



نموذج وصف البرنامج الأكاديمي



الجامعة : الوطنية للعلوم والتكنولوجيا

الكلية / المعهد : كلية التقنية الهندسية

القسم العلمي : قسم هندسة تقنيات الحاسوب

اسم البرنامج الأكاديمي او المهني : بكالوريوس هندسة تقنيات الحاسوب

اسم الشهادة النهائية : بكالوريوس هندسة تقنيات الحاسوب

النظام الدراسي : مسار بولونيا

تاريخ اعداد الوصف: 2026-2025

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التوقيع :
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التاريخ: ١٠/٢٩ / ٢٠٢٥

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دقق الملف من قبل
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التاريخ: ١٥/١٠ / ٢٠٢٥

التوقيع:



مصادقة السيد العميد

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National University of Science and Technology

الجامعة الوطنية للعلوم والتكنولوجيا



First Cycle – bachelor's degree (B.Eng.)
Department of **Computer Engineering Techniques**
Engineering Technical College
NUST

(بكالوريوس - هندسة تقنيات الحاسوب) الدورة الاولى (الكلية التقنية الهندسية - الجامعة الوطنية للعلوم والتكنولوجيا)



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1. Mission & Vision Statement

Vision Statement

To produce highly qualified and motivated graduates through a rigorous curriculum of theory and emphasize the technical application that develops the ability to solve problems, build systems, and develop and implement computer driven solutions, individually and in teams.

Mission Statement

Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety and cultural, societal, and environmental concerns.

2. Program Specification

Program code:	CET	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

The Computer Engineering Techniques program is designed to provide students with the skills to improve themselves by preparing them for a career in the digital sector. Students will learn how to administer and support the computing infrastructure of an organization. The curriculum consists of an integrated set of courses that builds a solid theoretical foundation for the students. Once the foundation is established, the program develops domain-specific skills in the fields of digital and analog system design, database development and administration, mobile communications, networking, artificial intelligence, and programming. In its entirety, the program aims to prepare the students for careers in companies where they will be involved with the design, implementation, and operation of computer systems. Moreover, the students will be provided with a knowledge of Internet technologies sufficient for the design and management of network information systems.

Level 1 builds a solid foundation for the student in mathematics and computer essentials, suitable for progression to all program modules. Program-specific core topics are covered at Level 2 preparing for application-specific led modules at levels 3 and 4.

At Levels 2, 3, and 4 IT students cover designing and administering complex network systems, database systems, and designing security solutions related to cyber-security. Students acquire programming skills in Python and C ++, the basics of routing and switching, designing IT networks and wide area network technologies in addition to mobile networks and information theory. Eventually, IT graduates will gain knowledge, skills, and competencies that are industry-oriented and market-driven.

The research ethos is developed and fostered from the start via practical's, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars, and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3, and 4. At Level 4 all students carry out an independent research project.

3. Program Goal

Computer Engineering Techniques is a field that involves the application of engineering and technological principles to the design, development, and maintenance of computer hardware, software, and network systems. To be successful in this field, professionals need to possess specific competencies. Below are some of the essential competencies for the Department of computer engineering techniques:

- 1. Programming Skills:** Proficiency in programming languages is essential for computer technology engineers to have expertise in programming languages such as C++, Matlab, and Python. They should be able to develop, test, and maintain programs that meet the needs of users.
- 2. Mathematical Skills:** They should be skilled in mathematical concepts such as algebra, trigonometry, and calculus, as they play a vital role in the design, development, and testing of computer components and systems.
- 3. Knowledge of Computer Hardware Skills:** Specialists should have a solid knowledge of computer hardware, including processors, memory, storage, and other essential components, and this is covered in computer organization, Microprocessors, and advanced computer architecture subjects.
- 4. Networking Skills:** Professionals should be able to design, configure, troubleshoot, and maintain computer networks and their protocols of operation besides the security of the network and the Internet in general.
- 5. Communication Systems Skills:** Proficiency in different types of communication systems: analog, digital, and mobile communication give the computer technology engineer a solid foundation for his field of operation in the future.
- 6. System Design and Troubleshooting Skills:** Specialists should have the skills to design and implement systems and also to identify and diagnose system malfunctions before applying corrective action and this is covered through many subjects such as instruments and measurement, control systems, real-time systems, microcontrollers, and other.
- 7. Problem-Solving Skills:** In this field, professionals are expected to have excellent problem-solving skills, as they are responsible for identifying and assessing complex problems and designing effective solutions, and this is mostly covered in subjects like project management and information theory besides engineering analysis.

8. **Electrical and Electronics Skills:** Solid foundation skills in electrical and electronics circuits and systems, their design and implementation are also crucial.
9. **Database Management Skills:** Knowledge of database structure, queries, and management is essential to ensure the optimum working of software applications.
10. **Research and Development Skills:** Specialists must be up to date on technological trends and keep themselves informed about emerging technologies and industry best practices.

In summary, Computer Engineering Techniques Specialist include hardware and software configuration, programming skills, networking and security knowledge, troubleshooting, database management, collaboration, communication, time management, custom solutions designing, and research and development. Overall, possessing these competencies equips Computer Engineering Techniques Specialist Professionals with the requisite skills to design, implement and maintain computer systems and networks effectively.

4. Student Learning Outcomes

The Department of Computer Engineering Technique requires professionals to possess generic competencies in addition to the technical skills and knowledge required to perform their roles effectively. Below are some of the generic competencies required by the Department of Computer Engineering Techniques:

1. **Analytical Thinking:** The ability to identify and analyze complex problems and provide practical solutions is essential for professionals in this field.
2. **Continuous Learning:** Keeping up to date with new technologies, tools, and techniques is crucial for professionals to remain competitive.
3. **Adaptability:** Being able to adapt and navigate changes is essential as the technology landscape is ever-changing.
4. **Creativity:** The ability to think creatively and innovate helps to develop new solutions and products.
5. **Teamwork:** Professionals must be able to work collaboratively with colleagues, clients, and other stakeholders to achieve the desired results.

6. **Communication Skills:** Effective communication skills are essential to understanding and articulating technical issues to colleagues, clients, and other stakeholders in a clear and concise manner.
7. **Project Management:** Competence in project management is essential, including planning, organization, and resource allocation.
8. **Time Management:** The ability to manage time is crucial to ensure project milestones are met.
9. **Leadership:** Professionals must be able to motivate and lead teams to achieve project objectives.
10. **Custom Solutions Designing:** The ability to design, develop, and maintain custom software applications and solutions, catering to end-user business requirements.

In conclusion, professionals in the Department of Computer Engineering Techniques must possess both technical and generic competencies to excel in their roles. Analytical thinking, continuous learning, adaptability, creativity, teamwork, communication skills, project management, time management, leadership, and customer service are among the essential generic competencies required. These competencies help to enhance competence and promote good performance in the department of computer engineering techniques.

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6. Credits, Grading and GPA

Credits

Middle Technical University 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 30 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	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

(50 - 100)	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:				
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.				

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:

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

7. Curriculum/Modules

Semester 1 | 30 ECTS credits | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET1101	Digital Fundamentals	88	88	6.00	C	
CET1102	Electrical Engineering Fundamentals	88	76	6.00	C	
CET1103	Mathematics I	59	76	5.00	B	
CET1104	Engineering Drawing	59	46	5.00	B	
CET1105	Engineering Workshops	60	48	6.00	B	
CET1106	English Language (Beginner)	45	17	2.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET1201	Digital Systems	88	79	6.00	C	CET1101
CET1202	Electrical Circuits	88	76	6.00	C	CET1102
CET1203	Programming Essentials	88	76	6.00	C	
CET1204	Mathematics II	59	46	5.00	B	CET1103
CET1205	Human Rights and Democracy	59	40	4.00	S	
NUST1206	Arabic Language	45	19	3.00	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET2101	Engineering Mathematics	59	76	5.00	B	CET1204
CET2102	Object Oriented Programming	88	76	6.00	B	
CET2103	Computer Organization & Architecture	74	76	6.00	C	
CET2104	Electronics Fundamentals	88	44	5.00	C	CET1202
CET2105	Communication Fundamentals	74	33	5.00	C	
CET2106	English Language (Intermediate)	45	17	3.00	S	

Semester 4 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET2201	Advanced Engineering Mathematics	59	88	5.00	B	CET2101
CET2202	Python Programming	74	76	5.00	B	
CET2203	Microprocessors	102	46	6.00	C	CET2103
CET2204	Analog Communications	74	42	5.00	C	CET2105
CET2205	Electronics Circuits	60	36	5.00	C	CET2104
CET2206	Instrumentation and Measurement	60	33	4.00	C	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3101	Operating Systems	74	76	5.00	C	
CET3102	Control Engineering Fundamentals	74	64	5.00	C	
CET3103	Digital Signal Processing	74	40	5.00	C	
CET3104	Digital Controllers	74	46	5.00	C	
CET3105	Digital Communications	74	47	5.00	C	CET2105
CET31XX	Elective	74	33	5.00	E	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3201	Advanced Control Systems	74	76	5.00	C	CET3102
CET3202	Computer Network Fundamentals	88	46	6.00	C	
CET3203	Database Systems	88	46	6.00	C	
CET3204	Engineering Analysis	74	46	5.00	C	
CET3205	English Language (Advanced)	45	19	3.00	S	
CET32XX	Elective	74	74	5.00	E	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET4101	Information Theory and Coding	88	76	6.00	C	
CET4102	Computer Networks Protocols	88	46	6.00	C	CET3202
CET4103	Mobile Communications	74	46	5.00	C	CET3105
CET4104	Engineering Management	74	46	5.00	B	
CET4105	Professional Ethics	45	17	3.00	S	
CET41XX	Elective	74	76	5.00	E	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET4201	Fiber Optics Communication	74	64	5.00	C	
CET4202	Advanced Computer Technology	74	33	5.00	C	
CET4203	Network Security & Cybersecurity	74	33	5.00	C	
CET4204	Cloud Computing	74	33	5.00	C	
CET4205	Project	74	67	5.00	C	
CET42XX	Elective	74	76	5.00	E	

Elective Subjects:

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3106	Real-Time Systems	74	76	5.00	E	
CET3107	Parallel Computing	74	76	5.00	E	
CET3206	Digital Image Processing	74	76	5.00	E	
CET3207	IoT Fundamentals	74	76	5.00	E	
CET4106	Artificial Intelligence	74	76	5.00	E	
CET4107	Web Design	74	76	5.00	E	
CET4108	Distributed Computing & Systems	74	76	5.00	E	
CET4206	Reconfigurable Computing Systems	74	76	5.00	E	
CET4207	Wireless Sensor Networks	74	76	5.00	E	
CET4208	Optimization Algorithms	74	76	5.00	E	

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National University of Science and Technology

الجامعة الوطنية للعلوم والتكنولوجيا



First Cycle – bachelor's degree (B.Eng.)
Department of **Computer Engineering Techniques**
Engineering Technical College
NUST

(بكالوريوس - هندسة تقنيات الحاسوب) الدورة الاولى (الكلية التقنية الهندسية - الجامعة الوطنية للعلوم والتكنولوجيا)



1. Overview
2. Undergraduate Modules 2023-2024
3. Contact

1 – Overview

the program of Computer Engineering Techniques to gain the Bachelor of Science degree. The program delivers (48) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

Module 1

Code	Course/Module Title	ECTS	Semester
CET1101	Digital Fundamentals	6	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	88
Description			
To be able to deal with the number systems and codes. To understand the functionality of logic gates. To have a skill to use the logic gates in designing logic circuit. To have a skill to simplify the digital circuits. To learn the simplification process, Boolean expression, Demorgans law, and Karnaugh map. To understand the principles for designing logic circuit. To understand adder, subtractor, decoder, encoder, multiplexer, demultiplexer, and comparator circuits			

Module 2

Code	Course/Module Title	ECTS	Semester
CET1102	Electrical Engineering Fundamentals	6	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	76
Description			
type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.			

Module 3

Code	Course/Module Title	ECTS	Semester
CET1103	Mathematics I	5	1

Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		59	76
Description			
This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.			

Module 4

Code	Course/Module Title	ECTS	Semester
CET1104	Mathematics I	5	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		59	76
Description			
This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.			

Module 5

Code	Course/Module Title	ECTS	Semester
CET1105	Engineering Workshops	5	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
	4	45	17
Description			
The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through labs, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.			

Module 6

Code	Course/Module Title	ECTS	Semester
CET1106	English Language (Beginner)	2	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		60	48
Description			
The main strategies that will be adopted in delivering this module are: - Allow students to actively participate in the learning process with class discussions and exercises that support the initiative. - Use didactic questioning through questions to determine student understanding of the material			