

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department**



Academic Program and Course Description Guide

2025

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

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

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

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

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Al-Nahrain University

Faculty/Institute: College of Information Engineering

Scientific Department: Department of Computer Networks

Academic or Professional Program Name: Bachelor of Computer Networks Engineering

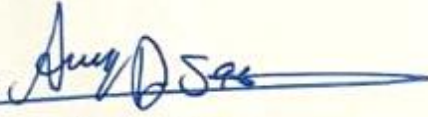
Final Certificate Name: BSc. In Computer Networks Engineering

Academic System: Semester Based

Description Preparation Date: 24\4\2025

File Completion Date: 24\6\2025

Signature:



Head of Department Name:

Assist. Prof. Dr. Ammar D. Jasim

Date: 24\6\2025

Signature:



Scientific Associate Name:

Assist. Prof. Dr. Mohammed E.
Abdulsatter

Date: 24\6\2025

The file is checked by:

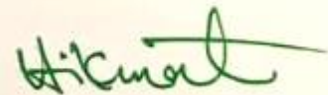
Dr. Mohammed A. Jabbar

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 24. 6. 2025

Signature:



Approval of the Dean

Prof. Dr. Hikmat N. Abdullah

1. Program Vision

To be a realistic and distinguished program in Computer Networks engineering in Baghdad and the region that is recognized for high-quality Computer Networks engineers.

2. Program Mission

1. Productive and practitioner Engineers.
2. Professional Engineers capable of solving the realistic projects who apply technological solutions to business needs.
3. Researchers that contribute to the development and innovation of the computer networking fields.
4. Prepared for both technical (design ability, laboratory experiences, use of engineering tools) and non-technical (teamwork, communication) elements that support economic and social development of the local community.
5. Learners who can always improve the professional knowledge.

6. Program Objectives

- Mobile Operator companies
- Telecommunications and Networking companies
- Government organizations datacenters
- Internet Service Providers
- Network Academic Institutes

7. Program Accreditation

Not Available

8. Other external influences

Ministry of Higher Education and Scientific Research

9. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	9	16	11.76%	
College Requirements	8	24	17.65%	
Department Requirements	30	96	70.59%	
Summer Training	Third year summer			
Other				

* This can include notes whether the course is basic or optional.

10. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2024-2025\ Frist Level	ENLA130	English Language I	2	
	CALC101	Calculus I	3	
	PHYS102	Physics	2	2
	BIOL103	Biology	3	
	ITFN104	IT Fundamentals	2	2
	EDAC105	Engineering Drawing-CAD	2	2
	HURI110	Human Rights	1	
	ARLA120	Arabic Language	1	
	CALC150	Calculus II	3	
	CFPR151	Computer Fundamentals and Programming	2	2
	LODS152	Logic Design	2	2
	ELCA153	Electrical Circuits Analysis	2	2
	FNET154	Fundamentals of Networks	2	2
2024-2025\ Second Level	ENGL200	English Language II	2	
	EGMM201	Engineering Mathematics I	3	
	PBST202	Probability and Statistics	3	
	ELPH203	Electronic Physics	2	2
	OOPJ204	Object Oriented Programming -Java	2	2
	WEBP205	Web programming	2	2
	PRMG255	Principles of Management	2	
	EGMM251	Engineering Mathematics II	3	
	SGAN252	Signal Analysis	2	2
	DSDD253	Digital System Design	2	2
	INCO254	Information Theory and Coding	3	
	DDBB259	Database	2	2
DEMO300	Democracy	2		

2024-2025\ Third Level	NUMD301	Numerical Methods	2	2
	CNET302	Computer Networks	2	2
	COMM303	Data Communications	2	2
	OSYS304	Operating Systems	2	2
	AIN307	Artificial Intelligence	2	2
	ENGL350	English Language III	2	
	CSMP351	Computer Systems and Microprocessors	2	2
	NETP352	Networks Protocols	2	2
	NTPG353	Networks Programming	2	2
	QUEU354	Queuing Theory	2	2
	SANN356	Storage Area Networks	3	
2024-2025\ Fourth Level	PRET400	Professional Ethics	2	
	GRPR401	Graduation Project I	1	2
	WMNE402	Wireless and Mobile Networks	2	2
	NSEC403	Networks Security	3	2
	CLCP405	Cloud Computing	2	2
	MAPP407	Mobile Applications	3	
	ENGL450	English Language IV	2	
	GRPR451	Graduation Project II	1	2
	MNTN452	Modern Networks Technologies	3	
	NMGT453	Networks Management	3	2
	NWDS454	Networks Design	2	2
MULN457	Multimedia Networks	2	2	

11. Expected learning outcomes of the program

Knowledge

- A1. Essential mathematical analysis appropriate to help model and analyze networks and systems
- A2. Introducing software programming concepts, object-oriented programming and operating systems
- A3. The role of Information Technology, communications, and Science underlying network layering systems
- A4. Essential management and design principles appropriate to relevant network equipment and associated software.

Skills

- B1. Ability to apply appropriate scientific principles, mathematical and computer-based methods for analyzing general network systems.
- B2. Ability to solve numerical problems encountered when applying mathematics, statistics and computing

B3. Be creative, organize tasks into a structured form, and understand the evolving state of knowledge in a rapidly developing area.

B4. Ability to plan, conduct and write a report on a project or assignment, prepare, and oral presentation in related fields.

Practical Skills

C1. Ability to use appropriate mathematical methods or IT tools, and program a computer to solve problems.

C2. Ability to use relevant laboratory equipment and network devices and tools and analyze the results critically.

C3. Design, build and test a small to intermediate LAN and WAN networks.

C4. Ability to research into advanced networking and systems, project management methods, and present work.

12. Teaching and Learning Strategies

In lectures, but most through laboratory sessions and assignments. Manage time and use of information resources, such as the library and IT methods, is experienced through projects and assignments.

13. Evaluation methods

Directly through subject specific assessment, and indirectly by observing tools and their effective use to enhance the student's overall performance.

14. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronics and Communications Engineering	Circuits and Electronics Systems Engineering			1	

Professor	Computers Engineering	Computer and Communications Engineering			1	
Assistant Professor	Physics	Electromagnetics\ Stripped Antenna			1	
Assistant Professor	Electronics and Communications Engineering	Spread Spectrum Systems			1	
Assistant Professor	Computers Engineering	Information Technology Engineering			1	
Assistant Professor	English \ Linguistics	English Literature			1	
Assistant Professor	Electrical Engineering	Communications Engineering			1	
Lecturer	Information Engineering	Information and Telecommunications Engineering			1	
Lecturer	Electronics and Communications Engineering	Wireless and Mobile Networks			1	
Lecturer	Information Engineering	Wireless and Mobile Networks			1	
Lecturer	Electronics and Communications Engineering	Networks and Wireless Communications Engineering			1	
Lecturer	Electrical Engineering	Communications Engineering			1	
Assistant Lecturer	Electronics and Communications Engineering	Communications and Networks Engineering			1	
Assistant Lecturer	Communications Engineering	Wireless Communication Technology			1	
Assistant Lecturer	Electrical Engineering	Electronics and Communications Engineering			2	
Assistant Lecturer	Internet Engineering	Networks and Internet Technologies Engineering			4	
Assistant Lecturer	Networks Engineering	Networks and Internet Technologies Engineering			1	

Assistant Lecturer	Computer Technology Engineering	Electrical and Computer Engineering			1	
Assistant Lecturer	Communications Engineering	Communication and Signal Processing Engineering			1	
Assistant Lecturer	Computer Networks and Communications Engineering	Computer Engineering			1	
Assistant Lecturer	Computer Communication Engineering	Communication Engineering			1	
Assistant Lecturer	Computer Technology Engineering	Embedded Systems Engineering			1	

Professional Development

Mentoring new faculty members

New faculty members need to join teaching methods training before teaching a class, which is mandatory to all faculty members to pass the training and teaching eligibility. After then, they should be members of some department committees, so they can learn the administrative part additional to the lecturing and demonstrating students.

Professional development of faculty members

All of the faculty members in the College of Information Engineering have access to a variety of professional development programs. A number of skill-development workshops, seminars, lectures, and training courses are presented by prominent speakers in many fields.

15. Acceptance Criterion

Students are admissible to Computer Networks Engineering Department/ College of Information Engineering according to a central admission process-based grades comparison managed by the Ministry of Higher Education and Scientific Research/ Studies, Planning, and Prosecution Office / Central Admission Department.

The following basic prerequisites must be met to be admitted to Computer Networks Engineering Department for B.Sc. program:

- A) The number of accepted students is limited to the number of seats as planned by the college council.
- B) The applicant must hold a secondary school certificate from Iraq, or its equivalent.
- C) The applicant must submit the necessary documents to the registration office within a certain time frame usually (two weeks after the admission approval).
- D) The applicants who have completed secondary school outside Iraq must have finished twelve years of primary and secondary studies at an accredited institution. He must also present an equivalent certificate issued by the Iraqi Ministry of Education.

16. The most important sources of information about the program

<https://coie-nahrain.edu.iq/en/>

17. Program Development Plan

Program Skills Outline

				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
2024/2025 1st year	ENLA130	English Language I	Basic									*	*	*	*
	CALC101	Calculus I	Basic					*	*	*	*				
	PHYS102	Physics	Basic					*	*	*	*				
	BIOL103	Biology	Basic												
	ITFN104	IT Fundamentals	Basic	*	*	*	*	*	*	*	*				
	EDAC105	Engineering Drawing- CAD	Basic					*	*	*	*				
	HURI110	Human Rights	Basic									*	*	*	*
	ARLA120	Arabic Language	Basic									*	*	*	*
	CALC150	Calculus II	Basic					*	*	*	*				
	CFPR151	Computer Fundamentals and Programming	Basic	*	*	*	*	*	*	*	*				
	LODS152	Logic Design	Basic					*	*	*	*				
	ELCA153	Electrical Circuits Analysis	Basic					*	*	*	*				
FNET154	Fundamentals of Networks	Basic	*	*	*	*	*	*	*	*					

2024/2025 2nd year	ENGL200	English Language II	Basic									*	*	*	*
	EGMM201	Engineering Mathematics I	Basic					*	*	*	*				
	PBST202	Probability and Statistics	Basic					*	*	*	*				
	ELPH203	Electronic Physics	Basic					*	*	*	*				
	OOPJ204	Object Oriented Programming -Java	Basic	*	*	*	*	*	*	*	*				
	WEBP205	Web programming	Optional	*	*	*	*	*	*	*	*				
	PRMG255	Principles of Management	Basic									*	*	*	*
	EGMM251	Engineering Mathematics II	Basic					*	*	*	*				
	SGAN252	Signal Analysis	Basic					*	*	*	*				
	DSDD253	Digital System Design	Basic					*	*	*	*				
	INCO254	Information Theory and Coding	Basic					*	*	*	*				
DDBB259	Database	Optional	*	*	*	*	*	*	*	*					
2024/2025 3rd year	DEMO300	Democracy	Basic									*	*	*	*
	NUMD301	Numerical Methods	Basic					*	*	*	*				
	CNET302	Computer Networks	Basic	*	*	*	*	*	*	*	*				
	COMM303	Data Communications	Basic	*	*	*	*	*	*	*	*				

	OSYS304	Operating Systems	Optional	*	*	*	*	*	*	*	*					
	AIN307	Artificial Intelligence	Optional	*	*	*	*	*	*	*	*					
	ENGL350	English Language III	Basic									*	*	*	*	
	CSMP351	Computer Systems and Microprocessors	Basic	*	*	*	*	*	*	*	*					
	NETP352	Networks Protocols	Basic	*	*	*	*	*	*	*	*					
	NTPG353	Networks Programming	Basic	*	*	*	*	*	*	*	*					
	QUEU354	Queuing Theory	Optional	*	*	*	*	*	*	*	*					
	SANN356	Storage Area Networks	Optional	*	*	*	*	*	*	*	*					
2024/2025 4th year	PRET400	Professional Ethics	Basic									*	*	*	*	
	GRPR401	Graduation Project I	Basic	*	*	*	*	*	*	*	*	*	*	*	*	
	WMNE402	Wireless and Mobile Networks	Basic	*	*	*	*	*	*	*	*					
	NSEC403	Networks Security	Basic	*	*	*	*	*	*	*	*					
	CLCP405	Cloud Computing	Optional	*	*	*	*	*	*	*	*					
	MAPP407	Mobile Applications	Optional					*	*	*	*					
	ENGL450	English Language IV	Basic										*	*	*	*
	GRPR451	Graduation Project II	Basic	*	*	*	*	*	*	*	*	*	*	*	*	*
MNTN452	Modern Networks Technologies	Basic	*	*	*	*	*	*	*	*	*					

	NMGT453	Networks Management	Basic	*	*	*	*	*	*	*	*				
	NWDS454	Networks Design	Optional	*	*	*	*	*	*	*	*				
	MULN457	Multimedia Networks	Optional	*	*	*	*	*	*	*	*				

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

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	Introduction	Theory	
2	2	A1	The sentence: What is a sentence and what is not a sentence.	Theory	Quiz1
3	2	A1	Parts of a sentence: subject; types of subjects	Theory	
4	2	A1	Parts of a sentence: verb; types of verbs: verb to be – ordinary verbs – modal Verbs	Theory	Test 1
5	2	A1	Types of verbs 2	Theory	Quiz2
6	2	A1	Tenses: Present v. Past	Theory	
7	2	A1	The first exam	Theory	Test 2
8	2	A1	Parts of a sentence, the complement.	Theory	
9	2	A1	Types of a sentence; simple sentence	Theory	
10	2	A1	Types of a sentence; complex sentence	Theory	
11	2	A1	Compound sentences	Theory	
12	2	A1	Practicing writing	Theory	Report
13	2	A1	The second exam	Theory	
14	2	A1	Practicing writing	Theory	Seminar
15	2	A1	Practicing writing	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Keith Boecker, P. Charles Brown, Oxford English for Computing, Oxford University press. -Prentice Hall, Writing & Practice Communication in Action, Pearson, Prentice Hall.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Longmann Preparation Course of the TOEFL test .the paper test
Electronic References, Websites	http://www.english for every one.com

1. Course Name:

Calculus I

2. Course Code:

CALC101

3. Semester / Year:

1st Semester / First Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٥/٢٠٢٤) المرحلة ()										رقم الأسبوع ()	
										اسم المادة	
										عدد الساعات	
										اسم التدريسي + التوقيع + التاريخ	
										اسم الطالب	

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Lect. Dr. Dhuha Hussien Hameed

Email: Dhuha_Hussien@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	1-	To understand the concept of rate of change
	2-	To Develop the derivative idea from rate of change
	3-	To perform derivative to different functions
	4-	To deal with integration basics

9. Teaching and Learning Strategies

Strategy	Weekly lectures with tutorial session ensure better understanding Quizzes and exams to ensure student learning
----------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	The Rate of Change of Function I: Coordinates for the plane, Increments and distance, The slope of a straight line, Equation of a straight line.	Theory	
2	4	A1	The Rate of Change of Function II: Functions and graphs, Slopes of quadratic and cubic curves, the slope of the curves $y=f(x)$, Derivatives, Velocity and other rates of change.	Theory	Quiz1
3	4	A1	The Rate of Change of Function III: Properties of limits, Infinity as a limit, Continuous functions,	Theory	
4	4	A1	Derivatives I: Formal differentiation, Polynomial functions and their derivatives, Products, power, and quotients.	Theory	Test 1
5	4	A1	Derivatives II: Implicit differentiation and fractional powers, Tangent line approximation, The chain rule and parametric equations, A brief review of trigonometry, Angles between curves.	Theory	Quiz2
6	4	A1	Derivatives III: Derivatives of trigonometric functions, Newton's method for approximating solutions of equations, Inverse functions and the Picard method.	Theory	
7	4	A1	Applications of Derivatives I: Curves sketching, The sign of the first derivatives, Concavity and points, Asymptotes and symmetry, Maxima and minima theorems.	Theory	Test 2

8	4	A1	Applications of Derivatives II: Related rates, Rolle's theorem, the mean value theorem, Indeterminate forms and l'Hopital rules, Extending the Mean Value Theorem to Taylor's formula.	Theory	
9	4	A1	Integration I: Indefinite integrals, Applications, Determining constants of integration, Integrals of trigonometric functions.	Theory	
10	4	A1	Integration II: Definite integrals, Area under a curve, Calculating areas as limits, The fundamental theorems of integral calculus.	Theory	
11	4	A1	Integration III: Integration by substitution Differentials, Rules for approximating definite integrals.	Theory	
12	4	A1	Applications of Definite Integrals I: Area between two curves, Distance, Calculating volumes by slicing.	Theory	Project
13	4	A1	Applications of Definite Integrals II: Length of plane curve, Area of a surface of revolution, Average value of a function.	Theory	
14	4	A1	Tr Transcendental Functions I: The inverse of trigonometric functions, Derivatives of the inverse trigonometric functions, The natural logarithm and its derivatives.	Theory	Seminar
15	4	A1	Transcendental Functions II: Properties of natural logarithm, The exponential function e^x , The function a^x and a^u , The function $y=\log_a u$.	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas and Finney, Calculus and Analytic Geometry, Pearson Education Inc, 11th Ed, 2008
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Physics

2. Course Code:

PHYS102

3. Semester / Year:

1st Semester / First Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٠/٢٠٢١) المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Lect. Dr. Ali Abdulhadi Jasim

Email: Jasim@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	<p>1- To provide the students the mathematics representation of Vectors and their physical representation.</p> <p>2-To understand oscillation motion and waves motion, including electromagnetic waves and sound Waves.</p> <p>3-To give the basic concepts of Physical Optics</p> <p>4-To recognize physics and mathematics Interference and diffraction.</p> <p>5-To identify physics of nature of light and interaction of wave with matter.</p> <p>6-Understanding capacitors, resistors and inductors.</p>
--------------------------	---

9. Teaching and Learning Strategies

Strategy	<p>The main strategy will be adopt in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their thinking skills. This will be achieve through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.</p>
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Vectors : Vectors and scalars, Component of Vectors , Vector Arithmetic	Theory+Lab	
2	4	A1	Force and Motion – I: Newtonian Mechanics, Newton's First Law, Force, Mass, Newton's second Law, Some Particular Forces, Applying Newton's Laws	Theory+Lab	Quiz1
3	4	A1	Force and Motion – II: Friction, Properties of Friction, The Drag Force and Terminal Speed, Uniform Circular Motion.	Theory+Lab	
4	4	A1	Kinetic Energy and Work: What is Energy? , Kinetic Energy, Work, Work and Kinetic Energy, Work Done by the Gravitational Force, Work Done by a Spring Force.	Theory+Lab	Test 1
5	4	A1	Oscillations: Simple Harmonic Motion, The Force Law for Simple Harmonic Motion, Energy in Simple Harmonic Motion, Pendulums, Damped Simple Harmonic Motion	Theory+Lab	Quiz2
6	4	A1	Waves – I: Types of waves, Transverse And Longitudinal waves, Wavelength and Frequency, The Speed of Traveling wave, The wave Equation, The Principle of	Theory+Lab	

			Superposition For waves, Interference of waves		
7	4	A1	Waves – II : Sound waves, The Speed of Sound, Traveling Sound Waves, Intensity and Sound level, The Doppler Effect, Supersonic Speed, Shock Waves	Theory+Lab	Test 2
8	4	A1	Electric Potential: Electric charges and electric fields, Conductors and Insulators, Coulomb’s law, The Electric Field Due to a Point Charge, The Electric Field Due to a Charged Disk	Theory+Lab	
9	4	A1	Capacitance: Calculating the Capacitance, Capacitors in Parallel and in Series, Energy Stored in an Electric Field, Capacitor with a Dielectric, Dielectrics: An Atomic View	Theory+Lab	
10	4	A1	Current and Resistance: Direct current circuits: Electric Current, Current Density, Resistance and Resistivity, Ohms Law, Power in Electric Circuits	Theory+Lab	
11	4	A1	Circuits: work ,energy , EMF, The Ammeter and The Voltmeter, RC Circuits	Theory+Lab	
12	4	A1	Magnetic Fields: What Produces a Magnetic Field?, Crossed Fields: Discovery of the Electron, source of magnetic fields; and Faraday’s law	Theory+Lab	Project
13	4	A1	Magnetic Fields Due to Currents: Calculating Magnetic Fields due to a Current, Force Between two parallel currents, Amperes law	Theory+Lab	
14	4	A1	Induction and Inductance: Faraday's Law of Induction, Lenz's law, Inductors and Inductance, Self-Induction. Mutual Induction	Theory+Lab	Seminar
15	4	A1	Review	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Physics Extended, 9th edition, Halliday and Resnick, John Wiley & Sons, 2011
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

7	3	A1	Photosynthesis	Theory	Test 2
8	3	A1	Cell division: Mitosis and Miosis: Mendel, Genes and inheritance	Theory	
9	3	A1	Cell division: Mitosis and Miosis: Mendel, Genes and inheritance	Theory	
10	3	A1	Genes, chromosomes and Human Genetics	Theory	
11	3	A1	DNA structure, Replication and Organization	Theory	
12	3	A1	From DNA to protein Biotechnology	Theory	Project
13	3	A1	Cell processes I- Transport (Passive and active)	Theory	
14	3	A1	Cell processes II- Metabolism (metabolic pathways & enzymes)	Theory	Seminar
15	3	A1	Cell processes III-Cellular respiration	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Biology: The Dynamic Science, By Peter J. Russell, Paul E. Hertz, Beverly McMillan Cengage Learning, 2011
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
IT Fundamentals
2. Course Code:
ITFN104
3. Semester / Year:
1 st Semester / First Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٥/٢٠٢٤) المرحلة ()										رقم الأسبوع ()	
										اسم المادة	عدد الساعات
										اسم التدريسي + التوقيع + التاريخ	
										اسم الطالب	

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ammar Abdulmalek Email: Ammar_Abdulmalek@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> To Learn and have basic knowledge about information technology roles and duties. To Understand how Computer works and its components To learn and have solid understanding about OSes and how they work with Computers. Understand database management systems and web technology. Have a solid understanding about how WWW web works. Student will have understanding about networking fundamentals, IP and protocols. To have and understand what is encryption and decryption and how computer security works.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and lab sessions, 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.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	IT roles: System administrator, Network administrator, web administrator, Database	Theory+Lab	

			administrator, security administrator. Skills for the Successful IT Person		
2	4	A1	Parts of a PC , system units and the parts inside, motherboard, microprocessor Chips, power supplies, expansion slots and cards	Theory+Lab	Quiz1
3	4	A1	Memory function , measure memory size, address bus, RAM and ROM, cache memory, I/O Devices : keyboard, mouse, microphone, scanners, digital cameras, video cards, monitor, and speakers	Theory+Lab	
4	4	A1	Storage systems: Hard Disks, CD drives and DVD drives	Theory+Lab	Test 1
5	4	A1	Principles of operating systems : Kernel, Device drivers, Shell, Utility programs, Interrupts, Process Management and Scheduling, Memory Management,	Theory+Lab	Quiz2
6	4	A1	Principles of operating systems : Virtual Memory: Paging and Page Tables, Resource Management, Deadlock, Other OS Tasks: Booting	Theory+Lab	
7	4	A1	Networks-I : A simple point-to-point connection, Data : Analog vs. Digital, Formatted Documents, Connection media – Examples, what is bandwidth? Multiplexing : Squeezing many channels into one, Why build networks?	Theory+Lab	Test 2
8	4	A1	Networks-II : Network protocols- Example: TCPIP protocol architecture.	Theory+Lab	
9	4	A1	Programming Languages : Types of software: System software, Application software, Programming languages: Machine, assembly, High-level and Fourth-generation” language.	Theory+Lab	
10	4	A1	Relational Databases : What is a database? What is a database management system? An Introduction to Microsoft Access,	Theory+Lab	
11	4	A1	Web Technologies : How the original Web works, Anatomy of a URL, How the Web works, WWW is a Client/Server System, web forms, CGI, FedEx, Microsoft Active Server Pages ASP), Cookies, Cookie Applications, how does Google work? Cloud-Introduction.	Theory+Lab	
12	4	A1	Computer Security : What is computer security? Securing communications: Encryption, Authentication, Integrity, Traditional cryptography, Ceasar’s Cipher: Encryption by Substitution.	Theory+Lab	Project
13	4	A1	IT roles : System administrator, Network administrator, web administrator, Database administrator, security administrator. Skills for the Successful IT Person	Theory+Lab	
14	4	A1	Parts of a PC , system units and the parts inside, motherboard, microprocessor Chips, power supplies, expansion slots and cards	Theory+Lab	Seminar
15	4	A1	Memory function , measure memory size, address bus, RAM and ROM, cache memory, I/O Devices : keyboard, mouse, microphone, scanners, digital cameras, video cards, monitor, and speakers	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: White, Ron, et. al. How Computers Work. 7th ed. Indianapolis, IN: Que Publishing. ISBN: 0789730332. Book#2: Gralla, Preston, et. al. How the Internet Works. 7th ed. Indianapolis, IN: Que Publishing. ISBN: 0789729733. Book#3: Viescas, John L. Running Microsoft® Access 2000. Redmond, WA: Microsoft® Press, 1999. ISBN: 1572319348. Book#4: Comer, Douglas E. Chapter 24 in The Internet Book. 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2000. pp. 223-242. ISBN: 0130308528.
Main references (sources)	Zimmerman, Phil. Chapter 1 in An Introduction to Cryptography.Reference#2: https://www.webopedia.com/
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Engineering Drawing-CAD
2. Course Code:
EDAC105
3. Semester / Year:
1 st Semester / First Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل () ٢٠٢٤/٢٠٢٥ المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Lect. Dr. Donya Abbas Email: Donya_abbas@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and lab sessions, 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.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and lab sessions, 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.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Basic Principles of Engineering Drawings: (Explanation of engineering tools, lines styles & types & Shapes drawing)	Theory+Lab	
2	4	A1	Engineering Operations: Dimensioning, Scale, Explanation of (Arch, Circle, Ellipse) drawings	Theory+Lab	Quiz1
3	4	A1	Exercises on Engineering Operations	Theory+Lab	
4	4	A1	Projections: Multiview projections (Top projection, Front projection & Side Projection)	Theory+Lab	Test 1
5	4	A1	Exercises on Projections	Theory+Lab	Quiz2

6	4	A1	A-Introduction to AutoCAD: History, Setting the Workspace, Keyboard Input, Working with Files, Displaying Objects. B-Creating Basic Drawings: Commands Using Object Snaps, Using Polar Tracking and Polar Snap, Using Object Snap Tracking, Working with Units, Using Function Key	Theory+Lab	
7	4	A1	A-Manipulating Objects: Object Selection Commands (copy, mirror, rotate, array) B-Modifying Tools: Trimming and Extending Objects, Offsetting Objects, Joining Objects, Break Objects Stretching Objects	Theory+Lab	Test 2
8	4	A1	A-Layer Management & Inquiry: Using Layers, Layer Tools, Organizing Objects with Layers, Using Inquiry Commands B-Working with Layouts & Viewpoints: Using Layouts, creating layouts, Using Viewports, Plotting Drawings	Theory+Lab	
9	4	A1	A-Annotating the Drawing: Creating Multiline Text, Creating Single Line Text, Using & editing Text Styles B-Dimensioning: Creating Dimensions, Using Dimension Styles, Editing Dimensions	Theory+Lab	
10	4	A1	A-Hatching Objects: Hatching Objects, Editing Hatch Objects B-Working with Reusable Content: Using Blocks, Working with Design Center, Using Tool Palettes C-Creating Additional Drawing Objects: Tables	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10
Mid-terms Exam:30
Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- كتاب الرسم الهندسي (عبد الرسول الخفاف) 2- Introducing AutoCAD 2008, Wiley, 2010 3- Technical Drawing 101 with AutoCAD 2017 4- Tutorial Guide to AutoCAD 2018
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Human Rights

2. Course Code:

HURI110

3. Semester / Year:

2nd Semester / First Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل () ٢٠٢٤/٢٠٢٥ المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)

2/2

7. Course administrator's name (mention all, if more than one name)

Name: Asst. Prof. Dr. Jabbar Ismael

Email: Jabbar_ismael@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and lab sessions, 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.
-------------------	---

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and lab sessions, 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.
----------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	حقوق الانسان في الحضارات القديمة	Theory	
2	2	A1	حقوق الانسان في الشرائع والاديان السماوية/ حقوق الانسان في الديانتين المسيحية واليهودية	Theory	Quiz1
3	2	A1	حقوق الانسان في الاسلام	Theory	
4	2	A1	مصادر حقوق الانسان/ المصادر الدولية	Theory	Test 1
5	2	A1	المصادر الوطنية	Theory	Quiz2
6	2	A1	ضمانات حقوق الانسان / ضمانات حقوق الانسان على الصعيد الداخلي	Theory	
7	2	A1	=	Theory	Test 2
8	2	A1	ضمانات حقوق الانسان على الصعيد الدولي	Theory	
9	2	A1	=	Theory	
10	2	A1	العولمة وحقوق الانسان	Theory	
11	2	A1	=	Theory	
12	2	A1	واجبات الحاكم الاسلامي	Theory	Report
13	2	A1	=	Theory	
14	2	A1	جرائم الابادة الجماعية	Theory	Seminar
15	2	A1	السيرة النبوية الشريفة	Theory	

3-	لاستعراض المثني والملحق به، جمع المذكر السالم والملحق به جمع المؤنث السالم، الأسماء الخمسة
4-	الالمام بالجملة الفعلية بناء الفعل الماضي، بناء فعل الامر و الفعل المضارع، بناؤه و اعرابه
5-	التعمق بالأسماء المنصوبة، المفعول به، المفعول المطلق، المفعول فيه، المفعول معه ومعاني حروف الجر
6-	التعرف والمراجعة للشعراء محمد مهدي الجواهري- معروف الرصافي- احمد مطر
7-	لمراجعة القرآن الكريم / سورة الحجرات
8-	لكيفية كتابة الهمزة المتوسطة والمتطرفة كتابة الضاد والطاء، كتابة التاء القصيرة والطويلة علامات الترقيم الأخطاء الشائعة في المكاتبات الرسمية ، كتابة العدد

9. Teaching and Learning Strategies

Strategy	1- محاضرات نظرية وواجبات ومناقشات وامتحانات 2- ارشاد الطلبة الى بعض المواقع الكترونية لتطوير قابلياتهم ومهاراتهم
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	الجملة الاسمية	Theory	
2	2	A1	المبتدأ وانواعه ، الخبر وانواعه، نواسخ الابتدء ، كان واخواتها، ان واخواتها	Theory	Quiz1
3	2	A1	المثني والملحق به، جمع المذكر السالم والملحق به	Theory	
4	2	A1	جمع المؤنث السالم، الأسماء الخمسة	Theory	Test 1
5	2	A1	الجملة الفعلية	Theory	Quiz2
6	2	A1	بناء الفعل الماضي، بناء فعل الامر	Theory	
7	2	A1	الفعل المضارع، بناؤه و اعرابه،	Theory	Test 2
8	2	A1	الأسماء المنصوبة، المفعول به، المفعول المطلق، المفعول فيه، المفعول معه	Theory	
9	2	A1	معاني حروف الجر	Theory	
10	2	A1	الشعر	Theory	
11	2	A1	محمد مهدي الجواهري	Theory	
12	2	A1	الشعر: معروف الرصافي	Theory	Report
13	2	A1	القرآن الكريم	Theory	
14	2	A1	سورة الحجرات	Theory	Seminar
15	2	A1	الاملاء	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lectures in Arabic Language
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Calculus II
2. Course Code:
CALC151
3. Semester / Year:
2nd Semester / First Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل () ٢٠٢٤/٢٠٢٥ المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Prog. Dr. Hind Subhi Hussien Email: Hind_Subhi@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	1-To understand complex numbers and basic operation over them. 2-To deal with basic mathematics concepts. 3-To use learned topics in solving electrical circuit analysis problem. 4-To Develop the knowledge about matrices and basic operation over them. 5-To perform calculation of convergence value of infinite series.

9. Teaching and Learning Strategies	
Strategy	Weekly lectures and tutorial session to ensure better understanding Quizzes and exams to ensure student learning

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Complex Numbers and Functions I	Theory	
2	4	A1	Complex Numbers and Their Geometric Representation, Polar Form, Powers and Roots, Polar coordinates, Graphs of polar equations, Polar equations of conics and other functions, Integrals.	Theory	Quiz1
3	4	A1	Complex Numbers and Functions II	Theory	
4	4	A1	Derivative of Complex Function, Exponential Function, Trigonometric and Hyperbolic Functions. Euler's Formula.	Theory	Test 1
5	4	A1	Complex Numbers and Functions III	Theory	Quiz2
6	4	A1	Line Integral in the Complex Plane, Cauchy's Integral Theorem, Cauchy's Integral Formula	Theory	
7	4	A1	Matrices and Linear Transformation I	Theory	Test 2

8	4	A1	Matrices, Vectors: Addition and Scalar Multiplication, Matrix Multiplication, Symmetric, Skew-Symmetric, and Orthogonal Matrices.	Theory	
9	4	A1	Matrices and Linear Transformation II	Theory	
10	4	A1	Linear Systems of Equations. Gauss Elimination, Linear Independence. Rank of a Matrix, Vector Space	Theory	
11	4	A1	Matrices and Linear Transformation III	Theory	
12	4	A1	Solutions of Linear Systems, Existence, Uniqueness, Determinants, Cramer's Rule, Inverse of a Matrix, Gauss-Jordan Elimination	Theory	Project
13	4	A1	Integration Methods I	Theory	
14	4	A1	Basic integration formulas, Integration by parts, Products and powers of trigonometric functions, Even powers of sines and cosines.	Theory	Seminar
15	4	A1	Integration Methods II	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas and Finney, Calculus and Analytic Geometry, Pearson Education Inc, 11th Ed, 2008
Main references (sources)	Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley Sons Inc, 10th Ed. 2011.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Brief History of Computers, Basic Components, CPU, I/O & Peripheral Devices, Number Systems, Data Representation	Theory+Lab	
2	4	A1	Overview of Computer Architecture, Computer Architecture, Computer Organization, computer system, Stored Program concept, Von Neumann Machine Architecture	Theory+Lab	Quiz1
3	4	A1	Computer System, Computer Components, Function of Control unit, System buses, Instruction cycle. Memory System, Characteristic of memory, Types of Memories: primary, secondary and cache memory	Theory+Lab	
4	4	A1	The language of computer, programming methodology: structural programming, OOP, ANSI/ISO standard C++.	Theory+Lab	Test 1
5,6,7	4	A1	Algorithms: Algorithm design & Flow Charts. Case study.	Theory+Lab	Quiz2
8	4	A1	Source, Object & exe codes. The Basic Structure of program,	Theory+Lab	
9	4	A1	Using I/O statements, Variables, Operators, Loops: for, while, do while loop.	Theory+Lab	Test 2
10	4	A1	Decisions: if statement, if-else statement, else-if construct, switch statement, Conditional operator	Theory+Lab	
11,12	4	A1	Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Calculating the length of the Array – Operations on Array – one dimensional array for inter-function communication – Two dimensional Arrays – Operations on Two Dimensional Arrays	Theory+Lab	
13	4	A1	Functions: Simple Functions, Functions that return a value, using arguments to pass data to a function, using more than one functions, External variables, Preprocessor directives. Strings: Introduction String and Character functions	Theory+Lab	
14	4	A1	Pointers: Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers – Generic Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Passing Array to Function.	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Book#1: William Stallings, Computer organization and architecture designing for performance, Prentice Hall, 2010.
Book#1: D. S., C++ Programming: From problem analysis to program design, 2nd Edition, Thomson 2004

Main references (sources)	Reference#1 Paul Deitel and Harvey Deitel, 'C++ How to program', 8th Edition, Prentice Hall Reference#2 Bjarne Stroustrup The C++ Programming Language, 3rd Edition, by AT&T 1997.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:																																																																																																																									
Logic Design																																																																																																																									
2. Course Code:																																																																																																																									
LODS152																																																																																																																									
3. Semester / Year:																																																																																																																									
2nd Semester / First Year																																																																																																																									
4. Description Preparation Date:																																																																																																																									
5-5-2025																																																																																																																									
5. Available Attendance Forms:																																																																																																																									
<table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="10">استمارة حضور اسبوعية للطلبة الفصل () 20-2024/2025 المرحلة ()</td> <td colspan="2">رقم الاسبوع ()</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>اسم المادة</td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>عدد الساعات</td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>اسم التدريسي + التوقيع + التاريخ</td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>اسم الطالب</td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> </table>		استمارة حضور اسبوعية للطلبة الفصل () 20-2024/2025 المرحلة ()										رقم الاسبوع ()												اسم المادة												عدد الساعات												اسم التدريسي + التوقيع + التاريخ												اسم الطالب																																																													
استمارة حضور اسبوعية للطلبة الفصل () 20-2024/2025 المرحلة ()										رقم الاسبوع ()																																																																																																															
										اسم المادة																																																																																																															
										عدد الساعات																																																																																																															
										اسم التدريسي + التوقيع + التاريخ																																																																																																															
										اسم الطالب																																																																																																															
6. Number of Credit Hours (Total) / Number of Units (Total)																																																																																																																									
4/3																																																																																																																									
7. Course administrator's name (mention all, if more than one name)																																																																																																																									
Name: Assist. Lect. Noor Natiq Email: Noor_Natiq@nahrainuniv.edu.iq																																																																																																																									
8. Course Objectives																																																																																																																									
Course Objectives	<ol style="list-style-type: none"> 1. Able to perform the conversion among different number systems. 2. Familiar with basic logic gates (AND, OR, NOT, XOR and XNOR). 3. Able to simplify simple Boolean functions by using the basic Boolean properties. 4. Able to design simple combinational logic using basic gates. 5. Able to optimize simple logic using Karnaugh maps, understand "don't care". 6. Familiar with basic combinational circuits like Adders, Comparators, decoder, BCD-to seven segment decoder, encoder, multiplexer and Demultiplexer. 7. Familiar with basic sequential logic components (S-R, J-K, D and T) Flip-Flop and their usage. 8. Familiar with basic sequential circuits like Register, Counters and Memory. 9. Able to understand and use high-level hardware description languages (VHDL and Verilog) to design combinational or sequential circuits. 																																																																																																																								
9. Teaching and Learning Strategies																																																																																																																									
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved																																																																																																																								

through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Digital systems: Decimal, binary, octal, hexadecimal number, number	Theory + lab	
2	4	A1	Boolean algebra and logic gates, Basic definitions of Boolean algebra, Boolean function, digital logic gate.	Theory + lab	Quiz1
3	4	A1	Get-level minimization: Canonical and standard forms, Simplification of Boolean functions	Theory + lab	
4	4	A1	Algebra manipulation, Karnaugh maps simplification (2 to 5) variable maps,	Theory + lab	Test 1
5	4	A1	Product of sum simplification, NAND and NOR implementation, don't care conditions	Theory + lab	Quiz2
6	4	A1	Representation of signed numbers: r's complement, (r-1)'s complement, Two's complement adder-subtractor, binary codes, code conversion, analysis procedure of code conversion	Theory + lab	
7	4	A1	Design of digital devices: Decoder, BCD-to seven segment decoder	Theory + lab	Test 2
8	4	A1	Encoder, priority encoder	Theory + lab	
9	4	A1	Multiplexer: design of (1-4) multiplexer, design of (1-8) multiplexer	Theory + lab	
10	4	A1	Demultiplexer: design of (1-4) demultiplexer, and (1-8) Demultiplexer,	Theory + lab	
11	4	A1	Latches and Flip-Flops: Flip-Flop types: S-R, D, J-K, T, Introduction to Registers, RAM, ROM, PROM, EPROM, and EEPROM,	Theory + lab	
12	4	A1	Synchronous sequential logic: Analysis of clocked sequential circuits, Derivation of state graphs and tables, reduction of state tables	Theory + lab	Project
13	4	A1	Synchronous sequential logic: Sequential circuit design, Shift Registers and Counters	Theory + lab	
14	4	A1	Asynchronous sequential circuits: Analysis procedure, circuit with latches, design procedure.	Theory + lab	Seminar
15	4	A1	Introduction to VHDL	Theory + lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: M. Morris Mano, "Digital Design", Prentice Hall, 3 rd edition, 2016
Main references (sources)	Reference#1: M. Morris Mano, Michael D. Ciletti, "Digital Design: With an Introduction to the Verilog HDL", Prentice Hall, 5 th edition, 2013 Reference#2: Roth, "Fundamentals of Logic Design", Thomson, 5 th Edition, 2004

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Electrical Circuits Analysis

2. Course Code:

ELCA153

3. Semester / Year:

2nd Semester / First Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل () ٢٠٢٥/٢٠٢٤ المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Lect. Dr. Kalid Waleed Hameed

Email: KWH_SaT@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	<ol style="list-style-type: none"> 1. Understand basic DC circuit technology. 2. Analyze circuits with methods of analysis and star-delta transformation. 3. Application of Network Theorems in DC circuits. 4. Understand basic AC circuit technology. 5. Apply circuit analysis methods and theorems in AC and R, L, and C circuits. 6. Calculate and discriminate various power types.
--------------------------	---

9. Teaching and Learning Strategies

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Fundamentals of DC circuits: current, voltage, circuit components, conductors & insulators, semiconductors.	Theory + lab	
2	4	A1	Fundamentals of DC circuits: Ohms law , dc power, energy, efficiency.	Theory + lab	Quiz1

3	4	A1	Series Circuits: Kirchhoff's voltage law, voltage divider rule, voltage regulation.	Theory + lab	
4	4	A1	Parallel Circuits: Kirchhoff's current law, current divider rule, power distribution.	Theory + lab	Test 1
5	4	A1	Network Theorems: Thevenin's theorem, Norton's theorem, maximum power transfer, applications.	Theory + lab	Quiz2
6	4	A1	Methods of Analysis: Branch Current analysis, Mesh analysis, Y & Δ conversion.	Theory + lab	
7	4	A1	AC fundamentals: definitions, sinusoidal waveform, phase relation, peak values, rms value & average values.	Theory + lab	Test 2
8	4	A1	The Basic Elements and Phasors: Response of inductors & capacitors in ac circuits, average power & P.F.	Theory + lab	
9	4	A1	The Basic Elements and Phasors: complex numbers, polar & rectangular forms.	Theory + lab	
10	4	A1	Series and Parallel AC Circuits: The R-L-C circuit in series, impedance diagram, voltage division.	Theory + lab	
11	4	A1	Series and Parallel AC Circuits: The R-L-C in parallel, admittance, current division.	Theory + lab	
12	4	A1	Power (AC): AC power: Real, Reactive and Apparent power, the power triangle, P.F. and P.F. correction.	Theory + lab	Project

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1 INTRODUCTORY CIRCUIT ANALYSIS, 5th Edition (Hard Copy), 10th & 11th Editions (PDF) By : ROBERT L. BOYLESTAD , Prentice Hall
Main references (sources)	Reference#1: Charles Alexander, Fundamentals of Electric Circuits, McGraw-Hill Education; 5 edition (January 12, 2012)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Fundamentals of Networks

2. Course Code:

FNET154

3. Semester / Year:

2nd Semester / First Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٠/٢٠٢٤) المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Lect. Safa Naser

Email: safa_naser@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	<ol style="list-style-type: none"> To understand the fundamental concepts of computer networks, including their applications, requirements, and architecture. To develop an understanding of network performance measures such as bandwidth, latency, and delay bandwidth product. To learn about link capacity, framing, and techniques for reliable transmission, including stop and wait and sliding window protocols. To gain knowledge of Ethernet and multiple access networks, including their physical properties, access protocols, frame formats, addresses, and transmitter algorithms. To explore wireless networking technologies, including 802.11/WiFi, 802.15.1/Bluetooth, and cell-phone technologies. To understand switching and bridging in network environments. To acquire knowledge about basic internetworking with Internet Protocol (IP), including the service model, datagram delivery, packet format, and fragmentation and reassembly. To learn about global addressing and classes in IP networks. To develop skills in subnetting and classless addressing. To gain practical experience through hands-on lab sessions, including configuring network components, building LANs, investigating network protocols using tools like Wireshark, and performing subnetting exercises using simulation software.
-------------------	---

9. Teaching and Learning Strategies

Strategy	<p>The main strategy employed in delivering the FNET154 module is to foster active student participation and enhance critical thinking skills. This will be achieved through interactive classes, practical experiments, group work, and discussions. By encouraging students to actively engage with the course material, ask questions, and participate in problem-solving activities, they will develop a deeper understanding of computer networks. The inclusion of critical thinking exercises and the utilization of multimedia resources further enhance the learning experience. Through these strategies, students will not only gain theoretical knowledge but also have the opportunity to apply it in real-world scenarios, refining their critical thinking abilities and fostering a collaborative learning environment.</p>
----------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2	4	A1	Introduction to course layout, computer networks applications, requirements, architecture (layering and protocols), Internet architecture	Theory + lab	

3	4	A1	Network performance measures (bandwidth, latency, and delay bandwidth product).	Theory + lab	Quiz1
4,5	4	A1	Link capacity, framing, reliable transmission, stop and wait and sliding window	Theory + lab	
6	4	A1	Ethernet and multiple access networks, physical properties, access protocol frame format, addresses and transmitter algorithm	Theory + lab	Test 1
7	4	A1	Midterm Exam 1	Theory + lab	Quiz2
8,9	4	A1	wireless networking (802.11/WiFi, 802.15.1/Bluetooth, and cell-phone technologies)	Theory + lab	
10	4	A1	Switching and bridging,	Theory + lab	Test 2
11,12	4	A1	Basic Internetworking with Internet Protocol (IP), service model, datagram delivery, packet format, and fragmentation and reassembly	Theory + lab	
13	4	A1	Midterm Exam 2	Theory + lab	
14	4	A1	Global addressing and classes	Theory + lab	
15	4	A1	Subnetting and classless addressing	Theory + lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: Richard M. Roberts and Chuck Easttom, Network Fundamentals, 3rd edition, The Goodheart-Willcox Co., 2020
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

5	2	A1	2.expressing yourself	Theory	Quiz2
6	2	A1	3.writing skills: decode the topic	Theory	
7	2	A1	1.Know when to use the past and the present, Use “have” and “had” correctly	Theory	Test 2
8	2	A1	2.common expressions	Theory	
9	2	A1	3.writing skills: develop supporting ideas	Theory	
10	2	A1	1.Comparatives and superlatives	Theory	
11	2	A1	2.common expressions	Theory	
12	2	A1	3.Writing skills: Introductory paragraph	Theory	Report
13	2	A1	1.Subject verb agreements	Theory	
14	2	A1	2.The processor	Theory	Seminar
15	2	A1	3.writing skills: Write unified supporting paragraphs	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Keith Boecker, P. Charles Brown, Oxford English for Computing, Oxford University press. -Prentice Hall, Writing &Practice Communication in Action, Pearson, Prentice Hall.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Longmann Preparation Course of the TOEFL test .the paper test
Electronic References, Websites	http://www.english for every one.com

6	4	A1	Basic concepts (order, degree, initial condition, general solution, particular solution).	Theory	
7	4	A1	Types of differential equations (1st order, 2nd order, higher orders DE).	Theory	Test 2
8	4	A1	Methods for solving 1st order: separable method, Homogeneous method, Exact method	Theory	
9	4	A1	Linear & Bernoulli methods, Methods for solving 2nd order homogenous DE with a constant coefficient.	Theory	
10	4	A1	Wronskian determined, Methods for solving 2nd order Non homogenous DE (variation of parameters, undermined and determined). ,	Theory	
11	4	A1	Euler equation, Higher order DE	Theory	
12	4	A1	Application Examples of DE	Theory	Report
13	4	A1	Vector Differential Calculus, Basic Definitions, Dot Product, Cross Product.	Theory	
14	4	A1	Vector and Scalar Functions, Vector Derivatives, Curves, Arch Length, Curvature,	Theory	Seminar
15	4	A1	Kinds of curves, tangent of curves, length and arc length of curves, chain rule.	Theory	

11. Course Evaluation

Quiz and Assignments:10
 Mid-terms Exam:30
 Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1 Thomas and Finney, Calculus and Analytic Geometry, Pearson Education Inc,11th Ed. 2008.
Main references (sources)	Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley Sons Inc, 10th Ed. 2011.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Probability and Statistics

2. Course Code:

PBST202

3. Semester / Year:

1st Semester / Second Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٠/٢٠٢١ المرحلة ())										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Lect. Dr. Khalid Waleed Hameed

Email: kwh_sat@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	1-To understand the probability concept 2-To deal with set theory and statistical measures 3- To understand different statical measures and their representations. 4-To know different probability distribution functions and their applications 5- To understand random variables and processes.
--------------------------	--

9. Teaching and Learning Strategies

Strategy	Weekly lectures and tutorial session to ensure better understanding Quizzes and exams to ensure student learning
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Review of Sets Theory,	Theory	
2	4	A1	Combinatorial analysis: Permutation and Combination	Theory	Quiz1
3	4	A1	Data representation	Theory	
4	4	A1	Tables: Frequency distribution table, Relative frequency distribution, Cumulative frequency distribution	Theory	Test 1
5	4	A1	Figures: Histogram, Frequency polygon, Ogives, Pi chart	Theory	Quiz2
6	4	A1	Statistical measurements:	Theory	
7	4	A1	Centrality (mean, median and mode)	Theory	Test 2
8	4	A1	Dispersion (range, variance, standard deviation)	Theory	
9	4	A1	Position (percentile, quartile, inter-quartile range)	Theory	
10	4	A1	Moments (laws, values meaning, 3 examples on each moment)	Theory	
11	4	A1	Mean, Variance, Skewness, Kurtosis	Theory	
12	4	A1	Elementary probability Theory, axioms of probability joint probability , Random Experiment, independent and mutually exclusive events.	Theory	Report
13	4	A1	Conditional Prob.	Theory	
14	4	A1	Joint prob. And conditional probability, Total Probability, Bayes Theorem, repeated (Bernoulli) trials	Theory	Seminar
15	4	A1	Random variables.	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1 Walpole & Myers, "Probability & Statistics for Engineers and Scientists", 8th Ed., 2007, Pearson Prentice Hall
Main references (sources)	Reference#1 Spiegel & Stephens, "Statistics", Schaum's Outline series, 4th Ed., McGraw-Hill Reference#2 Spiegel, Schiller & Srinivasan, "Probability & Statistics", Schaum's Outline series, 3rd Ed., McGraw-Hill
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Electronic Physics
2. Course Code:
ELPH203
3. Semester / Year:
1 st Semester / Second Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل () ٢٠٢٤/٢٠٢٥ المرحلة ()												رقم الأسبوع ()		
												اسم المادة	عدد الساعات	
												اسم التدريسي + التوقيع + التاريخ		
												اسم الطالب		

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Lect. Noora Hani Email: noora_hani@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> To make students familiar with basic electronics and semiconductors. To learn the components of Diodes and its P-N junction construction. To learn how to use diodes in simple circuits. To learn about transistors and its usage with different circuits. To study the differences between BJT and FET transistors and their usage in circuit applications. Introduce the students to Operational Amplifiers and its usage.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and tutorial sessions, 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.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Semiconductor Diodes: ideal diode, diode resistance, semiconductor material, Bohr's model of Ge & Si, intrinsic materials, energy levels, material types, and conductivity of conductors	Theory+Lab	
2	4	A1	Semiconductor Diodes: extrinsic semiconductors (p-type & n-type), electrons	Theory+Lab	Quiz1

			vs. holes flow, majority & minority carriers, current density and conductivity.		
3	4	A1	Semiconductor Diodes: P-N junction construction, forward biasing and reverse biasing, depletion region, operation, and diode equation, diode's characteristics.	Theory+Lab	
4	4	A1	Semiconductor Diodes: Diode resistance (static, dynamic and average), equivalent circuit, Zener diode, LEDs.	Theory+Lab	Test 1
5	4	A1	Diode Applications: load-line analysis, diode approximations, series diode configuration, parallel diodes configuration, series-parallel configurations, AND/OR gates.	Theory+Lab	Quiz2
6	4	A1	Diode Applications: half- wave rectifier, peak inverse voltage (PIV).	Theory+Lab	
7	4	A1	Diode Applications: full-wave rectifier (Bridge & Center Tap Transformer).	Theory+Lab	Test 2
8	4	A1	Diode Applications: Clipping and clamping circuits, Voltage Doubler and Tripler, Zener diode circuits and voltage regulation.	Theory+Lab	
9	4	A1	Bipolar Junction Transistor (BJT): construction, operation, configurations (CB, CE &CC).	Theory+Lab	
10	4	A1	Bipolar Junction Transistor (BJT): i/p and o/p characteristics, operation regions (saturation, active & cut-off).	Theory+Lab	
11	4	A1	BJT DC Biasing Circuits: dc load line analysis, the Q-point, fixed-bias circuit, emitter-stabilized bias.	Theory+Lab	
12	4	A1	BJT DC Biasing Circuits: voltage divider bias, voltage feedback bias.	Theory+Lab	Report
13	4	A1	BJT DC Biasing Circuits: transistor switching circuits (inverter operation).	Theory+Lab	
14	4	A1	FET: construction, i/p and o/p c/cs	Theory+Lab	Seminar
15	4	A1	FET: Biasing circuits (fixed bias, voltage divider bias, self-bias).	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	ELECTRONIC DEVICES AND CIRCUIT THEORY, 6th Edition (Hard Copy), 7th Ed. (PDF) By: ROBERT BOYLESTAD and LOUIS NASHELSKY, Prentice Hall
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Object Oriented Programming (Java)

2. Course Code:

			retrieving it later (Variables) Using variables with console output from week 1		
3	4	A1	Conditional statements and logical operators (IF, &, , >, <, <=, >=, ==) And Switch statements. Difference between IF and Switch	Theory+Lab	
4	4	A1	Repeating statements (For loops, While loops, Do..while)	Theory+Lab	Test 1
5	4	A1	Storing multiple values in a single variable Arrays . Iterating over Arrays (for i and foreach)	Theory+Lab	Quiz2
6	4	A1	Working with multiple Classes and Packages (Creating and Using)	Theory+Lab	
7	4	A1	OOP: Creating objects and using them through Inheritance and Member variables	Theory+Lab	Test 2
8	4	A1	The word Static , static Variables , static Methods .	Theory+Lab	
9	4	A1	Advanced OOP the word super and this , @Override	Theory+Lab	
10	4	A1	What are Exceptions ? Handling Exceptions , try-catch block, throw statement	Theory+Lab	
11	4	A1	Using classes from the Java API difference between StringBuilder and String And String manipulation	Theory+Lab	
12	4	A1	Converting between Numbers and Strings String.valueOf() , Integer.parseInt()	Theory+Lab	Report
13	4	A1	The Date class Parsing and Formatting Dates using SimpleDateFormat	Theory+Lab	
14	4	A1	Generics Classes and Methods	Theory+Lab	Seminar
15	4	A1	The java Collections API (List,Set, Map) and their base implementations (ArrayList, HashSet, HashMap)	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10
Mid-terms Exam:30
Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: Paul Deitel& Harvey Deitel, JAVA How to Program, 9th edition, 2011
Main references (sources)	Reference#1: https://docs.oracle.com/javase/tutorial/extra/certification/javase-8-programmer1.html#basics
Recommended books and references (scientific journals, reports...)	

			Creating a static personal webpage using HTML5 Creating a static personal webpage using HTML5+CSS		
5	4	A1	Client Side Scripting : Introducing JavaScript to create dynamic environment	Theory+Lab	Test 1
6	4	A1	Exam#1	Theory+Lab	Quiz2
7	4	A1	Server Side Scripting: Introducing PHP to handle server requests	Theory+Lab	
8,9,10,11	4	A1	Multiple Linked Dynamic Webpages Creating a dynamic personal login using HTML+PHP Handling requests via simple MySQL database Creating A Job application form with multiple pages Using Sessions with PHP	Theory+Lab	Test 2
12	4	A1	Exam#2	Theory+Lab	
13	4	A1	XML and Ajax : Understanding and applying XML with JavaScripting	Theory+Lab	
14	4	A1	Case study 1 : A problem to program selected by Instructor	Theory+Lab	
15	4	A1	Case study 2 : A problem to program selected by Instructor	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10
Mid-terms Exam:30
Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	2014 Jon Duckett HTML & CSS Design and Build Websites 1st Edition Wiley.
Main references (sources)	2020 Jon Duckett PHP & MySQL: Server-side Web Development 1st Wiley 2011 David Flanagan JavaScript The Definitive Guide 6th Oreilly
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Engineering Mathematics II

2. Course Code:

EGMM251

3. Semester / Year:

2nd Semester / Second Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل () ٢٠٢٥/٢٠٢٤ المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Prof. Dr. Emad Hasan Abood

Email: emad@coie-nahrain.edu.iq

8. Course Objectives

Course Objectives	<ol style="list-style-type: none"> To develop problem solving skills and understanding of related engineering mathematics topics To understand differential equation and its properties. To understand different solution methods of differential equation. To develop skills and understanding of vector calculus and their physical applications. To perform differentiation and integration of vectors.
--------------------------	---

9. Teaching and Learning Strategies

Strategy	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 group based solving problems.
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Vector Integral Calculus: Line Integrals, Double Integrals,	Theory	
2	4	A1	Green's Theorem, Surface area and surface Integral.	Theory	Quiz1
3	4	A1	Stokes's Theorem, Divergence Theorem.	Theory	
4	4	A1	Laplace Transforms I Laplace Transform. Linearity. First Shifting Theorem (s -Shifting), Transforms of Derivatives and Integrals.	Theory	Test 1
5	4	A1	Laplace Transforms II Unit Step Function, Second Shifting Theorem (t -Shifting), Short Impulses. Dirac's Delta Function. Partial Fractions, Gamma functions	Theory	Quiz2
6	4	A1	Laplace Transforms III	Theory	

			Other useful properties, Convolution. Integral Equations, Differentiation and Integration of Transforms, Systems of ODEs		
7	4	A1	Laplace Transforms IV Inverse Laplace Transform, General Formulas and Applications	Theory	Test 2
8	4	A1	Laplace Transforms V Solution of PDEs by Laplace Transforms	Theory	
9	4	A1	Fourier Analysis I Arbitrary Period. Even and Odd Functions. Half-Range Expansions, Forced Oscillations	Theory	
10	4	A1	Fourier Analysis II Approximation by Trigonometric Polynomials, Sturm–Liouville Problems. Orthogonal Functions, Orthogonal Series.	Theory	
11	4	A1	Fourier Analysis III Generalized Fourier Series, The use of Fourier Series in spectral analysis	Theory	
12	4	A1	Fourier Analysis IV Fourier Integral, Fourier Cosine and Sine Transforms, Fourier Transform. Fourier Transform properties.	Theory	Report
13	4	A1	Fourier Analysis V Fourier Transform of some useful functions, Discrete and Fast Fourier Transforms	Theory	
14	4	A1	Series Solutions of ODE I Power Series Method, Legendre’s Equation. Legendre Polynomials $P_n(x)$, Extended Power Series Method: Frobenius Method	Theory	Seminar
15	4	A1	Series Solutions of ODE II Bessel’s Equation. Bessel Functions $J_\nu(x)$, Bessel Functions of the $Y_\nu(x)$. General Solution	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1 Thomas and Finney, Calculus and Analytic Geometry, Pearson Education Inc,11th Ed. 2008.
Main references (sources)	Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley Sons Inc, 10th Ed. 2011.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

3	4	A1	Signal operations II; Time shifting, folding or reversing, Scaling of signals, Mixed operations.	Theory+Lab	
4	4	A1	Convolution; Convolution integral, evaluation of convolution, Convolution of discrete time signals, Input/output relations of systems.	Theory+Lab	Test 1
5	4	A1	System properties & Representations; Linearity, Time invariance, Memory, Causality, Stability, Parallel and Cascade systems, Feedforward & Feedback systems, Recursive and nonrecursive systems.	Theory+Lab	Quiz2
6	4	A1	LTI systems; Impulse response and unit step response of LTI systems	Theory+Lab	
7	4	A1	Fourier Analysis I; Definition of Fourier series of periodic signals, Exponential Fourier series, Line spectrum of periodic signals, Properties of F.S. analysis. Definition of Fourier Transform of nonperiodic signals, Properties of F.T.	Theory+Lab	Test 2
8	4	A1	Fourier Analysis III; System transfer function in frequency domain. The convolution theorem in frequency domain. Applications of F.T & convolution in signal transmission.	Theory+Lab	
9	4	A1	Laplace transform of analogue signals and systems	Theory+Lab	
10	4	A1	Analog –to-digital and digital-to-analog conversions Sampling of analog signals, The sampling theorem, Quantization and conversion, Digital-to-analog conversion, Analog-to-digital conversion, Basic element of digital signal processing.	Theory+Lab	
11	4	A1	Analysis of discrete signals and systems Representation of Systems by difference equation and block diagram, System properties, Test for Linear Time Invariant (LTI) systems, Up & Down sampling.	Theory+Lab	
12	4	A1	Discrete-time systems Input/output description of systems, Block diagram representation of discrete-time systems, Correlation of discrete-time signals, Properties of correlation.	Theory+Lab	Report
13	4	A1	The Z-transform Direct Z-transform, Inverse Z-transform, and Properties of the Z-transform.	Theory+Lab	
14	4	A1	Application of Z- transform in filtering techniques.	Theory+Lab	Seminar

	<ul style="list-style-type: none"> • Learn how to design and analyze the finite of state machine (FSM). • To perform SM Chart. • Learn how to design and analyze Asynchronous sequential circuits. • To learn VHDL and how to represent the Sequential Logic with it.
--	---

9. Teaching and Learning Strategies

Strategy	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.
----------	--

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Number systems and data encoding: Convert signed/unsigned, integer/fixed-point decimal numbers to/from binary/hex representations, Perform integer/fixed-point addition/subtraction using binary/hex number representations, Define precision and overflow for integer/fixed-point, signed/unsigned, addition/subtraction operations.	Theory+Lab	
2	4	A1	Boolean algebra applications: Define basic (AND, OR, NOT) and derived (e.g., NAND, NOR, XOR) Boolean operations, Enumerate Boolean algebra laws and theorems, Use basic and derived Boolean operations to evaluate Boolean expressions, Write and simplify Boolean expressions by applying appropriate laws and theorems and other techniques (e.g., Karnaugh maps).	Theory+Lab	Quiz1
3,4	4	A1	Basic logic circuits: Describe electrical representations of TRUE/FALSE, Describe physical logic gate implementations of basic (AND, OR, NOT) and derived (e.g., NAND, NOR, XOR) Boolean operations. Describe the high-impedance condition and logic gate implementation such as a tri-state buffer, Implement Boolean expressions using the two-level gate forms of AND-OR, OR-AND, NAND-NAND, NOR-NOR and positive/negative/mixed-logic conventions, Implement Boolean expressions using multiple gating levels and positive/negative/mixed-logic conventions, Discuss the physical properties of logic gates such as fan-in, fan-out, propagation delay, power consumption, logic voltage levels, and noise margin and their impact on the constraints and tradeoffs of a design. Explain the need for a hardware description language (HDL) in digital system design. Describe the logic synthesis process that	Theory+Lab	

			transforms an HDL description into a physical implementation, implement combinational networks using an HDL and generate/verify using appropriate design tools.		
5	4	A1	Modular design of combinational circuits: Describe and design single-bit/multi-bit structure/operation of combinational building blocks such as multiplexers, demultiplexers, decoders, and encoders. Describe and design the structure/operation of arithmetic building blocks such as adders (ripple-carry), subtractor, shifters, and comparators. Describe and design structures for improving adder performance such as carry lookahead and carry select. Analyze and design combinational circuits (e.g., arithmetic logic unit, ALU) in a hierarchical, modular manner, using standard and custom combinational building blocks. Implement combinational building blocks and modular circuits using an HDL and generate/verify using appropriate design tools.	Theory+Lab	Test 1
6,7	4	A1	Modular design of sequential circuits: Define a clock signal using period, frequency, and duty-cycle parameters. Explain the structure/operation of basic latches (D, SR) and flip-flops (D, JK, T). Describe propagation delay, setup time, and hold time for basic latches and flip-flops. Describe and design the structure/operation of sequential building blocks such as registers, counters, and shift registers. Analyze and create timing diagrams for sequential block operation. Enumerate design tradeoffs in using different types of basic storage elements for sequential building block implementation. Implement sequential building blocks using an HDL and generate/verify using appropriate design tools. Describe the characteristics of static memory types such as static SRAM, ROM, and EEPROM. Describe the characteristics of dynamic memories. Simulation and Testing of Sequential Circuits.	Theory+Lab	Quiz2
8,9	4	A1	Control and Datapath design: Describe a digital system that is partitioned into control+datapath and explain the need for control to sequence operations on a Datapath. Contrast the different types of Finite State Machines (FSMs): e.g., Mealy State Machine, Moore State Machine, and Algorithmic State Machine (ASM). Represent FSM operation graphically using a state diagram (e.g., Mealy state diagram, Moore state diagram, or ASM chart). Analyze state diagrams and create timing diagrams for FSM operation. Compute timing parameters such as maximum operating frequency, setup/hold time of synchronous inputs, clock-to-out	Theory+Lab	

			propagation delays, pin-to-pin propagate delay for a control+datapath design. Design an RTL model of a control+datapath using a HDL and synthesize/verify using appropriate design tools.		
10,11	4	A1	VHDL for Sequential Logic: Represent flip-flops, shift registers, and counters using VHDL processes, Write sequential VHDL statements, including if-then-else, case, and wait statements. Explain the sequence of execution for sequential statements and the order in which signals are updated when a process executes. Represent combinational logic using a process. Represent a sequential logic circuit with VHDL code. a. Use two processes. b. Use logic equations and a process that updates the flip-flops. c. Use a ROM and flip-flops. Given VHDL code for sequential logic, draw the corresponding logic circuit, Compile, simulate, and synthesize a sequential logic module.	Theory+Lab	Test 2
12	4	A1	Circuits for Arithmetic Operations: Analyze and explain the operation of various circuits for adding, subtracting, multiplying, and dividing binary numbers and for similar operations. Draw a block diagram and design the control circuit for various circuits for adding, subtracting, multiplying, and dividing binary numbers and for similar operations.	Theory+Lab	
13	4	A1	State Machine Design with SM Charts: State Machine Charts, Derivation of SM Charts, Realization of SM Charts.	Theory+Lab	
14	4	A1	Mid 1	Theory+Lab	
15	4	A1	Mid2	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: Charles H. Roth, Jr.& Larry L. Kinney, "Fundamentals of Logic Design", 7th Ed. Publisher: Cengage Learning, 2014, ISBN-13:978-1-111-62847-7
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

			of a discrete and continuous source, Maximum source entropy, source efficiency		
3	4	A1	Introduction to Information Theory-II Transition probability matrix of channel, Discrete noiseless and noisy channel models, uniform channel. Definition of mutual information & the average mutual information.	Theory	
4	4	A1	Information Transmission and Channel Capacity-I Information transmission over symmetric channel, noiseless channel, Binary symmetric channel, Ternary symmetric channel. Erasure Channel. Capacity of discrete channel.	Theory	Test 1
5	4	A1	Information Transmission and Channel Capacity-II Channel capacity for noiseless channels, Channel efficiency and redundancy. Channel capacity for symmetric channels. Channel capacity for non-symmetric channels, binary non-symmetric channel.	Theory	Quiz2
6	4	A1	Information Transmission and Channel Capacity-III Mutual information of continuous channel, Capacity of continuous channels. Efficiency and redundancy of continuous channels. Gaussian and uniform channels. Sampling of continuous source, Sampling Theorem, Nyquist theorem for transmission over band limited continuous channel. Shannon-Hartley channel capacity theorem.	Theory	
7	4	A1	Source Coding and Data Compression-I Source encoding; fixed and variable length codes, prefix property, Average length of source code, Source code efficiency and redundancy. Shannon-Fano source coding.	Theory	Test 2
8	4	A1	Source Coding and Data Compression-II Huffman source coding, compact codes, Source extension.	Theory	
9	4	A1	Source Coding and Data Compression-III Statistical compression techniques (Arithmetic Coding) , Standard Source Coding and Compression Examples.	Theory	
10	4	A1	Source Coding and Data Compression-IV. Dictionary Based Techniques (LZW), Transform coding for image, audio and video signals	Theory	
11	4	A1	Error Control Coding-I The channel coding, Main idea of error correction & detection codes, code rate (efficiency). Block and convolutional codes, Parity check codes, Binary repetition code, ASCII representation and other applications of channel coding	Theory	
12	4	A1	Error Control Coding-II Linear block codes, Matrix representation of linear block codes, Hamming codes, syndrome decoding, Hamming bound, and distance properties of LBC.	Theory	
13	4	A1	Error Control Coding-III Polynomial representation of block codes. Cyclic codes	Theory	

	<p>4- To outline the historical evolution of management theories.</p> <p>5- To explain how decisions are made within an organization and how those decisions are communicated to the various stakeholders.</p> <p>6- To relate the basic concepts of planning: the importance of planning, strategic planning, and the types of objectives and plans developed by organizations.</p> <p>7- To describe the various forms of structure available to an organization.</p> <p>8- To describe the control process including: the importance of control, tools for measuring organizational performance, and managerial actions.</p>
--	---

9. Teaching and Learning Strategies

Strategy	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 group based solving problems.
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	Managing and Performing, Managerial Decision Making	Theory	
2	2	A1	The History of management	Theory	Quiz1
3	2	A1	External and Internal organizational Environments and Corporate Culture	Theory	
4	2	A1	Ethics, corporate social responsibility	Theory	Test 1
5	2	A1	International Management	Theory	Quiz2
6	2	A1	The Strategic Analysis.	Theory	
7	2	A1	First Assessment (Lecture will continue after the assessment)	Theory	Test 2
8	2	A1	The Strategic Management Process	Theory	
9	2	A1	Continue: The Strategic Management Process	Theory	
10	2	A1	, Selection Criteria	Theory	
11	2	A1	Organizational Structures	Theory	
12	2	A1	Human Resource Management	Theory	Report
13	2	A1	Second assessment +Continue Human Resource Management	Theory	
14	2	A1	Leadership	Theory	Seminar
15	2	A1	Work Motivation for performance	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1 Principles of Management, Anastasia H. Cortes, David Bright, and Eva Hartmann, 1st Edition, 2019
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Database

2,3	4	A1	The Entity Relationship Model: ER diagrams, resolution of M:N relationships, and Table Instance Charts (TICs). Translations of TICs into relational tables.	Theory+Lab	Quiz1
4	4	A1	Introduction to SQL and relational database concepts: Relations and attributes. Candidate and primary keys. Foreign keys and why they are necessary. Introduction to relational operators and how they are applied. Learning how to interact with Oracle through the SQL*Plus. Creating and deleting tables.	Theory+Lab	
5	4	A1	Constraints imposed in a database: Updating and deleting rows in a table using the UPDATE TABLE, DELETE TABLE, and the DROP TABLE command with and without constraints. Implementation of the Selection and Projection operators. Ordering the results of a table according to a given attribute in ascending or descending orders.	Theory+Lab	Test 1
6	4	A1	Normalization of a database.: First, second and third normal forms. How to detect anomalies and use of the Armstrong's axioms for determining functional dependencies. Importance of normalizing a database and the types of anomalies that may be encountered in First, Second, and Third Normal Forms. How to recognize, prevent, and how to get rid of anomalies in these forms.	Theory+Lab	Quiz2
7	4	A1	Continuation of the normalization process.: BCNF form and Dependency preservation. Algorithms to ensure dependency preservation. The Join operator and its different types. Advantages and disadvantages of higher normal forms from an operational point of view.	Theory+Lab	
8,9	4	A1	Boolean Operators in SQL: pattern matching using the LIKE clause, % and underscore characters. Arithmetic Operations and use of built-in functions in SQL. Introduction to Group functions using the Group by clause and additional built in functions. Processing dates and time and basic arithmetic with dates. Formatting of dates and times.	Theory+Lab	Test 2
10	4	A1	Storage and Query Processing: RAID, Storage access, indexing and hashing, query processing and query optimization.	Theory+Lab	
11	4	A1	Transaction Management: Transactions and concurrency control. The notion of transactions, ACID properties of transactions, concurrent schedules, serializability, locking protocols.	Theory+Lab	
12	4	A1	Database Recovery Techniques: Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm, Recovery in Multidatabase Systems, Database Backup and Recovery from Catastrophic Failures.	Theory+Lab	
13	4	A1	Non-SQL Database	Theory+Lab	
14	4	A1	Mid-1	Theory+Lab	Report

15	4	A1	Mid-2	Theory+Lab
11. Course Evaluation				
Quiz and Assignments:10 Mid-terms Exam:30 Final Exam: 60				
12. Learning and Teaching Resources				
Required textbooks (curricular books, if any)			Book#1: C. J. Date, "Introduction to Database Systems", 8th Ed. Publisher: Addison-Wesley, 2003 Book#2: Ramez Elmasri, Shamkant B. Navathe, " Fundamentals of Database Systems", 7th Ed. Publisher: Pearson, 2016.	
Main references (sources)			Website: MIT Open Courseware (https://ocw.mit.edu/)	
Recommended books and references (scientific journals, reports...)				
Electronic References, Websites				

6	2	A1	الديمقراطية شبه المباشرة	Theory	
7	2	A1	(النيابية) الديمقراطية التمثيلية	Theory	Test 2
8	2	A1	=	Theory	
9	2	A1	الية النظام التمثيلي (الانتخاب	Theory	
10	2	A1	=	Theory	
11	2	A1	تنظيم عملية الانتخاب	Theory	
12	2	A1	=	Theory	Report
13	2	A1	نظم الانتخابات	Theory	
14	2	A1	=	Theory	Seminar
15	2	A1	الحكم الصالح	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1 Principles of Management, Anastasia H. Cortes, David Bright, and Eva Hartmann, 1st Edition, 2019
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Numerical Methods
2. Course Code:
NUMD301
3. Semester / Year:
1 st Semester / Third Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل () ٢٠٢٥/٢٠٢٤ المرحلة ()										رقم الأسبوع ()	
										اسم المادة	
										عدد الساعات	
										اسم التدريسي + التوقيع + التاريخ	
										اسم الطالب	

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Lect. Dr. Raya Kahtan Mohammed Email: rayakhahtan@coie-nahrain.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> To develop problem solving skills and understanding of related numerical methods topics To understand absolute and relative errors, rounding and computer errors. To understand how to find roots of equation using numerical methods. To analyze system of linear equation. To perform methods of least square and interpolation. To evaluate different numerical integration To determine numerical differentiation To solve numerically ordinary differential equation and related physical systems

9. Teaching and Learning Strategies	
Strategy	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 group based solving problems.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Introduction to numerical methods I	Theory+Lab	

			Absolute and relative errors, Rounding and chopping, Computer errors in representing numbers.		
2	4	A1	Introduction to numerical methods II Review of Taylor series and some useful mathematical relations	Theory+Lab	Quiz1
3	4	A1	Roots of Equations I Graphical Methods, Bisection method, Newton method	Theory+Lab	
4	4	A1	Roots of Equations II Secant method, Systems of nonlinear equations	Theory+Lab	Test 1
5	4	A1	Systems of Linear Equations I Gaussian elimination, Gaussian elimination with scaled partial pivoting and Tri-diagonal systems.	Theory+Lab	Quiz2
6	4	A1	Systems of Linear Equations II Gauss-Jordan method	Theory+Lab	
7	4	A1	Methods of Least Squares Linear Regression, Polynomial Regression, Multiple Linear Regression	Theory+Lab	Test 2
8	4	A1	Interpolation Newton's Divided Difference method, Lagrange interpolation, Inverse Interpolation	Theory+Lab	
9	4	A1	Numerical Integration I Trapezoid rule, Simpson's Rules	Theory+Lab	
10	4	A1	Numerical Integration II Romberg algorithm	Theory+Lab	
11	4	A1	Numerical Differentiation I Estimating derivatives	Theory+Lab	
12	4	A1	Numerical Differentiation II Richardson Extrapolation	Theory+Lab	Report
13	4	A1	Ordinary Differential Equations I Euler's method, Improvements of Euler's method, Runge-Kutta methods,	Theory+Lab	
14	4	A1	Ordinary Differential Equations II Methods for systems of equations, Adaptive RK Methods, Multistep Methods, Boundary value problems	Theory+Lab	Seminar

9. Teaching and Learning Strategies

Strategy	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.
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Defining service, protocol, network edge, network core – packet and circuit switching	Theory+Lab	
2	4	A1	Delay, loss, and throughput in packet-switched Networks	Theory+Lab	Quiz1
3	4	A1	Layered architecture and encapsulation	Theory+Lab	
4	4	A1	The Web and HTTP protocol, Web caching	Theory+Lab	Test 1
5	4	A1	Domain Name System, Video streaming with case studies of Netflix, YouTube, and Kankan	Theory+Lab	Quiz2
6	4	A1	EXAM-I	Theory+Lab	
7	4	A1	Services, multiplexing and demultiplexing, connectionless (UDP)	Theory+Lab	Test 2
8	4	A1	Reliable data transfer and TCP	Theory+Lab	
9	4	A1	Forwarding and routing, service model, Internet protocol version 4 addressing, subnetting, and CIDR	Theory+Lab	
10	4	A1	Network address translation, Internet protocol version 6	Theory+Lab	
11	4	A1	Generalized forwarding and Software Defined Networks	Theory+Lab	
12	4	A1	EXAM-II	Theory+Lab	Report
13	4	A1	Practicing network design with IPv4 addressing and subnetting	Theory+Lab	
14	4	A1	Routing algorithms, Distance vector and Link state	Theory+Lab	Seminar
15	4	A1	SDN control plane and Open-flow protocol	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10
 Mid-terms Exam:30
 Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Text Book : Numerical Methods for Engineers Author : Steven C. Chapra and Raymond P. Canal Publisher : McGraw Hill Edition & Year: 6th Edition, 2010
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

			bandwidths, single-tone and multi-tone signals.		
4	4	A1	Definition of Signals and Systems-II: Fourier Series, Line Spectrum, Fourier Transform, Modulation Property, Linear Time Invariant System, Ideal Filters, Power and Energy spectral density, Noise and distortion in Communication Systems, Signal-to-Noise Ratio.	Theory+Lab	Test 1
5	4	A1	Linear Modulation-I: Double-Side-Band Suppressed Carrier (DSB-SC), Double-Side-Band with Large Carrier (DSB-LC), Single-Side-Band (SSB), Coherent and noncoherent demodulation,	Theory+Lab	Quiz2
6	4	A1	Linear Modulation-II: Vestigial Side Band, Quadrature Amplitude Modulation (QAM), Frequency Mixers in communication systems, Standard Receiver.	Theory+Lab	
7	4	A1	Angle Modulation-I: Frequency Modulation (FM), Phase Modulation (PM), Spectrum of Angle Modulated Wave, Narrow & wideband signals.	Theory+Lab	Test 2
8	4	A1	Angle Modulation-II: The Phased Locked Loop Principles & Applications, Generation & Reception of FM Signal. FM stereophonic system, FM Standard Radio Receiver.	Theory+Lab	
9	4	A1	Pulse Modulations and Codec I: Sampling Theorem, Practical Sampling, Pulse Amplitude Modulation (PAM)	Theory+Lab	
10	4	A1	Pulse Modulations and Codec II: Pulse Width Modulation (PWM), Pulse Time Modulation. (PPM), PCM for speech signals, Uniform and Non-uniform Quantizers, Differential PCM, Linear Delta Modulation, DM with Double Integrations, Delta Sigma Modulation, Adaptive DM	Theory+Lab	
11	4	A1	Transmission of Digital Signals-I: Baseband and Passband Transmission, Types of line codes, the derivation of Power Spectral Density (PSD) of digital Signals, PSD of some important line codes, Pulse Shaping & ISI reduction.	Theory+Lab	
12	4	A1	Transmission of Digital Signals-II: Amplitude Shift Keying (ASK), On-Off Keying (OOK), Phase Shift Keying (PSK), Differential PSK and QPSK Frequency Shift Keying (FSK).	Theory+Lab	Report
13	4	A1	Transmission of Digital Signals-III: Minimum Shift Keying (MSK), Bandwidth Versus Transmission Rate Comparison of Different Signals.	Theory+Lab	
14	4	A1	Data Transmission: Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity.	Theory+Lab	Seminar

3. To understand threads and scheduling.
4. To learn how CPU and operating system works interoperable and CPU scheduling algorithms.
5. To learn and understand OS kernel and different OSES available.
6. To understand I/O devices and management within OSES.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and lab sessions, 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.
-----------------	--

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Operating System Overview: The evolution of operating systems, Major Achievements.	Theory+Lab	
2	4	A1	Process Description and Control: What Is a Process? process states, process description, process control.	Theory+Lab	Quiz1
3	4	A1	Threads: types of threads, multithreading models.	Theory+Lab	
4,5	4	A1	Process synchronization: background, the critical-section problem, synchronization hardware, semaphores, deadlocks and starvation.	Theory+Lab	Test 1
6	4	A1	Midterm Exam 1	Theory+Lab	Quiz2
7	4	A1	Virtual Memory: Hardware and control structure.	Theory+Lab	
8	4	A1	CPU scheduling: Uniprocessor: basic concepts, criteria, and algorithms	Theory+Lab	Test 2
9	4	A1	CPU scheduling: Multiprocessor: Real-time scheduling	Theory+Lab	
10, 11	4	A1	I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, Operating System Design Issues.	Theory+Lab	
12	4	A1	Midterm Exam 2	Theory+Lab	
13	4	A1	Computer security threads: Computer Security Concepts,	Theory+Lab	

			Threats, Attacks, and Assets, Intruders, Malicious Software, Viruses, Worms, and Bots.		
14-15	4	A1	Computer security techniques: Authentication, Access Control, Intrusion Detection, Malware Defense.	Theory+Lab	Report

11. Course Evaluation

Quiz and Assignments:10
Mid-terms Exam:30
Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	William Stallings, OPERATING SYSTEMS INTERNALS AND DESIGN PRINCIPLES, 9th Ed., Pearson, 2018
Main references (sources)	
Recommended books and references (scientific journals, reports...)	A. Silberschatz, Peter B. Galvin, and G. Gagne, Operating system concepts, 8th Edition, Addison-Wesely, 2008
Electronic References, Websites	

1. Course Name:
Artificial Intelligence
2. Course Code:
AINT307
3. Semester / Year:
1 st Semester / Third Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٥/٢٠٢٤ المرحلة ())										رقم الاسبوع ()	
										اسم المادة	عدد الساعات
										اسم التدريسي + التوقيع + التاريخ	اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Prof. Dr. Lahieb M. Jawad Email: lahieb.m.jawad@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> To learn Artificial Intelligence: what is AI, why do we need. To understand Predicate calculus (logic). To Introduce Inference rules (Resolution theorem proving). To understand Network representation. Learn about Procedural representation. Learn about Problem Solving using State Space. Learn about Blind search. Learn about Heuristic search, using heuristic in games and MARcov models.

9. Teaching and Learning Strategies	
Strategy	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.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Introduction to Artificial Intelligence: what is AI, why do we need AI, An overview of some of AI approach applications.	Theory+Lab	
2,3	4	A1	Predicate calculus (logic): Propositional calculus (logic),	Theory+Lab	Quiz1

			Predicate calculus (logic), constants, variables, functions, predicates and how to represent English statements using predicate logic, syntax and semantic of predicate logic.		
4	4	A1	Inference rules (Resolution theorem proving): convert to clause form. Examples of resolution with propositional and predicate logic.	Theory+Lab	
5	4	A1	Network representation: Semantic net and conceptual graphs.	Theory+Lab	Test 1
6	4	A1	Procedural representation: Production systems, forward and backward chaining, Examples of Production systems.	Theory+Lab	Quiz2
7	4	A1	Exam-I	Theory+Lab	
8	4	A1	Problem Solving using State Space: Introductory concepts and state space search, Data driven and goal driven search.	Theory+Lab	Test 2
9	4	A1	Blind search: (depth-first search, breadth-first search, depth limited search and iterative deepening search)	Theory+Lab	
10	4	A1	Heuristic search: (Hill climbing algorithm and Best first search).	Theory+Lab	
11	4	A1	Heuristic search: (A algorithm, and A* algorithm).	Theory+Lab	
12	4	A1	Exam-II	Theory+Lab	
13	4	A1	Using heuristic in games: (Minimax procedure and alpha-beta procedure)	Theory+Lab	Report
14	4	A1	Introduction to Dynamic Programming	Theory+Lab	
15	4	A1	Markov models : Markov processes and Hidden Markov models	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: George F. Luger, Artificial Intelligence, structures and strategies for complex problem solving, 6th Edition, 2009. Book#2: Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Fourth Edition, Prentice Hall, 2020
Main references (sources)	
Recommended books and references (scientific journals, reports...)	References#1: Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill, 2010. References#2: E Charniak and D McDermott, "Introduction to Artificial Intelligence".

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	NOUN CLAUSES: Noun Clauses with (Question Words, Whether or If, and That). Question Words Followed by Infinitives. Quoted Speech. Reported Speech: Modal Verbs in Noun Clauses. The Subjunctive in Noun Clauses	Theory	
2	2	A1	ADJECTIVE CLAUSES: Adjective Clause Pronouns, Using: (Whose, Where, and When) in -Adjective Clauses. Using Adjective Clauses to Modify Pronouns. Punctuating Adjective Clauses. Reducing Adjective Clauses to Adjective Phrases.	Theory	Quiz1
3	2	A1	GERUNDS AND INFINITIVES: Common Verbs Followed by: Gerunds, and Infinitives. Infinitives with Objects. Using Gerunds as the Objects of Prepositions. Gerunds and Infinitives as Subjects	Theory	
4	2	A1	COORDINATING CONJUNCTIONS: Parallel Structure, Parallel Structure: Using Commas. Punctuation for Independent Clauses; Connecting "Them" with "And" & "But". Paired conjunctions: Both...And; Not Only...But Also; Either...Or; Neither ...Nor	Theory	Test 1
5	2	A1	ADVERB CLAUSES: Using Adverb Clauses to Show: Time Relationships. Cause and Effect. Expressing Contrast Using Even Though. Showing Direct Contrast: While. Expressing Conditions in Adverb Clauses	Theory	Quiz2
6	2	A1	Mid Exam	Theory	
7	2	A1	REDUCTION OF ADVERB CLAUSES TO MODIFYING ADVERBIAL PHRASES: Changing Time Clauses to Modifying Adverbial Phrases. Expressing the Idea of "During the Same Time" in Modifying Adverbial Phrases. Expressing Cause and Effect in Modifying Adverbial Phrase. Using Upon+ -----ing in Modifying Adverbial Phrases.	Theory	Test 2
8	2	A1	CONNECTIVES THAT EXPRESS CAUSE AND EFFECT, CONTRAST, AND CONDITION: Using Because Of and Due To Cause and Effect: Using Therefore, Consequently, and So. Summary of Patterns and Punctuation. Other Ways of Expressing Cause and Effect: Such ...That and So ...That. Expressing Purpose: Using So That.	Theory	

9	2	A1	CONDITIONAL SENTENCES AND WISHES: Overview of Basic Verb Forms Used in Conditional Sentences. Expressing Real Conditions in the Present or Future. Using "Mixed Time" in Conditional Sentences. Wishes About the Present, Past, and Future. Use of Wish + Would	Theory	
10	2	A1	ASKING QUESTIONS: Yes/No questions, Questions with: (where, why, when, and what time, with who. who(m) and what). Using: (how often, how far, which, what kind of, and what + a form of do). Using how about and what about, Tag questions.	Theory	
11	2	A1	MODAL AUXILIARIES: Expressing ability: can and could. Expressing possibility: May and Might Expressing permission may and can. Polite questions. Expressing advice. Expressing necessity. Making logical conclusions. Making suggestions. Stating preferences.	Theory	
12	2	A1	WRITING Thesis: How to avoid plagiarism, Summary & paraphrase. Writing and analysis of abstracts.	Theory	Report
13	2	A1	WRITING Thesis: How to read and take notes, how to organize notes. How to write a thesis statement (Active/Passive voice). How to write introductions & conclusions.	Theory	
14	2	A1	WRITING Thesis: The research process Styles of documentation, Use of sources, Skills of Information Competency, Tools of Research.	Theory	Seminar
15	2	A1	Mid Exam	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Understanding and using English grammar, 5th edition, Betty Azar and Stacy A. Hagen
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Fundamentals of English Grammar, 3rd edition, Betty S. Azar, 2000
Electronic References, Websites	

1. Course Name:

Computer Systems and Microprocessors

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Introduction to Computers: Characteristics of Computers, Components of a computer, Types of Computers, Computer System Hardware	Theory+Lab	
2,3	4	A1	Register transfer and Microoperations: Register Transfer Language, Bus and Memory Transfer, ALU Microoperations, Arithmetic logic shift unit (ALU).	Theory+Lab	Quiz1
4	4	A1	Basic computer organization and Design: Instruction codes, computer registers, computer instructions, Timing and control, Design of basic computer.	Theory+Lab	
5	4	A1	Hardware architecture: Microprocessors, Computer bus, Bus skew, Bus types: Synchronous bus, Asynchronous bus.	Theory+Lab	Test 1
6	4	A1	The CPU: Arithmetic and Logic Unit (ALU), CPU structure, Instruction cycle, Instruction fetch and decode, determine the type of instruction.	Theory+Lab	Quiz2
7	4	A1	Memory hierarchy: Cache memory, associative memory.	Theory+Lab	
8	4	A1	Exam	Theory+Lab	Test 2
9	4	A1	The 8086 Microprocessor and its Architecture: Internal Microprocessor Architecture, The programming Model, Multipurpose registers, special registers, segment registers.	Theory+Lab	
10	4	A1	Addressing Modes: Register, Immediate, Direct, Register-indirect, base-plus index, register relative.	Theory+Lab	
11	4	A1	Data Movement Instructions:	Theory+Lab	

9. Teaching and Learning Strategies

Strategy

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Review on layering model, data encapsulation, physical and logical addressing, data and control planes	Theory+Lab	
2,3	4	A1	IPv4 datagram format, fragmentation, NAT protocol, and ARP protocol	Theory+Lab	Quiz1
4	4	A1	WEB, DNS, and DHCP protocols	Theory+Lab	
5	4	A1	SNMP and the ICMP protocol	Theory+Lab	Test 1
6	4	A1	Matching and action, examples using OpenFlow	Theory+Lab	Quiz2
7	4	A1	Exam 1	Theory+Lab	
8	4	A1	Review on distance vector and link state algorithms. RIPv2 datagram format, OSPF protocol	Theory+Lab	Test 2
9	4	A1	CIDR and Hierarchal routing, the BGP protocol, AS paths, route aggregation, best routes, and IP anycast	Theory+Lab	
10	4	A1	UDP segment structure and checksum, TCP segment structure, Timers, and RTT estimation	Theory+Lab	
11	4	A1	TCP flow control and connection management	Theory+Lab	
12	4	A1	Principles of congestion control, causes and cost of congestion, approaches to congestion control	Theory+Lab	
13	4	A1	Exam2	Theory+Lab	Report
14,15	4	A1	Services at the link layer, error detection and correction – parity checks	Theory+Lab	

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Basic Concepts, Protocols and Terminology: Clients, Servers and Peers, Ports and Sockets, The Internet and IP Addresses, Internet Services, URLs and DNS, TCP and UDP	Theory+Lab	
2	4	A1	Starting Network Programming in Java: The <i>InetAddress</i> Class	Theory+Lab	Quiz1
3	4	A1	TCP Sockets	Theory+Lab	
4	4	A1	Network Programming with GUIs	Theory+Lab	Test 1
5	4	A1	Ports scanning	Theory+Lab	Quiz2
6	4	A1	Multithreading and Multiplexing	Theory+Lab	
7	4	A1	Thread Basics, Using Threads in Java, Extending the Thread Class	Theory+Lab	Test 2
8	4	A1	Explicitly Implementing the Runnable Interface	Theory+Lab	
9	4	A1	Multithreaded Servers	Theory+Lab	
10	4	A1	Java Database Connectivity (JDBC) , Creating an ODBC Data Source	Theory+Lab	
11	4	A1	Simple Database Access	Theory+Lab	
12	4	A1	Modifying the Database Contents	Theory+Lab	Report
13	4	A1	Using a GUI to Access a Database	Theory+Lab	
14			Scrollable Result Sets in JDBC, Modifying Databases via Java Methods		
15			Design and implementation of a multithreaded gui-client server application		

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: Jan Graba , An Introduction to Network Programming w Java: Java 7 Compatible , 3rd edition 2013
Main references (sources)	
Recommended books and references (scientific journals, reports...)	References : Elliotte Rusty Harold , Java Network Programmi Second Edition 2020
Electronic References, Websites	

1. Course Name:

Queuing Theory

2. Course Code:

QUEU354

3. Semester / Year:

2nd Semester / Third Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٠-٢٠٢٤) المرحلة ()										رقم الأسبوع ()	
										اسم المادة	
										عدد الساعات	
										اسم التدريسي + التوقيع + التاريخ	
										اسم الطالب	

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Salim A. Mohammed Ali

Email: salimm@nahrianuniv.edu.iq

8. Course Objectives

Course Objectives	
	9. To understand the concept of Queuing system analysis
	10. To learn the basics of Markov chains and its relation to Queuing systems.
	11. To recognize different type of Queuing systems such as single and multi-server systems.
	12. To learn the performance measurements parameters of Queuing systems and how to identify these measurements.
	13. To analyze existing systems into Queuing models.

9. Teaching and Learning Strategies

Strategy	
	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and tutorial sessions, 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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Introduction: Course layout, definitions of queuing theory, queuing models with case studies of File server, network router, and multiprocessor system.	Theory	
2	4	A1	Poisson Process: Foundation of the Poisson Process, Poisson Distribution Mean and Variance, The Inter-Arrival Time, The Markov Property, Exponential Service Times.	Theory	Quiz1
3	4	A1	M/M/1 Queue (Part I): Birth-death process, pure birth process, pure death process.	Theory	

4	4	A1	M/M/1 Queue (Part II): Foundation of the M/M/1 queueing system, flows and balancing, analysis in detail, Little's Law.	Theory	Test 1
5	4	A1	M/M/1/K Queue: Analysis of steady state and performance measures.	Theory	Quiz2
6	4	A1	Exam I.	Theory	
7	4	A1	M/M/∞ Queue: Analysis of steady state and performance measures.	Theory	Test 2
8	4	A1	M/M/m Queue: Erlang C system analysis and performance measure, using Erlang C chart to find probability of queuing.	Theory	
9	4	A1	M/M/m/K Queue: Analysis of steady state and performance measures.	Theory	
10	4	A1	M/M/m/m Queue: Erlang B system analysis and performance measure, using Erlang B chart to find probability of queuing.	Theory	
11	4	A1	Open Queuing Networks: The product form solution, the global balance equation, Jacksons network.	Theory	
12	4	A1	Exam II.	Theory	Report
13	4	A1	Open Queuing Networks: Practicing Open queuing network analysis	Theory	
14	4	A1	Closed Queuing Networks (Part I): Cyclic network and mean value analysis	Theory	
15	4	A1	Closed Queuing Networks (Part II): Practicing MVA of closed queuing network	Theory	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book#1: Thomas G. Robertazzi, Computer Networks and System Queueing Theory and Performance Evaluation, 1st Edition Springer-Verlag, 1990.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Storage Area Networks

2. Course Code:

SANN356

3. Semester / Year:

2nd Semester / Third Year

4. Description Preparation Date:

5-5-2025

5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٠/٢٠٢١) المرحلة ()										رقم الأسبوع ()	
										اسم المادة	
										عدد الساعات	
										اسم التدريسي + التوقيع + التاريخ	
										اسم الطالب	

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Prof. Mustafa A. Neamah
Email: mstfkadum@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives

- To learn about storage devices, HDD and SSD
- To understand the performance of these storage devices.
- To understand how storage arrays works, their features and properties.
- To understand RAID, its different configurations, and variations.
- Learn about fiber channel SAN.
- Learn about iSCSi SAN and how it participates in storage networks.
- Learn about NAS arrays and file storage with contrast to block storage.

9. Teaching and Learning Strategies

Strategy

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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Storage Devices part-1	Theory	
2	4	A1	Storage Devices part-2	Theory	Quiz1
3	4	A1	Storage Arrays: Architectural Principles,	Theory	
4	4	A1	Storage Arrays: All-Flash Arrays, Deduplication, pros and cons.	Theory	Test 1
5	4	A1	RAID: What Is RAID, RAID Groups,	Theory	Quiz2
6	4	A1	RAID: RAID Levels, and The Future of RAID.	Theory	
7	4	A1	Fiber Channel SAN: Why FC SAN, SAN Topologies,	Theory	Test 2
8	4	A1	Fiber Channel SAN: Redundancy, FC SAN.	Theory	
9	4	A1	Midterm-I	Theory	
10	4	A1	iSCSI SAN: IP Network Considerations,	Theory	
11	4	A1	iSCSI Names and Device Login Authentication	Theory	
12	4	A1	Files, NAS, and Objects: NAS Protocols,	Theory	Report
13	4	A1	NAS Arrays, Object Storage and NAS Performance	Theory	
14	4	A1	Midterm-II	Theory	
15	4	A1	Data Center Design, Data Center Overview and cabling	Theory	

11. Course Evaluation

	<p>19. To develop skills and understanding of channel capacity and redundancy.</p> <p>20. To understand ethical leadership in engineering and society and Conflicts of interests</p> <p>21. To know ethics in the workplace, Fairness (personal and social) source code construction.</p> <p>22. To understand ethics in the electronic and digital age, privacy and confidentiality issue, responsible conduct of research, intellectual property and society.</p>
--	---

9. Teaching and Learning Strategies

Strategy	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 group based solving problems.
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	Course introduction and overview, Morals and ethics, Comparison of ethics and engineering ethics, Ethics at personal and student level	Theory	
2	2	A1	The concept of professions: The importance of ethics in science and engineering, The role of codes of ethics, Professional responsibilities of engineers	Theory	Quiz1
3	2	A1	The concept of morality: The importance of core values, Moral/ethical dilemmas and hierarchy of moral values, Factors affecting moral responsibility, and degrees of responsibility	Theory	
4	2	A1	Overview of ethical theories and applications	Theory	Test 1
5,6	2	A1	Basics of ethical analyses and decision-making	Theory	Quiz2
7	2	A1	The importance if intention: Truth (personal and social), The concept of whistleblowing	Theory	
8	2	A1	Ethical leadership in engineering and society, Conflicts of interests	Theory	Test 2
9	2	A1	Engineers in organizations: Ethics in the workplace, Fairness (personal and social)	Theory	
10	2	A1	Specific case example – Challenger Incident	Theory	
11	2	A1	Reliability, risk and safety: Risk management, Resource allocations	Theory	
12	2	A1	Ethics in the electronic and digital age, Privacy and confidentiality issue	Theory	
13	2	A1	Responsible conduct of research, Intellectual property and society	Theory	Report
14	2	A1	Ethics and the environment, Innovation and ethics	Theory	
15	2	A1	Class summary and closure	Theory	Seminar

11. Course Evaluation

Quiz and Assignments:10

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Antennas (Definition, types, gain , directivity, pattern , S-parameters)	Theory+Lab	
2	4	A1	Propagation (modes, LOS transmission, link budget)	Theory+Lab	Quiz1
3	4	A1	Fading (Propagation mechanism / Channels types / channel models)	Theory+Lab	
4	4	A1	Spread Spectrum (DSSS / FHSS) (power and processing gain calculations)	Theory+Lab	Test 1
5	4	A1	Cellular Networks Principles (frequency reuse calculations / handover / modes)	Theory+Lab	Quiz2
6	4	A1	1st and 2nd generations (specification / network architecture / component rules)	Theory+Lab	
7	4	A1	3rd generation	Theory+Lab	Test 2
8	4	A1	4th generation (net architecture / technologies)	Theory+Lab	
9	4	A1	5th generation (net architecture / technologies)	Theory+Lab	
10	4	A1	6th generation (technologies)	Theory+Lab	
11	4	A1	LAN tech	Theory+Lab	
12	4	A1	WLAN (802.11) architecture / services / protocol stack	Theory+Lab	Report
13	4	A1	WLAN (802.11) frame structure	Theory+Lab	
14			BT(802.15) usage models, net archi, states and procedures,		
15			BT(802.15) protocol stack , frame structure		

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Text book-1: wireless communication and networking
Author: William Stalling
Publisher: Pearson
Edition & Publication Year: 2nd Ed., 2005

Text book-2: Data & Computer Communications
Author: William Stalling
Publisher: Pearson Prentice Hall
Edition & Publication Year: 10th Ed., 2014

Main references (sources)

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

1. Course Name:

Network Security

2. Course Code:

NSEC403

			(Secure/Multipurpose Internet Mail Extensions), Limitations of the SMTP/RFC822 scheme, S/MIME Certificate Processing, Pretty Good Privacy (PGP), PGP Operation (Authentication, Confidentiality, Confidentiality & Authentication, Email Compatibility, and Compression), PGP operation procedure.		
5	5	A1	Cryptographic Keys and Key Rings, Key types: Symmetric, Asymmetric” Cryptography (Public/Private Key), PGP Session Keys, PGP Public & Private Keys, PGP Key Rings, The procedure to keep the private key in the private-key ring , PGP Message Generation, PGP Message Reception, PGP Message Format,	Theory+Lab	Quiz2
6	5	A1	IP security, Goals of IPSec, IPSec Architecture, IPsec operation modes (Transport and Tunnel Modes), Protocol architecture for the two modes.	Theory+Lab	
7	5	A1	Security Associations, Authentication Header (AH), Encapsulating Security Payload (ESP), Key management, Oakley, Internet Security Association & Key Management Protocol (ISAKMP), Internet key exchange (IKE) Payloads & Exchanges, Combining Security Associations.	Theory+Lab	Test 2
8	5	A1	Web security, Web Traffic Security Approaches, Secure Sockets Layer, SSL Architecture, SSL concepts, connection state OF SSL, SSL Record Protocol, SSL Record Format, SSL Handshake Protocol.	Theory+Lab	
9	5	A1	Transport Layer Security (TLS), Secure Electronic Transactions (SET), Key Features of SET, SET Process Steps, Payment Gateway Authorization.	Theory+Lab	
10	5	A1	A Comparison of Threats on the Web, Intruders, intrusion techniques, intrusion detection, Intrusion prevention, rule-based intrusion detection, Techniques for learning passwords, password management, Intrusion detection Methods, distributed intrusion detection, honey pots.	Theory+Lab	
11,12	5	A1	Malicious Software, Trojan Horse, Mobile Code, Multiple-Threat Malware, Viruses, Virus Structure, Compression Virus, Virus Classification, E-Mail Viruses, Virus Countermeasures, Methods of Antivirus, Worms, Worm Technology, Worm Countermeasures, Network Based Worm Defense, Distributed Denial of Service Attacks, DDoS Countermeasures, Digital Immune System, Behavior-Blocking Software.	Theory+Lab	
13	5	A1	Firewall, design principles, Firewall capability, Firewall Limitations, Types of firewalls, packet filters, Attacks on Packet Filters, Stateful Packet Filters, Application Level Gateway (Proxy), Circuit Level Gateway, Firewall rule contents, Comparisons of Firewall, Host-Based	Theory+Lab	Report

			Firewalls, Personal Firewalls, Firewall Configurations, Distributed Firewalls, DMZ Networks, Virtual Private Networks.		
14	5	A1	Cryptography, Cryptography capability, the strength of ciphers, cryptographic system components, RSA Algorithm, Generation Keys of RSA, RSA Encryption and Decryption.	Theory+Lab	
15	5		Final Exam		

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Text book1: William Stallings, “Cryptography and Network Security; Principles and Practice” , 5 th Edition, 2010. Textbook2: Joseph Migga Kizza, “Guide to Computer Network Security” , Springer, 4 th Edition , 2017.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Cloud Computing
2. Course Code:
CLCP405
3. Semester / Year:
1 st Semester / Fourth Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة الفصل (٢٠٢٥/٢٠٢٤ المرحلة ())										رقم الأسبوع ()	
										اسم المادة	عدد الساعات
										اسم التدريسي + التوقيع + التاريخ	
										اسم الطالب	

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Lect. Dr. Salim A. Mohammed Ali Email: salimm @nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> To understand the main terminologies and new techniques used in Cloud Computing. To learn about the different types of Cloud Computing. To learn how to design and establish a small Cloud computing system. To learn about the current programming and scripting technique that are used in Cloud computing services. To obtain knowledge of how to scale cloud servers vertically and horizontally.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and tutorial sessions, 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.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	The Era of Cloud Computing: The Motivations for Cloud, Power wall, Racks of Server Computer, Elastic Computing, Multi-tenant Clouds, IaaS, PaaS, SaaS, and DaaS.	Theory	

2	4	A1	Types of Clouds and its Providers: Private and Public Cloud, Provider Lock-in, Hybrid Cloud, Multi-Cloud, Hyperscale.	Theory	Quiz1
3	4	A1	Data Center Infrastructure and Equipment: Racks, Aisles, and Pods, Power and Cooling, Network Equipment, North-South and East-West Network Traffic, Fat tree Design, leaf spine scaling, Unified Data Centers Network.	Theory	
4	4	A1	Virtual Machines and Containers: Approaches To virtualization, Properties of Virtualization, Level of Trust and I/O devices, VM Migration, Hypervisor. Container approach, Docker Containers, Docker software components.	Theory	Test 1
5	4	A1	Virtual Networks and Virtual Storage: Virtual Networks, Overlay and Underlays, VLANs, VXLAN, Virtual Network Switch, NAT, Mobility, SDN, The OpenFlow Protocol, Programmable Networks. Local and Remote Storage, NAS, SAN, Object Storage.	Theory	Quiz2
6	4	A1	Cloud Automation and Orchestration: The need of Automation, Level of Automation, Use of ML and AI, Automation Tools, Zero Touching Provision. Kubernetes Scope, Kubernetes Cluster and Pods, Init Containers, Control Plane Software and Communication, Worker Node Software.	Theory	
7	4	A1	The Map Reduce Paradigm: Cloud native vs. Conventional Software, Parallel Processing, MapReduce Programming Paradigm, Math of MapReduce, Apache Hadoop, HDFS, Hadoop support for Programming languages.	Theory	Test 2
8	4	A1	Microservices: Monolithic Apps in Data Centers, The Microservices Approach: Pros and Cons, Microservices Granularity, Communication Protocols for Microservices, Service Mesh Proxy, Microservices Technologies.	Theory	
9	4	A1	Controller-Based Management Software: Traditional Distributed Applications Management, Periodic Monitoring, Managing Cloud-Native Applications, Control Loop Concept, Kubernetes and Control Loop, CRD, Reactive and Dynamic Planning.	Theory	
10	4	A1	Serverless Computing and DevOps: The serverless Computing Approach, Stateless Servers and Containers, Serverless Infrastructure, An Example of Serversles Processing. DevOps Approach, Continuous Integration, Continuous Delivery, Caucious Deployment, Sandbox, Canary, and Blue/Green.	Theory	
11	4	A1	Edge Computing and IoT: The Latency Disadvantage of Cloud, Low Latency Needs, Extending Edge to A Fog Hierarchy, Multi-level Caching, Edge computing and	Theory	

6. Number of Credit Hours (Total) / Number of Units (Total)

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Lect. Saad B. Yonis

Email: saad_badie @nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	<ol style="list-style-type: none"> 1. The course aims to equip students with practical skills by engaging them in hands-on development projects. 2. Students will learn to design, and develop mobile applications using industry-standard tools and technologies. 3. Emphasis will be placed on building functional and user-friendly applications. 4. The course aims to familiarize students with cross-platform development frameworks and techniques. 5. Students will learn how to develop applications that can run on multiple platforms, such as iOS and Android, using frameworks like Flutter. 6. This will enable them to maximize their reach and minimize development efforts.
--------------------------	--

9. Teaching and Learning Strategies

Strategy	several strategies can be employed to enhance student learning and engagement. One effective strategy is to adopt a project-based learning approach, where students actively work on hands-on development projects throughout the course. By tackling real-world mobile app projects, either individually or in teams, students can apply their knowledge and skills in a practical setting. Providing guidance, feedback, and regular milestones ensures that students make progress and achieve the desired learning outcomes.
-----------------	---

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Mobile applications history and types, mobile development platforms.	Theory+Lab	
2	4	A1	Introduction to Flutter and its anatomy	Theory+Lab	Quiz1
3	4	A1	The Anatomy of a Flutter App,	Theory+Lab	
4	4	A1	Hot Reload and hot restart	Theory+Lab	Test 1
5	4	A1	data types and variables	Theory+Lab	Quiz2
6	4	A1	Mid-Term Exam 1	Theory+Lab	
7	4	A1	The Function and how to use it	Theory+Lab	Test 2
8	4	A1	ISS setState?	Theory+Lab	
9	4	A1	widget lifecycle	Theory+Lab	
10-11	4	A1	API and API Examples.	Theory+Lab	
12	4	A1	Mid-Term Exam 2	Theory+Lab	
13-14	4	A1	JSON and Examples	Theory+Lab	Project
15	4	A1	Async/Await	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Marco L. Napoli, Beginning Flutter: A Hands on Guide to App Development, Wiley, 2019
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	, https://www.wiley.com/en-us/Beginning+Flutter%3A+A+Hands+On+Guide+to+App+Development-p-9781119550822

1. Course Name:
English Language IV
2. Course Code:
ENGL450
3. Semester / Year:
2 nd Semester / Fourth Year
4. Description Preparation Date:
5-5-2025
5. Available Attendance Forms:

استمارة حضور اسبوعية للطلبة للفصل () ٢٠٢٤/٢٠٢٥ المرحلة ()										رقم الأسبوع ()
										اسم المادة
										عدد الساعات
										اسم التدريسي + التوقيع + التاريخ
										اسم الطالب

6. Number of Credit Hours (Total) / Number of Units (Total)
2/2
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Raghad Shakir Email: Raghad_Shakir@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> To provide students with essential information in English language in association with reading, writing and speaking skills, and knowing more English vocabulary. To understand sentences, tenses, and practicing writing. To enhance students' English language competencies along with their technical or professional knowledge. To enhancing students' communication skills in English can result in better job opportunities in the future

9. Teaching and Learning Strategies	
Strategy	<p>The main strategies that will be adopted in delivering this module are:</p> <ul style="list-style-type: none"> Allow students to actively participate in the learning process with class discussions and exercises that support the initiative. Use didactic questioning through questions to determine student understanding of the material. <p>Writing an assignment and report that encourages students to clarify and organize their thinking and independently research and present on a topic.</p>

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	An Approach to Academic Writing	Theory	
2	2	A1	General-Specific and Specific-General Texts	Theory	Quiz1
3	2	A1	Problem, Process, and Solution	Theory	
4	2	A1	Abstract	Theory	Test 1
5	2	A1	Paraphrasing	Theory	Quiz2
6	2	A1	Research Report	Theory	

7	2	A1	Research Proposal	Theory	Test 2
8	2	A1	MID EXAM I	Theory	
9	2	A1	Writing Summaries	Theory	
10	2	A1	Results and conclusions	Theory	
11	2	A1	Annotated Bibliography	Theory	
12	2	A1	Various Disciplines and Topics: Personal statements, scientific reports, discussion board postings, in-class essays, literature reviews, business genres, PowerPoint presentations, personal statements, and introductions and conclusions	Theory	Report
13	2	A1	Presentation slides	Theory	
14	2	A1	Presentation slides	Theory	Seminar
15	2	A1	MID EXAM II	Theory	

11. Course Evaluation

Quiz and Assignments:10
Mid-terms Exam:30
Final Exam: 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Academic Writing for Graduate Students, 3rd Edition: Essential Skills and Tasks John M. Swales & Christine B. Feak
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

3	3	A1	Advanced Coding Techniques: Convolutional Codes (structure and applications in network standards)	Theory	
4	3	A1	Virtualization Technology: Benefits of VM's, How Virtualization works, Hypervisors (VMWare, KVM, and Others), Types of Hypervisors, Hypervisor Vendors, Choosing a Hypervisor	Theory	Test 1
5	3	A1	Software Defined Network (SDN): Motivation, How SDN works, Understanding SDN, SDN Architecture, SDN controllers, Openflow protocol, SDN development tools.	Theory	Quiz2
6	3	A1	Cellular Packet-Switched Architecture:	Theory	
7	3	A1	The wireless data services (cellular digital packet data, advanced radio data information systems). Trunk interface unit, wireless terminal interface, Base station Interface unit, Cellular controller interface unit.	Theory	Test 2
8	3	A1	Cellular Networks: Business Wireless Data Networks, Cellular Data Networks, All-IP Architecture: Networking Elements, Components of the UMTS Network.	Theory	
9	3	A1	Satellite Systems: Introduction, Applications, A Typical satellite system, Types of Satellite Systems, Satellite parameters, Transmission Impairments, Power Delay Profile: Statistics.	Theory	
10	3	A1	Digital Subscriber Line Technology	Theory	
11	3	A1	The plain old telephone networks, The local loop, Spectrum of digital subscriber loop (DSL), Channel characteristics, Main DSL system elements. Modulation techniques in DSL, Types and features of DSL systems, DSL based networks	Theory	
12	3	A1	Optical Networks	Theory	Project
13	3	A1	Wavelength-Division Multiplexed (WDM) System Components, WDM system design, Trunk Capacity. WDM networking and Reconfigurable Optical transport layer, DWDM Technology, Wireless optical networks	Theory	
14	3		Virtual Private Network (VPN): Overview, how does it works? why is a VPN, How to choose the right VPN service, What options are available to connect to a VPN?	Theory	
15	3		5G and beyond Networks	Theory	

11. Course Evaluation

Quiz and Assignments:10
Mid-terms Exam:30
Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Textbook-1: James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach", Pearson, 7th Edition, 2017.
Textbook-2: Rapaport, "The wireless communications, principles and practices", Edition/Publisher / 2002 /Prentice Hall.
Textbook-3: Jim Doherty, "SDN and NFV Simplified: A Visual Guide to Understanding Software Defined Networks and Network

35. To explore Authentication, Authorization, and Accounting (AAA) concepts in network management, including RADIUS for AAA and managing user authentication, access control, and accounting.
To understand the principles of network automation and orchestration, including infrastructure-as-code, orchestration frameworks, and their application in network management.

9. Teaching and Learning Strategies

Strategy	The main strategy employed in delivering the Network Management course is to foster active student participation and enhance critical thinking skills. This will be achieved through interactive classes, practical experiments, group work, and discussions. By encouraging students to actively engage with the course material, ask questions, and participate in problem-solving activities, they will develop a deeper understanding of network management principles and techniques. The incorporation of critical thinking exercises and the utilization of multimedia resources further enhance the learning experience. Through these strategies, students will not only gain theoretical knowledge but also have the opportunity to apply it in real-world scenarios, refining their critical thinking abilities and fostering a collaborative learning environment. Continuous assessments and feedback will ensure that students can monitor their progress and identify areas for improvement. Ultimately, this approach aims to equip students with the necessary skills and knowledge to effectively manage computer networks and adapt to the evolving demands of the field.
-----------------	--

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	A1	Introduction to course layout. Introduction to Network Management: Goals, organization, functions and components	Theory+Lab	
2	5	A1	Basic foundations: Standards, models, language, Architecture of NMSs, SNMP, SMI, and MIB data model	Theory+Lab	Quiz1
3	5	A1	SNMP versions, MIBs, MIB file structure and writing MIBs with ASN.1	Theory+Lab	
4	5	A1	Encoding Rules, BER, SNMP Messages, SNMP Message encoding, syslog	Theory+Lab	Test 1
5	5	A1	Midterm Exam 1	Theory+Lab	Quiz2
6	5	A1	Network management tools and systems: System utilities for management, & measurement.	Theory+Lab	
7	5	A1	Network management applications: Configuration ,fault , security and accounting.	Theory+Lab	Test 2
8	5	A1	Authentication, Authorization, and Accounting (AAA) Management, RADIUS for AAA	Theory+Lab	
9	5	A1	Midterm Exam 2	Theory+Lab	
10	5	A1	Web-based management, Desktop management interface,	Theory+Lab	
11,12	5	A1	Netconf and YANG	Theory+Lab	
13	5	A1	Broadband network management, Performance management, Service Level Agreements (SLAs), Flow data and analysis	Theory+Lab	Report
14	5	A1	Network Task Automation, Autonomous Network Management	Theory+Lab	
15	5		Final Exam		

11. Course Evaluation

Quiz and Assignments:10

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Lect. Saad B. Yonis

Email: saad_badie @nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	<ol style="list-style-type: none"> 1. To learn about Network design methodology. 2. To understand the network design models used in recent network design approach. 3. To understand how enterprise LAN is designed. 4. To understand datacenter design and how datacenters use design criteria. 5. Learn about wireless LAN design. 6. Learn WAN design, how the Internet is designed and how connect enterprises to the Internet. 7. Learn about Internet routing designs. 8. Learn how to design secured networks using best practices.
--------------------------	--

9. Teaching and Learning Strategies

Strategy	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.
-----------------	--

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A1	Network Design Methodology	Theory+Lab	
2	4	A1	Network Design Models part- I	Theory+Lab	Quiz1
3	4	A1	Network Design Models part- II	Theory+Lab	
4	4	A1	Enterprise LAN Design part - I	Theory+Lab	Test 1
5	4	A1	Enterprise LAN Design part - II	Theory+Lab	Quiz2
6	4	A1	Data Center Design part- I	Theory+Lab	
7	4	A1	Data Center Design part -II	Theory+Lab	Test 2
8	4	A1	Wireless LAN Design part - I	Theory+Lab	
9	4	A1	Wireless LAN Design part - II	Theory+Lab	
10-11	4	A1	WAN Design part- I	Theory+Lab	
12	4	A1	WAN Design part-II	Theory+Lab	
13-14	4	A1	The Internet Protocol and Routing Protocols part - I	Theory+Lab	Project
15	4	A1	The Internet Protocol and Routing Protocols part - II	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Text book: CCDA 200-310 Official Cert Guide Fifth Edition, Authors : Anthony Bruno, Steve Jordan, Pearson education - 2017
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

			Networks , Company Networks , University Networks , Home Networks , Overview . Standard Organizations		
2	4	A1	Requirements: Telephony , Streaming, IPTV 11, High-End Videoconferences, Webcast.	Theory+Lab	Quiz1
3, 4	4	A1	Audio, Image, Video Coding, and Transmission: Audio: Companding, Differential Quantization, Vocoders. Basics of Video Coding: Simple Compression, Motion Estimation. JPEG, MPEG/H.26x Video Compression, MPEG Data Streams, H.261, MPEG-4, H.264, Scalable Video Codec, H.265.	Theory+Lab	
5,6	4	A1	Underlying Network Functions: Real-Time Protocol (RTP), Elements of RTP, Details of RTP, RTP Payload, Details of RTCP. Session Description Protocol (SDP): SDP Overview, Extending SDP, Javascript Session Establishment Protocol (JSEP). Streaming:Real-Time Streaming Protocol (RTSP).	Theory+Lab	Test 1
7,8	4	A1	Multicast: Multicast Overview, Multicast Addressing, Types of Multicast, Multicast End Delivery, Multicast Routing Protocols, Protocol Independent Multicast – Sparse Mode, Application Layer Multicast. Quality of Service: Integrated Services (Intserv), Resource Reservation Protocol (RSVP), Differentiated Services (DiffServ), QoS on the LAN, QoS in the Real World. NTP.Caching: Caching Elements, web Cache Communications Protocol (WCCP), Content Delivery Networks, Use of Cache Servers in Private Networks.	Theory+Lab	Quiz2
9,10	4	A1	Synchronization and Adaptation: End-to-End Model, Jitter, Packet Loss, Play-Out Time, hypothetical Decoder, Multiple Streams, Adaptive Play-Out, Congestion Control, Delay, Queuing, Media Player, Storage and Retrieval, Integration Scripting Languages, Optimization.	Theory+Lab	
11,12	4	A1	Session Initiation Protocol: SIP Basics, First Steps with SIP, SIP Servers, More SIP Methods. PSTN Interconnection, Conferencing, Presence, Network Address Translation, APIs and Scripting, Security and Safety, Planning a VoIP Company Telephony System, Dial Plan, Emergency, VoIP Network Planning.	Theory+Lab	Test 2
13,14	4	A1	Other Standard VoIP Protocols: H.323 VoIP Family, H.225, H.245, Comparing SIP and H.323,	Theory+Lab	

			T.120 Data Applications, Gateway Control, H.248, Signal Control, Mobile VoIP, IP Multimedia Subsystem, VoLTE, Skype.		
15	4	A1	Exam	Theory+Lab	

11. Course Evaluation

Quiz and Assignments:10

Mid-terms Exam:30

Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Text book1: Hans W. Barz and Gregory A. Bassett, "MULTIMEDIA NETWORKS PROTOCOLS, DESIGN, AND APPLICATIONS", © 2016 John Wiley and Sons Ltd
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	