

University of AlKafeel

College of Technical Engineering

Computer Technology Engineering Department



جامعة الكفيل
University of Alkafeel

Academic Program and Course Description Guide



2026-2025

Academic Program Description Form

University Name: University of AlKafeel

Faculty/Institute: Technical Engineering

Scientific Department: Computer Engineering Technology

Academic Program Name: Bachelor of Computer Engineering Technology

Study System Annual

Year of Preparation Date: 2025

File Completion Date: 20/09/2025

Signature:

Head of Department: Assoc. Prof
Ali Jasim Ramadan

Date:

20/09/2025

Signature:

Scientific Associate Name:
Lecturer Zainab Sabah idan

Date:

20/09/2025

The file has been checked by:

Quality Assurance and University Performance Division

The Director of the Quality Assurance and University Performance Division:

Assistant Lecturer Hashim Ali Hashim

Date:

20/09/2025

Signature:



Approval of the Dean

1. Program Vision

1. Educational Objectives: Defining the main objectives of the educational program, such as providing students with the fundamental knowledge and skills necessary in engineering technology fields, and developing their research and analytical abilities.
2. Curriculum and Courses: Designing comprehensive study programs that include a diverse range of core and elective courses covering various engineering technology fields, such as mechanical engineering, electrical engineering, and civil engineering.
3. Active Learning and Practical Application: Enhancing practical experience through advanced engineering laboratories, workshops, and applied projects that help students apply theoretical concepts in a practical environment.
4. Scientific Research and Innovation: Fostering a culture of scientific research and innovation by supporting academic research and technological projects that contribute to developing new and innovative solutions.
5. Continuing Learning and Professional Development: Providing opportunities for continuous learning and professional development for faculty members and students to keep pace with technological and professional advancements in engineering fields.

2. Program message

1. We aim to enhance our students' problem-solving and innovation skills across all engineering disciplines.
2. We are committed to academic and ethical excellence, striving to prepare our students to be innovative leaders and active contributors to the development of local and global society and the economy.
3. We provide a stimulating and supportive learning environment that encourages self-directed learning and innovation, helping our students achieve their aspirations and develop their personal and professional capabilities.
4. We work to build a brighter future for our students and the communities we serve through engineering and technology.

3. Program objectives

- a) To graduate qualified computer engineers capable of overcoming all the difficulties and obstacles they encounter while working in the industrial and technological sectors by equipping them with all the necessary information, fundamentals, and scientific facts required in their field of computer engineering.
- b) To strive to graduate engineers specializing in various computer engineering technologies who possess the ability to innovate and create in different engineering fields after graduation and keep pace with scientific and technological advancements in the developed world.

c) To prepare technical and engineering personnel specializing in computer engineering to stay abreast of the most important scientific and technological developments and to utilize them in service to society and to develop students' teamwork skills.

4. Program accreditation

Not accredited by the program.

5. Other external influences

Beneficiary satisfaction, alignment of learning and teaching outcomes with the labor market, community service by the department and the extent of student participation in it.

6. Program structure

Program structure	Number of courses	Study unit	Percentage	* comments
Institutional requirements	3	6	3%	
College requirements	—	—	—	—
Department requirements	27	97%	171	
Summer training	2	—	—	
Other				—

The notes may include whether the course is core or elective *

Program Description 7

Level/Year	Course code	Course name	Credit hours and units	
			theoretical	practical

Fourth Electronics branch	4CTEE1	Project Management	2	2
	4CTEE2	Advanced digital electronics	2	2
	4CTEE3	Computer interface circuit design	2	2
	4CTEE4	Advanced computer technology	2	2
	4CTEE5	Computer networks	2	2
	4CTEE6	Intelligent Systems Modeling	2	2
	4CTEE7	elective subject	2	2
	4CTEE8	project	-	4
Fourth Communications branch	4CTEC1	Project Management	2	2
	4CTEC2	Computer and network security	2	2
	4CTEC3	Mobile communications	2	2
	4CTEC4	Computer network protocols	2	2
	4CTEC5	Multimedia computing	2	2
	4CTEC6	Information theory and coding	2	2
	4CTEC7	elective subject	2	2
	4CTEC8	project	-	4

8. Expected learning outcomes of the program

Knowledge

1. To acquire knowledge, understanding, principles, theories, and fundamentals in computer engineering.
2. To understand modern and advanced scientific topics in the field of computer engineering.
3. To become familiar with the most important computer software used in solving engineering problems.
4. To understand the basics of how laboratory equipment works.

Skills

A. Subject-Specific Skills

1. Describe and analyze computer applications.
2. Write, prove, and discuss engineering rules and the principles upon which they are based.
3. Analyze and discuss problems and find effective solutions, potentially using specialized computer programs.
4. Justify, explain, and prove concepts, especially engineering concepts in the field of computer engineering.

B. Thinking Skills

1. The learner is able to receive and accept information.
2. The learner is able to work as part of a team.
3. The learner develops a spirit of friendliness, empathy, and respect for themselves and others.
4. The learner adheres to the ethics of scientific research, the ethics of university institutions, and ethics derived from religion and social norms.

C. General and Transferable Skills (Other skills related to employability and personal development):

1. Prepare engineering designs for computer components and systems.

2. Providing engineering consultations on engineering problems and their solutions in the field of computer engineering.
3. Analyzing, discussing, and utilizing the results of engineering tests in design and evaluation processes.
4. The ability to write and formulate technical engineering reports on the results of scientific tests and examinations, and the ability to deduce the results and their implications.

Values

1. The college is committed to graduating students who are socially and ethically responsible and who contribute effectively to the development of society and the resolution of its problems.
2. The college is committed to transparency and integrity in all academic and administrative processes, which contributes to building the trust of students, parents, and the community in the college.

9. Teaching and learning strategies

1. Theoretical lectures.
2. Discussion lectures.
3. Practical lectures in laboratories.
4. Student seminars.
5. Small group learning methods.
6. Graduation projects for graduating students and their presentations.

Theoretical and practical lectures, presenting information from diverse and reputable scientific sources.

Explanation and demonstration through lectures.

- Presentation of scientific lectures using electronic output devices: data projectors, interactive whiteboards, television screens.
- Homework assignments and mini-projects within the lectures.
- Scientific laboratories.
- Graduation projects.
- Scientific visits.
- Scientific courses and seminars held in the department.
- Summer training.

10. Assessment methods

1. Monthly or semester written exams.
2. Quick quizzes.
3. Scientific report writing.
4. Scientific seminars.
5. Homework assignments.
6. Graduation project defense committees for final-year students.

Regular oral and practical assessments of students to evaluate their understanding of the presented scientific theories.

Surprise quizzes.

- Homework and mini-projects within the course.
- Semester and final exams for theoretical and practical courses.
- Participation in lectures.
- Reports for theoretical and practical courses.

11. Faculty						
Faculty members						
academic rank	Specialization		Special requirements/skills (if any)		Faculty preparation	
	general	private			angel	lecturer
Mr		1			1	
Mr		1			1	
Teacher		5			5	
Assistant teacher		7			7	

Professional Development
Orienting new faculty members New faculty members should be introduced to the college's vision and mission, as well as the academic program in computer engineering. The college's history, development, and current direction should be explained, along with the importance of their contribution to achieving the college's goals. Effective support should be provided to develop the skills of new faculty members, whether through continuing education programs, workshops, or training courses that help them improve their teaching and research techniques.
Professional development of faculty members • Organizing ongoing training programs covering various aspects of teaching and research, such as modern teaching techniques, assessment methods, time management, and the development of personal and social skills. • Encouraging faculty members to participate in international conferences and workshops to exchange experiences and learn about the latest developments in their academic fields. • Enhancing support for faculty research and providing the necessary infrastructure for conducting high-quality research.

- Encouraging publication in peer-reviewed scientific journals and participation in writing chapters for electronic or print books.
- Conducting periodic evaluations of faculty performance to identify strengths and weaknesses and provide necessary guidance and support.
- Encouraging faculty members to participate in the work of academic and administrative committees within the college, which contributes to the development of academic policies and the improvement of the teaching and research environment.
- Providing material and non-material rewards or incentives to encourage outstanding performance and dedication to improving academic performance and contributing to the success of the college.

12. Admission standard

First: College Admission Requirements:

- 1- Admission to students is subject to the regulations of the Ministry of Higher Education and Scientific Research (Central Private Admission).
- 2- Successfully passing any special test or personal interview deemed necessary by the College or University Council.
- 3- Passing the medical examination.

Second: Admission Requirements for the Science Department:

- 1- Selecting one of several preferred programs in order of preference.
- 2- High school graduation average.
- 3- The capacity of the Science Department.

13.Key sources of information about the program

1. Market needs.
2. Local trends.
3. Studies and surveys.
4. Specialized seminars and workshops with stakeholders.

14. Program development plan

1. Identify specific development goals aimed at improving the program, such as enhancing students' practical skills or updating the curriculum to keep pace with technological advancements.
2. Update the curriculum to include the latest developments in engineering technology.
3. Introduce new courses covering emerging and evolving fields such as artificial intelligence, environmental engineering, and renewable energy.
4. Develop practical workshops and applied projects that enhance students' understanding and ability to solve real-world engineering problems.
5. Develop and improve engineering laboratories and facilities to provide a stimulating learning environment.

Provide the necessary resources to effectively support research and teaching activities.

Curriculum Skills Plan

Please check the boxes corresponding to the individual learning outcomes from the program that are being assessed

Learning outcomes required from the program											
Year / Level	Course code	Course Name	essential My choice	Knowledge and understanding	Subject-specific skills	thinking skills	General and transferable skills (or) other skills related to employability				
Fourth	4CTEE1	Project Management	essential	*	*	*	*	*	*	*	*
	4CTEE2	Computer and network security	essential	*	*	*	*	*	*	*	*
	4CTEE3	Mobile communications	essential	*	*	*	*	*	*	*	*
	4CTEE4	Computer network protocols	essential	*	*	*	*	*	*	*	*
	4CTEE5	Multimedia computing	essential	*	*	*	*	*	*	*	*
	4CTEE6	Information theory and coding	essential	*	*	*	*	*	*	*	*
	4CTEE7	Advanced computer technology	optional	*	*	*	*	*	*	*	*
	4CTEE8	English Language	assistance	*	*	*	*	*	*	*	*
	4CTEE9	Professional Ethics	assistance	*	*	*	*	*	*	*	*

Course description template

1. Course Name	
Project Management	
2. Course code	
4CTEE1	
3. Semester/Year	
annual	
4. Date this description was prepared	
20/09/2025	
5. Available forms of attendance	
mandatory	
6. Number of study hours (total) / Number of units (total)	
120	
7. Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
8. objectives Course	
Course objectives	Students in engineering disciplines gain knowledge about project management concepts and research applications
9. Teaching and learning strategies	
strategy	Theoretical and practical lectures and presentation of information from various reputable scientific sources

10.Course Structure					
Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1 st , 2 nd	8	Project management concept	Project management	Lecture and Laboratory	Tests
3 rd , 4 th	8	Getting to know Economics and Management for Engineers	Economics and management for the engineers	Lecture and Laboratory	Tests
5 th , 6 th	8	Factory Getting to know and workshop design	Layout of factories and workshops	Lecture and Laboratory	Tests
7 th	4	Getting to know productivity	Productivity	Lecture and Laboratory	Tests
8 th , 9 th	8	Understanding engineering project drawings	Networks	Lecture and Laboratory	Tests
10 th , 11 th	8	Understanding the Critical Path Method in Project Management	Critical path method (CPM)	Lecture and Laboratory	Tests

12th, 13th, 14th, 15th	16	Understanding the PERT technique (time and cost)	Pet technique (Time and cost)	Lecture and Laboratory	Tests
16th	4	Getting to know Resource allocation problems	The resource allocation problems	Lecture and Laboratory	Tests
17th, 18th	8	Understanding the concept of linear equations (formal method, simple method)	Linear programming (graphical method, simplex method)		
19th, 20th, 21st	12	Understanding the concept of inventory and its types	Inventory models(Economic order quantity)(EOQ)		
22nd	4	Understanding the concept of the break-even point in project management	The break-even point		
23rd, 24th	8	Getting to know Inventory cost	The cost of inventory		
25th, 26th, 27th	12	Understanding the Maintenance concept policy and its concepts	Maintenance policy and concepts	Lecture and Laboratory	Tests
28th, 29th	8	Understanding quality control	Quality control	Lecture and Laboratory	Tests

30th	4	Understanding the Employer concept management	Employer management	Lecture and Laboratory	Tests
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11.Course Evaluation	
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc	
12.Learning and teaching resources	
Required textbooks (methodology, applicable)	
Main references (sources)	[1] Y Bakouros and V Kelessidis “Project management” INNOREGIO: dissemination of innovation and knowledge management techniques, January 2000 [2] JR Meredith and SJ Mantel “Project Management”, J Wiley & Sons, 1995 [3] S Choudhury “Project Management”, Tata McGraw Hill – 2003 [4] Principles of Project Management, NPC publication
Recommended supporting books and references (scientific journals, reports)	A number of electronic references and a number of specialized websites
Electronic references, websites	

Course description template

1. Course Name	
Computer and network security	
2. Course code	
4CTEE2	
3. Semester/Year	
annual	
4. Date this description was prepared	
20/09/2025	
5. Available forms of attendance	
mandatory	
6. Number of study hours (total) / Number of units (total)	
120	
7. Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
8. objectives Course	
Course objectives	To provide the student with information on the basic concepts of methods used in data protection and computer networks
9. Teaching and learning strategies	
strategy	Theoretical and practical lectures and presentation of information from various reputable scientific sources

10.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1st, 2nd, 3rd	12	Understanding the fundamentals of computer and network security, and a thorough grasp of the most common and frequently used terms in data encryption algorithms, will enable students to easily understand external sources when consulting them, as they will have mastered the basics of data encryption and computer security	Introduction, Symmetric Ciphers model: plaintext, encryption algorithm, secret key, cipher text, decryption algorithm, A Model of conventional encryption Cryptography, Cryptanalysis, block and stream cipher	The lecture and the laboratory in ' addition to the open free discussion	Tests Homework after each lecture
4th	4	Understanding the simplest traditional encryption methods, the	Caesar Cipher The affine Cipher	Lecture and Laboratory	Tests

		origins of the encryption concept, the need for it, and where it was applied, is crucial These methods use a single, fixed number, making them easy to crack once the encryption key is known			
5th, 6th	8	Encryption methods rely on various mathematical equations, as well as using a method of shifting the letters of the original text to a specific number of selected letters	Mono alphabetic substitution ciphers Shift ciphers	Lecture and Laboratory	Tests
7th	4	Using descriptors in encoding words and sentences	Hill cipher	Lecture and Laboratory	Tests
8th	4	It uses a key table and explicit text	Playfair cipher	Lecture and	Tests

		characters in a circular fashion, so that every two characters are processed together		Laboratory	
9th	4	Improving the performance of the above methods by using a somewhat more complex encryption key	Polyalphabetic ciphers Vigenere cipher	Lecture and Laboratory	Tests
10th	4	Treating explicit text as a set of boxes of a certain length actually involves manipulating (hiding) the data by changing the positions of the explicit text characters rather than converting them into other characters	The Transposition cipher	Lecture and Laboratory	Tests
11th	4	Using more than one key with each	Affine cipher	Lecture and	Tests

		character of the plaintext is a precursor to using streaming encryption		Laboratory	
12th	4	randomly generated binary units (bits) of a size equal to the size of the explicit text	One-time pad	Lecture and Laboratory	Tests
13th, 14th, 15th	12	The encryption and decryption process is done using a single key and must be kept securely, allowing only authorized people to know it	Cryptanalysis of a Symmetric key	Lecture and Laboratory	Tests
16th	4	Finding the greatest common divisor of two integers, reducing the value of the common fraction to the lowest possible value	Euclid's Algorithm		

17th, 18th, 19th	12	This is a modern method that uses a symmetric key, ie, a single key for both encryption and decryption It uses a very small key size of around 56 bits, but even so, it can be broken	SYMMETRIC-KEY ALGORITHMS -DES—The Data Encryption Standard, hers -16 round Feistel system		
20th, 21st	8	A modern encryption method that uses two different keys, one for encryption and the other for decryption, is considered one of the modern encryption methods	PUBLIC-KEY ALGORITHMS, -RSA, - Other Public-Key Algorithms,		
22nd, 23rd, 24th, 25th	16	Bilateral authentication methods include using a single secret key, creating a shared key for a limited number of	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,		

		users (authorized individuals), and relying on personal information or official documents to verify user identity It's also important to know how to completely hide your password on networks especially those) with weak security) even from authorized users	- Authentication Using Public-Key Cryptography,		
26th, 27th	8	Identifying the processes for detecting and preventing breaches, and in the event of breaches, knowing the peaceful ways to deal with them and block access to them again, through the use of stricter	OSI security Architecture, a model for network security, EMAIL SECURITY -PGP— Pretty Good Privacy, S/MIME	Lecture and Laboratory	Tests

28th, 29th, 30th	12	Providing protection through network layers Protecting devices and connections within a single network How to properly manage and store databases, ensuring that backup copies are readily available for easy retrieval when needed, or in case of data loss or breach, especially for data transmitted over the internet Learn about the installation and operation of virtual private networks (VPNs), which are not limited to computer networks and devices, but also include smart	Protocols of computer networks PROTECTION SERVICES: □ OS protection service: protected objects and methods of OS protection, security of OS, memory and addressing protection, fence protection □ Database protection service: □ Network protection service: IP and E-Commerce protection, VPN and next generation networks protection		
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		mobile devices and tablets			
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11.Course Evaluation	
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc	
12.Learning and teaching resources	
Required textbooks (methodology, applicable)	[1] Cryptography and Network Security, 7th Edition [2] Handbook of Applied Cryptography [3] Defensive Security Handbook: Best Practices for Securing Infrastructure [4] Network Monitoring and Analysis: A Protocol Approach to Troubleshooting [5] Network Security Essentials:Application And Standards, 6Th Edition
Main references (sources)	
Recommended supporting books and references (scientific journals, reports)	A number of electronic references and a number of specialized websites
Electronic references, websites	

Course description template

1. Course Name	
Mobile communications	
2. Course code	
4CTEE3	
3. Semester/Year	
annual	
4. Date this description was prepared	
20/09/2025	
5. Available forms of attendance	
mandatory	
6. Number of study hours (total) / Number of units (total)	
120	
7. Name of the course coordinator (if there is more than one, please mention it)	
(:inclined to) A Name: AI	
8. objectives Course	
The course aims to teach the student about mobile cellular communications across all generation systems, and to study the internal structure of cells and the coverage of the communication process	Course objectives
9. Teaching and learning strategies	
Theoretical lectures in the classroom and practical sessions in the laboratory Involving the student in the design of the mycorrhizal communication towers and writing the programming part Laboratory application using computer programs and - 3 discussion of results	strategy

To reach parts 1 and 2 of paragraph 9, the student is tasked with addressing a practical engineering problem related to Control engineering offers, during the course of study, appropriate solutions for analyzing the root of the problem and following Theories and rules used to solve them, and presentation of the results of the analysis and solutions, and their economic and social impact	
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10.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1-3	6	Understanding the different types and generations of mobile systems	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	A slideshow and illustrative images of the types and generations of mobile communication systems and their uses	Daily test
7-4	8	Identifying the types of ground stations, how they are distributed, and methods for selecting frequencies	The Cellular Concept-System Design Fundamentals: Cellular system, Hexagonal geometry cell and concept of	Explaining the mechanism for extracting frequencies for ground stations for users, how to use these	Daily test

			frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, channel & channel Interference factor, S/I ratio consideration reduction and calculation for Minimum Co-channel and adjacent interference, Handoff Strategies, Umbrella Cell Concept	frequencies, and methods for redistributing them on the network	
11-8	8	Calculating the volume of information transmitted through ground stations and how to obtain the best results	Traffic Engineering: Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization	Explaining the mechanism and volume of information transmitted between devices and ground stations, and calculating the mathematical formulas to obtain the required results	monthly exam
15-12	8	Microwave station design	Large scale path loss: Free Space propagation loss equation, Path-loss of NLOS and LOS systems, Reflection, Ray ground reflection model,	Explanation, clarification, and performing the required calculations for the operation of microwave stations, taking into account the standards of	Daily test

			Diffraction, Scattering, Link budget design,	signal strength, the possibility of temperature changes, and rain	
18-16	6	Calculating microwave signal propagation by designing a station using Pathloss 40 software	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	Calculating microwave signal propagation by designing a station using Pathloss 40 software	monthly exam
22-19	8	The importance of inclusion and transfer methods	Modulation Techniques for Mobile Radio: Review for basic digital modulation techniques, QPSK, MSK, GMSK Multiple Access Techniques: Frequency Division Multiple Access (FDMA) Time Division Multiple Access (TDMA) Spread Spectrum Multiple Access Space Division Multiple Access (SDMA)	Understanding the types of signal modulation and learning about transmission methods using FDMA, TDMA or CDMA the advantages of each method, and how to use them	
28-23	12	Understanding the protocols and how	Wireless Systems: GSM system	Explanation and clarification of	Daily test

		each layer of these protocols works, along with the importance of recognizing the differences between the systems	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	the types of protocols used in mobile communication systems, and an explanation of the difference between GSM and CDMA, and the architecture of each type	
30-29	4	A practical application using some of these systems through the transfer of information between devices	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	Discussing other types of systems, the advantages and disadvantages of each type, and how they work	Daily test

11.Course Evaluation	
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc	
12.Learning and teaching resources	
Required textbooks (methodology, (applicable	
Main references (sources)	[1]-Wireless communications principles and practices [2]-WIRELESS COMMUNICATIONS AND NETWORKING [3]-Wireless and Cellular Telecommunications
Recommended supporting books and references (scientific journals, reports)	A number of electronic references and a number of specialized websites
Electronic references, websites	

Course description template

1. Course Name	
Computer network protocols	
2. Course code	
4CTEE4	
3. Semester/Year	
annual	
4. Date this description was prepared	
20/09/2025	
5. Available forms of attendance	
mandatory	
6. Number of study hours (total) / Number of units (total)	
120	
7. Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
8. objectives Course	
Course objectives	The course aims to introduce students to the protocols used in computer networks and how they work Mastering the use of different protocols within computer networks
9. Teaching and learning strategies	
strategy	Learn the fundamentals of digital communication according to lecture theory, and follow modern methods in Learning through the use of electronic screens and presentations
	Theoretical and practical lectures and presentation of information from various reputable scientific sources

10.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1	4	OSI Recognition: An Introduction to the Reference Model	Introduction to the OSI Reference Mode	Lecture and Laboratory	Tests
2	4	TCP/IP model differentiation	TCP/IP Reference Model	Lecture and Laboratory	Tests
3	4	Understanding application layer protocols	Application Layer Protocols	Lecture and Laboratory	Tests
4	4	Understanding the World Wide Web	WWW	Lecture and Laboratory	Tests
5	4	Protocols used in the network	(HTTP, HTTPS, FTP)	Lecture and Laboratory	Tests
6	4	Differences between STMP and POP	Electronic Mail (SMTP, POP)	Lecture and Laboratory	Tests
7	4	Identifying the types of protocols	DHCP, DNS, SNMP	Lecture and Laboratory	Tests
8	4	some of the Identifying protocols found in the Lira network	SSH, Telnet, BGP, RIP	Lecture and Laboratory	Tests
9	4	Understanding the layers of transfer	Transport Layer Protocols	Lecture and Laboratory	Tests
10	4	Understanding the data flow method	Congestion Control, Flow Control	Lecture and Laboratory	Tests

11	4	User Scheme Protocol (USP) identification	End-to-End Protocols (UDP)	Lecture and Laboratory	Tests
12	4	Identifying the types of calls and remote procedures	TCP, RPC	Lecture and Laboratory	Tests
13	4	Understanding the specific algorithms in the network	Network Layer Protocols Routing Algorithms	Lecture and Laboratory	Tests
14	4	Understanding the shortest path to the network	Flooding, Shortest path routing	Lecture and Laboratory	Tests
15	4	Compares distances between networks	Distance Vector routing	Lecture and Laboratory	Tests
16	4	Network connection is determined	Link State routing	Lecture and Laboratory	Tests
17	4	Hierarchical routing algorithm	Hierarchical routing	Lecture and Laboratory	Tests
18	4	Getting to know Broadcasting and network multicast routing	Broadcast and multicast routings	Lecture and Laboratory	Tests
19	4	Internet guidance	Routing in the Internet	Lecture and Laboratory	Tests
20	4	Identifying the direction of the path vector	Path Vector routing	Lecture and Laboratory	Tests
21	4	Routing for Internet Protocol networks	OSPF routing	Lecture and Laboratory	Tests
22	4	Network internal gateway routing protocol	EIGRP routing	Lecture and Laboratory	Tests

23	4	Understanding Network Generations	IPv4, IPv6, IPsec	Lecture and Laboratory	Tests
24	4	Understanding the differences between ICMP and IGMP protocols	ICMP, IGMP	Lecture and Laboratory	Tests
25	4	Error control and flow control algorithms	Data Link Layers, Error control and flow control algorithms	Lecture and Laboratory	Tests
26	4	Understanding network protocols	ARP, L2TP, PPP	Lecture and Laboratory	Tests
27	4	Understanding Integrated Services Digital Network (ISDN) Interfaces	MAC (Ethernet, DSL, ISDN, FDDI)	Lecture and Laboratory	Tests
28	4	Network protocol	STP	Lecture and Laboratory	Tests
29	4	Multi-sensor access to the carrier with collision detection	CSMA/CD	Lecture and Laboratory	Tests
30	4	Check the summation algorithms	Check sum algorithms	Lecture and Laboratory	Tests

11.Course Evaluation

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc

12.Learning and teaching resources

Required textbooks (methodology, applicable)	
Main references (sources)	[1]Digital Communications Fundamentals and Applications, by Bernard Sklar, Prentice Hall, USA [2]Communication Systems, by Simon Hyakin, Wiley, USA

	[3]Modern Digital and Analog Communications Systems, by BP Lathi, Oxford University, England [4]Digital Communications, by Ian A Glover and Peter M Grant, Prentice Hall, England [5]Digital Communication, by Andy Bateman, Prentice Hall, USA [6] Communication Systems an Introduction to Signals and Noise in Electrical Communication, by A Bruce Carlson, et at, McGraw-Hill, USA
Recommended supporting books and references (scientific journals, reports)	A number of electronic references and a number of specialized websites
Electronic references, websites	

Course description template

1. Course Name	
Multimedia computing	
2. Course code	
4CTEE5	
3. Semester/Year	
annual	
4. Date this description was prepared	
20/09/2025	
5. Available forms of attendance	
mandatory	
6. Number of study hours (total) / Number of units (total)	
120	
7. Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
8. objectives Course	
Course objectives	To provide students in engineering disciplines with knowledge about multimedia concepts and their practical applications in the present time
9. Teaching and learning strategies	
strategy	Theoretical and practical lectures and presentation of information from various reputable scientific sources

10.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1st	4	Understanding what multimedia is	Introduction to Multimedia	Lecture and Laboratory	Tests
2nd	4	Recognizing complex texts and multimedia	Hyper Text and Hyper Media	Lecture and Laboratory	Tests
3rd	4	Understanding multimedia components	Components of Multimedia	Lecture and Laboratory	Tests
4th	4	Identifying research and projects related to multimedia	Multimedia Research Topics and Projects	Lecture and Laboratory	Tests
5th	4	multimedia applications	Multimedia applications	Lecture and Laboratory	Tests
6th	4	Understanding the relationship between multimedia and the internet	Multimedia on the web	Lecture and Laboratory	Tests
7th	4	Understanding the basics of multimedia	Multimedia Data Basics	Lecture and Laboratory	Tests
8th, 9th	8	Understanding how to represent images digitally	Graphics and Image Data Representation	Lecture and Laboratory	Tests
10th	4	Understanding how to convert	Image digitization	Lecture and	Tests

		images to digital format		Laboratory	
11th	4	Recognizing spatial image quantization	Spatial resolution and quantization	Lecture and Laboratory	Tests
12th	4	Identifying Image Types	Image type	Lecture and Laboratory	Tests
13th	4	Knowing the final shapes of the images	Image file formats	Lecture and Laboratory	Tests
14th	4	Identifying the mathematical operations performed on images	Arithmetic operation on image	Lecture and Laboratory	Tests
15th	4	Identifying the logical operations performed on images	Logical operation on image	Lecture and Laboratory	Tests
16th	4	Understanding what a graph is	Image histogram	Lecture and Laboratory	Tests
17th	4	Learn how to edit a chart	Histogram modification and Histogram equalization	Lecture and Laboratory	Tests
18th, 19th	8	Understanding image compression technology	Image compression techniques	Lecture and Laboratory	Tests
20th	4	Understanding the basics of sound	Sound and Audio Basics	Lecture and Laboratory	Tests

21st	4	Understanding audio-to-digital conversion technology	Digitization of sound	Lecture and Laboratory	Tests
22nd	4	Knowledge of Nyquist's theory	Nyquist theorem	Lecture and Laboratory	Tests
23rd	4	Identifying artificial voices	Synthetic sound	Lecture and Laboratory	Tests
24th	4	Knowing how to mute and transmit sound	Quantization and transmission of Audio	Lecture and Laboratory	Tests
25th	4	Learn how to compress an audio file	Compression of audio	Lecture and Laboratory	Tests
26th	4	Understanding the basics of video files	Video Basics	Lecture and Laboratory	Tests
27th	4	Understanding the basics of color systems for video files	Video color models	Lecture and Laboratory	Tests
28th	4	Understanding the types of video signals	Type of video signals	Lecture and Laboratory	Tests
29th	4	Learn how to compress video	Video compression	Lecture and Laboratory	Tests
30th	4	Internet multimedia	Multimedia over networks	Lecture and Laboratory	Tests

11.Course Evaluation	
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc	
12.Learning and teaching resources	
Required textbooks (methodology, (applicable	
Main references (sources)	[1] Fundamentals of Multimedia, Ze-Nian Li, Mark S Drew Prentice Hall, 2004Communication, by A Bruce Carlson, et at, McGraw-Hill, USA [2]Digital Image Processing Using MATLAB, Rafael C Gonzalez, Richard E Woods, and Steven L Eddins, Prentice Hall, 2004 [3]Digital video processing, AM Tekalp, Prentice Hall, 2005 [4]The data compression book, Mark Nelson, Imprint: M & T Books, Publisher: IDG Books Worldwide, Inc, January 1, 1991
Recommended supporting books and references (scientific journals, reports)	A number of electronic references and a number of specialized websites
Electronic references, websites	

Course description template

1. Course Name	
Information theory and coding	
2. Course code	
4CTEE6	
3. Semester/Year	
annual	
4. Date this description was prepared	
20/09/2025	
5. Available forms of attendance	
mandatory	
6. Number of study hours (total) / Number of units (total)	
hours per semester 30	
7. Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
8. objectives Course	
Course objectives	- Managing the basic components of the information system used in computer networks, according to Shannon's theory - Evaluate the information or surplus information possessed by the sources and determine their efficiency using mathematical methods - Distinguishing the difference between continuous and discontinuous information channels, and mastering how to calculate their capacities - Gaining detailed and practical knowledge of the basic types of source encoding, and how to calculate their efficiency - Gaining detailed knowledge of the basic types of channel encoding and methods for detecting and correcting errors in them - Gaining basic knowledge to avoid the primary sources of channel errors, and to minimize their impact as much as possible - Preparing the student to learn about digital communication technologies and the different types of digital modulation of intermediate and high frequencies

9. Teaching and learning strategies

strategy	Explanation and clarification (lecture) A method of presenting selected examples of illustrative questions and their solutions Self-learning method (assigning students to complete learning some (skills after giving them the basics
	Theoretical and practical lectures and presentation of information from various reputable scientific sources

10.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1	4	Ability to apply probability theory in info theory	Review of related probability and statistics related topics Definition of Alphabet , Definition of random variable	Explanation and clarification (lecture), assigning specific tasks to students, and solving exercises	Exams(term, daily), classroom activity and positive participation, preparing reports and visual aids not) mandatory for the student but optional)
2	4	Understanding difference between independent and dependent events	Definition of joint probability , Conditional probabilities and Bayes rule Independence of two random variables Venn's diagram		
3	4	Understanding sense of information	Model of information transmission system Common sense definition of information Logarithmic measure of information Self-information		
4	4	Learning how to compute mutual information	Definition of information for noisy channel Posteriori		

			probabilities Average mutual information for noisy channel		
5	4	Learning how to describe information channel	Shannon representation diagram of information source Parameters of secret channel		
6	4	Having ability to compute entropy for info Source	Average information (entropy) of a discrete and continuous source, maximum source entropy Source efficiency		
7	4	Ability to describe information channel by transition matrix	Transition probability matrix of channel, discrete noiseless and noisy channel models, uniform channel Ternary symmetric channel		
8	4	Understanding BSC and TSC	Information transmission over symmetric channel, noiseless channel, binary symmetric		

			channel, ternary symmetric channel		
9	4	Understanding special cases in Binary channels	Memory and memory less information channels Binary Erasure channel (BEC)		
10 , 11	8	Having ability to calculate capacity and efficiency for Symmetric channel	Capacity of discrete channel, channel capacity for noiseless channel Channel efficiency and redundancy Channel capacity for symmetric channels		
12	4	Having ability to calculate capacity, for non Symmetric channel	Channel capacity for nonsymmetrical channels binary nonsymmetrical channel		
13	4	Difference Understanding between discrete and continuous information channels	Mutual information of continuous channel Capacity of continuous channels Efficiency and redundancy of continuous channel		

14	4	Understanding continuous information channel with Gaussian noise distribution	Entropy for continuous uniform distribution source Entropy for continuous Gaussian distribution source		
15 , 16	4	Learning relationship between Shannon-Hartly formula and Nyquist theorem	Sampling of continuous source Sampling Theorem Nyquist theorem for transmission over band limited continuous channel Shannon-Hartly channel capacity theorem		
17	4	Learning how to compute capacity for continuous channel	AWGN channel model (capacity, bandwidth, S/N ratio)		
18	4	Learning how to deal with channels when cascaded	Cascaded information channels Parallel information channels		
19	4	Understanding basics of source coding types	Source encoding; fixed and variable length codes Prefix property Average length		

			of source code Source code efficiency and redundancy		
20	4	Understand and apply	tree coding method		
21	4	Understand and apply	Shannon – Fano coding method		
22	4	Understand and apply	Huffman Coding Hamming distance		
23	4	Understand why we need channel coding and basic types	Channel Coding in Digital Communication Systems Forward Error Correction (FEC)		
24	4	Understand, implementation, measuring efficiency, and no of detected /corrected errors	Block codes Repetition Codes, Single Parity Check Codes		
25	4	Understand, implementation, measuring efficiency, and no of detected /corrected errors	Hamming(7,4) code, Cyclic Redundancy Check (CRC)		
26	4	Understanding basics	Why do we need to compress? Data compression basics Lossless Compression Run-Length Encoding (RLE)		
27 , 28	8	Understanding basics	Principles of example of		

			Coding Methods used in file and image compression ZIP JPEG		
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11.Course Evaluation	
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc	
12.Learning and teaching resources	
Required textbooks (methodology, applicable)	
Main references (sources)	[1] Data Communications and Networking \McGraw-Hill \Forouzan Networking Series \by Behrouz A Forouzan\Copyright © 2007 by The McGraw-Hill Companies, Inc ELEMENTS OF INFORMATION THEORY\Second Edition\THOMAS M COVER & JOY A THOMAS\Second Edition\Copyright© 2006 by John Wiley & Sons
Recommended supporting books and references (scientific journals, reports)	A number of electronic references and a number of specialized websites Google Books
Electronic references, websites	

Course description template

1. Course Name	
Advanced computer technology	
2. Course code	
4CTEE7	
3. Semester/Year	
annual	
4. Date this description was prepared	
20/09/2025	
5. Available forms of attendance	
mandatory	
6. Number of study hours (total) / Number of units (total)	
120	
7. Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
8. objectives Course	
Course objectives	Advanced internal architecture study of the microprocessor 80386 Studying addressing methods Studying the types and methods of storage in main, temporary and virtual memories Studying the working method of a processor that operates on a fragmentation and recursion system An architectural study and the features of some modern generation designs of multi-core microprocessors An architectural study and the features of some modern generation designs of microprocessors with parallel processing capability Studying modern types of input systems using the sudden interrupt system and the direct presence of memory by input units
9. Teaching and learning strategies	
strategy	Explanation and clarification (lecture)

	A method for displaying selected examples of illustrative questions and their solutions Self-learning method (assigning students to complete learning sources skills after giving them Its basics
	Theoretical and practical lectures, presenting information from diverse and reputable scientific sources

10.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1	4		Introduction to computers - Internal organization of computers	Explanation and clarification (lecture), assigning specific tasks to students, and solving exercises	Exams(term, daily), classroom activity and positive participation, preparing reports and visual aids not mandatory) for the student but optional)
2	4		Introduction to assembly programming		
3	4		More about segment in the 80x86		
4, 5	8		The μP and its architecture Addressing modes		
6, 7	8		Protected mode memory addressing Selectors and descriptors Local and global descriptor tables		
8, 9	8		Descriptor and page table entries - Program – invisible registers		

			-Illustrating local memory access Examples		
10, 11	8		Memory paging - Virtual memory		
12, 13	8		Paging mechanism Segment translation Page translation		
14	4		TLB Examples		
15	4		Major changes in the 80386		
16	4		Hardware organization of the memory address space		
17	4		Bus states and pipelined and non-linear bus cycles		
18, 19	8		Cache memory Cache organization Fully associative Direct mapped Set associative		
20, 21	8		Examples		
22, 23	8		Cache memory used for 80386 Direct Maps Two-way set associative		
24	4		Enhancements of 80386		
25	4		Pipelining design techniques		

26, 27	8		Intel's Pentium Features of the Pentium Intel's overdrive technology		
28	4		Pentium pro Out of order execution		
29, 30	8		Other Pentium processors Core Processor		

11.Course Evaluation

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc

12.Learning and teaching resources

Required textbooks (methodology, applicable)	
Main references (sources)	[1] Advanced Computer Architecture and Parallel Processing: by Hesham El-Rewini & Mostafa Abd-El-Barr \ Copyright © 2005 by John Wiley & Sons [2] Principles of computer architecture :by Miles J Murdocca \ CLASS TEST EDITION – AUGUST 1999 \ Copyright©1999 Prentice Hall [3] Intel 80386 hardware reference manual \ @INTEL CORPORATION 1986
Recommended supporting books and references (scientific journals, reports)	A number of electronic references and a number of specialized websites
Electronic references, websites	

Course description template

13.Course Name	
English Language	
14.Course code	
4CTEE8	
15.Semester/Year	
annual	
16.Date this description was prepared	
20/09/2025	
17.Available forms of attendance	
mandatory	
18.Number of study hours (total) / Number of units (total)	
120	
19.Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
20.objectives Course	
Course objectives	- Providing the student with a cognitive skill about the concept, specifications and importance of the English language and learning its skill - learn the students How to reading in the English language - learn the students How to Listen, speaking and write in the English language - Providing the students with a cognitive skill in the meanings and formulating sentences in English
Student Learning Outcomes	1. Conducts the required tests, experiments, and measurements; analyzes and interprets their results; and applies experimental findings to improve engineering processes. 2. Designs systems, components, or processes for broadly defined engineering problems in accordance with the objectives of the educational program. 3. Works effectively as a member or leader of a specialized engineering team.

	4. Identifies and uses appropriate technical references and resources and applies written, oral, and graphical communication skills in both technical and non-technical environments. 5. Engages in self-directed continuous professional development. 6. Adheres to quality principles and pursues continuous improvement.
21. Teaching and learning strategies	
strategy	Theoretical lectures and the delivery of information using a variety of credible and authoritative sources.

22.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
1	2	Achieving cognitive and practical objectives through understanding tenses.	Unit1 grammar Tens (present , past , present perfect)	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
2	2	Teaching students the Present Simple and the Future Tenses.	Unit 2 grammar present simple ,present passive	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
3	2	Achieving cognitive and practical objectives.	Unit 3 past tense and listening	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
4	2	Achieving cognitive and practical objectives.	Modal verbs	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
5	2	Achieving cognitive and practical objectives and teaching the Future Tense form.	Future forms	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
6	2	Teaching students how to ask about something they like.	Question with like	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
7	2	Achieving cognitive and practical objectives.	Present perfect	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
8	2	Conditional Sentences	Conditionals	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.

9	2	Conditional sentences of probability, how to teach them, and how to make use of them.	Probability	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
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23.Course Evaluation	
The final grade is distributed out of 100 according to the tasks assigned to the student, such as daily attendance and participation, daily, oral, monthly, and written examinations, reports, and other assigned activities.	
24.Learning and teaching resources	
Required textbooks (methodology, applicable)	Headway Plus
Main references (sources)	Headway Plus
Recommended supporting books and references (scientific journals, reports)	Scientific journals in the field of English language studies.
Electronic references, websites	Specialized electronic websites.

Course description template

25.Course Name	
Professional Ethics	
26.Course code	
4CTEE9	
27.Semester/Year	
annual	
28.Date this description was prepared	
20/09/2025	
29.Available forms of attendance	
mandatory	
30.Number of study hours (total) / Number of units (total)	
120	
31.Name of the course coordinator (if there is more than one, please mention it)	
Name:	Email:
32.objectives Course	
Course objectives	Introducing students to professional ethics and equipping them with the ethical principles and professional standards that enhance their commitment to ethical conduct in their expected field of work after graduation.
Student Learning Outcomes	1. Conducts the required tests, experiments, and measurements; analyzes and interprets their results; and applies experimental findings to improve engineering processes. 2. Designs systems, components, or processes for broadly defined engineering problems in accordance with the objectives of the educational program. 3. Works effectively as a member or leader of a specialized engineering team. 4. Identifies, analyzes, and solves broadly defined engineering problems. 5. Identifies and uses appropriate technical references and resources and applies written, oral, and graphical communication skills in both technical and non-technical environments.

	6. Engages in self-directed continuous professional development. 7. Demonstrates an understanding of and commitment to professional and ethical responsibilities. 8. Understands the local and global impact of engineering solutions and applies this understanding within his or her field of specialization. 9. Adheres to quality principles and strives for continuous improvement.
33. Teaching and learning strategies	
strategy	Theoretical lectures and the presentation of information from various credible and reliable sources.

34.Course Structure

Week	Hours	Required learning outcomes	Unit/Course or Topic Name	Teaching method	Evaluation Method
	2	To define the concept of ethics. To explain the importance of ethics in the life of the individual and society. To distinguish between ethical and unethical behavior.	Unit One: Ethics	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
4, 5, 6	2	To explain the concepts of work and profession. To clarify the difference between work and profession. To recognize the importance of work in the development of individuals and society.	Unit Two: Work and Profession	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
7, 8	2	To define professional values and professional ethics. To list the major professional values. To explain the impact of adherence to professional ethics in the workplace.	Professional Values and Ethics	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
9, 10, 11, 12	2	To identify patterns of unethical behavior. To provide examples of unethical practices in the workplace. To explain the effects of unethical behavior on individuals and organizations.	Patterns of Unethical Behavior in the Profession	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.

13 14 15	2	To identify methods for promoting professional ethics. To explain the role of education in strengthening professional values. To propose methods for reducing unethical behavior.	Methods and Approaches for Promoting the Values of Professional Ethics	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
17, 18, 19, 20, 21, 22	2	To explain the responsibilities of engineers toward society. To list the ethical principles governing the practice of the engineering profession. To adhere to the principles of safety and professional accuracy.	Ethics of Engineering Practice	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.
23, 24, 25, 26,27, 28,29, 30	2	To become familiar with the principles of the Code of Ethics for the engineering profession. To explain the importance of adherence to the professional code of honor. To relate the code of ethics to sound professional practice.	Code of Ethics for the Engineering Profession of the Federation of Arab Engineers	Publishing the lectures on the Siraj Platform.	Assignments and daily and monthly examinations.

35.Course Evaluation

The final grade is distributed out of 100 according to the tasks assigned to the student, such as daily attendance and participation, daily, oral, monthly, and written examinations, reports, and other assigned activities.

36.Learning and teaching resources

Required textbooks (methodology, (applicable	Professional Ethics
Main references (sources)	Professional Ethics
Recommended supporting books and references (scientific journals, reports)	
Electronic references, websites	Internet Resources