze electric circuits. 4-Solve Problem of different electric circuits 5-Compare the application of different type of electric circuits. 6-Appreciate the importance of electric circuit elements. 7-Compare and contrast the operation of different types of electrical elements.

	8-Derive equations related to the circuit's performance and design. 9-Identify different types of electrical elements and their applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – 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. Ohm's law, Resistors, Resistivity, Temperature rise & Temperature coefficient of resistance, Voltage & Current sources [8 hrs] • Part B DC circuits. Series circuits, Parallel circuits. Kirchhoff's laws. Power and energy [14 hrs] • Part C Network Theorems . Star-delta & delta-star transformation. Sources transformations Mesh analysis. Nodal analysis. Superposition theorem. Thevnin's theorem. Norton's theorem. Maximum power transfer theorem. [32 hrs] • Revision problem classes [4 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1-**Hands-on Experiments:** Engage students in practical experiments to deepen their understanding of circuits. 2-**Simulation Software:** Use circuit simulation software for virtual circuit design and analysis. 3-**Problem-solving Exercises:** Include various problem-solving exercises to apply circuit analysis techniques. 4-**Group Projects:** Assign collaborative projects for circuit design and construction. 5-**Real-world Applications:** Discuss practical applications of circuits in different devices and systems. 5-**Interactive Discussions:** Encourage student participation and critical thinking through open-ended questions. 6-**Conceptual Understanding:** Focus on intuitive understanding alongside mathematical analysis. 7-**Assessment Variety:** Use diverse assessment methods to gauge student understanding. 8-**Office Hours and Support:** Offer individualized assistance through office hours or online support.

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	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes	3	10% (10)	5, 10	LO #1, 2, 10 and 11

Formative assessment	**Assignments**	2	10% (10)	3, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	15	10% (10)	Continuous	All
	Report	6	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Constituent parts of an electrical system, Current flow in a circuit, Electromotive force and potential difference, Electrical units.
Week 2	Ohm's law, Resistors, Resistivity, Temperature rise & Temperature coefficient of resistance, Voltage & Current sources
Week 3	Series circuits , Parallel circuits.
Week 4	Kirchhoff's laws.
Week 5	Power and energy.
Week 6	Star-delta & delta-star transformation
Week 7	Sources transformations
Week 8	Mesh analysis.
Week 9	Nodal analysis.
Week 10	Superposition theorem.
Week 11	Thevnin's theorem
Week 12	Nortan's theorem
Week 13	Maximum power transfer theorem.
Week 14	Reciprocity theorem
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Connection of resistances in series and parallel.
Week 2	Lab 2: Verification of Ohm's law using hardware .
Week 3	Lab 3: Verification of Ohm's law using digital simulation.
Week 4	Lab 4: Verification of Kirchhoff's current law and Voltage law using hardware.
Week 5	Lab 5: Verification of Kirchhoff's current law and Voltage law using digital simulation.
Week 6	Lab 6: Determination of mesh currents using hardware.
Week 7	Lab 7: Determination of mesh currents using digital simulation.
Week 8	Lab 8: Measurement of nodal voltages using hardware and digital simulation.
Week 9	Lab 9: Verification of superposition theorem using hardware .
Week 10	Lab 10: Verification of superposition theorem using digital simulation.
Week 11	Lab 11: Verification of Thevnin's theorem using hardware.
Week 12	Lab 12: Verification of Thevnin's theorem using hardware.
Week 13	Lab 13: Verification of Nortan's using hardware.
Week 14	Lab 14: Verification of Nortan's using digital simulation.

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 I - DC 5th edition, Pearson Education 2002	No
Websites	Direct Current (DC) https://www.allaboutcircuits.com/textbook/direct-current/	

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.

FUNDAMENTAL OF PROGRAMMING Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK114	**Fundamental of Programming**	1	4	3	6

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	**Mr. Muhammad Nayef**
Instructor(s) of the Course Unit	**Mr. Muhammad Nayef**

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	Introduce the students with computer programming techniques using C++ language, and how it can be used to solve problems related to their specialization.
Contents of the Course Unit:	To learn the 1- Introduction to C++. 2- Operators & Making Decisions 3- Looping & Arrays 4- Pointers & Functions.

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	Introduction to C++ (Structure of a program)
2	Variables, Data Types, Declaration of variables, Scope of variables, Initialization of variables, Expressions and Basic Input/Output.
3	Operators (Assignment, Arithmetic operators, Compound assignment, Increase and decrease, Relational and equality operators, Conditional operator)
4	Making Decisions (if...else and switch).
5	Looping (while loop and for loop).
6	Bitwise Operators and Explicit type casting operator
7	Arrays (Single Dimensional arrays, Arrays as parameters)
8	Arrays (two Dimensional arrays, Arrays as parameters)
9	Character Sequences and String handling.
10	Structure
11	Pointers (Reference operator, dereference operator, Declaring variables of pointer types,)
12	Pointers and arrays, Pointers to pointers, void pointers and Pointers to functions
13	Functions (Local and global variables, Arguments passed by value and by reference, Default values in parameters)
14	Overloaded functions and Recursive functions.
15	**Revision**

No.	PRACTICAL PART
1	**Lab 1:** Introduction to C++ program using visual studio .
2	**Lab 2:** my first program and how solve a problem.
3	**Lab 3:** if...else and switch programs
4	**Lab 4:** while loop and for loop programs
5	**Lab 5:** Bitwise Operators programs
6	**Lab 6:** Single Dimensional arrays
7	**Lab 7:** two Dimensional arrays ..part1
8	**Lab 8:** two Dimensional arrays..part2
9	**Lab 9:** Character and String programs
10	**Lab 10**: how implement a Structure
11	**Lab 11**: Pointers and arrays
12	**Lab 12**: Functions.part1
13	**Lab 13**: Functions.part2
14	**Lab 14**: Review

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT :	AIK114	COMPUTER PROGRAMMING	
WORKLOAD FOR LEARNING & TEACHING ACTIVITIES			
TYPE OF THE LEARNING ACTIVITES	LEARNING ACTIVITIES (# OF WEEK)	DURATION (HOURS, H)	WORKLOAD (H)
Lecture & In-Class Activities	**15**	**2**	**30**
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)	2	2	4
Project Work	NA	NA	NA
Seminar	**1**	**3**	**3**
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	6	3	18
Final Exam	1	3	3
Preparation for the Final Exam	1	14	14
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	9	9
Short Exam (Quizzes)	4	1	4
Preparation for the Short Exam	4	3	12
TOTAL WORKLOAD OF THE COURSE UNIT	**51**	**43**	**150**
Workload (h) / 25			**150÷25**
ECTS Credits allocated for the Course Unit			**6**

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Department of Artificial Intelligence Technology Engineering

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**FUNDAMENTAL OF PROGRAMMING**	**Module Delivery**	
Module Type	CORE	✓ **Theory** ✓ **Lecture** ✓ **Lab** ✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	AIK114		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	**Semester of Delivery**	1
Administering Department	**DEPARTMENT OF ARTIFICIAL INTELLIGENCE TECHNOLOGY ENGINEERING**	**College**	**NORTHERN TECHNICAL UNIVERSITY/ TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND AI / KIRKUK**
Module Leader	Mr. Muhammad Nayef	**e-mail**	mohammed.naife@ntu.edu.iq
Module Leader's Acad. Title	Assit. Lecturer	**Module Leader's Qualification**	M.Sc
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval		**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	Introduce the students with computer programming techniques using C++ language, and how it can be used to solve problems related to their specialization.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes for a module on computer programming in C++ can vary depending on the specific objectives of the course or program: 1-Understanding the basics of C++: Students should be able to comprehend the fundamental concepts of C++ programming, including syntax, data types, variables, operators, control structures, and functions. 2-Proficiency in C++ programming: Students should develop the skills required to write, compile, and execute C++ programs. They should be able to implement various programming constructs and algorithms using C++.

	3-Problem-solving and algorithm design: Students should gain the ability to analyze problems and design efficient algorithms to solve them using C++. They should be able to break down complex problems into smaller, manageable tasks and implement them in code. 4-Debugging and error handling: Students should develop skills in debugging C++ programs and identifying and fixing errors. They should learn techniques for error handling, exception handling, and writing robust code. 5-Code optimization and efficiency: Students should be able to optimize their C++ code for efficiency, considering factors such as algorithm complexity, data structures, and code organization. They should learn about performance analysis and profiling tools to identify bottlenecks in code. 6-Software development practices: Students should understand and apply good software development practices, including code documentation, version control, and testing. They 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 to enhance comprehension and mastery of the subject. Here are some effective learning and teaching strategies for C++ programming: Hands-on coding , Step-by-step approach , Visual aids and diagrams , Active learning , Real-world examples and projects , Online resources and coding platforms , Code documentation 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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	2, 4, 9, 11	LO #1, 2, 10 and 12
	Assignments	2	4% (4)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	15	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
	Seminar	1	6% (6)	5	LO # 1-4
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to C++ (Structure of a program)
Week 2	Variables, Data Types, Declaration of variables, Scope of variables, Initialization of variables, Expressions and Basic Input/Output.
Week 3	Operators (Assignment, Arithmetic operators, Compound assignment, Increase and decrease, 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 in parameters)
Week 14	Overloaded functions and Recursive functions.
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	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.

ARTIFICIAL INTELLIGENCE Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK113	**Artificial Intelligence**	1	2	2	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Dr. Amal Saeed Taama**
Instructor(s) of the Course Unit	**Dr. Amal Saeed Taama**

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	Introduce the student to general artificial intelligence fundamentals.
Contents of the Course Unit:	Artificial intelligence, machine learning, principles and applications

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	Introduction to artificial intelligence
2	Artificial intelligence types
3	Artificial intelligence applications
4	Introduction to machine learning
5	Machine learning types
6	Machine learning applications
7	Principles of neural networks
8	Advanced neural networks
9	Principles of fuzzy logic
10	Introduction to optimizations
11	Optimizations types
12	Optimizations applications
13	Artificial intelligence ethics
14	Artificial intelligence future
15	**Final Exam**

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT:	AIK113 ARTIFICIAL INTELLIGENCE		
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	15	2	30
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	NA	NA	NA
Reading	NA	NA	NA
Assignment (Homework)	4	10	40
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	6	6
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	4	4
Short Exam (Quizzes)	1	10	10
Preparation for the Short Exam	NA	NA	NA
TOTAL WORKLOAD OF THE COURSE UNIT	**39**	**39**	**125**
Workload (h) / 25			**125÷25**
ECTS Credits allocated for the Course Unit			**5**

Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Technical Engineering Collage for Computer and Artificial Intelligence/Kirkuk
Department of Artificial Intelligence Technology Engineering

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ARTIFICIAL INTELLIGENCE	**Module Delivery**	
Module Type	CORE	✓ **Theory** ✓ **Lecture** ✓ **Lab** **Tutorial** ✓ **Practical** **Seminar**	
Module Code	AIK113		
ECTS Credits	5		
SWL (hr/sem)	30		
Module Level	1	**Semester of Delivery**	2
Administering Department	DEPARTMENT OF ARTIFICIAL INTELLIGENCE TECHNICAL ENGINEERING	**College**	NORTHERN TECHNICAL UNIVERSITY TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND ARTIFICIAL INTELLIGENCE/KIRKUK
Module Leader	Assist. Prof. Dr. Amel Saeed Tuama	**e-mail**	
Module Leader's Acad. Title	**Assistant Prof.**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	None	**e-mail**	Amel.tuama@ntu.edu.iq
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval	15/ 10/2025	**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 Aims أهداف المادة الدراسية	To enable the learner to understand the basics of artificial intelligence. To enable the learner to understand the basics of machine learning. To develop the learner knowledge regarding the artificial intelligence's applications, ethics and future developments.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will get the basic ideas of artificial intelligence. Students will get the basic ideas of machine learning. Students will enlarge their knowledge regarding the artificial intelligence's applications. Students will enlarge their knowledge regarding the artificial intelligence's ethics. Students will enlarge their knowledge regarding the artificial intelligence's future developments.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part 1 – **Basics of artificial intelligence** [6 hrs] Definitions, Ideas, Types and applications. Part 2 – **Basics of machine learning** [6 hrs] Definitions, Ideas, Types and applications. Part 3 – **Basics of neural networks** [4 hrs] Definitions, Ideas, Types and applications. Part 4 – **Basics of fuzzy logic** [2 hrs] Definitions, Ideas, Types and applications. Part 5 – **Basics of optimization** [6 hrs] Definitions, Ideas, Types and applications. **Revision [4 hrs]**

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to provide bases information in artificial intelligence for students, while at the same time they may refine and expand their critical thinking skills. This can be obtained via lectures, homeworks, quizzes and examinations.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	65	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	55	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	32
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	(10)	5	LO # 1, 2, 3 and 4
	Assignments (Home works)	4	(20)	3, 6, 9, 12	LO # 1-11
	Projects / Lab.	1	10	0	0
	Report	1	10	0	0
	Midterm Exam	2 hr	20% (20)	7	LO # 1-7

Summative assessment	**Final Exam**	3 hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Artificial Intelligence
Week 2	Production Systems
Week 3	Heuristic Search Techniques
Week 4	Knowledge Representation
Week 5	Using Predicate Logic
Week 6	Using Rule
Week 7	Symbolic Reasoning Under Uncertainty
Week 8	Weak and Strong Slot-and-Filler Structures
Week 9	Game Playing
Week 10	Planning
Week 11	Understanding
Week 12	Natural Language Processing
Week 13	Learning
Week 14	Expert Systems
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Install Python and how to use the program
Week 2	Variables, Expressions, and Statements
Week 3,4	Conditional Execution
Week 5,6	Function
Week 7	Loops and Iteration

Week 8	Strings
Week 9	Files
Week 10	Lists
Week 11	Dictionaries
Week 12	Tuples
Week 13	Regular Expressions
Week 14	Using Web Services

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Artificial Intelligence, Elaine Rich, Kevin Knight, & Shivashankar B Nair, McGraw Hill, 3rd ed.,2009.	-
Recommended Texts	**1.** Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI.,2010 **2.** Artificial Intelligence, Cengage Learning, S Kaushik, 1st ed.2011	-
Websites		

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.

MATHEMATICS Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK112	**Mathematics**	1	3	3	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Dr. Essam Rafiq Faiq**
Instructor(s) of the Course Unit	**Dr. Essam Rafiq Faiq**

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	**Revision**

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT :	AIK112	MATHEMATICS	
WORKLOAD FOR LEARNING & TEACHING ACTIVITIES			
TYPE OF THE LEARNING ACTIVITIES	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			**125÷25**
ECTS Credits allocated for the Course Unit			**5**

Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Technical Engineering Collage for Computer and Artificial Intelligence/Kirkuk
Department of Artificial Intelligence Technology Engineering

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	MATHEMATICS	**Module Delivery**	
Module Type	BASIC	✓ **Theory** ✓ **Lecture** **Lab** ✓ **Tutorial** **Practical** ✓ **Seminar**	
Module Code	AIK112		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	1
Administering Department	DEPARTMENT OF ARTIFICIAL INTELLIGENCE	**College**	NORTHERN TECHNICAL UNIVERSITY TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND AI /KIRKUK
Module Leader	Dr. Essam Rafiq Faiq	**e-mail**	essam_raffik@ntu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	PhD
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval		**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	Mathematics is an important tool for understanding modern and scientific technologies, and the modern world today relies heavily on mathematics. Mathematics is also characterized by multiple benefits, including that it is an intellectual tool, a strong communication method, and it is in itself a way of thinking, through which the capabilities of individuals develop, and it helps us in advanced logical thinking. It also helps the student to understand the laws and issues needed for the purpose of solving simple and complex electrical circuits.
Module Learning Outcomes	1. Learning about the basic Matrix and Determinants 2. Learning the Algebraic functions, natural logarithm, the exponential function,

مخرجات التعلم للمادة الدراسية	trigonometric functions, inverse trigonometric functions and hyperbolic functions. 3. Learning the Derivatives formula and chain rule. 4. Learning the Integration, Indefinite and Definite Integral 5. Learning the Integration method
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: **Part A –** the basic Matrix and Determinants Matrix, properties, and operations, Determinants and properties of determinants Inverse of square matrix by determinants, Solving linear System equations using the inverse of the coefficient matrix and Cramer's rule. [13 hrs] **Part B –** Algebraic functions Review of natural logarithm, the exponential function, trigonometric functions, inverse trigonometric functions and hyperbolic functions. [10 hrs] **Part C –** Derivatives of natural logarithm, the exponential function, trigonometric functions, inverse trigonometric functions and hyperbolic functions. Applications of differentiation. [20 hrs] **Part D:** Review of Integration, Indefinite and Definite Integral, Integration method and Applications of integration, approximation(trapezoidal rule, Simpson's rule) Area between curves [10 hrs] Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in exercises, while improving and expanding their mathematical reasoning skills.

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	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	8	10% (10)	2,6,8,10	LO #1-10
	Assignments	13	10% (10)	Continuous	All
	Projects / Lab.	0	0		
	Report	0	0		
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Matrix, properties, and operations
Week 2	Determinants and properties of determinants Inverse of square matrix by determinants
Week 3	Solving linear System equations using the inverse of the coefficient matrix and Cramer's rule
Week 4	Algebraic functions
Week 5	Review of natural logarithm, the exponential function, trigonometric functions
Week 6	inverse trigonometric functions and hyperbolic functions
Week 7	Derivatives formula and chain rule.
Week 8	Derivatives of natural logarithm, the exponential function, trigonometric functions
Week 9	inverse trigonometric functions and hyperbolic functions.
Week 10	Applications of differentiation.
Week 11	Review of Integration, Indefinite and Definite Integral
Week 12	Integration method
Week 13	Integration method
Week 14	Applications of integration, approximation(trapezoidal rule, Simpson's rule) Area between curves
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Advance Engineering Mathematics, Alan Jeffrey, 2002**	Yes
Recommended Texts	**Calculus I, Paul Dawkins, 2007**	No
Websites	https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx	

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.

DIGITAL LOGIC Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK111	**Digital Logic**	1	4	3	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Ahmed Safaa Salman**
Instructor(s) of the Course Unit	**Ahmed Safaa Salman**

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	**Numbers Systems, Operations, and Codes**: Decimal Numbers, Binary numbers.
2	**Numbers Systems, Operations, and Codes**: Hexadecimal Numbers, Octal numbers.
3	**Numbers Systems, Operations, and Codes**: Data representation (integer and fraction) using different number systems. Conversion Between Different Numbers Systems.
4	**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	**Numbers Systems, Operations, and Codes:** Signed Numbers, Arithmetic Operations with Signed Numbers.
6	**Numbers Systems, Operations, and Codes**: Digital Codes (BCD, Excess-3, Parity, Gray ..... etc.).
7	**Logic Gates:** The Inverter (NOT Gate), The AND Gate, The OR Gate.
8	**Logic Gates:** The NAND Gate, The NOR Gate, The Exclusive-OR Gate and Exclusive-NOR Gate.
9	**Boolean Algebra and Logic Simplification:** Boolean Operations and Expressions.
10	**Boolean Algebra and Logic Simplification:** Laws and Rules of Boolean Algebra.
11	**Boolean Algebra and Logic Simplification** Simplification Using Boolean Algebra. DeMorgan's theorems.
12	**Boolean Algebra and Logic Simplification:** The Karnaugh Map (1, 2 , 3 and 4 variables) , SOP and POS Minimization.
13	**Combinational Logic Analysis:**

	Basic Combinational Logic Circuits. Implementing Combinational Logic.
14	**Combinational Logic Analysis:** Combinational Logic Using NAND and NOR Gates. Logic Circuit Operation with Pulse Waveform Inputs.
15	**Combinational Logic Analysis:** Logic Circuit Operation with Pulse Waveform Inputs.

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 :	**AIK111**	**DIGITAL LOGIC**	
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	NA	NA	NA
Laboratory	14	2	28
Reading	NA	NA	NA
Assignment (Homework)	5	1	5
Project Work	NA	NA	NA
Seminar	1	1	1
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	10	1	10
Final Exam	1	3	3
Preparation for the Final Exam	1	15	15
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	10	10
Short Exam (Quizzes)	4	0.25	1
Preparation for the Short Exam	2	1	2
TOTAL WORKLOAD OF THE COURSE UNIT	**78**	**47**	**125**
Workload (h) / 25			**125÷25**

ECTS Credits allocated for the Course Unit	5

Ministry of Higher Education and
Scientific Research - Iraq
Northern Technical University
Technical Engineering College for Computer and AI/ Kirkuk
Department of Artificial Intelligence

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**DIGITAL LOGIC**	**Module Delivery**	
Module Type	CORE	✓ **Theory** ✓ **Lecture** ✓ **Lab** ✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	AIK111		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	1
Administering Department	DEPARTMENT OF ARTIFICIAL INTELLIGENCE	**College**	Northern Technical University TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND AI/ KIRKUK
Module Leader	Ahmed Safaa Salman	**e-mail**	ahmed.safaa23@ntu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval	15/10/2025	**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	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.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the different number systems. 2. Learning the arithmetic operations related to different number systems. 3. Learning the different logic gates of computer system and their work. 4. Ability to design, simplify and implement different logical and arithmetic circuits that considered the basic of digital system. 5. Ability to design, simplify and implement different sequential circuits, counters and shift registers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part 1 – Numbers Systems, Operations, and Codes Different Number Systems, Data representation (integer and fraction) using different number systems. Conversion Between Different Numbers Systems. Arithmetic operations using different number systems, and Digital Codes (BCD, Parity, Gray, Excess-3 ….. etc.) [14 hrs] • Part 2- Logic Gates The Inverter (NOT Gate), AND Gate, OR Gate, NAND Gate, NOR Gate, the Exclusive-OR Gate and Exclusive-NOR Gates. [12 hrs] • Part 3 Boolean Algebra and Logic Simplification Boolean Operations and Expressions, Laws and Rules of Boolean Algebra, Simplification Using Boolean Algebra, DE Morgan's theorems, The Karnaugh Map (1, 2, 3 and 4 variables), SOP and POS Minimization. [16 hrs] • Part 4 Combinational Logic Analysis Basic Combinational Logic Circuits, Implementing Combinational Logic, Combinational Logic Using NAND and NOR Gates, Logic Circuit Operation with Pulse Waveform Inputs. [10 hrs] • Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	8	10% (10)	4-13	LO #1, 2 - 13
	Assignments	5	10% (10)	2, 5,8,11,13	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	2	10% (10)	9,13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**1- Numbers Systems, Operations, and Codes:** Decimal Numbers, Binary numbers.
Week 2	**1- Numbers Systems, Operations, and Codes**: Hexadecimal Numbers, Octal numbers.
Week 3	**1- Numbers Systems, Operations, and Codes**: Data representation (integer and fraction) using different number systems. Conversion Between Different Numbers Systems.
Week 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.
Week 5	**1- Numbers Systems, Operations, and Codes:** Signed Numbers, Arithmetic Operations with Signed Numbers.
Week 6	**1- Numbers Systems, Operations, and Codes:** Digital Codes (BCD, Excess-3, Parity, Gray ….. etc.).
Week 7	**2- Logic Gates:** The Inverter (NOT Gate), The AND Gate, The OR Gate.
Week 8	**2- Logic Gates:** NAND Gate, NOR Gate, Exclusive-OR Gate and Exclusive-NOR Gates.
Week 9	**3- Boolean Algebra and Logic Simplification**: Boolean Operations and Expressions.
Week10	**3- Boolean Algebra and Logic Simplification:** Laws and Rules of Boolean Algebra.
Week11	**3- Boolean Algebra and Logic Simplification** Simplification Using Boolean Algebra. DeMorgan's theorems.
Week12	**3- Boolean Algebra and Logic Simplification** The Karnaugh Map (1, 2, 3 and 4 variables), SOP and POS Minimization.
Week13	**4- Combinational Logic Analysis:** Basic Combinational Logic Circuits. Implementing Combinational Logic.
Week14	**4- Combinational Logic Analysis:** Combinational Logic Using NAND and NOR Gates. Logic Circuit Operation with Pulse Waveform Inputs.
Week15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to digital laboratory kit operation
Week 2	Lab 2: Logic Gates (AND, OR, NOT, NAND, NOR).

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Education 2015	Yes
Recommended Texts	M. Morris Mano, Michael D. Ciletti, Digital Design, 5th edition, Pearson Education 2013	No
Websites	Digital Systems: From Logic Gates to Processors: https://www.coursera.org/learn/digital-systems	

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.

DIGITAL CIRCUITS DESIGN Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK121	**Digital Circuits Design**	2	2+2	3	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Ahmed Safaa Salman**
Instructor(s) of the Course Unit	**Ahmed Safaa Salman**

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	• To learn the basic techniques and methodologies for designing and analyzing digital circuits such as Adder – subtractor circuits. • To learn the Decoder and Encoder circuits. • To learn the Comparator, Multiplexer and Demultiplexer circuits. • To learn and analysis sequential circuits such as flip-flop circuits and Registers. • To learn the types of counters.
Contents of the Course Unit:	1 – Functions of Combinational Logic. 2 – Latches, Flip-Flops, and Timers. 3 – Counters 4 – Shift Registers

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- Functions of Combinational Logic.** Basic Adders; Half and Full Adders.
2	**1- Functions of Combinational Logic.** Basic Subtractors; Half and Full Subtractors.
3	**1- Functions of Combinational Logic.** Parallel Binary Adders and Subtractors. 1's ,2's Complement Subtractor, 2's Complement Adder-Subtractor, BCD Adder, etc.
4	**1- Functions of Combinational Logic.** Comparators, Code converters.
5	**1- Functions of Combinational Logic.** Decoders, Encoders.
6	**1- Functions of Combinational Logic.** Multiplexers (Data Selectors), Demultiplexer.
7	**2- Latches, Flip-Flops, and Timers.** Latches
8	**2- Latches, Flip-Flops, and Timers.** Edge-Triggered Flip-Flops.
9	**2- Latches, Flip-Flops, and Timers.** Flip-Flop operating (R-S, T, J-K,D)
10	**3- Counters** Synchronous Counters.
11	**3- Counters** Asynchronous Counters.
12	**3- Counters** Design of Counters.
13	**4- Shift Registers** Basic Operations, Serial In/Serial out Shift Registers, Serial In/Parallel out Shift Registers.
14	**4- Shift Registers** Parallel In/Serial Out Shift Registers, Parallel In/parallel Out Shift Registers, Bidirectional Shift Registers.
15	**Final Exam.**

No.	PRACTICAL PART
1	**Lab 1:** Half Binary Adder
2	**Lab 2:** Full Binary Adder
3	**Lab 3**: Half Binary Subtractor
4	**Lab 4:** Full Binary Subtractor
5	**Lab 5:** 2's Complement Adder-Subtractor
6	**Lab 6:** Binary Comparator
7	**Lab 7:** Digital Multiplexer
8	**Lab 8:** Demultiplexer.
9	**Lab 9:** Decoders
10	**Lab 10:** Encoders
11	**Lab 11:** D Flip-Flop
12	**Lab 12:** JK- Flip-Flop
13	**Lab 13:** T- Flip-Flop
14	**Lab 14:** Review

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT:	AIK121 DIGITAL CIRCUITS		
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	NA	NA	NA
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	**14**	**2**	**28**
Reading	6	1	6
Assignment (Homework)	3	2	6
Project Work	3	4	12
Seminar	**1**	**1**	**1**
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	6	2	12
Final Exam	**1**	**3**	**3**
Preparation for the Final Exam	1	12	12
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	8	8
Short Exam (Quizzes)	3	2	2
Preparation for the Short Exam	3	2	6
TOTAL WORKLOAD OF THE COURSE UNIT	**56**	**43**	**125**
Workload (h) / 25			**125÷25**
ECTS Credits allocated for the Course Unit			**5**

Ministry of Higher Education and
Scientific Research - Iraq
Northern Technical University
Technical Engineering College for Computer and Artificial Intelligence /Department of AI Engineering Technology /Kirkuk

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**DIGITAL CIRCUITS DESIGN**	**Module Delivery**	
Module Type	CORE	✓ **Theory** ✓ **Lecture** ✓ **Lab** ✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	AIK121		
ECTS Credits	5		
SWL (hr/sem)	150		
Module Level	1	**Semester of Delivery**	2
Administering Department	Department of Artificial Intelligence	**College**	Northern Technical University Technical Engineering College for Computer and AI/ Kirkuk
Module Leader	Ahmed Safaa	**e-mail**	ahmed.safaa23@ntu.edu.iq
Module Leader's Acad. Title	Assit. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval		**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	**NONE**	**Semester**	1
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. To learn the basic techniques and methodologies for designing and analyzing digital circuits such as Adder – subtractor circuits. 2. To learn the Decoder and Encoder circuits. 3. To learn the Comparator, Multiplexer and Demultiplexer circuits. 4. To learn and analysis sequential circuits such as flip-flop circuits and Registers. 5. To learn the types of counters.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Ability to design Adder and Subtractor circuits. 2. Knowledge of designing encoder and decoder circuits. 3. Knowledge the Comparator, Multiplexer, Demultiplexer and places of use. 4. Learn how to design an asynchronous and synchronous counter.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part 1 – Functions of Combinational Logic. Half, Full and Parallel Binary Adders and Subtractors. 1's and 2's Complement Subtractor, 2's Complement Adder-Subtractor, BCD Adder, etc. Comparators, Decoders, Encoders, Multiplexers, Demultiplexer [14 hrs] • Part 2- Latches, Flip-Flops, and Timers. Latches, Edge-Triggered Flip-Flops. Flip-Flop operating (R-S, T, J-K ,D) [12 hrs] • Part 3 Counters Synchronous Counters, Asynchronous Counters. Design of Counters. [26 hrs] • Part 4 Shift Registers Basic Shift Register Operations: SISO, SIPO, PISO, PIPO, Bidirectional and special Types Shift Register. [10 hrs] • Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	78	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	1- Functions of Combinational Logic. Basic Adders; Half and Full Adders.
Week 2	1- Functions of Combinational Logic. Basic Subtractors; Half and Full Subtractors.
Week 3	1- Functions of Combinational Logic. Parallel Binary Adders and Subtractors. 1's ,2's Complement Subtractor, 2's Complement Adder-Subtractor, BCD Adder, etc.
Week 4	1- Functions of Combinational Logic. Comparators, Code converters.
Week 5	1- Functions of Combinational Logic. Decoders, Encoders.
Week 6	1- Functions of Combinational Logic. Multiplexers (Data Selectors), Demultiplexer.
Week 7	2- Latches, Flip-Flops, and Timers. Latches
Week 8	2- Latches, Flip-Flops, and Timers. Edge-Triggered Flip-Flops.
Week 9	2- Latches, Flip-Flops, and Timers. Flip-Flop operating (R-S, T, J-K ,D)
Week 10	3- Counters Synchronous Counters.
Week 11	3- Counters Asynchronous Counters.
Week 12	3- Counters Design of Counters.
Week 13	4- Shift Registers Basic Shift Register Operations. Serial In/Serial out Shift Registers. Serial In/Parallel out Shift Registers.
Week 14	4- Shift Registers Parallel In/Serial Out Shift Registers. Parallel In/parallel Out Shift Registers. Bidirectional Shift Registers.
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Half Binary Adder
Week 2	Lab 2: Full Binary Adder
Week 3	Lab 3: Half Binary Subtractor
Week 4	Lab 4: Full Binary Subtractor
Week 5	Lab 5: 2's Complement Adder-Subtractor
Week 6	Lab 6: Binary Comparator
Week 7	Lab 7: Digital Multiplexer
Week 8	Lab 8: DeMultiplexer.
Week 9	Lab 9: Decoders
Week 10	Lab 10: Encoders
Week 11	Lab 11: D Flip-Flop
Week 12	Lab 12: JK- Flip-Flop
Week 13	Lab 13: T- Flip-Flop
Week 14	Lab 14: Review

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Education 2015	Yes
Recommended Texts	M. Morris Mano, Michael D. Ciletti, Digital Design, 5th edition, Pearson Education 2013	No
Websites	Digital Systems: From Logic Gates to Processors: https://www.coursera.org/learn/digital-systems	

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.

OBJECTED ORIENTED PROGRAMMING Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK122	**Object Oriented Programming**	2	2+2	3	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Dr. Mohammed Naief Qasim**
Instructor(s) of the Course Unit	

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	Introduce the students with computer programming techniques using C++ language, and how it can be used to solve problems related to their specialization.
Contents of the Course Unit:	To learn the 1- Looping & Arrays 2- Statements & Making Decisions 3- Pointers & Functions. 4- Introduction to OOP concepts: Classes.

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	Arrays (two Dimensional arrays, Arrays as parameters)
2	Arrays (two Dimensional arrays, Arrays as parameters) … part2
3	Character Sequences and String handling.
4	Statements (switch, break, go to)
5	Structure
6	Pointers (Reference operator, dereference operator, Declaring variables of pointer types,)
7	Pointers and arrays, Pointers to pointers, void pointers and Pointers to functions
8	Functions – Basic Concepts
9	Functions (Local and global variables, Arguments passed by value and by reference, Default values in parameters)
10	Functions examples
11	Overloaded functions and Recursive functions.
12	Header and name space
13	Introduction to Classes
14	Introduction to OOP concepts: Classes, Objects, Encapsulation.
15	**Revision**

No.	Practical Part
1	**Lab 1:** two Dimensional arrays … Problem-solving… part1
2	**Lab 2:** two Dimensional arrays ... Problem-solving… part2
3	**Lab 3:** Character and String programs
4	**Lab 4:** Statements (switch, break, go to) …part1
5	**Lab 5:** Statements (switch, break, go to) …part2
6	**Lab 6:** how implement a Structure… part2
7	**Lab 7:** Pointers and arrays… part1
8	**Lab 8:** Pointers and arrays… part2
9	**Lab 9:** Functions...part1
10	**Lab 10:** Functions...part2
11	**Lab 11:** Functions...part3
12	**Lab 12:** Header and name space programs
13	**Lab 13:** Introduction to Classes programs
14	**Lab 14**: Review

Workload & ECTS Credits of The Course Unit :	**AIK122** Objected Oriented Programming		
Workload For Learning & Teaching Activities			
Type of the Learning Activites	Learning Activities (# of week)	Duration (hours, h)	Workload (h)
Lecture & In-Class Activities	**15**	**2**	**30**
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)	2	2	4
Project Work	NA	NA	NA
Seminar	**1**	**3**	**3**
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	6	3	18
Final Exam	1	3	3
Preparation for the Final Exam	1	14	14
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	9	9
Short Exam (Quizzes)	4		
Preparation for the Short Exam	4	3	12
Total Workload of the Course Unit	**51**	**43**	**125**
Workload (h) / 25			**125÷25**
ECTS Credits allocated for the Course Unit			**5**

Ministry of Higher Education and
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MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**COMPUTER PROGRAMMING**	**Module Delivery**	
Module Type	CORE	✓ **Theory** ✓ **Lecture** ✓ **Lab** ✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	AIK122		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	2
Administering Department	**DEPARTMENT OF ARTIFICIAL INTELLIGENCE**	**College**	**NORTHERN TECHNICAL UNIVERSITY/ TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND AI / KIRKUK**
Module Leader	Dr. Mohammed Naief Qasim	**e-mail**	mohammed.naife@ntu.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	PhD
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval		**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	Introduce the students with computer programming techniques using C++ language, and how it can be used to solve problems related to their specialization.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes for a module on computer programming in C++ can vary depending on the specific objectives of the course or program: 1-Understanding the basics of C++: Students should be able to comprehend the fundamental concepts of C++ programming, including syntax, data types, variables, operators, control structures, and functions. 2-Proficiency in C++ programming: Students should develop the skills required to write, compile, and execute C++ programs. They should be able to implement various programming constructs and algorithms using C++. 3-Problem-solving and algorithm design: Students should gain the ability to analyze problems and design efficient algorithms to solve them using C++. They should be

	able to break down complex problems into smaller, manageable tasks and implement them in code. 4-Debugging and error handling: Students should develop skills in debugging C++ programs and identifying and fixing errors. They should learn techniques for error handling, exception handling, and writing robust code. 5-Code optimization and efficiency: Students should be able to optimize their C++ code for efficiency, considering factors such as algorithm complexity, data structures, and code organization. They should learn about performance analysis and profiling tools to identify bottlenecks in code. 6-Software development practices: Students should understand and apply good software development practices, including code documentation, version control, and testing. They should learn how to write readable and maintainable code.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A-Arrays & Pointer. [14 hrs] • Part B- Statement & Making Decisions [12 hrs] • Part C- Functions [16 hrs] • Part D- Functions [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 to enhance comprehension and mastery of the subject. Here are some effective learning and teaching strategies for C++ programming: Hands-on coding, Step-by-step approach, Visual aids and diagrams, Active learning, Real-world examples and projects , Online resources and coding platforms , Code documentation 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	2, 4, 9, 11	LO #1, 2, 10 and 12
	Assignments	2	4% (4)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	15	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
	Seminar	1	6% (6)	5	LO # 1-4
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Arrays (two Dimensional arrays, Arrays as parameters)
Week 2	Arrays (two Dimensional arrays, Arrays as parameters) … part2
Week 3	Character Sequences and String handling.
Week 4	Statements (switch, break, go to)
Week 5	Structure
Week 6	Pointers (Reference operator, dereference operator, Declaring variables of pointer types,)
Week 7	Pointers and arrays, Pointers to pointers, void pointers and Pointers to functions
Week 8	Functions – Basic Concepts
Week 9	Functions (Local and global variables, Arguments passed by value and by reference, Default values in parameters)
Week 10	Functions examples
Week 11	Overloaded functions and Recursive functions.
Week 12	Header and name space
Week 13	Introduction to Classes
Week 14	Introduction to OOP concepts: Classes, Objects, Encapsulation.
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: two Dimensional arrays … Problem-solving… part1
Week 2	Lab 2: two Dimensional arrays ... Problem-solving… part2
Week 3	Lab 3: Character and String programs
Week 4	Lab 4: Statements (switch, break, go to)…part1
Week 5	Lab 5: Statements (switch, break, go to)…part2
Week 6	Lab 6: how implement a Structure… part2
Week 7	Lab 7: Pointers and arrays… part1
Week 8	Lab 8: Pointers and arrays… part2
Week 9	Lab 9: Functions...part1
Week 10	Lab 10: Functions...part2
Week 11	Lab 11: Functions...part3

Week 12	Lab 12: Header and name space programs
Week 13	Lab 13: Introduction to Classes programs
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.

ENGINEERING MATHEMATICS Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T)	CREDIT	ECTS CREDIT
AIK123	**Engineering Mathematics**	2	3	3	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Dr. Essam Rafiq Faiq**
Instructor(s) of the Course Unit	**Dr. Essam Rafiq Faiq**

OBJECTIVES AND CONTENTS	introduce students to mathematics through the laws and issues necessary for the purpose of assisting them in their studies in their field of specialization.
Objectives of the Course Unit:	To learn the
Contents of the Course Unit:	1- Complex numbers 2- Multivariable functions and partial derivatives 3- Vector and analytic geometry in space 4- Vector valued functions 5- Multiple Integrals

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	Complex numbers in Cartesian coordinates and polar from.
2	linear algebra for complex number in polar and Cartesian Euler's formula.
3	DeMoivre's theorem to find powers and the nth roots of given complex numbers
4	Functions of several variables.
5	Partial differentiation and the chain rule.
6	Functions of a complex variable, Cauchy-Riemann equations.
7	Cartesian coordinates and vectors in space, Dot product and Cross product.
8	Lines and planes in space, Tangent and normal in the plane.
9	The two-dimensional Coordinate system, The three dimensional Coordinate.
10	Directional derivatives, Gradient vectors.
11	Divergence, curl and the Laplacian.
12	Double Integral in rectangular and polar form, Areas and volumes.
13	Triple integrals in rectangular coordinates.
14	Applications (Surface Area, Green's theorem and Stokes' theorem).
15	**Final Exam**

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT :	AIK123	ENGINEERING MATHEMATICS	
WORKLOAD FOR LEARNING & TEACHING ACTIVITIES			
TYPE OF THE LEARNING ACTIVATES	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	**73**	**54**	**125**
Workload (h) / 25			**125÷25**
ECTS Credits allocated for the Course Unit			**5**

Ministry of Higher Education and
Scientific Research - Iraq
Northern Technical University
Technical Engineering College for Computer and Artificial
Intelligence /Department of AI Engineering Technology /Kirkuk

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**ENGINEERING MATHEMATICS**	**Module Delivery**	
Module Type	BASIC	✓ **Theory** ✓ **Lecture** **Lab** ✓ **Tutorial** **Practical** ✓ **Seminar**	
Module Code	AIK123		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	2
Administering Department	**DEPARTMENT OF ARTIFICIAL INTELLIGENCE**	**College**	**NORTHERN TECHNICAL UNIVERSITY ENGINEERING TECHNICAL COLLEGE/KIRKUK**
Module Leader	Dr. Essam Rafiq Faiq	**e-mail**	essam_raffik@ntu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	PhD
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval		**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	Mathematics is an important tool for understanding modern and scientific technologies, and the modern world today relies heavily on mathematics. Mathematics is also characterized by multiple benefits, including that it is an intellectual tool, a strong communication method, and it is in itself a way of thinking, through which the capabilities of individuals develop, and it helps us in advanced logical thinking. It also Introduce students to mathematics through the laws and issues necessary for the purpose of assisting them in their studies in their field of specialization .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the complex numbers. 2. Learning the Functions of several variables. 3. Learning the Lines and planes in space, Tangent and normal in the plane 4. Learning the Triple integrals in rectangular coordinates 5. Double Integral in rectangular and polar form, Areas and volumes 6. Applications (Surface Area, Green's theorem and Stokes' theorem
Indicative	Indicative content includes the following:

Contents المحتويات الإرشادية	❖ Complex Numbers– For most students the assumptions I've made above about their exposure to complex numbers is the extent of their exposure. Problems tend to arise however because most instructors seem to assume that either students will see beyond this exposure in some later class or have already seen beyond this in some earlier class. Students are then suddenly expected to know more than basic arithmetic of complex numbers but often haven't actually seen it anywhere and have to quickly pick it up on their own in order to survive in the class. [13 hrs] ❖ Vector Fields – In this section we introduce the concept of a vector field and give several examples of graphing them. We also revisit the gradient that we first saw a few chapters ago. Line Integrals – Part I – In this section we will start off with a quick review of parameterizing curves. This is a skill that will be required in a great many of the line integrals we evaluate and so needs to be understood. We will then formally define the first kind of line integral we will be looking at : line integrals with respect to arc length. Line Integrals – Part II – In this section we will continue looking at line integrals and define the second kind of line integral we'll be looking at : line integrals with respect to x, y, and/or z. We also introduce an alternate form of notation for this kind of line integral that will be useful on occasion. Line Integrals of Vector Fields – In this section we will define the third type of line integrals we'll be looking at : line integrals of vector fields. We will also see that this particular kind of line integral is related to special cases of the line integrals with respect to x, y and z. [20 hrs] ❖ Part D: Multiple Integrals - In this chapter will be looking at double integrals, i.e. integrating functions of two variables in which the independent variables are from two dimensional regions, and triple integrals, i.e. integrating functions of three variables in which the independent variables are from three dimensional regions. Included will be double integrals in polar coordinates and triple integrals in cylindrical and spherical coordinates and more generally change in variables in double and triple integrals. [20 hrs] ❖ Revision problem classes. [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in exercises, while improving and expanding their mathematical reasoning skills.

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	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	64	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (25)	5, 7, 9, 11	LO #1, 2, 10 and 11
	Assignments	8	16% (10)	Continuous	All
	Projects / Lab.	0	0		
	Report	1	4%		
Summative assessment	Midterm Exam	2 hr	10% (20)	7	LO # 1-7
	Final Exam	3 hr	50% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	COMPLEX NUMBERS IN CARTESIAN COORDINATES AND POLAR FROM
Week 2	LINEAR ALGEBRA FOR COMPLEX NUMBER IN POLAR AND CARTESIAN EULER'S FORMULA.
Week 3	DEMOIVRE'S THEOREM TO FIND POWERS AND THE NTH ROOTS OF GIVEN COMPLEX NUMBERS
Week 4	Functions of several variables
Week 5	PARTIAL DIFFERENTIATION AND THE CHAIN RULE
Week 6	FUNCTIONS OF A COMPLEX VARIABLE, CAUCHY-RIEMANN EQUATIONS
Week 7	Cartesian coordinates and vectors in space, Dot product and Cross product
Week 8	LINES AND PLANES IN SPACE, TANGENT AND NORMAL IN THE PLANE
Week 9	THE TWO-DIMENSIONAL COORDINATE SYSTEM, THE THREE DIMENSIONAL COORDINATE .
Week 10	Directional derivatives, Gradient vectors
Week 11	Divergence, curl and the laplacian
Week 12	Double Integral in rectangular and polar form, Areas and volumes
Week 13	Triple integrals in rectangular coordinates
Week 14	APPLICATIONS (SURFACE AREA, GREEN'S THEOREM AND STOKES' THEOREM)
Week 15	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Advance Engineering Mathematics, Alan Jeffrey, 2002**	Yes
Recommended Texts	**Calculus II &Calculus III, Paul Dawkins, 2007**	No
Websites	https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx	

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.

AC CIRCUITS ANALYSIS Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK124	**AC Circuit Analysis**	2	2+2	3	5

GENERAL INFORMATION	
Language of Instruction:	**English**
Level of the Course Unit:	**Bachelor's Degree**
Type of the Course:	**Compulsory**
Mode of Delivery of the Course Unit	**Face to Face**
Coordinator of the Course Unit	**Dr. Zaid Ahmed Hamid**
Instructor(s) of the Course Unit	**Dr. Zaid Ahmed Hamid**

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	• To teach the fundamental concept of AC single & 3-phase electrical circuits. • To teach fundamentals of Electric Circuits, their components and the mathematical Tools used to represent and analyze AC electrical circuits including resistors, capacitors, and inductors, dependent and independent sources.
Contents of the Course Unit:	1 – Inductance & Capacitance in Electric circuits. 2 – Alternating Quantities. 3 – Single-phase AC Circuits. 4 – Power in AC Circuits. 5 – Three-Phase Circuit 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- 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 and parallel)
2	**2- Alternating Quantities.** Ac systems, waveforms, terms and definitions.
3	**2- Alternating Quantities.** Average and R.M.S values of current and voltage.
4	**2- Alternating Quantities.** Phasor diagram
5	**3- Single - phase of AC Circuits.** AC in resistive circuits, current and voltage in inductive circuits, current and voltage in capacitive circuits.
6	**3- Single - phase of AC Circuits.** Concept of complex impedance and admittance, AC series and parallel circuits.
7	**3- Single - phase of AC Circuits.** RL , RC and RLC circuit analysis and phasor representation.
8	**4- Power in AC circuits.** Power in resistive circuits, power in inductive and capacitive circuits, power in circuit with resistance and reactance.
9	**4- Power in AC circuits.** Power factor, its practical importance, improvement of power factor, measurement of power in a single – phase AC circuits.
10	**5- Three – phase circuit analysis.** Basic concept and advantages of three – phase circuit.
11	**5- Three – phase circuit analysis.** Phasor representation of star and delta connection.
12	**5- Three – phase circuit analysis.** Phase and line quantities.
13	**5- Three – phase circuit analysis.** Voltage and current computation in 3-phase balance and unbalance circuits.
14	**5- Three – phase circuit analysis.** Real and Reactive power computation, measurement of power and power factor in 3-phase system.
15	**Final Exam.**

No.	PRACTICAL PART
1	**Lab 1:** Measurement amplitude, frequency and time with oscilloscope using hardware and digital simulation.
	Lab 2: Examine phase relation in RL & RC circuit using hardware and digital simulation.
2	**Lab 3:** Calculate & verify average and RMS value,
3	**Lab 4**: Impedance of series RL and RC circuit using digital simulation.
4	**Lab 5:** Impedance of series RLC circuit using digital simulation.
5	**Lab 6:** Determination of average value, RMS value, form factor, peak factor of sinusoidal wave using digital simulation.
6	**Lab 7:** Measure currents and voltages in three-phase balanced AC circuits
7	**Lab 8:** Prove Y-Δ transformation,
	Lab 9: Exercise on phasor diagrams for three-phase circuits.
8	**Lab 10:** Measurement of voltage, current& power in a three-phase circuit.
9	**Lab 11:** Ohm's LAW, KVL AND KCL in AC circuits using digital simulation.
10	**Lab 12:** Determination of mesh currents in AC circuits using digital simulation.
11	**Lab 13:** Measurement of nodal voltages in AC circuits using digital simulation.
14	**Lab 14:** Review

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT :	**AIK125**	**AC CIRCUIT ANALYSIS**	
WORKLOAD FOR LEARNING & TEACHING ACTIVITIES			
TYPE OF THE LEARNING ACTIVATES	LEARNING ACTIVITIES (# OF WEEK)	DURATION (HOURS, H)	WORKLOAD (H)
Lecture & In-Class Activities	15	2	30
Preliminary & Further Study	2	2	4
Land Surveying	NA	NA	NA
Group Work	NA	NA	NA
Laboratory	14	2	28
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	2	2	4
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	6	2	12
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)	3	0.5	1.5
Preparation for the Short Exam	3	1.5	4.5
TOTAL WORKLOAD OF THE COURSE UNIT	**53**	**51**	**125**
Workload (h) / 25			**125÷25**
ECTS Credits allocated for the Course Unit			**5**

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MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**AC CIRCUIT ANALYSIS**	**Module Delivery**	
Module Type	CORE	✓ **Theory** ✓ **Lecture** ✓ **Lab** ✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	**AIK124**		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	2
Administering Department	**DEPARTMENT OF ARTIFICIAL INTELLIGENCE**	**College**	**NORTHERN TECHNICAL UNIVERSITY/ TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND ARTIFICIAL INTELLIGENCE/KIRKUK**
Module Leader	Dr. Zaid Ahmed Hamid	**e-mail**	Zaid.aljawary@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		**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**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 (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	Having successfully completed the course, students will be able to: 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. Laboratory Skills: Students will develop practical skills in using circuit simulation software and laboratory equipment to design, analyze, and verify the performance of AC circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – Inductance & Capacitance in Electric circuits. 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] • Part B Alternating Quantities. Ac systems, waveforms, terms and definitions. Average and R.M.S values of current and voltage. [10 hrs] • Part C Single - phase of AC Circuits. 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] • Part D Power in AC circuits. 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] • Part E Three – phase circuit analysis. 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	11-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	58	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	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 and 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 capacitive 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 resistance and reactance.
Week 9	4- **Power in AC circuits.** Power factor, its practical importance, improvement of power factor, measurement of power in a 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	
	Material Covered
Week 1	Lab 1: Measurement amplitude, frequency and time with oscilloscope using hardware and digital 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 using 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 (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.

ENGINEERING DRAWING Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
AIK125	**Engineering Drawing**	1	3	2	3

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	**Nawal Kamal**
Instructor(s) of the Course Unit	**Nawal Kamal**

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 projections (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 projections 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 :	**AIK125**	**ENGINEERING DRAWING**	
WORKLOAD FOR LEARNING & TEACHING ACTIVITIES			
TYPE OF THE LEARNING ACTIVITIES	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**

Ministry of Higher Education and
Scientific Research - Iraq
Northern Technical University
Technical Engineering College for Computer and Artificial Intelligence /Department of AI Engineering Technology /Kirkuk

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ENGINEERING DRAWING	**Module Delivery**	
Module Type	CORE	✓ **Theory**	
Module Code	AIK125	**Lecture**	
ECTS Credits	3	✓ **Lab**	
SWL (hr/sem)	75	**Tutorial**	
		✓ **Practical**	
		Seminar	

Module Level	1	**Semester of Delivery**	1
Administering Department	**Department of Artificial Intelligence**	**College**	**NORTHERN TECHNICAL UNIVERSITY/ Technical Engineering College for computer and Artificial Intelligence/Kirkuk**
Module Leader	Nawal Kamal Khoursheed	**e-mail**	nawalkamal@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	None	**e-mail**	
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval		**Version Number**	1.0

Relation with Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims
أهداف المادة الدراسية

1. Define 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
4. Decomposes 3D shapes into binary projections

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning types of engineering lines and their uses and how to draw 2. Drawing geometric shapes such as square, rectangular, parallelogram and circle 3. Learning dimensions in engineering drawing and how to put them on the drawing 4. Learning Fundamentals of projection in engineering drawing 5. Ability of drawing an anthropomorphic shape
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – AutoCAD interface Setup, save, limits, grid, object snap and ortho mode [3 hrs.] • Part B- Coordinate method Direct distance method, Absolute coordinate, Relative coordinate, Polar coordinate[3hrs] • Part C Draw menu Line, polyline, rectangle, arc, circle, ellipse and hatch [12hrs] • Part D Modify and Properties menu Copy, move, offset, erase, extend, trim and array, line shape and line size [9 hrs.] • Part D Projection Front, side and top ortho projections [6 hrs.] • Part E stereoscopic shapes Method for drawing stereoscopic shapes[6hrs] • Revision problem classes [8 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem)	75		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	3	5% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	5% (10)	Continuous	All
	Report	0	0% (0)	0	0
Summative assessment	Midterm Exam	2 hr	30% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	-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.
Week 2	Coordinate method (Direct distance method, Absolute coordinate, Relative coordinate, Polar coordinate)
Week 3	Draw menu (line, poly line, polygon, rectangle).
Week 4	Drawing objects of pentagonal, hexagonal and octagonal shapes
Week 5	Draw menu arc, circle, ellipse, point and text).
Week 6	Draw several shapes containing circles and texts
Week 7	Modify menu (erase, copy, mirror, move offset)
Week 8	Modify menu (rotate, trim, extend, explode)
Week 9	Properties and Layers in AutoCAD and dimension
Week 10	Orthographic projection
Week 11	Draw the three projections (front, side and top) of some shapes
Week 12	Basics of drawing stereoscopic shapes
Week 13	Draw stereoscopic shape
Week 14	Printing the graphic
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Definition of AutoCAD interface
Week 2	**Lab 2**: Applications of Coordinate method

Week 3	Lab 3: Draw figures of lines, polygons and rectangle
Week 4	Lab 4: Drawing objects of pentagonal, hexagonal and octagonal shapes
Week 5	Lab 5: Drawing figures of circles and ellipse
Week 6	Lab 6: Draw several shapes containing circles and texts
Week 7	Lab 7: Applications of some order in modify menu
Week 8	Lab 8: Applications of other order in modify menu
Week 9	Lab 9: Practicing of using layers
Week 10	Lab 10: Practicing of projection of simple figure
Week 11	Lab 11: Draw three projections of figure
Week 12	Lab 12: Practicing of drawing stereoscopic shapes
Week 13	Lab 13: Draw stereoscopic shape
Week 14	Lab 14: Practicing of Printing the graphic

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	AutoCAD 2017 2D Fundamentals Randy H. Shih ® Tutorial First Level by Randy H. Shih	No
Recommended Texts	Introduction to AutoCAD 2011 2D and 3D Design, Alf Yarwood	No
Websites	HTTPS://YOUTU.BE/XFO8VQT731M **Introduction to AutoCad 2017 Tutorial series**	

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.

PHYSICS Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
CAIK100	**Physics**	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	**Swash Sami Mohammed**
Instructor(s) of the Course Unit	**Swash Sami Mohammed**

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	The objectives of the subject of physics in university and college include the following: 1- It aims to provide students with a solid foundation in the basic principles and concepts of electrical and electronic physics. 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.
Contents of the Course Unit:	**Indicative content includes the following.** **Part A –** * Introduction to materials science and engineering, Energy levels, atomic structure and Polymer **[**12 **hrs.]** * Electrical source voltage and current, Types of impedances, their characteristics and methods of connection **[12hrs]** * Semiconductors Fundamentals, Extrinsic Semiconductors **[8 hrs.]** **Part B-** * The P-N Junction, The P-N Junction diode, diode application **[**10 **hrs.]** * Type of diode (Zener diode, Light Emitting Diodes, Tunnel Diode) **[10 hrs.]** * Transistor, Bipolar transistor biasing, field effect transistor FET **[**10 **hrs.]**

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:
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	Electrical 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	Transistor, Bipolar, transistor biasing, field effect transistor FET.
Week 14	Review
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)	3	1	3
Project Work	NA	NA	NA
Seminar	2	1	2
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	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**

Ministry of Higher Education and
Scientific Research - Iraq
Northern Technical University
Technical Engineering College for Computer and AI/ Kirkuk
Department of Artificial Intelligence

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	PHYSICS	**Module Delivery**	
Module Type	SUPPLEMENT	✓ **Theory** ✓ **Lecture** **Lab** **Tutorial** **Practical** ✓ **Seminar**	
Module Code	CAIK100		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	**Semester of Delivery**	2
Administering Department	DEPARTMENT OF ARTIFICIAL INTELLIGENCE	**College**	NORTHERN TECHNICAL UNIVERSITY TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND AI/ KIRKUK
Module Leader	Sawash Sami Mohammed	**e-mail**	swash.sami23@ntu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	MsC
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval		**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	DC Circuit Analysis	**Semester**	1
Co-requisites module	AC Circuit Analysis	**Semester**	2

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 physics in university and college include the following: 1- It aims to provide students with a solid foundation in the basic principles and concepts of electrical and electronic physics. 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.

	3- Preparation for advanced studies: Electrical and electronic physics serves as a basis for more advanced courses in electrical engineering or related fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understanding of Basic Principles: Gain a comprehensive understanding of the basic principles and laws that govern electrical and electronic phenomena of 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. 3- Familiarity with electrical and electronic components and devices and develop a working knowledge of electrical components and devices commonly used in electrical engineering. 4- 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.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **Part A –** * Introduction to materials science and engineering, Energy levels, atomic structure and Polymer **[**12 **hrs.]** * Electrical source voltage and current, Types of impedances, their characteristics and methods of connection **[12hrs]** * Semiconductors Fundamentals, Extrinsic Semiconductors **[8 hrs.]** **Part B-** * The P-N Junction, The P-N Junction diode, diode application **[**10 **hrs.]** * Type of diode (Zener diode, Light Emitting Diodes, Tunnel Diode) **[10 hrs.]** * Transistor, Bipolar transistor biasing, field effect transistor FET **[**10 **hrs.]**

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.12
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	3, 7, 11, 14	LO #1, 2, 10 and 11
	Assignments	0	0	0	0
	Projects / Lab.	0	0	0	0
	Report	4	10% (10)	5, 6, 8, 10, 13	LO # 5, 8 and 12
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	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	Electrical 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	Transistor, Bipolar, transistor biasing, field effect transistor FET.
Week 14	Review
Week 15	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		No
Recommended Texts	Electronic devices - Thomas L. Floyd, -Electronic devices and Circuits - Jimme J. Cathy- second edition	
Websites		

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.

COMPUTER Programme Course Description

CODE	NAME OF THE COURSE UNIT	SEMESTER	IN-CLASS HOURS (T+P)	CREDIT	ECTS CREDIT
NTU102	**Computer**	1	2	2	3

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	
Instructor(s) of the Course Unit	

OBJECTIVES AND CONTENTS	
Objectives of the Course Unit:	Introduce the student to general computer parts.
Contents of the Course Unit:	Computer principles, Computer parts and Windows

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:
1st	Introducing to the Computer System Including: What is Computer?, Computer System, Functions of Computer Input Storage Process & Output, Classification of Computers and Computer Units
2nd, 3rd, 4th	Explaining Types of Computer Keyboards and Types of Keyboard Keys
5th	Explaining Types of Computer Mice and Mouse Functions
6th	Explaining Different Plugs and Ports for Some Computer Parts
7th	Illustrating Computer Discs and Drives
8th	Illustrating RAM, Non-Volatile and Cache Memories
9th, 10th, 11th	Demonstrating Computer Hardware Parts and Definitions
12th, 13th	Presenting Windows, Windows Desktop and Windows Taskbar
14th, 15th	Illustrating Start Menu and Windows Accessories
15th	**Final Exam**

Week	PRACTICAL PART
1st	Introducing to the Computer System Including: What is Computer?, Computer System, Functions of Computer Input Storage Process & Output, Classification of Computers and Computer Units
2nd, 3rd, 4th	Explaining Types of Computer Keyboards and Types of Keyboard Keys
5th	Explaining Types of Computer Mice and Mouse Functions
6th, 7th	Explaining Different Plugs and Ports for Some Computer Parts, and Illustrating Computer Discs and Drives
8th	Illustrating RAM, Non-Volatile and Cache Memories
9th, 10th, 11th, 12th	Demonstrating Computer Hardware Parts and Definitions, and Presenting Windows, Windows Desktop and Windows Taskbar
13th, 14th	Illustrating Start Menu and Windows Accessories
15th	**Final Exam**

WORKLOAD & ECTS CREDITS OF THE COURSE UNIT: NTU102 COMPUTER			
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	15	1	15
Land Surveying	NA	NA	NA

Group Work	NA	NA	NA
Laboratory	NA	NA	NA
Reading	NA	NA	NA
Assignment (Homework)	4	3	12
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	4	4
Preparation for the Final Exam	1	6	6
Mid-Term Exam	1	2	2
Preparation for the Mid-Term Exam	1	4	4
Short Exam (Quizzes)	1	2	2
Preparation for the Short Exam	NA	NA	NA
TOTAL WORKLOAD OF THE COURSE UNIT	**39**	**24**	**75**
Workload (h) / 25			**75÷25**
ECTS Credits allocated for the Course Unit			**3**

Ministry of Higher Education and
Scientific Research - Iraq
Northern Technical University
Technical Engineering College for Computer and Artificial Intelligence /Department of AI Engineering Technology

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	COMPUTER	**Module Delivery**	
Module Type	SUPPORTED	✓ **Theory** ✓ **Lecture** **Lab** **Tutorial** ✓ **Practical** **Seminar**	
Module Code	NTU102		
ECTS Credits	3		
SWL (hr/sem)	30		
Module Level	1	**Semester of Delivery**	2
Administering Department	DEPARTMENT OF ARTIFICIAL INTELLIGENCE	**College**	NORTHERN TECHNICAL UNIVERSITY TECHNICAL ENGINEERING COLLEGE FOR COMPUTER AND ARTIFICIAL INTELLIGENCE/KIRKUK
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval	/ /	**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. Studying computer principles. 2. Defining keyboards and mice. 3. Presenting principles of memories. 4. Explaining disc drives. 5. Explaining principles of windows. 6. Illustrating accessories of windows.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Abilities to recognize different computer hardware parts. 2. Defining various types of keyboards and mice. 3. Getting knowledge about computer memories and drives. 4. Getting knowledge about windows. 5. Presenting different windows accessories.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Computer types of: digital, analogues and hybrid. Different memory types of: RAM, ROM, PROM, EPROM and EEPROM. Different drives types of: magnetic and optical. Windows facilities of: Notepad, Wordpad, Paint, Accessories and others.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Strategies that will be adopted for delivering this module are theoretical lectures, practical experiments, home works and exams. This will be achieved through classes, interactive tutorials and by considering practical experiments.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	32
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	0	0% (0)	N/A	N/A
	Assignments (Homework)	5	15% (15)	10	LO #1 - #10
	Projects / Lab.	15	15% (15)	Continuous	All
	Report	0	0% (0)	N/A	N/A
Summative assessment	**Midterm Exam**	2hr	30% (30)	10	LO #1 - #10
	Final Exam	3hr	40% (40)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
1st	**Introducing to the Computer System Including: What is Computer?, Computer System, Functions of Computer Input Storage Process & Output, Classification of Computers and Computer Units**
2nd, 3rd, 4th	**Explaining Types of Computer Keyboards and Types of Keyboard Keys**
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7th	**Illustrating Computer Discs and Drives**
8th	**Illustrating RAM, Non-Volatile and Cache Memories**
9th, 10th, 11th	**Demonstrating Computer Hardware Parts and Definitions**
12th, 13th	**Presenting Windows, Windows Desktop and Windows Taskbar**
14th	**Illustrating Start Menu and Windows Accessories**
15th	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
1st	**Introducing to the Computer System Including: What is Computer?, Computer System, Functions of Computer Input Storage Process & Output, Classification of Computers and Computer Units**
2nd, 3rd, 4th	**Explaining Types of Computer Keyboards and Types of Keyboard Keys**
5th	**Explaining Types of Computer Mice and Mouse Functions**
6th, 7th	**Explaining Different Plugs and Ports for Some Computer Parts, and Illustrating Computer Discs and Drives**
8th	**Illustrating RAM, Non-Volatile and Cache Memories**
9th, 10th, 11th, 12th	**Demonstrating Computer Hardware Parts and Definitions, and Presenting Windows, Windows Desktop and Windows Taskbar**
13th, 14th	**Illustrating Start Menu and Windows Accessories**
15th	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	[1] Umar Farooq, "What is Computer - Definition & Basic Concept of Computer", Study Lecture Notes, 2016. [2] University Information Technology Services, "Microsoft Windows 10, Getting Started Guide", Kennesaw State University – UITS, 2016.	In the internet
Recommended Texts	Cre8te Opportunities, "Introduction To Computers (Windows 10)", Digital Skills Academy, 2016.	In the internet
Websites	[1] http://www.studylecturenotes.com/computer-science/what-is-computer-definition-basic-concept-of-computer	

[2] http://ergonomictrends.com/different-types-of-computer-keyboards/
[3] UKEssays, "Wireless Mouse: History and Types", 2018. [Online]. Available: https://www.ukessays.com/essays/computer-science/wireless-mouse-history-types-5302.php?vref=1.
[4] https://searchstorage.techtarget.com/definition/RAM-random-access-memory
[5] https://tldp.org/HOWTO/Network-boot-HOWTO/a610.html#:~:text=PROM%3A%20Pronounced%20prom%2C%20an%20acronym,the%20computer%20is%20turned%20off.

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