

**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

2024

Academic Program Description Form

University Name:

Faculty/Institute: Al Rafidain University College

Scientific Department: Computer techniques engineering

Academic or Professional Program Name:

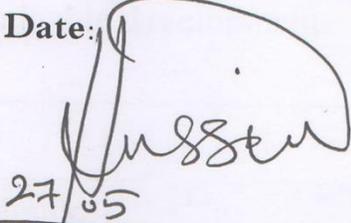
Final Certificate Name: Bachelor's degree in Technical Engineering

Academic System: annual

Description Preparation Date: 10/1/2024

File Completion Date:

Signature:



Head of Department 27/05
2024

Name: prof. Dr. Hussain K. Mansi

Date: 27/5/2024

Signature:

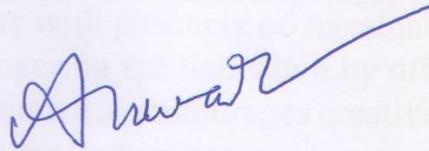


Scientific Associate Name:

Assist. Prof. Dr. Samer S. E.

Date: 27/5/2024

The file is checked by:



Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 27/5/2024

Signature:

Approval of the Dean

1. Program Vision

To be a leading department in providing high-quality education that blends theoretical knowledge and practical skills in the field of computer technology, enabling the department's students to become leaders and innovators in the technology industry, actively contributing to the development of society and achieving sustainable development.

2. Program Mission

The mission of the program is to prepare distinguished and inspiring engineers in the field of computer technology who possess the knowledge and skills necessary to analyze, design, and develop innovative technical solutions and sustainable development that meet the needs of the job market and contribute to the development of society.

3. Program Objectives

1. To provide students with concepts of sustainable development in the Computer Techniques Engineering specialization by offering a stimulating and advanced learning environment that encourages creative thinking and problem-solving in the field of computer techniques.
2. Develop students' skills in software design and development, systems design, communication network technologies, and cyber security.
3. Enhance active and interactive learning through practical projects and applied workshops.
4. Provide opportunities for practical learning through training in leading companies and technical institutions.
5. Promote scientific research and innovation in the field of computer engineering technology.
6. Enhance students' social and ethical responsibility values and guide them to apply technology responsibly and ethically.

4. Program Accreditation

The program has not yet obtained program accreditation.

5. Other external influences

Academic programs may be affected by the rapid evolution of technology, necessitating updates to curriculum content and teaching technologies. Additionally, changes in educational and regulatory policies, such as the Quality Assurance Program in the Ministry of Higher Education and Scientific Research, are also external influences that must be considered in the development and improvement of the academic program for the department.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements	5	9	%17.2	
Department Requirements	22	131	%75.86	
Summer Training	2	–	%6.8	
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
Second Year	1	computer applications	1	2
	2	Mathematics (2)	1T+2	
	3	Microprocessor architecture	2	3
	4	Devices and measurements	2	2
	5	Computer Programming(2)	2	2
	6	Foundations of communications	1T+2	2
	7	Electronics	2	2
	8	English language 2	1	-
	9	AI-Bath crimes	1	-
	10	summer training	-	-
3rd year Computer Communications Networks Branch	1	Computer network simulators	1	2
	2	Engineering analysis	2	2
	3	Fundamentals of control engineering	2	2
	4	Foundations of computer networks	2	2
	5	Design of real time systems	2	2
	6	Digital signal processing	2	2
	7	Digital communications	2	2
	8	Optional topic	2	2
	9	English Language 3	1	-
	10	summer training	-	-
4th year Computer Communications Networks Branch	1	Computer networking protocols	2	2
	2	Information theory and coding	2	2
	3	Advanced communications systems	2	2
	4	Security of computers and their networks	2	2
	5	project management	2	2
	6	Multimedia computing	2	2
	7	Optional topic	2	2

	8	English Language 4	1	-
	9	The project	-	4

8. Expected learning outcomes of the program

Knowledge

- 1- Know and understand communications networks and how to connect them
- 2- Know and understand digital signals and analyze them
- 3- Know and understand the parts of the calculator and how to install them and solve their problems
- 4- Know and understand the various electronic circuits and how to use them and benefit from them
- 5- Knowledge and understanding of different programming languages and how to use them and benefit from them
- 6- Know the types of digital controllers and how to program them and design their circuits

Skills

- 1- Writing and implementing programs for communications, controllers, and engineering algorithms
- 2- Design and implementation of wired and wireless computer networks
- 3- Diagnosing and treating malfunctions occurring in computer devices and their accessories

Ethics

- 1- Cultivating the spirit of creativity among students and ensuring that they find innovative solutions to various problems
- 2- Developing students' ability to work collectively as effective teams that produce outstanding results
- 3- Developing students' sense of responsibility and psychological preparation to bear the burdens placed on their shoulders

4 -Developing the values of keenness and perseverance in completing work to achieve satisfactory results

9. Teaching and Learning Strategies

1. **Active and Interactive Learning:** Encouraging students to participate in small group discussions, workshops, and practical projects. Interactive teaching sessions can be organized involving dialogue, analysis, and hands-on application of theoretical concepts.
2. **Project-Based Learning:** Designing applied projects that simulate real-world challenges engineers may encounter in the field of computer technology. These projects may include software development, computer system design and implementation, and solving engineering problems.
3. **Community Engagement Learning:** Integrating students into projects or volunteer activities related to their local communities or industries. These activities can enhance teamwork, communication, and leadership skills.
4. **Enhancing Practical Skills:** Providing opportunities to develop practical skills such as programming, database design and management, graphic interface development, data analysis, network design, and digital circuitry.
5. **Collaborative Assessment:** Encouraging students to participate in collaborative assessment processes, where they evaluate each other's work and provide constructive feedback to improve performance.
6. **Self-Directed Learning and Personal Motivation:** Providing self-directed educational resources for students to enhance continuous learning outside the classroom, including books, articles, and online resources.
7. **Reverse Learning:** Encouraging students to analyze errors and challenges encountered in projects or practical experiments and extract lessons learned to improve future performance.

10. Evaluation methods

1. **Comprehensive Assessment:** Utilizing a diverse range of assessment methods such as tests, projects, practical tasks, active participation in class, and discussions. This allows students to demonstrate a variety of skills and knowledge acquired throughout the program.
2. **Practical Assessment:** Including applied projects and practical tasks in the assessment process, where students can apply the concepts and skills they have acquired to solve real-world problems and develop technical solutions.
3. **Evaluation of Graduation Projects:** Conducting a comprehensive assessment of the applied graduation projects carried out by students, with a focus on innovation and practical application of the concepts learned during the program.
4. **Collaborative Assessment:** Encouraging peer assessment where students evaluate each other's work and provide constructive feedback and guidance for performance improvement.
5. **Participation in Research and Innovation Projects:** Encouraging students to participate in research and innovation projects to test their critical thinking and technical innovation skills.
6. **Evaluation of Personal Skills:** Including an assessment of personal skills such as communication, teamwork, leadership, and critical analysis, as these skills are essential for engineers' success in the job market.

These assessments are conducted in the following formats:

1. **Interactive Assessment Format:** The instructor evaluates the student directly to benefit from the feedback relied upon by faculty members to assess the teaching and learning process.
2. **Periodic Written Tests:** To assess the extent of students' follow-up of academic content and how they interact with the information and feedback provided by the instructor.
3. **Semester Exams:** To evaluate the student's interest and interaction with the scientific material received during the semester in both its academic and practical aspects.
4. **Final Exams:** Which represent the final stage of assessment and indicate the extent of the student's interest and interaction with the scientific material received during the academic year in both its academic and practical aspects.

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11. Faculty						
Faculty Members						
Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof. Dr. Hussein Kitan Al-Khafaji	computer science	Data mining and Artificial Intelligence			staff	
prof. Dr. Jaber Salman Aziz	Electrical Engineering	Communication Engineering			staff	
Prof. Dr. Anwar Jaafar Muhammad Jawad	Applied Mathematics	Applied Mathematics			staff	
Assistant Prof. Dr. Thiab Hussein Nayel	Statistics Sciences	Mathematical Statistics			staff	
Assistant Prof.Dr. Hussam Najm Al-Bayati	Statistics	Mathematical statistics & Reliability analysis			staff	
Assistant Prof. Dr. Muhammad Khudair Hassan Abdullah	Electronic computer science	امنية حاسبات			staff	
Assistant Prof. Noura Ahmed Mawla	computer science	Data security			staff	
Lecturer.Dr. Ammar Falih Mahdi Mard	Computer Science	Artificial Intelligence			staff	
Lecturer.Dr. Ibrahim Hatem Muhammad	Electronic and communications engineering	Electronic and communications engineering			staff	
Lecturer.Dr. Hayder Mahmoud Jawad	communications engineering	communications engineering			staff	
Lecturer.Dr. Aseel Khaled Ahmed	computer science	network security and protocols			staff	
Lecturer.Dr. Rana Khudair Abbas Ahmed	Computer Science	Computer Science			staff	

Lecturer. Salima Baji Abdullah	Computer Science	امنية بيانات			staff	
Lecturer. Nada Adnan Taher	Computer science	Database			staff	
Lecturer. Ibrahim Muhammad Khalil	Electronic and Communications engineering	Electronic circuits and systems			staff	
Lecturer. Hana Hamid Marza	Computer Science	Computer Science			staff	
Assistant Lecturer. Saif Kamel Shnain	Physics Science	Remote Sensing			staff	
Assistant Lecturer. Wafaa Adnan Sajid	statistics	applied statistics			staff	
Assistant Lecturer. Muhammad Mubarak Saleh Qaddouri	Computer Engineering	Computer Engineering			staff	
Assistant Lecturer. Hussein Qasim Ahmed	electrical engineering	power engineering			staff	
Assistant Lecturer. Basma Muhammad Khalil	electronics and communication engineering	electronics and communication engineering			staff	
Assistant Lecturer. Saad Jabbar Abbas	Electrical Engineering	Electronic instrumentation and control			staff	
Assistant Lecturer. Nahla Mohieldin Mohamed Najm	Computer science	Artificial intelligence			staff	
Assistant Lecturer. Hazem Nouri Abdel Razzaq	computer engineering	information technology			staff	

Professional Development

Mentoring new faculty members

Guidance for New Faculty Members

These steps can significantly contribute to the professional development and guidance of new faculty members in the Department of Computer Engineering Technologies, ensuring their success in their academic careers.

Establishment of a Guidance and Professional Development Program:

1. **Educational and Training Workshops:** Organize regular workshops for new faculty members to enhance their teaching and mentoring skills. These workshops may cover elements such as lesson design, effective teaching techniques, and academic advising.
2. **Customized Training Programs:** Develop tailored training programs targeting the needs of new faculty members based on their levels and specializations. These programs may include guidance on university policies, research ethics, and innovative teaching strategies.
3. **Personal Mentoring Programs:** Provide opportunities for personal mentoring and development for new faculty members by experienced academic staff. This mentoring may involve providing advice and guidance on balancing professional and personal life, setting career goals, and developing leadership skills.
4. **Regular Monitoring and Evaluation:** Conduct periodic meetings with new faculty members to monitor their progress and provide necessary support. This monitoring may include assessing their teaching and research performance and identifying areas needing further development.
5. **Provision of Social and Professional Networking Opportunities:** Organize social and professional events that allow new faculty members to network and connect with their peers, building strong professional networks.
6. **Encouragement of Innovation and Research:** Provide support and encouragement for new faculty members to engage in research, innovation, and scholarly publication activities, helping them build a strong research record and develop their academic skills.

Professional development of faculty members

The department has developed a plan for the professional development of faculty members, including the following steps:

1. **Identifying Development Needs:** Conduct surveys or interviews with faculty members to identify their needs and interests regarding professional development, such as teaching strategies, assessment techniques, and research skill development.
2. **Planning Training Programs:** Based on the identified development needs, design customized training programs including workshops, training courses, and advisory sessions.

3. **Implementation of Training Programs:** Implement the planned training programs regularly, ensuring the provision of necessary resources and qualified trainers for delivering the training.
4. **Monitoring and Evaluation of Results:** Evaluate the effectiveness of the training programs through participant feedback and surveys, with data analysis conducted to assess results and identify areas for improvement.
5. **Providing Opportunities for Individual Guidance:** Offer opportunities for individual guidance for faculty members to discuss their professional goals and challenges and develop personalized professional development plans.
6. **Continuous Guidance:** Provide ongoing support and guidance to faculty members through individual and group sessions, as well as continuous educational and training resources.

12. Acceptance Criterion

Department Admission Criteria

Departmental admission criteria for students are determined annually by the Ministry of Higher Education and Scientific Research. However, the general criteria have been as follows:

1. Graduates from the preparatory schools – scientific branch, with minimum grade thresholds determined by the Ministry of Higher Education and Scientific Research.
2. Graduates from industrial preparatory schools, computer engineering departments and the following specializations:
 - a. Computer Maintenance specialization
 - b. Communications specialization
 - c. Computer Assembly and Maintenance specialization
3. Graduates from technical institutes.

13. The most important sources of information about the program

- 1– Specialized scientific books

- 2- Academic research
- 3- The Internet of Information
- 4- The accumulated scientific experiences of the department's staff
- 5- Feedback from the labor market

14. Program Development Plan

Development Plan:

Academic Program Development Plan for the Computer Engineering Department:

This plan aims to enhance and strengthen the academic program of the Computer Engineering Department to ensure the provision of an outstanding educational experience and enable students and faculty members to successfully achieve their academic and professional goals.

Goal:

Improving the quality and efficiency of the academic program to meet the needs of the job market, student aspirations, and enhance the department's position as a leading center for education and research in the field of computer engineering.

Steps:

1. Current State Assessment:

Conduct a comprehensive assessment of the current academic program to identify strengths, weaknesses, opportunities, and challenges after gathering feedback from students, faculty members, and program graduates.

2. Goal Setting:

Set specific and measurable goals to improve the academic program in line with student aspirations and the needs of the job market.

3. Curriculum Development (within allowed ratios):

- Update course curricula to reflect the latest developments in the field of computer engineering.
- Include new course materials covering modern technologies and emerging trends in the industry.

4. Enhancing the Learning Experience:

-Develop and improve teaching and learning methods, including the effective use of modern technologies and available educational resources.

-Enhance student interaction and active participation in the learning processes.

5. Promoting Scientific Research:

-Enhance scientific research and publication in the field of computer engineering by providing the necessary support and resources to faculty members.

-Encourage students to participate in research, innovation, and scientific publication activities.

6. Developing Practical Skills:

-Provide opportunities for students to develop practical skills required in the job market, such as communication, teamwork, and problem-solving.

-Organize training courses and workshops to learn applied skills.

7. Strengthening Academic Guidance:

-Provide specialized guidance programs for students to help them choose suitable academic and professional paths.

-Provide opportunities for communication with faculty members to obtain advice and guidance on their academic and professional paths.

8. Monitoring and Evaluation:

-Implement a regular monitoring system for the performance of the academic program and evaluate it to identify areas in need of improvement.

- Gather feedback and opinions from students and faculty members to assess the effectiveness of the implemented changes.

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
Second Year	1	computer applications		/		/			/	/		/	/	/	
	2	Mathematics (2)		/	/	/		/	/	/			/	/	/
	3	Microprocessor architecture				/	/		/		/	/			/
	4	Devices and measurements			/	/		/	/	/	/			/	/
	5	Computer Programming(2)		/	/		/	/	/	/	/	/	/	/	
	6	Foundations of communications		/	/	/			/	/	/	/		/	/
	7	Electronics			/		/			/	/	/		/	/
	8	English language 2												/	/
	9	Al-Baath Crimes												/	/
	10	summer training		/		/	/	/	/	/			/		/

3rd year Computer Communications Networks Branch	1	Computer network simulators				/	/		/		/	/			/
	2	Engineering analyses			/	/		/	/	/	/			/	/
	3	Fundamentals of control engineering		/		/			/	/		/	/	/	
	4	Foundations of computer networks		/	/	/		/	/	/			/	/	
	5	Design of real time systems				/	/		/		/	/			/
	6	Digital signal processing			/	/		/	/	/	/			/	/
	7	Digital communications		/	/		/	/	/	/	/	/	/	/	
	8	Optional topic		/	/	/			/	/	/		/	/	/
	9	English language 3												/	/
	10	summer training			/		/			/	/	/		/	/
4th year Computer Communications	1	Computer networking protocols		/		/	/	/	/			/		/	
	2	Information theory and coding			/	/		/	/	/	/			/	/

Networks Branch	3	Advanced communications systems		/	/		/	/	/	/	/	/	/	/	
	4	Security of computers and their networks		/		/	/	/	/			/		/	
	5	project management			/	/		/	/	/	/			/	/
	6	Multimedia computing		/	/		/	/	/	/	/	/	/	/	
	7	Optional topic		/	/	/			/	/	/		/	/	/
	8	English language 4												/	/
	9	The project			/		/			/	/	/		/	/

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

Course Description Form

1. Course Name: Electronics	
2. Course Code:	
3. Semester / Year: 2 nd /2023-2024	
4. Description Preparation Date: 2024/1/10	
5. Available Attendance Forms: Lecture \ laboratory	
6. Number of Credit Hours (Total) / Number of Units (Total): 120	
7. Course administrator's name (mention all, if more than one name) Assist. Lecturer Saif K.S.	
8. Course Objectives	
Course Objectives	Viewing the properties of electronic materials and how it is manufactured Understanding and knowledge of the practical applications of diode and Transistor Understanding and knowledge of the types of amplifiers Transistors and the principle of each one's work Understanding and knowledge of the electrical signal amplifiers and kinds Practical application and of amplifiers and the circuits used in
9. Teaching and Learning Strategies	
Strategy	<p>Knowledge and Understanding</p> <p>1-identification signal emerging from the diode characteristics and practical applications where it is used curve</p> <p>2-identify to the transistor principle of his work and the characteristics of the signal in and out of it and ways of linking the electronic circuit</p> <p>3- types Transistor and the principle of the work of each one of these species</p> <p>4-identify the frequency response for each type of Transistor and how to employ it in circuit design</p> <p>5- identify amplifiers signal types and applications used in addition to the frequency response of these amplifiers</p> <p>6- identify the integrated circuit</p> <p>Subject-specific skills</p> <p>1 - incoming and outgoing values are calculated from the circuit board that contains a diode or Transistor</p> <p>2 - How to design circuitry according to certain values</p> <p>Teaching and Learning Methods</p> <p>Academic lectures that contribute to a strong and solid basis to support cognitive fishing student</p> <p>Practical laboratory that provides practical experience for students through practical experiences, which in turn support and promote understand and grasp the theoretical side</p>

Assessment methods

Interactive assessment carried out directly between the student and the professor, one of the feedback upon which faculty members in the evaluation of teaching and learning practical ways
Written tests periodic information all over the follow-up to the student for scientific content and the extent of interaction with the material given by teaching
Quarterly tests and be middle ring, which was held over the student's interest and follow-up of scientific material besides theoretical and skills during a full semester
Final exams and is the final episode in the student assessment and the extent of interaction and interest in the subject area during the full academic year

Thinking Skills

- 1-implant the spirit of creativity and diligence of the students find them on innovative solutions to various problems
- 2-development ability of students to work together effectively as teams come out excellent result
- 3-develop a sense of responsibility among students and psychological configuration to carry the burden on their shoulders
- 4- development to ensure the values and perseverance to get the job done to reach satisfactory results

Teaching and Learning Methods

Stimulate creative side by asking different problems in front of the students and urged them to find appropriate Solutions Form working groups are evaluating the results of its work and change their structure on a regular basis for the development of the spirit of cooperation, development and motivate students to do the tireless work of the various efforts

Assessment methods

Direct assessment where they are evaluated by the teaching directly and install their feedback about it
Operation projects and graduation projects are neighborhood to assess the student's ability to creativity and achievement, teamwork and ability to find various scientific solutions to problems

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	10	Introduction to the semiconductor material and diode characteristics	Semiconductor materials	Lecture + lab	Oral test
3-4	10	Diode application in DC	applications Diode	Lecture + lab	Oral test
5-6	10	Diode application in AC	applications Diode	Lecture + lab	Oral test
7	5	Zener diode characteristics and applications	Zener diode	Lecture + lab	Oral test
8-9-10	15	BJT transistor characteristic and configuration methods	BJT transistors	Lecture + lab	Oral test
11-12-13	15	BJT DC analysis	BJT DC analysis	Lecture + lab	Oral test

14-15-16-17	20	Transistor modeling and analysis of AC models used to resolve this circuit	Transistor modeling and analysis of AC circuits	Lecture + lab	Oral test
18-19-20-21	20	FET transistor characteristics and applications	FET transistor	Lecture + lab	Oral test
22-23	10	Transistors frequency response	frequency response	Lecture + lab	Oral test
24-25-26-27	20	Amplifiers types and applications	Amplifiers types and applications	Lecture + lab	Oral test
28-29-30	15	Integrated circuits	Integrated circuits	Lecture + lab	Oral test

11. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Electronic device and circuit theory Boylestad
Main references (sources)	,
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	-----

Course Description Form

1. Course Name: Communication Fundamentals	
2. Course Code:	
3. Semester / Year: 2024-2023	
4. Description Preparation Date: 2024/1/10	
5. Available Attendance Forms: Lecture , Lab.	
6. Number of Credit Hours (Total) / Number of Units (Total) : 150/6	
7. Course administrator's name (mention all, if more than one name): Assist. Lecturer Hussain K. Ahmed	
8. Course Objectives	
Course Objectives	<p>Understanding what is the communication, the signal and the systems advantage and disadvantage of each type of signals and systems.</p> <ul style="list-style-type: none"> - Viewing and knowledge block diagram communication system. - Understanding analyzing signals in Fourier series and Fourier transform. - Understanding what is the filters, types of filters and the design of filters. -Understanding the concepts of analogue modulation AM &FM) - Understanding the transmission in the communication and its application in the smith chart
9. Teaching and Learning Strategies	
Strategy	<p>Knowledge and Understanding</p> <ul style="list-style-type: none"> 1- definition of concepts and terminology used in analogue communication. 2- definition of advantage and disadvantage of each type of signals in communications. 3- identification signal representation using Fourier series and Fourier transform 4-Identify filters and its application in communication systems 5- definition types of analogue modulation (AM& FM) 6- definition the transmission line and its application of Smith chart <p>Subject-specific skills</p>

- 1-How to representation the signal from time domain to frequency domain.
- 2-Design passive filters and active filters a digital communication system
- 3-modulate analogue signal by AM & FM.
- 4-How to reduce the noise and interference on the analogue signal

Teaching and Learning Methods

- View lecture and charts
- smart board
- Scientific laboratories

Assessment methods

- Oral questions and information retrieval
- Weekly exams
- Quarterly tests
- Final exams

Thinking Skills

- 1- student development on how to analyze the difficulties and overcome them
- 2-Develop a sense of responsibility
- 3-Development diligence and perseverance to get the job done to reach satisfactory results
- 4- Implant the spirit of innovation among students

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1		Understand what is signal and system	Introduction to signal and system	Lecture , lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
2		Understand the types of signals	Signal classification,	Lecture , lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
3		Understand the types system, communication system	System classification ,	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
4-5		Understand the signal	Fourier Series	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment

		representation using Fourier Series			<ul style="list-style-type: none"> • Editorial periodic test • Direct assessment
6		Understand the signal spectrum	signal spectrum	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
7		Understand the signal spectrum using Fourier transform	signal spectrum using Fourier transform	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
8-9		Understand the Properties of Fourier transform	Properties of Fourier transform	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
10-11-12		Understand Filters and Filters classification	Filters, Filters classification Passive & Active	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
13-14-15		Understand Amplitude modulation and type of AM	Amplitude modulation, type of AM,	Lecture, lab	
16-17		Understand the Frequency Division Multiplexing and types of Modulation and Demodulation , SSB VSB,	Frequency Division Multiplexing , SSB Modulation and Demodulation, VSB	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
18-19-20-21-22		Understand Frequency Modulation types FM and power calculation	Frequency Modulation, type of FM, Narrow Bandwidth FM & Wide band FM, power calculation, SNR in FM,	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
23-24		Understand the noise in AM and FM	Noise in communication systems, noise in AM and FM	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct

					assessment
25-26- 27-28- 29-30		Understand the Transmission Line and Smith Chart	Transmission Line Smith Chart.	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
11. Course Evaluation					
20% documented exam 5% Quizes 5% reports and homework					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			- Haykin S., Introduction to Analog and Digital Communications, second edition, 2007. -Modern Digital and Analog Communication Systems, By B.P.Lathi OXFORD -Analog and Digital Communications, By Schaum		
Main references (sources)			Principles of Communication Systems, By S. Chitode, First Edition-2007		
Recommended books and references (scientific journals, reports...)			-----		
Electronic References, Websites			-----		

Course Description Form

1. Course Name: Computer application	
2. Course Code:	
3. Semester / Year: 2 nd /2023-2024	
4. Description Preparation Date: 2024/1/10	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total):120	
7. Course administrator's name (mention all, if more than one name): Dr. Haider M.J.	
8. Course Objectives	
Course Objectives	The aim of this tutorial is to introduce the software MATLAB for numerical computations and in particular familiarizing student with the <i>Matlab</i> Training the student to the Basic commands through the <i>Command window</i> and output through the <i>Graph window</i>
9. Teaching and Learning Strategies	
Strategy	<p>Knowledge and Understanding</p> <p>1- perform basic mathematical operations on simple variables, vectors, matrices and complex numbers</p> <p>2- generate 2-D plots</p> <p>3- use and write script files (MATLAB programs). MATLAB script files have a file extension name .m and are, therefore, usually referred as M-files.</p> <p>Use the ‘help’ and ‘lookfor’ commands to debug codes</p> <p>Teaching and Learning Methods</p> <p>Academic lectures that contribute to a strong and solid basis to support cognitive fishing student</p> <p>Practical laboratory that provides practical experience for students through practical experiences, which in turn support and promote understand and grasp the theoretical side</p> <p>Assessment methods</p> <p>Interactive assessment carried out directly between the student and the professor, one of the feedback upon which</p> <p>faculty members in the evaluation of teaching and learning practical ways</p> <p>interaction with the material given by teaching</p>

Quarterly tests and be middle ring, which was held over the student's interest and follow-up of scientific material
Final exams and is the final episode in the student assessment and the extent of interaction and interest in the subject area during the full academic year

Thinking Skills

- 1-implant the spirit of creativity and diligence of the students find them on innovative solutions to various problems
- 2-development ability of students to work together effectively as teams come out excellent result
- 3-develop a sense of responsibility among students and psychological configuration to carry the burden on their shoulders
- 4- development to ensure the values and perseverance to get the job done to reach satisfactory results

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1		Introduction ,Matlab environment, Mat lab windows	Introduction Matlab	Lecture + lab	Oral test
2-3		A first program, Expression, Constants	A first program	Lecture + lab	Oral test
4		Variables and assignment statement	Variables	Lecture + lab	Oral test
5		Arrays, Built in functions, basic matrix		Lecture + lab	Oral test
6-7		multiple data sets in one graph	Basic Plotting	Lecture + lab	Oral test
8-9-10		Conditional statement	Control statement	Lecture + lab	Oral test
11-12-13		While, for statement	repetition	Lecture + lab	Oral test
14		String handling	String handling	Lecture + lab	Oral test
15		Procedures and function	function	Lecture + lab	Oral test
16		cells	cells	Lecture + lab	Oral test
17		Length, size, reshape, dot	Printing output	Lecture + lab	Oral test
18-19-20		Handle graphics and user interface	GUI	Lecture + lab	Oral test
21		Getting input, setting output	GUI	Lecture + lab	Oral test

22-23		Predefined GUI	GUI	Lecture + lab	Oral test
24-25		Menu-driven programs	Menu-driven programs	Lecture + lab	Oral test
26-27		Writing and reading to & from text file	Manipulating text	Lecture + lab	Oral test
28-29-30		Introduction to image analysis	Image	Lecture + lab	Oral test

11. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	MATLAB Programming for Engineers, by steven j. 1999
Main references (sources)	,
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	-----

Course Description Form

Course Name: Computer Programming 2

1. Course Code:

2. Semester / Year: 2nd / 2023-2024

3. Description Preparation Date: 2024/1/10

4. Available Attendance Forms: Lecture \ laboratory

5. Number of Credit Hours (Total) / Number of Units (Total) :150

6. Course administrator's name (mention all, if more than one name) :
Dr. Rana K.A.

7. Course Objectives

Course Objectives

1. knowledge variables, data types, and basic input/output
2. knowledge making decisions
3. knowledge the looping
4. knowledge functions
5. know and understand the arrays

8. Teaching and Learning Strategies

Strategy

Knowledge and Understanding

1. knowledge variables, data types, and basic input/output
2. knowledge making decisions
3. knowledge the looping
4. knowledge functions
5. know and understand the arrays

Subject-specific skills

1. Implement the statement and the functions.
2. write the programs using C++
3. Design related programs in the field of competence

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which the development of the students' knowledge Laboratory and practical workshops: that provide everything he needs from the student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the

occupational safety steps to reduce the damage caused to persons and property
 Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.

Assessment methods

Interactive Rating: Rating process where the ditch directly between the student and teaching and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.

Periodic tests editorial: The availability of these tests the knowledge of a faculty member for over a follow-up to the students to content academy and how to interact with information and observations given by teaching students.

Quarterly exam: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester, both academic and skill

The final exam: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year, both academic and skill.

Thinking Skills

1. Planting the spirit of creativity among students and to ensure that find them innovative solutions to various problems
2. Students develop the ability to work together effectively as teams graduated distinct results.
3. Sense of responsibility among students and psychological configuration to carry the burden on their shoulder's development.
4. Development to ensure the values and perseverance to get the job

Teaching and Learning Methods

Ask a scientific problem and the demand of the students to find more than a solution to it different scientific methods to stimulate creative side of the students.

Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and stimulate students to instead of all the efforts the crisis of the work of the various conditions and with several people.

Assessment methods

Direct assessment: Where is this Rating by faculty members directly and through observation of the interaction of students and their application of section sentimental ad valorem targets and record their observations about it Operation projects and graduation projects: is assessing the student's ability to ACCT and to work in teams, consequences and solutions to various scientific problems facing students.

9. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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1-2	8	C++ Review Program structure, namespace, identifiers, variables, constants, operators, typecasting,	Algorithm and Flow Chart	lecture laboratory	Oral exam, paper exam, lab. Report
3	4	Introduction to Object-Oriented Programming in C++.	Introduction to C++ (Structure of a program	lecture laboratory	Oral exam, paper exam, lab. Report
-5-4 -7-6 -8	20	Objects and Classes (Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors and operator overloading)	Variables, Data Types, Declaration of variables, Scope of variables, Initialization of variables, Expressions and Basic Input/Output	lecture laboratory	Oral exam, paper exam, lab. Report
-10-9 -11 -12 -13 -14	20	Polymorphism (Pointers in C++, Pointers and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism)	Operators (Assignment, Arithmetic operators, Compound assignment, Increase and decrease, Relational and equality operators, Conditional operator, Bitwise Operators and Explicit type casting operator)	lecture laboratory	Oral exam, paper exam, lab. Report
-15 -16 -17 -18 -19	20	I/O and File management (Concept of streams, cin and cout objects, C++	Making Decisions (if...else and switch)	lecture laboratory	Oral exam, paper exam, lab. Report
-20 -21 -22 -23 -24 25	24	stream classes, Unformatted and formatted VO, manipulators, File stream, C++ File stream classes, File	Looping (while loop and for loop)	lecture laboratory	Oral exam, paper exam, lab. Report

		management functions, File modes, Binary and random files)			
-26 -27 -28 -29 30	24	Templates, Exceptions and STL (What is template? function templates and class templates, Introduction to exception, try-catch throw, multiple catch, catch all, rethrowing exception, implementing user defined exceptions, Overview and use of Standard Template Library).	Jump statements (break, continue and goto)	lecture laboratory	Oral exam, paper exam, lab. Report

10. Course Evaluation

20% documented exam
5% Quizzes
5% reports and homework
20% Lab.

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. How to Program C++ 2. Step by step with C++ 3. Pointers in C++
Main references (sources)	,
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	-----

Course Description Form

13.	Course Name: Instrumentation & Measurements				
14.	Course Code:				
15.	Semester / Year: 2 nd /2023-2024				
16.	Description Preparation Date: 2024/1/10				
17. Available Attendance Forms: lecture and Lab.					
18. Number of Credit Hours (Total) / Number of Units (Total) :120					
19. Course administrator's name (mention all, if more than one name) : Assist. Lecturer Saad J.A.					
20. Course Objectives					
Course Objectives		<ol style="list-style-type: none"> 1. knowledge and measurement units for electrical engineering physical quantities 2. knowledge of measurement devices for basic electrical transactions 3. knowledge of the special electronic measurement devices 4. knowledge and understanding of how to work oscilloscope and sensors of various physical quantities 5. know and understand how the different devices generate electrical signal 			
21. Teaching and Learning Strategies					
Strategy		<p>Academic lectures: providing a solid foundation upon which the development of the students' knowledge</p> <p>Laboratory and practical workshops: that provide everything he needs from the student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to persons and property</p> <p>Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.</p>			
22. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 st , 2 nd , 3 rd , 4 th	16	Introduction To Measurements Quantities	Introduction To Measurements Quantities And Instruments.	lecture laboratory	Oral exam, paper exam , lab. Report

		And Instruments.			
5 th , 6 th , 7 th , 8 th	16	Electromechanical Indicating Instruments	Electromechanical Indicating Instruments	lecture laboratory	Oral exam, paper exam, lab. Report
9 th , 10 th , 11 th , 12 th	16	Bridges And Their Applications.	Bridges And Their Applications.	lecture laboratory	Oral exam, paper exam, lab. Report
13 th , 14 th , 15 th , 16 th	16	Oscilloscopes	Oscilloscopes	lecture laboratory	Oral exam, paper exam, lab. Report
17 th , 18 th , 19 th , 20 th	16	Signal Generation.	Signal Generation.	lecture laboratory	Oral exam, paper exam, lab. Report
23 rd , 24 th , 25 th , 21, 22	12	Primary Sensing Elements.	Primary Sensing Elements.	lecture laboratory	Oral exam, paper exam, lab. Report

23. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

24. Learning and Teaching Resources

Required textbooks (curricular books, if a	“Modern electronic instrumentation and measuring techniques”, Cooper D & A D Helfrick
Main references (sources)	
Recommended books and references (scientific journals, reports...)	1. “Electronic Instrumentation”, H. S. Kalsi 2. “Electronic Instrumentation and Measurements”, David A Bell
Electronic References, Websites	1- “Principles of measurement systems”, John P. Beatly
	2- Electronics & electrical measurements, A K Sawhney, , Dhanpat Rai & sons http://www.academia.edu/.../A_K.Sawhney-A_course_in_Electrical_and_Electronic_Measu...%20Similar

Course Description Form

1. Course Name: Mathematics 2

2. Course Code:

3. Semester / Year: 2nd / 2023-2024

4. Description Preparation Date: 2024/1/10

5. Available Attendance Forms: lecture

6. Number of Credit Hours (Total) / Number of Units (Total) : 90

7. Course administrator's name (mention all, if more than one name):
Dr. Thiab H. N.

8. Course Objectives

Course Objectives

Understanding and learning the application of math.
Law to solve problems

9. Teaching and Learning Strategies

Strategy

Stimulating the creative side by asking different problems to students and motivate them to find appropriate solutions
Work teams are evaluating the results of its work and change their structure regularly to develop a spirit of cooperation and development and motivating students to make unremitting efforts to work with the different circumstances

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Vector analysis	Vector analysis	Lecture	Daily test
2	3	Vector field	Vector field	Lecture	Daily test
3	3	Linear algebra	Linear algebra	Lecture	Daily test
4	3	Vector calculus	Vector calculus	Lecture	Daily test
5	3	Scalars and vector unit	Scalars and vector unit	Lecture	Daily test
6	3	Orthogonal vector	Orthogonal vector	Lecture	Daily test
7	3	Dot product	Dot product	Lecture	Daily test
8	3	cross product	cross product	Lecture	Daily test

9	3	Theory for vector field	Theory for vector field	Lecture	Daily test
10	3	Vector variable function	Vector variable function	Lecture	Daily test
11	3	Polar coordinates – gradient in polar	Polar coordinates – gradient in polar	Lecture	Daily test
12	3	Spherical coordinates	Spherical coordinates	Lecture	Daily test
13	3	Complex number	Complex number	Lecture	Daily test
14	3	Algebra for complex number	Polar form of complex number	Lecture	Daily test
15	3	Algebra for Spherical coordinates	Algebra for complex number	Lecture	Daily test
16	3	Infinite series	Algebra for Spherical coordinates	Lecture	Daily test
17	3	Infinite series	Infinite series	Lecture	Daily test
18	3	Power series	Power series	Lecture	Daily test
19	3	Convergence and divergence series	Convergence and divergence series	Lecture	Daily test
20	3	Convergence and divergence series	Convergence and divergence series	Lecture	Daily test

11. Course Evaluation

30% documented exam
10% Quizzes
10% reports and homework

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Calculus I and II
Main references (sources)	,
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	----

Course Description Form

1. Course Name: Microprocessor architecture					
2. Course Code:					
3. Semester / Year: 2 nd / 2023-2024					
4. Description Preparation Date: 2024/1/10					
5. Available Attendance Forms: Lecture, laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total) : 120					
7. Course administrator's name (mention all, if more than one name) Assist. Lect. Nahla M.M.N.					
8. Course Objectives					
Course Objectives		1-Knowledge of major components and know the basic parts of the electronic calculator. 2-Knowledge of the main types of memory used in the calculator. 3-Knowledge of the CPU and components in the electronic calculator. Possession of a scientific and practical skill of being able to diagnose faults and perform maintenance and repairs to the system calculator.			
9. Teaching and Learning Strategies					
Strategy		Academic lectures: providing a solid foundation upon which to develop cognitive balance for students Practical laboratory: which provides each student the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	10	Identify the main parts of the computer	General architecture of digital computer, review of 8085 p	Lecture, laboratory	Questions oral, daily exam
3-4	10	Knowledge of memory classification	8085 memory addressing	Lecture, laboratory	Questions oral, daily exam
5-6	10	Understanding methods of data representation within the computer	8085 1/0 addressing	Lecture, laboratory	Questions oral, daily exam

7-8	10	Knowledge of MP execution steps	8085 machine cycle & bus timing	Lecture, laboratory	Questions oral, daily exam
9	5	Identify the various interrupts types	8085 Interrupt Types	Lecture, laboratory	Questions oral, daily exam
10	5	Understanding assembly programming for 8085 MP	Introduction to 8085 MP instruction set	Lecture, laboratory	Questions oral, daily exam
11-12	10	Knowledge of 8086 MP architecture	8086 Software Architecture, BIU, EU, registers, pipeline	Lecture, laboratory	Questions oral, daily exam
13	5	Understanding the memory types in 8086 MP	Memory segmentation, generating memory address	Lecture, laboratory	Questions oral, daily exam
14	5	Understanding the main parts of 8086 MP	Hardware organization of 8086 space,	Lecture, laboratory	Questions oral, daily exam
15-16	10	Understanding the main component of 8086 system	Pin configuration, min & max mode, 8288 bus controller, 8284 system clock	Lecture, laboratory	Questions oral, daily exam
17-18	10	Understanding of different programs for 8086 MP	Addressing mode, machine language coding	Lecture, laboratory	Questions oral, daily exam
19-20-21-22-23	25	Understanding assembly programming for 8086 MP	8086 instructions set (Data transfer)	Lecture, laboratory	Questions oral, daily exam
24	5		LOOP instructions	Lecture, laboratory	Questions oral, daily exam
25	5	Understanding how to store and retrieve data in the stack	Stack memory, POP & PUSH instructions	Lecture, laboratory	Questions oral, daily exam
26-27	5	Understanding the buses behavior with 8086 MP	Memory read & write Bus Cycles, Idle & wait state	Lecture, laboratory	Questions oral, daily exam
28-29	10	Understanding how to connect memory with 8086 MP	Memory Interface Circuits, bus transceivers, Bank Write and Bank Read	Lecture, laboratory	Questions oral, daily exam
30	10	Understanding how to connect input and output devices with 8086 MP	I/O interface	Lecture, laboratory	Questions oral, daily exam

11. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

12. Learning and Teaching Resources

Required textbooks (curriculum books, if any)	1- Digital Fundamental by Floyed
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Main references (sources)	2-Ramesh S. Goankar, "Microprocessor Architecture Programming and Applications with 8085", 5th Edition, Prentice Hall
Recommended books and references (scientific journals, reports...)	
Electronic References, Website	

Course Description Form

1. Course Name: Computer Networks Fundamentals

2. Course Code:

3. Semester / Year: 3rd/2023-2024

4. Description Preparation Date: 2024/1/10

5. Available Attendance Forms: Lecture, laboratory

6. Number of Credit Hours (Total) / Number of Units (Total): 120

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

8. Course Objectives

Course Objectives

1. Know the types of computer networks
2. Know the types of devices of Computer Networks
3. Learn methods of linking computer networks
4. Know how to relay information through computer networks
5. Know the types of protocols and programs that is appropriate for computer networks depending on the desired application.

9. Teaching and Learning Strategies

Strategy

Academic lectures: providing a solid foundation upon which to develop cognitive balance for students
Practical laboratory: which provides each student the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 st , 2 nd	8	Introduction, and classify the computer networks according to application, size, transmission technology.	Knowledge of types of networks based on size and transport Technology	Lecture, laboratory	Questions oral, daily exam
3 rd	4	LANs: Topologies, CSMA/CD, Token Access protocols, and IP addressing	Learn the most important species in the local area networks	Lecture, laboratory	Questions oral, daily exam

4 th	4	Connection-Oriented Versus Connectionless Service, and Service Primitives	Understanding the difference between the services that rely on communication, that does not rely on contact	Lecture, laboratory	Questions oral, daily exam
5 th , 6 th	8	The ISO reference Model, and TCP/IP Reference Model.	Understanding of the OSI model	Lecture, laboratory	Questions oral, daily exam
7 th	4	Metropolitan Area Networks, Wide Area Networks, Internetworks, and VPNs	Knowledge of types of large networks and small and private	Lecture, laboratory	Questions oral, daily exam
8 th	4	Digital signal (size of : text files, image files, voice files, and videos files)	Knowing the size of the files by type	Lecture, laboratory	Questions oral, daily exam
9 th	4	Bandwidth-Limited Signals, The Maximum Data Rate of a Channel	Knowing the bandwidth and speed of transmission of information	Lecture, laboratory	Questions oral, daily exam
10 th	4	guided transmission media, and wireless transmission	Knowledge of types of center carrier	Lecture, laboratory	Questions oral, daily exam
11 th	4	Communication satellites: Geostationary, Medium-Earth Orbit, and Low-Earth Orbit Satellites	Knowledge of types of satellites	Lecture, laboratory	Questions oral, daily exam
12 th , 13 th	8	Digital modulation and multiplexing: Baseband, Pass band, FDM, TDM, and	Knowledge of types of signal conditioning	Lecture, laboratory	Questions oral, daily exam
14 th , 15 th , 16 th	12	public switched telephone network: Structure of the Telephone System, DSL, and Trunks and Multiplexing, and Switching(Circuit switching & packet swishing)	Knowledge of types of data switches and hubs	Lecture, laboratory	Questions oral, daily exam
17 th	4	cable television:	Knowledge of CATV components	Lecture, laboratory	Questions oral, daily exam
18 th , 19 th , 20 th	12	DATA LINK LAYER DESIGN ISSUES: Framing, Error Control, and Flow Control	Knowledge of the duties of the data link layer	Lecture, laboratory	Questions oral, daily exam
21 st , 22 th	8	ELEMENTARY DATA LINK PROTOCOLS	Albertkulat knowledge of working in the data link layer	Lecture, laboratory	Questions oral, daily exam

23 th , 24 th	8	SLIDING WINDOW PROTOCOLS	Know the actual data is broken when you transfer data from the calculator to the center bus	Lecture, laboratory	Questions oral, daily exam
25 th	4	Network Layer (Store-and-Forward Packet Switching)	Knowledge of the duties of network layer and how to do direct data	Lecture, laboratory	Questions oral, daily exam
26 th	4	Network layer(Implementation of Connectionless Service)	Knowledge of services carried out without connection in the network layer	Lecture, laboratory	Questions oral, daily exam
27 th ,28 th	8	Network layer (Implementation of Connection-Oriented Service)	Knowledge of services that implement based on connectionoriented in the network layer	Lecture, laboratory	Questions oral, daily exam
29 th	4	Network layer(Routing Algorithms)	See guidance in the network layer algorithms	Lecture, laboratory	Questions oral, daily exam
30 th	4	Network layer(Broadcast Routing)	Knowledge of the routing algorithms in all directions in the network layer	Lecture, laboratory	Questions oral, daily exam

11. Course Evaluation

20% documented exam
5% Quizzes
5% reports and homework
20% Lab.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Data Communications and Networking by McGraw-Hill Forouzan Networking Series
Main references (sources)	COMPUTER NETWORKING by James F. Kurose University of Massachusetts, Amherst
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	-----

Course Description Form

1. Course Name: Computer Networks simulation					
2. Course Code:					
3. Semester / Year: 3 rd /2023-2024					
4. Description Preparation Date: 2024/1/10					
5. Available Attendance Forms: Lecture, laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total): 120					
7. Course administrator's name (mention all, if more than one name) Assist. Lect. Mohammed M.S.					
8. Course Objectives					
Course Objectives		<ol style="list-style-type: none"> 1. Know the types of computer networks 2. Know the types of devices of Computer Networks 3. Learn methods of linking computer networks and simulators packet tracer 4. Know how to relay information through computer networks 5. Know the types of protocols and programs that is appropriate for computer networks depending on the desired application. 			
9. Teaching and Learning Strategies					
Strategy	<p>Academic lectures: providing a solid foundation upon which to develop cognitive balance for students</p> <p>Practical laboratory: which provides each student the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly</p>				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 st , 2 ⁿ 3 ^{3d}	8	Lecture, laboratory	(Simulation Overview), the three models (network model, node model, and process model).	Knowledge of types of networks based on size and transport Technology	Questions oral, daily exam

3r 4.5.6.7.d	4	Lecture, laboratory	Scenario 1: Network Implementation Scenario 2: Low level design Scenario 3: MPSL technology Scenario 4: Prediction and validation of network	Learn the most important species in the local area networks	Questions oral, daily exam
8.9 th	4	Lecture, laboratory	SETUP(Simple Network, Busy network, One-server network, and Faster network)	Understanding the difference between the services that rely on communication, that does not rely on contact	Questions oral, daily exam
10.11 th	8	Lecture, laboratory	SETUP Wireless Network .	Understanding of the OSI model	Questions oral, daily exam
12	4	Lecture, laboratory	Using routing protocols	Knowledge of types of large networks and small and private	Questions oral, daily exam
13.14.15	4	Lecture, laboratory	ANALYSIS (Response Time of Simple Network vs. Busy network)	Knowing the size of the files by type	Questions oral, daily exam
16.17.18.19.20	4	Lecture, laboratory	CPU utilization of various servers in the Busy network	Knowing the bandwidth and speed of transmission of information	Questions oral, daily exam
21.22.2324.25.26	4	Lecture, laboratory	Different types of examples	Knowledge of types of center carrier	Questions oral, daily exam
27.28.29.30	4	Lecture, laboratory	Other types of computers network simulator	Knowledge of types of satellites	Questions oral, daily exam

11. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Data Communications and Networking by McGraw-Hill Forouzan Networking Series

Main references (sources)	COMPUTER NETWORKING by James F. Kurose University of Massachusetts, Amherst
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	----

Course Description Form

25. Course Name: control engineering Fundamentals	
26. Course Code:	
27. Semester / Year: 3 rd / 2023-2024	
28. Description Preparation Date: 2024/1/10	
29. Available Attendance Forms: Lecture , Lab.	
30. Number of Credit Hours (Total) / Number of Units (Total): 120	
31. Course administrator's name (mention all, if more than one name) Assist. Lect. Husain K. Ahmed	
32. Course Objectives	
Course Objectives	The course aims to provide students of the third stage of two branches with information and prepare them to be able to: 1-system analysis in the time domain by using differential equations in the Laplace transform 2-System analysis in the frequency domain 3-working on the design of controllers designed using control theory which is PID 4-study and analysis of different systems for different entries response 5. study and analysis of the system stability
33. Teaching and Learning Strategies	
Strategy	Academic lectures: providing a solid foundation upon which to develop students' knowledge Laboratory and practical workshops: that provide everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to people and property.
34. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2			Open and closed loop system	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
3-4-5			Transfer function and Mathematical modelling of control systems	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
6-7			DC servo motor transfer function	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
8			Block diagram representation	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
9-10-11-12			Time domain analysis of control system: <ul style="list-style-type: none"> Steady state analysis Transient response analysis Analysis of 1 st order system	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
13-14			P-I-D controllers	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
15-16			Routh's criterion and applications of Routh's criterion	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
17-18-19-20			Root Locus	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
21-22-23-24			Bode plot	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment

					<ul style="list-style-type: none"> • Editorial periodic test Direct assessment
25-26-27-28			Compensation	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
29-30			Different examples	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment

35. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

36. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Modern Control Engineering by Ogata
Main references (sources)	-Control Systems by Bakshi -Modern Control Systems by Dorf -Control Systems Engineering by Nise
Recommended books and references (scientific journals, reports...)	----
Electronic References, Websites	----

Course Description Form

37. Course Name: Digital communication					
38. Course Code:					
39. Semester / Year: 3 rd /2023-2024					
40. Description Preparation Date:2024/1/10					
41. Available Attendance Forms: Lecture , Lab.					
42. Number of Credit Hours (Total) / Number of Units (Total): 120					
43. Course administrator's name (mention all, if more than one name): Assist. Lect. Basma M. K.					
44. Course Objectives					
Course Objectives		-The aims to students in third stage to defined and understand the -Concepts and terminology used in digital communications - -The advantage and disadvantage of each type of digital communication systems Types of Digital modulation			
45. Teaching and Learning Strategies					
Strategy	- View lecture and charts - smart board - Scientific laboratories				
46. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 lecture /2 lab	Understand what is a digital system	Introduction to digital communication	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment

2	2 lecture /2 lab	Understand the types of signals digital system design	Signal types, General block diagram of digital communication	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
3	2 lecture /2 lab	Identify the advantages and disadvantages of digital modulation	Advantage and disadvantage of digital modulation, digital coding	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
4-5	2 lecture /2 lab	Noise measurement & S/N ratio	S/N in analog pulse modulation	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
6	2 lecture /2 lab	Understand the types of modulation PCM DPCM	Pulse Code Modulation PCM), Noise Consideration in PCM, Limitation and Modifications of PCM, Differential PCM (DPCM).	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
7	2 lecture /2 lab	Understanding encapsulation type DM	Delta Modulation (DM), Delta-Sigma Modulation,	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
8-9	2 lecture /2 lab	Find the possibility of interference between waves and configure filters	Intersymbol Interference (ISI), Pulse Shaping to reduce ISI, Equalizer, Adaptive Equalizer, Matched Filter.	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
10-11	2 lecture /2 lab	Understand the types of modulation ASK, FSK, PSK	Baseband modulation (Digital Modulation), Amplitude Shift Keying (ASK) [Modulation and demodulation]. Frequency Shift Keying (FSK) [Modulation and demodulation], Phase Shift Keying (PSK) [Modulation, Coherent and Noncoherent Detection], Differential PSK.	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
12-13-14	2 lecture /2 lab	Analysis of the mistakes of the binary system	Error performance of Binary System.	Lecture , lab	<ul style="list-style-type: none"> Interactive assessment

					<ul style="list-style-type: none"> • Editorial periodic test • Direct
15-16-17-18-19-20-21-22-23-24	2 lecture /2 lab	Understand the types of modulation QPSK, OQPSK K	Quadrature Phase Shift Keying (QPSK), Offset QPSK, Minimum Shift Keying	Lecture , lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment
25 , 26 , 27 ,28, 29 30	2 lecture /2 lab	Understand the types of modulation QAM, MPS	Quadrature Amplitude Modulation (QAM), Multilevel Modulation Techniques M-ary PSK, M-ary QAM, Bandwidth Efficiency and power Spectra of modulated Signal, Carrier Recovery and Clock Recovery.	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test • Direct assessment

47.

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

48. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Sarkar N., Elements of Digital Communications, first edition, 2003
Main references (sources)	- Haykin S., Introduction to Analog and Digital , Communications second edition, 2007.
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	-----

Course Description Form

49. Course Name: Digital Signal Processing	
50. Course Code:	
51. Semester / Year: 3 rd /2023-2024	
52. Description Preparation Date: 2024/1/10	
53. Available Attendance Forms: Lecture , Lab.	
54. Number of Credit Hours (Total) / Number of Units (Total): 120	
55. Course administrator's name (mention all, if more than one name): Assist. Lect. Basma M. K.	
56. Course Objectives	
Course Objectives	The course aims to provide students of the third stage of two branches with information and prepare them to be able to: 1-To teach students the concepts of discrete-time signals, including mathematical representations, properties, frequency content, and aliasing. 2-To teach students the concepts of linear time-invariant discrete-time systems, including representations, properties, convolution relationship, and analysis techniques based on Fourier and Z transforms. To introduce the concepts of filter design.
57. Teaching and Learning Strategies	
Strategy	Academic lectures: providing a solid foundation upon which to develop students' knowledge Laboratory and practical workshops: that provides everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to people and property.
58. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st, 2nd , 3rd	2 lecture /2 lab		Introduction to digital signal processing: Basic elements of DSP, DSP vs. ASP, application of DSP, Continuous time signals vs. discrete time signals	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
4 th , 5 th , 6 th	2 lecture /2 lab		Discrete time signals and sequences	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
7 th , 8 th , 9 th	2 lecture /2 lab		Standard of discrete time signals (sequences): Unit sample sequence, Unit step sequence, Unit ramp sequence, Exponential sequence,	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
10 th , 11 th 12 th	2 lecture /2 lab		(classification of discrete time signals) System properties: Static and dynamic system, shift invariant and shift variant system, Causal and noncausal system, linear and nonlinear system, stable and unstable system.	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
13 th , 14 th	2 lecture /2 lab		Convolution: Direct form method, graphical method, slide rule method	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
15-16			Correlation of discrete time sequence: Cross correlation and auto correlation		
17 th , 18 th	2 lecture /2 lab		Frequency domain representation: Find Frequency response	Lecture, lab	
19 th ,20 th 21 st	2 lecture /2 lab		Discrete Fourier transform (DFT), Linear convolution	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment

			using DFT, Invers Discrete Fourier transform (IDFT)		<ul style="list-style-type: none"> Editorial periodic test Direct assessment
22nd,23rd , 24 th	2 lecture /2 lab		Fast Fourier transform (FFT): Butterfly computation, Invers Fast Fourier transform (IFFT)	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
25 th ,26 th , 27 th	2 lecture /2 lab		Introduction to Z transform: Definition of Z transform and ROC, Properties of Z transform, Inverse Z transform, application of Z transform(pole& zero plot ,causality and stability of Z transform, solution of difference equation using Z transform	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment
28 th , 29 th ,30 th	2 lecture /2 lab		Realization of digital filter: Basic FIR filter structure, direct form of FIR structure, Cascaded form of FIR structure, Basic IIR filter structure, direct form of IIR structure, Cascaded form of IIR form of IIR structure, Parallel structure	Lecture, lab	<ul style="list-style-type: none"> Interactive assessment Editorial periodic test Direct assessment

59. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

60. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- John G. Proakis , Dimitris K Manolakis Digital signal processing: principles algorithms and applications. Pearson; 4 edition (April 7, 2006).
Main references (sources)	1-Hayes, Monson H. Digital signal processing Tata McGraw-Hill edition 2009
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	-----

Course Description Form

1. Course Name: engineering analysis					
2. Course Code:					
3. Semester / Year: 3 rd /2023-2024					
4. Description Preparation Date: 2024/1/10					
5. Available Attendance Forms: Lecture, laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total): 120					
7. Course administrator's name (mention all, if more than one name): Dr. Hussam N. A.					
8. Course Objectives					
Course Objectives		<p>Article to aim that the student be able to</p> <ol style="list-style-type: none"> 1. solving equations sports complex in several ways 2. knowledge of mathematical functions to convert from the time domain to the frequency domain process 3. knowledge of mathematical functions to convert from the field to the deterioration of the time domain process 			
9. Teaching and Learning Strategies					
Strategy		<p>Academic lectures: providing a solid foundation upon which to develop cognitive balance for students</p> <p>Practical laboratory:, which provides each student the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly</p>			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2- 3-4- 5-6-7	28	Knowledge transfer from the time domain to the	Laplace transform, properties	Lecture, laboratory	Oral Questions, daily exam

		frequency domain, knowledge of the theories and the characteristics of this conversion and methods of their application			
8-9-10-11-12-13-14	28	Knowledge conversion modes using the Z-transform with features and applications	Z-transform, properties, theorems, and applications	Lecture, laboratory	Oral Questions, daily exam
15-16-17-18-18	20	Solving mathematical equations by the possibilities, knowing the statistics methods	Probability (Basic terminology, probability and set notation, law of probability, independent events), Statistics (Graphical representation, measure of central tendency, measure of dispersion)	Lecture, laboratory	Oral Questions, daily exam
20-21-22-23	16	Learn methods of different accounts of the equations	Numerical computation	Lecture, laboratory	Oral Questions, daily exam
24-25	8	Solving nonlinear equation	Solution of nonlinear equation	Lecture, laboratory	Oral Questions, daily exam
26-27-28	12	Engineering analysis derivative	Numerical solution of ODE	Lecture, laboratory	Oral Questions, daily exam
29-30	8	Learn method	Matrices	Lecture, laboratory	Oral Questions, daily exam

11. Course Evaluation

20% documented exam
5% Quizzes
5% reports and homework

20% Lab.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1-Higher Engineering Mathematics by Dr. B.S. Grewal 2-An introduction to Numerical analysis David F. Mayers
Main references (sources)	,
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	1-Higher Engineering Mathematics by Dr. B.S. Grewal www.ocw.mit.edu www.math.uiowa.edu

Course Description Form

1. Course Name: Real-Time System Design					
2. Course Code:					
3. Semester / Year: 3 rd / 2023–2024					
4. Description Preparation Date: 2024/1/10					
5. Available Attendance Forms: Lecture, laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total): 120					
7. Course administrator's name (mention all, if more than one name) Assist. Lect. Saad J. A.					
8. Course Objectives					
Course Objectives		<ol style="list-style-type: none"> 1. Introduce the student to the concept of Real Time systems Design 2. To know major distinction between systems and real-time systems 3. To introduce the students to the components of real-time systems 4. Familiarize the students with the problem of clock-speed and the need for matching ccts. 5. To learn on how to think in terms of peripheral interface devices (PIDs). 6. Learn how to do Input/output pin expansion. 			
9. Teaching and Learning Strategies					
Strategy	<p>Academic lectures: This a design class hence, the teaching is based on the active participation principle where the students are faced with a problem formulation, and a pool of suggested answers is collected. The suggestions are then discussed one by one from practicality perspective. A candidate solution is chosen. The process is repeated for every-topic in the class.</p> <p>Practical laboratory: The students are taught embedded system programming as they design, build, and code their own systems.</p>				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1st, 2nd,	2 theory/ 2 lab		Definition of RTS Systems vs RTS RTS c/c	Lecture, laboratory	Questions oral, daily exam
3 rd	2 theory/ 2 lab		Signals:types interpretations	Lecture, laboratory	Questions oral, daily exam
4 th	2 theory/ 2 lab		Sensors and transducers	Lecture, laboratory	Questions oral, daily exam
5 th , 6 th , 7 th , 8 th ,	2 theory/ 2 lab		A/D converters: principles circuits designs	Lecture, laboratory	Questions oral, daily exam
9 th , 10 th , 11 th , 12 th ,	2 theory/ 2 lab		D/A converters: Principles circuits designs	Lecture, laboratory	Questions oral, daily exam
13 th , 14 th , 15 th , 16 th	2 theory/ 2 lab		Input Output Expansion Tri-state buffers Output Latching Pseudo-code circuit design in/out	Lecture, laboratory	Questions oral, daily exam
17 th , 18 th	2 theory/ 2 lab		PIDs: The need for PIDs Designs using PIDs (general principle)	Lecture, laboratory	Questions oral, daily exam
19 th , 20 th	2 theory/ 2 lab		8155 PID internal structure commands designs	Lecture, laboratory	Questions oral, daily exam
21 st , 22 nd , 23 rd	2 theory/ 2 lab		Timers, Prog-timers	Lecture, laboratory	Questions oral, daily exam
24 th , 25 th	2 theory/ 2 lab		Interrupts	Lecture, laboratory	Questions oral, daily exam
26 th , 27 th	2 theory/ 2 lab		DMA	Lecture, laboratory	Questions oral, daily exam
28 th , 29 th , 30 th	2 theory/ 2 lab		Serial I/O	Lecture, laboratory	Questions oral, daily exam

11. Course Evaluation

20% documented exam
5% Quizzes
5% reports and homework
20% Lab

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Practical Introduction to RTS for
undergraduate engineers.
BY: Douglas W. Harder. 2014.

Main references (sources)	,
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	https://www.ces.tech/

Course Description Form

61.	Course Name: Advanced Computer Technology
62.	Course Code:
63.	Semester / Year: 4 th /2023-2024
64.	Description Preparation Date: 2024/1/10
65. Available Attendance Forms: Lecture , Lab	
66. Number of Credit Hours (Total) / Number of Units (Total): 120	
67.	Course administrator's name (mention all, if more than one name)
68.	Course Objectives
Course Objectives	<p>The course aims to provide students of the 4th stage of the two branches with information and prepare them to be able to:</p> <ol style="list-style-type: none"> 1. The μP and its architecture and the addressing modes 2. Paging mechanism, Segment translation and Page translation 3. Cache memory, Cache organization, Fully associative, Direct mapped and Set associative 4. Cache memory used for 80386 <ul style="list-style-type: none"> - Direct Maps - Two-way set associative <p>Intel's Pentium and its Features</p>
69.	Teaching and Learning Strategies
Strategy	<p>Academic lectures: providing a solid foundation upon which to develop students' knowledge Laboratory and practical workshops: that provides everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to people and property.</p>
70. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3	2 lecture /2 lab		Introduction to computers and assembly programming	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
4,5	2 lecture /2 lab		The μ P and its architecture . Addressing modes	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
6,7	2 lecture /2 lab		Protected mode memory addressing . Selectors and descriptors . Local and global descriptor tables	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
8,9	2 lecture /2 lab		Descriptor and page table entries	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
10,11	2 lecture /2 lab		- Memory paging Virtual memory	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
12,13,14	2 lecture /2 lab		- Paging mechanism . Segment translation . Page translation	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
15,16,17	2 lecture /2 lab		Major changes in the 80386, Hardware organization of the memory address space	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
18,19,20, ,21	2 lecture /2 lab		Cache memory - Cache organization . Fully associative . Direct mapped . Set associative	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
22,23	2 lecture /2 lab		Cache memory used for 80386 - Direct Maps Two-way set associative	Lecture , lab	Interactive assessment Editorial periodic test

					Direct assessment
24,25	2 lecture /2 lab		Enhancements of 80386, Pipelining design Techniques	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
26,27	2 lecture /2 lab		Intel's Pentium . Features of the Pentium	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment
28,29,30	2 lecture /2 lab		Pentium pro . Out of order execution Core processor	Lecture , lab	Interactive assessment Editorial periodic test Direct assessment

71. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

72. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<i>The 80386, 80486 and Pentium Processor</i> By: Walter A. Triebel
Main references (sources)	<i>The 80x86 IBM Pc and Compatible Computers (Volumes I & II)</i> By: Mohammed Ali Mazidi
Recommended books and references (scientific journals, reports...)	----
Electronic References, Websites	----

Course Description Form

73.	Course Name: Computer and Network Security	
74.	Course Code:	
75.	Semester / Year: 4 th / 2023-2024	
76.	Description Preparation Date: 2024/1/10	
77. Available Attendance Forms: Lecture , Lab.		
78. Number of Credit Hours (Total) / Number of Units (Total): 120		
79.	Course administrator's name (mention all, if more than one name)	
80.	Course Objectives	
Course Objectives	<p>The course aims to provide students of the fourth stage of two branches with information and prepare them to be able to:</p> <ol style="list-style-type: none"> 1. Knowledge the basics of information security in the telecommunications 2. Studying means and methods that must be followed to protect the computers to access them from unauthorized tampering in it. 3. Protection of data and databases from threats. 4. The protection of a network of computers, especially the private networks from malicious attacks by activating investment and network protection protocols <p>Study and analysis of asymmetric encryption algorithms Caser, substitution, affine, OTP, Hill cipher, playfair, transposition</p> <ol style="list-style-type: none"> 6. Studying the concept of code analysis and give an example of the code substitution 7. Studying and analysis of asymmetrical algorithms RSA 	
81.	Teaching and Learning Strategies	
Strategy	<p>Academic lectures: providing a solid foundation upon which to develop students knowledge</p> <p>Laboratory and practical workshops: that provide everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow</p>	

the occupational safety steps to reduce the damage caused to people and property.

82. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2-3	2 lecture /2 lab		Symmetric Ciphers model: plaintext, encryption algorithm, secret key, cipher text, decryption algorithm, A Model of conventional encryption. Cryptography, Cryptanalysis, block and stream cipher	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
4	2 lecture /2 lab		Caeser Cipher the Affine Cipher	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
5-6	2 lecture /2 lab		Mono alphabetic substitution ciphers Shift ciphers	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
7	2 lecture /2 lab		Hill cipher	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
8	2 lecture /2 lab		Play fair cipher	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
9	2 lecture /2 lab		Polyalphabetic ciphers Vigenere cipher	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
10-11-12-13	2 lecture /2 lab		The Transposition cipher Affine cipher otp	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment

14-15-16	2 lecture /2 lab		Cryptanalysis of a Symmetric key	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
17	2 lecture /2 lab		Euclid's Algorithm	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
18-19	2 lecture /2 lab		SYMMETRIC-KEY ALGORITHMS -DES—The Data Encryption Standard, hers -16 round Feistel system	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
20-21-22	2 lecture /2 lab		PUBLIC-KEY ALGORITHMS, -RSA, - Other Public-Key Algorithms	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
23-24-25-26-27	2 lecture /2 lab		AUTHENTICATION PROTOCOLS, -Authentication Based on a Shared Secret Key, -Establishing a Shared Key: The Diffie - Hellman Key Exchange, -Authentication Using a Key Distribution Center, -Authentication Using Kerberos, - Authentication Using Public-Key Cryptography	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
28	2 lecture /2 lab		OSI security Architecture, a model for network security EMAIL SECURITY	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
29-30	2 lecture /2 lab		PROTECTION SERVICES: OS protection service: protected objects and methods of OS protection, security of	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment

			OS, memory and addressing protection, fence protection Database		
83. Course Evaluation					
20% documented exam 5% Quizes 5% reports and homework 20% Lab.					
84. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Cryptography and network security: principles and practice edition), Author: Stallings, William. Year: 2003		
Main references (sources)			Computer security: Art and science . Author: Matthew Bishop, year: 2003		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			----		

Course Description Form

85. Course Name: Computer Networks protocols					
86. Course Code:					
87. Semester / Year: 4 th / 2023-2024					
88. Description Preparation Date: 2024/1/10					
89. Available Attendance Forms: Lecture, laboratory					
90. Number of Credit Hours (Total) / Number of Units (Total): 120					
91. Course administrator's name (mention all, if more than one name) Assist. Lect. Mohammed M. S.					
92. Course Objectives					
Course Objectives		<ol style="list-style-type: none"> 1. Know the types of computer networks 2. Know the types of devices of Computer Networks protocols 3. Learn methods of linking and layering computer networks 4. Know how to relay information through computer networks protocols 5. Know the types of protocols and programs that is appropriate for computer networks depending on the desired application. 			
93. Teaching and Learning Strategies					
Strategy	<p>Stimulate the creative side of the students and that by asking various scientific problems and the demand of the students find appropriate scientific solutions to them in different ways</p> <p>Develop a spirit of cooperation between the students, through the formation of working teams and motivate the students to exert all the necessary conditions for the work of the various efforts and with several people.</p>				
94. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 st , 2 nd	8	Lecture, laboratory	Introduction to the OSI Reference Mode, and the TCP/IP Reference Model. Protocol Hierarchies in these models.	Knowledge of types of networks based on size and transport Technology	Questions oral, daily exam

3 rd	4	Lecture, laboratory	<p>The LANs Protocols:</p> <ul style="list-style-type: none"> • Ethernet (CSMA/CD) • Fast Ethernet • Local Talk • Token Ring • FDDI <p>ATM</p>	Learn the most important species in the local area networks	Questions oral, daily exam
4 th	4	Lecture, laboratory	<p>The Internet Protocols</p> <ul style="list-style-type: none"> • Internet Protocol (IP): (IPv4 & IPv6) • TCP <p>UDP</p>	Understanding the difference between the services that rely on communication, that does not rely on contact	Questions oral, daily exam
5 th , 6 th	8	Lecture, laboratory	<p>The WIRELESS LANs Protocols</p> <ul style="list-style-type: none"> □ The Bluetooth Protocol Stack <p>BROADBAND WIRELESS Protocols (the 802.11, and the 802.16).</p>	Understanding of the OSI model	Questions oral, daily exam
7 th	4	Lecture, laboratory	<p>The ELECTRONIC MAIL {Message Formats, Message Transfer Protocols (SMTP (simple mail transfer protocol), Extensions ESMTP (Extended SMTP) and POP3 (post office protocol) {.</p>	Knowledge of types of large networks and small and private	Questions oral, daily exam
8 th	4	Lecture, laboratory	<p>DNS (Domain Name System) DHCP (Dynamic Host Configuration</p>	Knowing the size of the files by type	Questions oral, daily exam
9 th -30	4	Lecture, laboratory	<p>OTHER Protocols</p> <ul style="list-style-type: none"> • RTP the realtime transport protocol, and RTCP realtime transport control • SSH secure shell 	Knowing the bandwidth and speed of transmission of information	Questions oral, daily exam

			<ul style="list-style-type: none"> • Talent telephone network • SFTP: secure file transfer protocol • SSL: secure socket layer • TLS: transport layer security • E6: Ethernet globalization protocols • NTP: network time protocol • PPP : point to point protocol 		
29 th	4	Lecture, laboratory	Network layer(Routing Algorithms)	See guidance in the network layer algorithms	Questions oral, daily exam
30 th	4	Lecture, laboratory	Network layer(Broadcast Routing)	Knowledge of the routing algorithms in all directions in the network layer	Questions oral, daily exam

95. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

96. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Computer Networking A. Top-Down. Approach 6th Edition
Main references (sources)	Computer Networks - A Tanenbaum - 5th - 2 edition
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	-----

Course Description Form

97. Course Name: Information Theory and coding					
98. Course Code:					
99. Semester / Year: 4 th / 2023-2024					
100. Description Preparation Date: 2024/1/10					
101. Available Attendance Forms: Lectures & Lab.					
102. Number of Credit Hours (Total) / Number of Units (Total): 120					
103. Course administrator's name (mention all, if more than one name) Assist. Lect. Bassma M. K.					
104. Course Objectives					
Course Objectives		a- To study the important of information system and show its facilities and limitations. b- To analysis all types of communication channels and study its characteristics and capacity calculations. c- To know the source coding using various theories that transfer the information into digital form with minimum data rate. d- To analysis the efficiency of each type of source code. e- To calculate the efficiency for each type. f- To study some types of channel coding, its facilities and its limitations.			
105. Teaching and Learning Strategies					
Strategy		1- Employ the method transmitter and receiver and check the quality of received information. 2- Apply an experiment for the theory subjects.			
106. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2	1+2	Review	The probability	Theory	Direct questions

3,4	1+2	The relation between probability and information	The conditional probability and random variable	Theory and applications	Daily test and report
5,6,7	1+2	To identify the communication channels	The channels with and without noise	Showing the relation between reality and communication channels	What are the important of channels
8,9,10	1+2	To distinguish between symmetric and non-symmetric	symmetric and non-symmetric channels	Write a report for each channel types	Questions and answers
11,12,13	2+1	Calculate the channel capacity	The capacity of each channel	The theory lecture	Daily test
14,15	---	Semester test	----	-----	-----
16,17	---	Middle holiday			
18,19,20,21	1+2	Data compression	The types of coding	The theory lecture	Daily test
22,23,24,25	1+2	Error Correction	The types of channel coding	The theory and laboratory lecture	Daily test
26,27	1+2	Connect the overall system	Review	Design a complete system	Evaluate the system
28,29,30	1+2	Final exam			

107. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

108. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Coding and Information Theory by Steven
Main references (sources)	Elements of information theory by Thomas
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	----

Course Description Form

109. Course Name: mobile communication					
110. Course Code:					
111. Semester / Year: 4 th / 2023-2024					
112. Description Preparation Date: 2024/1/10					
113. Available Attendance Forms: Lecture , Lab.					
114. Number of Credit Hours (Total) / Number of Units (Total): 120					
115. Course administrator's name (mention all, if more than one name): Assist. Lect. Saad J. A.					
116. Course Objectives					
Course Objectives		<p>It is aimed at students on the fourth stage definition</p> <ul style="list-style-type: none"> - Concepts and terminology used in cellular systems - The study of developments in the generation cellular system - How to design cells - How to cover all the cell by signal and at all spaces - Types of modulation signal in Cellular Communications <p>Wireless systems construction, design and processing of interference signals</p>			
117. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none"> - View lecture and charts smart board - Scientific laboratories 			
118. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1-2-3		Understanding of the cellular system and learn how development across multiple generations and to identify the characteristics of each generation	Introduction to Wireless Communication System: Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication, Second generation (2G) systems. Evolved Second-Generation Systems (2.5G). Third-Generation (3G) Systems. Fourth Generation (4G) Systems. Fifth Generation (5G) Systems	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
4-5-6-7		Identify how to configure the cells and calculate the frequencies and overlapping frequencies and signal converter	The Cellular Concept System Design Fundamentals: Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment

			adjacent interference, Handoff Strategies, Umbrella Cell Concept		
8-9-10-11		Insurance service and network for each cell and calculate capacity	Traffic Engineering: Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
12-13-14-15		Calculate the signal propagation through the air and its implications	Large scale path loss: Free Space Propagation loss equation, Path-loss of NLOS and LOS systems, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design,	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
16-17-18		Send multiple signals and calculate delay	Small scale multipath propagation: Impulse model for multipath channel, Delay spread, Feher's delay spread, upper bound Small scale, Multipath Measurement parameters of multipath channels, Types of small scale Fading, Rayleigh and Rician distribution	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
19-20		Learn the types of modulation used in the cellular system, such as QPSK, MSK,	Modulation Techniques for Mobile Radio: Review for basic digital modulation techniques, QPSK,MSK,GMSK,	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment

		GMSK			
21-22		Understanding FDMA technology And Technology TDMA	Multiple Access Techniques: Frequency Division Multiple Access (FDMA). Time Division Multiple Access (TDMA). Spread Spectrum Multiple Access.	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
23-24-25-26-27-28		Identify the CDMA technology And everything related to the system	Wireless Systems: GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Concept of spread spectrum, Architecture of IS-95 CDMA system, Air interface, CDMA forward channels, CDMA reverse channels, Power control in CDMA, cellular technology, GPRS system architecture	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment
29-30			Recent trends: Wi-Fi, WiMAX, ZigBee Networks, Software Defined Radio, UWB Radio, Wireless Ad-hoc Network and Mobile Portability, Security issues and challenges in a Wireless network.	Lecture, lab	<ul style="list-style-type: none"> • Interactive assessment • Editorial periodic test Direct assessment

119. Course Evaluation

20% documented exam
5% Quizes
5% reports and homework
20% Lab.

120. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Mischa Schwartz, Mobile Wirel Communications, Cambridge University Press 2005 - J. G. Proakis, Digital Communications, 4th ed. NY: McGraw Hill, 2000
Main references (sources)	
Recommended books and references (scientific journals, reports...)	-----
Electronic References, Websites	----

