

University of Technology

الجامعة التكنولوجية



*First Cycle – Bachelor's Degree (B.Sc.) –
Network Engineering branch-
Computer Engineering Department.*

بكالوريوس - فرع هندسة الشبكات - قسم هندسة الحاسوب.



Table of Contents | جدول المحتويات

1. Mission & Vision Statement	بيان المهمة والرؤية
2. Program Specification	مواصفات البرنامج
3. Program (Objectives) Goals	أهداف البرنامج
4. Program Student learning outcomes	مخرجات تعلم الطالب
5. Academic Staff	الهيئة التدريسية
6. Credits, Grading and GPA	الاعتمادات والدرجات والمعدل التراكمي
7. Modules	المواد الدراسية
8. Contact	اتصال

1. **Mission & Vision Statement**

Vision Statement

This program intends to be one of the premier destinations for Computer Network Engineering education, fostering a dynamic learning environment that cultivates exceptional talent, fosters innovation, and produces graduates who are at the forefront of designing, implementing, and securing robust and cutting-edge networks to shape the future of digital connectivity. The program's commitment to driving breakthroughs in networking technologies, security, and infrastructure. This includes pushing the boundaries of knowledge and contributing to advancements in areas such as software-defined networking (SDN), network virtualization (NV), cybersecurity, computing, edge computing, Artificial intelligent (AI), wireless networks, Internet of Things (IoT) and their applications in various industries. Furthermore, the vision emphasizes designing and implementing sustainable and efficient network architectures, promoting seamless communication and collaboration, and enabling transformative applications and services. Overall, this vision has the ambition to acquire specialized expertise through a comprehensive course that is specifically tailored to enhance employability and pave the way for a fulfilling and successful career. Also, it aims to make a significant impact on the field, industry, and society as a whole.

Mission Statement

The mission of the academic staff of computer networks is to provide a world-class Computer Network Engineering program that educates, inspires, and empowers students to become highly skilled professionals and leaders in the field of networking. Through rigorous academics, hands-on experiences, and industry collaborations. The academic and engineering staff of the department strive to foster technical expertise, critical thinking, and ethical responsibility, enabling our graduates to design, implement, and manage robust and secure networks that drive innovation and address real-world challenges. They equip students with the necessary knowledge and skills by exposing students to a broad range of topics, including network design, protocols, security, performance optimization, and emerging technologies. The program also offers opportunities for students to engage in real-world projects, internships, and industry collaborations. The program bridges the gap between theory and practice to ensure graduates are well-prepared for the evolving demands of the industry.

2. **Program Specification**

Programme code:	BSc-NWE	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

Computer Network Engineering is a discipline that applies scientific and mathematical principles to the analysis and design of computer hardware, software, and operating systems, with a specific focus on

network infrastructure. It integrates various aspects of electrical and computer engineering to study the integration of hardware and software components.

In this field of study, students delve into the principles of electricity, signals and systems, computer architecture, microprocessors, communication theory, and the technologies utilized in the development of digital devices. Additionally, they acquire knowledge in programming languages, data structures, operating systems, and databases. As the course progresses, the advanced level concentrates on the technical aspects of network design, installation, configuration, systems administration, maintenance, management, and the application of cutting-edge technologies. Through this advanced curriculum, students gain the expertise required to comprehend, design, implement, and test both current and future wireless and wired communication networks.

At the level 1, the Computer Network Engineering program provides students with a solid understanding of fundamental concepts, principles, and technologies related to computer engineering. As mentioned above it is included the basic subjects such as electricity, electronic, logic and digital system design, programming language and mathematics.

At Level 2, the basic subjects of computer engineering are kept in progress such as computer architecture, microprocessor, signal processing, python programming and communication. Besides that, this level focuses on building a strong technical foundation and developing essential skills in computer networks. Key components of the network foundation level include: Introducing students to the basic concepts, protocols, and components of computer networks. Also, Covering topics such as network models, network addressing, sub-netting, and basic network troubleshooting. In addition, exploring network Infrastructure, such as routers, switches, and firewalls, and their roles in network architecture.

The third Level, is the intermediate level of the program builds upon the foundation level and delves deeper into advanced networking concepts, technologies, and practical applications. Students acquire a more comprehensive understanding of network design, implementation, and management. It explores principles and methodologies for designing efficient and scalable networks, including sub-netting, routing protocols, and network virtualization. It also examines various data communication technologies, network protocols, and their applications in different network environments. The third level focused as well on covering deep learning, wireless networking standards, mobile communication protocols, and the design and management of wireless networks.

At last level, the program focuses on advanced networking technologies, emerging trends, and specialized areas within computer network engineering. This level encourages students to pursue in-depth knowledge and expertise in specific domains. It examines advanced routing protocols, dynamic routing algorithms, and advanced switching technologies. It also covers advanced network security topics, such as intrusion detection and prevention, network access control, and security policies. Program further includes Artificial Intelligent (AI), cloud computing concepts, virtualization technologies, and network QoS and automation using Software-Defined Networking (SDN).

Finally, the module integrates the knowledge and skills acquired throughout the program. It focuses on practical projects, research, and industry engagement to provide students with real-world experience and prepare them for professional practice.

3. Program Objectives

The objectives of a Computer Network Engineering program are to:

1. Develop a strong foundation in the principles, theories, and practices of computer networking.
2. Equip students with the necessary skills to design, implement, and manage computer networks of varying sizes and complexities.
3. Provide students with hands-on experience in configuring and troubleshooting network devices and protocols.
4. Train students to apply their knowledge and skills to real-world scenarios and practical problems in the field of networking.
5. Foster critical thinking and problem-solving skills in students to tackle complex network issues.
6. Prepare students for a career in the rapidly evolving and dynamic field of computer networking.
7. Develop communication and teamwork skills in students to collaborate with other professionals in the field of networking.
8. Cultivate ethical and professional values in students to promote responsible and ethical use of computer networks.
9. Encourage research and innovation in the field of computer networking to contribute to the advancement of the field.
10. Provide a strong foundation for further education and professional development in computer networking.

4. Student Learning Outcomes

In the Network Engineering program, students will develop a deep understanding of the fundamental principles and concepts of computer network engineering. They will gain proficiency in network design, implementation, and troubleshooting, along with a strong foundation in network security and data protection. Through hands-on experience and practical coursework, students will learn to analyze and solve complex problems related to computer networks. They will also develop effective communication and teamwork skills, as well as a strong sense of professional ethics and responsibility. Graduates of the program will be equipped with the knowledge and skills to design, implement, and manage both wired and wireless communication networks, contributing to the advancement of technology and meeting the evolving needs of the industry. By the end of the program, graduates will be well-prepared to contribute to the advancement of computer network engineering, exhibit research and innovation capabilities, and possess the critical thinking skills necessary to navigate and excel in their future careers.

Outcome 1

Comprehensive Understanding of theory

Graduates of the program will possess a comprehensive knowledge of the fundamental concepts, principles, and theories related to computer network engineering.

Outcome 2

Oral and Written Communication

Students will develop strong collaboration and communication skills, allowing them to effectively work in multidisciplinary teams and communicate complex technical concepts to various stakeholders using both oral and written communication skills.

Outcome 3

Practical Skills

Graduates will be capable of designing, implementing, and evaluating computer network systems, components, or processes to meet desired needs, considering various constraints such as economic, environmental, social, and ethical factors.

Outcome 4

Scientific Knowledge

Graduates will recognize the importance of lifelong learning and engage in continuous professional development to keep up with advancements in computer network engineering and related technologies.

Outcome 5

Design and Analysis Skills

Students will develop the ability to design, analyze, and evaluate computer network systems, considering factors such as performance, scalability, and reliability.

Outcome 6

Critical Thinking

Graduates will have the ability to objectively analyze and evaluate information, identify and solve problems, make informed decisions, and effectively communicate ideas. Critical thinking encourages computer engineers to approach problems and tasks systematically. Also, it contributes to innovative solutions in the field of computer engineering.

Outcome 7

Professionalism and ethical responsibility

Graduates will demonstrate professionalism and ethical responsibility in their practice, adhering to industry standards, codes of conduct, and legal regulations while considering the social and ethical implications of their work.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

University of Technology is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

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

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

Calculation of the Cumulative Grade Point Average (CGPA)

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

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

$$\text{CGPA} = [(1^{\text{st}} \text{ module score} \times \text{ECTS}) + (2^{\text{nd}} \text{ module score} \times \text{ECTS}) + \dots] / 240$$

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ELCA111	Electrical Circuits Analysis	93	82	7.00	B	
MATH112	Mathematics I	48	102	6.00	B	
LOCD113	Logic Circuits Design	93	82	7.00	C	
ENDA114	Engineering Drawing and Autocad	63	37	4.00	B	
ENLA107	English language	33	17	2.00	S	
WSHE106	Workshops	90	10	4.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PRSP121	Problem Solving and Programming	108	67	7.00	C	
MATH122	Mathematics II	48	77	5.00	B	
PECD123	Physics and Electronic Circuits Design	93	57	6.00	B	
DISD124	Digital Systems Design	93	57	6.00	B	
DEHR105	DEMOCRACY	33	17	2.00	S	
WSHE106	Workshops	90	10	4.00	S	

8. **Contact**

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