Course Description (level two)

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.;

1. Educational institution Northern Technical University	Northern Technical University
2. Scientific Department	Computer engineering techniques
3. Course Name/Code	TECK101
4. Available Attendance Forms	Theoretical , Practical
5. Courses /Year	Course
6. Number of credit hours (total)	60 h
7. Date of preparation of this description	24\3\2023

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

A1. It aims to know the concepts of object-oriented programming

A2. It aims to learn how to program websites that use object programming

A3. It aims to know the mechanism for constructing programming ideas to address problems in other sciences (mathematics, mechanical engineering, etc.

A4. It aims to know the necessary requirements to work in private companies as a programmer or technical engineer

B - Skills objectives of the course

B1. It aims to learn programming skills and work on projects that require high skills in programming of objects

B2. It aims to use modern and advanced tools to deliver largest amount of knowledge to the student

B3. It aims to make the student aware of his programming capabilities and the extent of their compatibility with the level of the required project

B4. Blended learning (electronic and in-person), scientific films and videos, laboratories, training at summer And graduation projects

10. Teaching and learning methods

Development courses, seminars

1. Quiz

2 -Quarterly and annual exams.

3 -Seminars

13.Course Structure

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1	4	Complex numbers	Complex numbers	Theoretical+ practical	exam
2+3	8	Complex numbers	Complex numbers	Theoretical+ practical	exam
4+5+6+7	16	Cauchy- Rieman equations, Harmonics	Cauchy- Rieman equations, Harmonics	Theoretical+ practical	exam
8+9	8	Double integral	Double integral	Theoretical+ practical	exam
10+11+12	4	Multiple integration, Surface area, Green theorem and Stock's theorem	Multiple integration, Surface area, Green theorem and Stock's theorem	Theoretical+ practical	exam
13+14+15	4	Theory of vector field, vector variable and Function, separation and convolution	Theory of vector field, vector variable and Function, separation and convolution	Theoretical+ practical	exam

C- Emotional and value goals

C1- He works in a team spirit

C2- Adheres to the ethics of the university institution

C3- Receives and accepts knowledge.

D- General and qualifying skills transferred (other skills related to employability and personal development).

D1- Develops the student's work in the workshops.

D2- Develops the student's skills on electronic devices.

D3-The student acquires the ability to use electronic devices.

D4- The student learns on electronic devices.

14. Infrastructure

1- The Department of Computer Engineering Technologies has four scientific

2- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

3- The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.;

1. Educational institution Northern Technical University	Northern Technical University
2. Scientific Department	Computer engineering techniques
3. Course Name/Code	COE2011 \ OOP
4. Available Attendance Forms	Theoretical , Practical
5. Courses /Year	Course
6. Number of credit hours (total)	60 h
7. Date of preparation of this description	7\1\2023

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

A1. It aims to know the concepts of object-oriented programming

A2. It aims to learn how to program websites that use object programming

A3. It aims to know the mechanism for constructing programming ideas to address problems in other sciences (mathematics, mechanical engineering, etc.

A4. It aims to know the necessary requirements to work in private companies as a programmer or technical engineer

B - Skills objectives of the course

B1.It aims to learn programming skills and work on projects that require high skills in programming of objects

B2.It aims to use modern and advanced tools to deliver largest amount of knowledge to the student

B3.It aims to make the student aware of his programming capabilities and the extent of their compatibility with the level of the required project

B4. Blended learning (electronic and in-person), scientific films and videos, laboratories, training at summer And graduation projects

10. Teaching and learning methods

Development courses, seminars

Quizzes , midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goal

C1. Developing creative and critical thinking skills: Enhancing the ability to think creatively and solve problems effectively through designing and implementing complex programs

C2. Promoting collaboration and teamwork: Encouraging students to work together on software projects that promote effective communication and collaboration.

C3. Developing ethical and professional values: Promoting awareness of the importance of ethical behavior and professional responsibility in the field of software development

C4. Enhancing self-confidence: Providing opportunities for students to develop their skills and achieve success in writing programs, which enhances their self-confidence.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure					
The week	**Hours**	**Required Learning Outcomes**	**Unit / Subject Name**	**Method of education**	**Evaluation method**
1	4	C++ review	C++ review	Theoretical+ practical	exam
2+3	8	Object + class	Object + class	Theoretical+ practical	exam
4+5+6+7	16	Inheritance	Inheritance	Theoretical+ practical	exam
8+9	8	Polymorphism	Polymorphism	Theoretical+ practical	exam
10+11+12	4	I/O and File management	I/O and File management	Theoretical+ practical	exam
13+14+15	4	Template	Template	Theoretical+ practical	exam

14. Infrastructure

4- The Department of Computer Engineering Technologies has four scientific

5- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

6- The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plan
OOP can be developed by opening a line of communication between the department and private companies to know the requirements of the labor market. Students can also be assigned to write programs or design simple websites that   meet the needs of these companies.

Course Description Form

Course Description

The most significant aspects of the course and the learning objectives that the student should accomplish are outlined in this course description, which also shows if the student has taken full use of the available learning possibilities. A connection to the program description is required.

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**TECK203 Physics**
4. Available Attendance Forms	**Theoretical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**30 h**
7. Date of preparation of this description	**7\1\2023**

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A. Cognitive goals

1. Gaining a better grasp of natural phenomena: Students should gain a better understanding of the laws of motion, energy, electricity, magnetism, waves, and the electromagnetic spectrum as well as other natural phenomena.

2. Developing analytical skills: improving pupils' capacity to evaluate intricate physical issues and use principles and rules of physics to address them.

3. Fostering a thorough grasp of scientific procedures and encouraging pupils to acquire scientific thinking abilities like inquiry, experimentation, and reasoning.

4. Innovation and discovery: Learning about the scientific underpinnings of contemporary technologies and scientific investigation can help to foster an innovative and exploratory mindset.

B - Skills objectives of the course

B1- Create the capacity to explain difficult physics ideas in writing, through explanations, or through presentations.

B2- Improve the capacity to collaborate in interdisciplinary teams and communicate clearly with others in order to tackle challenging physics problems.

B3- Improving the capacity to assess physical data and carry out mathematical modeling using specialist software and computer tools.

B4- Improving one's capacity for original and creative thought in the realm of physics by resolving scientific issues and coming up with fresh approaches.

10- Teaching and learning methods

Electronic and in-person blended learning, scientific movies and videos, summer and career training, and capstone projects

11- Assessment methods

Testing on a daily, quarterly, and final basis, as well as submitting and debating weekly reports

C- Emotional and value goals

Enhancing students' enthusiasm and curiosity about the physical sciences, their foundations, and their applications in everyday and scientific life is

C-1: Positive contact with knowledge.
C-2: Fostering a passion for lifelong learning: Encouraging learners to pursue lifelong learning and future in-depth investigations of physics.
C-3: Fostering Curiosity and Exploration: Motivating learners to go deeper into natural phenomena and uncover new and fascinating aspects of physics through investigation and study.

D- General and qualifying skills transferred (other skills related to employability and personal development).

D-1: Analytical skills: the capacity to apply logic and mathematical methods to solve physics problems after conducting a thorough and correct analysis.
D-2: Experimental skills: The capacity to organize practical experiments, gather information, precisely interpret findings, and employ a range of instruments and methods in the lab.
D-3: Research skills: The capacity to read and comprehend scientific publications and research in a variety of physics topics.
D-4: Computer skills: The capacity to perform mathematical modeling, simulate real-world processes, and analyze physical data using a variety of computer tools and applications.

13.Course Structure

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1-2	4	Introduction to materials science and engineering, Energy levels, Atomic structure and Polymer	Introduction to materials science and engineering, Energy levels, Atomic structure and Polymer	Theoretical	exam
3+4	4	Internal structure of cell, Resistance of Material and resistivity	Internal structure of cell, Resistance of Material and resistivity	Theoretical	exam
5-6	4	Electrical source voltage, current Types of impedances, their characteristics and methods of connection	Electrical source voltage, current Types of impedances, their characteristics and methods of connection	Theoretical	exam
7-8	4	Semiconductors Fundamentals, Extrinsic Semiconductors	Semiconductors Fundamentals, Extrinsic Semiconductors	Theoretical	exam
9-10	4	The P-N Junction, The P-N Junction diode, diode application	The P-N Junction, The P-N Junction diode, diode application	Theoretical	exam
11-12	4	Type of diode (Zener diode, Light Emitting Diodes, Tunnel Diode)	Type of diode (Zener diode, Light Emitting Diodes, Tunnel Diode)	Theoretical	exam
13-14-15	6	Transistor, Biploar transistor biasing, field effect transistor FET	Transistor, Biploar transistor biasing, field effect transistor FET	Theoretical	exam

14. Infrastructure

A data viewer or projector (DATA SHOW) is provided in the classrooms to assist the teacher in quickly presenting scientific subject. Additionally, the classrooms are equipped with easily understood teaching resources in the form of instructional videos.

15.Course Development Plan

A number of elements are included in the strategy for the development of the university physics course, including:

Updating scientific content entails examining and revising the course's scientific principles and topics in light of current advancements in the physical sciences. Creating and maintaining instructional materials, such as textbooks, online learning tools, and computerized courses, is part of developing educational approaches

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

1. Educational Institution	**Northern Technical University**
2. Scientific Department	**Computer Engineering Techniques**
3. Course Name/Code	**Communication Fundamentals1** **COE207**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	3
7. Date of preparation of this description	٢٥\٣\2024

8. Course Objectives

This module aims to provide a comprehensive understanding of the fundamentals of communication, focusing primarily on signals and systems. It will delve into signal and system classifications, energy and power considerations.

9. Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

The course aims is to introduced to:

A1.signals and systems.

A2.Signal classifications.

A3.System classifications.

A4.Energy and power in signal classification.

A5.Fourier series and signal spectrum.

A6.Fourier transform relationships.

B - Skills objectives of the course

Upon successful completion of this module, students should be able to:

B1. Understand and define signals and systems.

B2. Classify different types of signals.

B3. Classify different types of systems.

B4. Calculate of power and energy.

10. Teaching and Learning Methods

The teaching methods include lectures, class discussion, homework assignments, and Lab reports. Lecture notes, announcements, and Lab manual will be posted on an appropriate communication platform.

11. Assessment Methods

Quizzes, Assignments, Lab reports, midterm exam, and final exam.

C- Emotional and value goals

C1.   Building confidence in dealing with and solving complex engineering problems.

C2.   Promoting a growth mindset, encouraging students to embrace mistakes as opportunities for learning.

C3.   Encouraging teamwork and collaboration in laboratory experiments and group projects.

D- General and Qualifying Skills Transferred (Other Skills Related to Employability and Personal Development).

D1. Communication skills: Effectively conveying technical concepts through written reports, presentations, and discussions.

D2. Teamwork and collaboration: Working collaboratively with peers on laboratory experiments, projects, and assignments.

D3. Time management: Planning and organizing tasks to meet project deadlines and academic requirements.

12. Course Structure					
The week	**Hours**	**Required Learning Outcomes**	**Unit / Subject Name**	**Method of education**	**Evaluation method**
1,2	8	Fundamental concepts	Introduction to Signals and Systems	Theoretical+ practical	exam
3,4,5,6	12	Analysis	signals and system definitions, Signal classifications , System Classifications Signal classifications " energy-Power"	Theoretical+ practical	exam
7,8	8	Analysis	Fourier Series	Theoretical+ practical	exam

9,10	8	Analysis	Fourier Series Spectra	Theoretical+ practical	exam
11,12	8	Analysis	Decomposition of vectors and signals	Theoretical+ practical	exam
13,14	8	Analysis	Complex Fourier Series (exponential)	Theoretical+ practical	exam
15,16	8	Analysis	Complex Fourier Series (exponential) and signal Spectrum	Theoretical+ practical	exam

13.Infrastructure

13. Infrastructure

31- The Department of Computer Engineering Technologies has four scientific laboratories.

32- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for number of students.

33- Each laboratory also contains a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14. Course Development Plan
The course can be created and developed based on the requirements of the labor market. Therefore, a well-structured and engaging course that effectively teaches the fundamental concepts in communications systems is established to prepares students for further study and careers in the field.

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

1. Educational Institution	**Northern Technical University**
2. Scientific Department	**Computer Engineering Techniques**
3. Course Name/Code	**Communication Fundamentals2** **COE208**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**3**
7. Date of preparation of this description	**25\3\2023**

8. Course Objectives

This unit aims to provide a comprehensive understanding of the basics of communication, focusing primarily on data communication, where it will delve into the methods of signals modulation and their types.

9. Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

The course aims is to introduced to:

A1. Fourier Transform pairs for selected functions.

A2.Properties of Fourier transforms.

A3.Amplitude modulation techniques.

A4.Power calculations in amplitude modulation.

A5.Angle modulation techniques.

B - Skills objectives of the course

Upon successful completion of this module, students should be able to:

B1.Understand and apply the Fourier series to analyze signal spectrums.

B2.Understand the Fourier transform relationship, transform pairs, and its properties.

B3.Understand and apply amplitude modulation techniques, including DSBSC generation, large carrier AM generation, and detection.

B4.Calculate power in amplitude modulation.

B5.Understand and apply angle modulation techniques, including frequency modulation and phase modulation.

10. Teaching and Learning Methods

The teaching methods include lectures, class discussion, homework assignments, and Lab reports. Lecture notes, announcements, and Lab manual

 will be posted on an appropriate communication platform.

11. Assessment Methods
Quizzes, Assignments, Lab reports, monthly exam, and final exam.
C- Emotional and value goals C1. Building confidence in dealing with and solving complex engineering problems. C2. Promoting a growth mindset, encouraging students to embrace mistakes as opportunities for learning. C3. Encouraging teamwork and collaboration in laboratory experiments and group projects.
D- General and Qualifying Skills Transferred (Other Skills Related to Employability and Personal Development). D1. Communication skills: Effectively conveying technical concepts through written reports, presentations, and discussions. D2. Teamwork and collaboration: Working collaboratively with peers on laboratory experiments, projects, and assignments. D3. Time management: Planning and organizing tasks to meet project deadlines and academic requirements.

12. Course Structure

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1,2	8	Fundamental concepts	Fourier Transform relationship,	Theoretical+ practical	exam
3,4,5,6	12	Analysis	Transform Pairs for selected functions, Properties of Fourier Transform	Theoretical+ practical	exam
7,8	8	Fundamental concepts	Modulation and Demodulation	Theoretical+ practical	exam
9,10	8	Analysis	Amplitude Modulation: DSBSC Generation , Large Carrier AM Generation, Power Calculation and Detection,	Theoretical+ practical	exam
11,12	8	Analysis	Angle Modulation: Frequency Modulation ,	Theoretical+ practical	exam
13,14	8	Analysis	Phase Modulation, Instantaneous Frequency	Theoretical+ practical	exam
15,16	8	Analysis	Sampling and Analog to digital Conversion, SAMPLING THEOREM:	Theoretical+ practical	exam

13. Infrastructure

34-   The Department of Computer Engineering Technologies has four scientific laboratories.

35-   Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for number of students.

36-   Each laboratory also contains a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14. Course Development Plan
The course can be created and developed based on the requirements of the labor market. Therefore, a well-structured and engaging course that effectively teaches the fundamental concepts in control engineering is established to prepares students for further study and careers in the field.

Course Description (level three)

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

1. Educational Institution	Northern Technical University
2. Scientific Department	Computer Engineering Techniques
3. Course Name/Code	Control Engineering Fundamentals 1\ COE 301
4. Available Attendance Forms	Theoretical , Practical
5. Courses /Year	Course
6. Number of credit hours (total)	3
7. Date of preparation of this description	1\6\2023
8. Course Objectives	

8. Course Objectives

This course is an introductory course on linear control systems. It introduces the fundamentals and concepts of modeling and control of linear time invariant systems

9. Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

The course aims:

A1. To provide a solid knowledge on feedback control principles of the linear time invariant systems.

A2. To understand and apply various analysis tools to determine the performance of the control systems.

A3. To provide the necessary skills for the design of feedback control systems.

A4. Use computer simulation software such as MATLAB to perform time domain analysis, frequency domain analysis, and control system design.

B - Skills objectives of the course

B1. Learn to model dynamic systems using differential equations and transfer functions, and analyze system behavior using mathematical techniques.

B2. Acquire skills in simulating control system behavior using software tools such as MATLAB/Simulink, and interpret simulation results to evaluate system performance.

B3. Developing problem solving skills by applying the basic principles of linear control theory to analyze linear control systems.

B4. Communicating technical information effectively through written reports and oral presentations.

10. Teaching and Learning Methods

The teaching methods include lectures, class discussion, homework assignments, and Lab reports. Lecture notes, announcements, and Lab manual will be posted on an appropriate communication platform.

11. Assessment Methods
Quizzes, Assignments, Lab reports, midterm exam, and final exam.

C- Emotional and value goals

C1. Building confidence in dealing with and solving complex engineering problems.

C2. Promoting a growth mindset, encouraging students to embrace mistakes as opportunities for learning.

C3. Encouraging teamwork and collaboration in laboratory experiments and group projects.

D- General and Qualifying Skills Transferred (Other Skills Related to Employability and Personal Development).

D1. Communication skills: Effectively conveying technical concepts through written reports, presentations, and discussions.

D2. Teamwork and collaboration: Working collaboratively with peers on laboratory experiments, projects, and assignments.

D3. Time management: Planning and organizing tasks to meet project deadlines and academic requirements.

12. Course Structure

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1,2	8	Fundamental concepts	Introduction to control systems, open and closed loop system.	Theoretical+ practical	exam
3,4,5,6	16	Modeling	Mathematical modeling of physical systems and transfer functions. Mathematical modeling of D.C. Servo Motor.	Theoretical+ practical	exam
7,8	8	Modeling	Block diagrams.	Theoretical+ practical	exam
9,10	8	Analysis	Time-domain analysis of closed loop control systems and error analysis.	Theoretical+ practical	exam
11,12	8	Analysis	Stability analysis and Rouths Stability criterion.	Theoretical+ practical	exam
13,14	8	Analysis	Root Locus technique.	Theoretical+ practical	exam
15, 16	8	Design	Control system design using Root Locus method.		exam

13. Infrastructure

7- The Department of Computer Engineering Technologies has four scientific laboratories.
8- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for number of students.
9- Each laboratory also contains a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14. Course Development Plan

The course can be created and developed based on the requirements of the labor market. Therefore, a well-structured and engaging course that effectively teaches the fundamental concepts in control engineering is established to prepares students for further study and careers in the field.

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

1. Educational Institution	**Northern Technical University**
2. Scientific Department	**Computer Engineering Techniques**
3. Course Name/Code	**Control Engineering Fundamentals 2\ COE 302**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**3**
7. Date of preparation of this description	**1\6\2023**

8. Course Objectives

This course is an introductory course on linear control systems. It introduces the fundamentals and concepts of modeling and control of linear time invariant systems

9. Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

The course aims:

A1. To provide a solid knowledge on feedback control principles of the linear time invariant systems.

A2. To understand and apply various analysis tools to determine the performance of the control systems.

A3. To provide the necessary skills for the design of feedback control systems.

A4. Use computer simulation software such as MATLAB to perform time domain analysis, frequency domain analysis, and control system design.

B - Skills objectives of the course

B1. Learn to model dynamic systems using differential equations and transfer functions, and analyze system behavior using mathematical techniques.

B2. Acquire skills in simulating control system behavior using software tools such as MATLAB/Simulink, and interpret simulation results to evaluate system performance.

B3. Developing problem solving skills by applying the basic principles of linear control theory to analyze linear control systems.

B4. Communicating technical information effectively through written reports and oral presentations.

10. Teaching and Learning Methods

The teaching methods include lectures, class discussion, homework assignments, and Lab reports. Lecture notes, announcements, and Lab manual will be posted on an appropriate communication platform.

11. Assessment Methods
Quizzes, Assignments, Lab reports, midterm exam, and final exam.
C- Emotional and value goals C1. Building confidence in dealing with and solving complex engineering problems. C2. Promoting a growth mindset, encouraging students to embrace mistakes as opportunities for learning. C3. Encouraging teamwork and collaboration in laboratory experiments and group projects.
D- General and Qualifying Skills Transferred (Other Skills Related to Employability and Personal Development). D1. Communication skills: Effectively conveying technical concepts through written reports, presentations, and discussions. D2. Teamwork and collaboration: Working collaboratively with peers on laboratory experiments, projects, and assignments. D3. Time management: Planning and organizing tasks to meet project deadlines and academic requirements.

12. Course Structure

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1,2	8	Analysis	Analysis of control system in frequency domain.	Theoretical+ practical	exam
3,4	8	Analysis	Bode Diagrams.	Theoretical+ practical	exam
5,6,7	12	Design	Control system design using Bode Diagrams.	Theoretical+ practical	exam
8,9,10	12	Design	Design of control systems and compensation concepts.	Theoretical+ practical	exam
11,12,13,14,15	20	Design	P, PI, PD and PID modes of feedback control, realization of PID controller using active and passive elements.	Theoretical+ practical	exam

16	4	Fundamental concepts	Definitions of non-linear systems.	Theoretical+ practical	exam

13. Infrastructure

10-　　The Department of Computer Engineering Technologies has four scientific laboratories.

11-　　Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for number of students.

12-　　Each laboratory also contains a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14. Course Development Plan
The course can be created and developed based on the requirements of the labor market. Therefore, a well-structured and engaging course that effectively teaches the fundamental concepts in control engineering is established to

prepares students for further study and careers in the field. |

Course Description Form

Course Description

Digital control systems are one of the important subjects in computer science and electrical engineering, focusing on the design and analysis of dynamic systems and variables using digital systems. This course covers the fundamental concepts of digital control, including digital signal processing and digital operations for system control. Students learn about concepts such as time-domain and frequency-domain transformations, and design digital control systems using various methods and techniques. Additionally, students become familiar with digital computing tools and software used in the analysis and design of digital control systems

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**COE007 Digital Control**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**7\1\2023**
8. Course Objectives Understanding Basic Concepts: This course aims to provide students with a comprehensive understanding of the fundamental concepts in the field of digital	

control, including digital signal processing and principles of digital control.

Dynamic Systems Analysis: The course aims to teach students how to analyze dynamic and variable systems using digital systems, and understand their behavior and response to different inputs.

Designing Digital Controllers: This objective is achieved by introducing students to various techniques and methods used in designing digital control systems, including closed-loop and open-loop system design.

Practical Application: The course also aims to equip students with the practical skills necessary to use digital computing tools and software in the analysis and design of digital control systems.

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

Identifying the fundamental concepts and skills required in each topic of the course.

Providing an interactive learning environment that encourages active student participation.

B - Skills objectives of the course

Enhancing practical skills through the use of applied lessons and solving practical cases.
Guiding students to understand the relationships and interactions between different concepts in the course.
Reinforcing critical and analytical thinking skills in solving problems related to the studied topics.
Promoting cooperative learning through group projects and collaborative activities.
Providing opportunities to develop effective communication skills through presentations, discussions, and reports.
Enhancing the ability to interact with advanced technology used in the field.
Encouraging students to use multiple sources for research and self-learning.

Introducing comprehensive assessment mechanisms that evaluate understanding, practical application, analytical ability, and critical thinking skills required.

10. Teaching and learning methods

Development courses, seminars

11. Assessment methods

Quizzes , midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goals

Enhancing Emotional Awareness: The course aims to enhance awareness of the importance of ethical and social values in the field of digital controls and network protocols.

Developing Ethical Consistency: The course aims to develop students' ability to think ethically and make sound decisions in the context of technology and communications.

Fostering Social Responsibility: The course aims to guide students towards understanding their roles and responsibilities as professionals in the field of information technology and communications in serving society.

Promoting Academic Values: The course aims to promote values of commitment to continuous learning and professional development in the field of digital controls and network protocols.

Encouraging Innovation and Creativity: The course seeks to encourage students to engage in creative thinking and innovation in solving relevant technical and social problems.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure

عدد الساعات الاسبوعية				اسم المادة	
عدد الوحدات	م	ع	ن	باللغة الانكليزية	باللغة العربية
6	4	2	2	**Controllers Digital**	مسيطرات رقمية

أهداف المادة: تهدف المادة الى دراسة نوعين من المسيطرات المتقدمة (PIC&PLC) ومعماريتها الداخلية وكيفية
برمجتها لتصميم مشاريع

Weeks	Syllabus
1st	Introduction to Microcontroller, Types of Microcontroller, difference between MP and Microcontroller.
2nd, 3rd, 4th	Architecture of PIC Microcontroller • General Organization of PIC Microcontroller • Registers & Special function registers (SFR reg.) • Memory units and CPU unit • I/O ports • Serial communication • Baud rate • UART • Oscillator • Timer /Counters
5th, 6th, 7th	Programming the Microcontroller • Outputting data/signals • Reading data/Signals • Character LCD • Graphic LCD
8th, 9th, 10th, 11th	• A/D converter & Analog Module • On chip CCP (Capture, Compare & PWM) • Microcontroller Interrupts Programming • EEPROM Programming
12th, 13th, 14th, 15th	Application projects of Microcontroller.
16th	Principle of PLC
17th, 18th	Input – Output modules of PLC
19th	Numbers systems and codes
20th	Fundamentals of logic in PLC
21th	Basic of PLC programming
22th ,23th	PLC- wiring diagram and ladders logic program and sensors
24th	Timers Programming
25th	Counters Programming
26th	Math. Operations
27th , 28th	Sensors and Actuators for Industrial Applications.
29th ,30th	PLC projects

14. Infrastructure

13- The Department of Computer Engineering Technologies has four scientific

14- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

15- The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plan

The course can be developed by establishing a connection between the department and private companies to understand the requirements of the job market. Additionally, students can be assigned to write programs or design systems that meet the needs of these companies.

Course Description Form

Course Description

This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description.

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**COE406 Digital Signal Processing**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**7\1\2023**
8. Course Objectives The aim of this course is to teach the student the basic topics of signal processing in the time and frequency domains and their uses in processing audio and video signals, in addition to the use of digital filters.	

9 .Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives If the student successfully completes this course, he will be able to: A1- Understanding and classifying digital signal processing systems. A2- Understand how to convert an analogue signal to digital. A3-Understanding the pulse and frequency analysis of intermittent signals. A4- Design digital filters and study their response.
B– Skills objectives of the program B1 - The student should be able to apply engineering-mathematical analyses. B2 - The ability to identify, formulate and solve engineering problems. B3- Mastery of the mathematical, basic, and engineering sciences necessary to conduct the analysis and design of electrical engineering systems. B4- The ability to use systems simulation programs.
10. Teaching and learning methods
Development courses, seminars   **11. Assessment methods**
Quizzes , midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goals

C1. Recognizes the demands and ethical responsibility of the engineering profession, as well as the need for and ability to engage in lifelong learning.

C2- Understands the impact of engineering solutions on economic activities.

D- General and qualifying skills transferred (other skills related to employability and personal development).

D1-Ability to identify, formulate and solve engineering problems.

D2- The ability to design and conduct experiments and analyze and interpret the results.

D3- The ability to use modern engineering techniques, skills, and tools necessary to practice the engineering profession.

13.Course Structure

Evaluation method	Learning method	Subject name	Annual learning outcomes	Hours	Week
quiz	theoretical + practical	Introduction to digital signal processing	The student understands the topic	٢ theoretical ٢ + practical	1
quiz	theoretical + practical	Basic elements of DSP, DSP vs. ASP, application of DSP,	The student understands the topic	٢ theoretical ٢ + practical	2
quiz	theoretical + practical	Continues time signals vs. discrete time signals	The student understands the topic	٢ theoretical ٢ + practical	3
quiz	theoretical + practical	Discrete time signals and sequences	The student understands the topic	٢ theoretical ٢ + practical	4
quiz	theoretical + practical	Discrete time signals and sequences	The student understands the topic	٢ theoretical ٢ + practical	5
quiz	theoretical + practical	Discrete time signals and sequences	The student understands the topic	٢ theoretical ٢ + practical	6

quiz	theoretical + practical	Standard of discrete time signals (sequences)	The student understands the topic	٢ theoretical ٢ + practical	7
quiz	theoretical + practical	Unit sample sequence, Unit step sequence,	The student understands the topic	٢ theoretical ٢ + practical	8
quiz	theoretical + practical	Unit ramp sequence Exponential sequence.	The student understands the topic	٢ theoretical ٢ + practical	9
quiz	theoretical + practical	(classification of discrete time signals) system properties	The student understands the topic	٢ theoretical ٢ + practical	10
quiz	theoretical + practical	Static and dynamic system, shift invariant and shift variant system,	The student understands the topic	٢ theoretical ٢ + practical	11
quiz	theoretical + practical	Causal and non-causal system, linear and nonlinear system, stable and unstable	The student understands the topic	٢ theoretical ٢ + practical	12
quiz	theoretical + practical	Convolution: Direct form method,	The student understands the topic	٢ theoretical ٢ +	13

				practical	
quiz	theoretical + practical	graphical method, slide rule method	The student understands the topic	٢ theoretical ٢ + practical	14
quiz	theoretical + practical	Correlation of discrete time sequence cross correlation and auto correlation	The student understands the topic	٢ theoretical ٢ + practical	15

	Required prescribed books
ei P. Hsu, "Schaum's Outlines of ry and Problems of Signals and Systems", aw- Hill Companies. ison H. Hayes," Schaum's Outline of Theory and ems of Digital Signal Processing", 1- McGraw- Hill Companies.	Main references (sources)
*John G. Proakis, Dimitris G. Manolakis," Digital Signal Processing", 3rd Edition. l A. lynn," Digital signal processing with computer applications", 2nd edition. *John W. Leis,"Digital Signal Processing Using Matlab for Students And Researchers". 1- *Vinay K. Ingle,John G. Proakis," Digital	Recommended books and references (scientific journals, reports,...)

Signal Processing Using MATLAB".	
	Electronic references, Internet sites…

.Course development plan
Familiarity with everything new and innovative in teaching and -1 -١ .learning strategies   Providing seminars through the student that address modern signal -2 -٢ .processing systems

Course Description Form

Course Description

This course will provide the student with a foundation in mathematical principles and to solve the differential equations with classic mathematics and numerical methods.

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**TECK301 \ Numerical Analysis**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**24\3\2024**
8. Course Objectives Understanding and applying mathematical equations related to the study of computer technologies.	

9 .Course Outcomes and Methods of Teaching, Learning and Assessment
A - Cognitive objectives
A1. Developing students' skills by solving many examples related to the topic
A2. Developing the ability to think and analyze scientifically
A3. Solving the mathematical equations to get the unknown variables
A4. Choosing the appropriate solution method for the given differential equations

B - Skills objectives of the course
B1. The ability to understand and solve many vocabulary and laws related to the study of computers in particular.
B2. Develop a mathematical relation for a given physical problem.
B3. Solving first, second and higher order of differential equations, using different method in classical mathematics and numerical analysis.
B4. Understanding the numerical methods that can help him in solving non-standard mathematical equations using approximate methods on computers, calculators or even on hands.

10. Teaching and learning methods
Full explanation using the blackboard or data show. Use of the Internet and textbooks.
11. Assessment methods
Quizzes , midterm exam, homework and final tests

C- Emotional and value goals

C1. Develop the skill to solve questions step by step.

C2. Developing thought in understanding issues .

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure					
The week	**Hours**	**Required Learning Outcomes**	**Unit / Subject Name**	**Method of education**	**Evaluation method**
1	4	Numerical Solution of Nonlinear D.E	Numerical Solution of Nonlinear D.E	Blackboard. Examples. discussion.	exam
2+3	8	Simple Iteration Method + Newton-Raphson Method	Simple Iteration Method + Newton-Raphson Method	Blackboard. Examples. discussion.	exam
4+5+6+7	16	Interpolation + Lagrange Interpolation + Solution of Linear Instantaneous D.E+. Direct and Indirect Method	Interpolation + Lagrange Interpolation + Solution of Linear Instantaneous D.E+. Direct and Indirect Method	Blackboard. Examples. discussion.	exam
8+9	8	Numerical Integration and Numerical Differentiation + Solving	Numerical Integration and Numerical Differentiation + Solving	Blackboard. Examples. discussion.	exam

		Partial D.E. and its Applications	Partial D.E. and its Applications		
10+11+12	12	Newton Method for Curve Editing + Solving Ordinary D.E. + Runge-Kutta Method	Newton Method for Curve Editing + Solving Ordinary D.E. + Runge-Kutta Method	Blackboard. Examples. discussion.	exam
13+14+15	12	Power Series + Exponential Equations + Method	Power Series + Exponential Equations + Method	Blackboard. Examples. discussion.	exam

14.Course Development Plan

The course can be developed by examining modern sources, using new meth
and integrating them with existing methods

Infrastructure

The base contains a data viewer or projector (DATA SHOW),
which helps the teacher deliver the scientific material in a
short time..

Course Description Form

Course Description

This course will provide the student with a foundation in mathematical principles and to solve the differential equations with classic mathematics and numerical methods.

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**TECK300 \ Engineering Analysis**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**24\3\2024**
8. Course Objectives Understanding and applying mathematical equations related to the study of computer technologies.	

9 .Course Outcomes and Methods of Teaching, Learning and Assessment
A - Cognitive objectives **A1.** Developing students' skills by solving many examples related to the topic **A2.** Developing the ability to think and analyze scientifically **A3.** Solving the mathematical equations to get the unknown variables **A4**. Choosing the appropriate solution method for the given differential equations
B - Skills objectives of the course **B1**. The ability to understand and solve many vocabulary and laws related to the study of computers in particular. **B2**. Develop a mathematical relation for a given physical problem. **B3**. Solving first, second and higher order of differential equations, using different method in classical mathematics and numerical analysis. **B4.** Understanding the numerical methods that can help him in solving non-standard mathematical equations using approximate methods on computers, calculators or even on hands.
10. Teaching and learning methods
Full explanation using the blackboard or data show. Use of the Internet and textbooks.
11. Assessment methods
Quizzes , midterm exam, homework and final test

C- Emotional and value goals

C1. Develop the skill to solve questions step by step.

C2. Developing thought in understanding issues .

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure					
The week	**Hours**	**Required Learning Outcomes**	**Unit / Subject Name**	**Method of education**	**Evaluation method**
1	4	First Order Differential Equations	First Order Differential Equations	Blackboard. Examples. discussion.	exam
2+3	8	Methods of Solving First Order D.E. +Applications on First Order D.E	Methods of Solving First Order D.E. +Applications on First Order D.E	Blackboard. Examples. discussion.	exam
4+5+6+7	16	Second Order Linear D.E. with	Second Order Linear D.E. with	Blackboard. Examples.	exam

		Constant Coefficients+ Applications on Second Order D.E.+ Higher Order Linear D.E. +Applications on Higher Order D.E	Constant Coefficients+ Applications on Second Order D.E.+ Higher Order Linear D.E. +Applications on Higher Order D.E	discussion.	
8+9	8	Integrating Factors+ Fourier series for Periodic Functions	Integrating Factors+ Fourier series for Periodic Functions	Blackboard. Examples. discussion.	exam
10+11+12	12	Even and Odd Functions+ Applications on Fourier Series	Even and Odd Functions+ Applications on Fourier Series	Blackboard. Examples. discussion.	exam
13+14+15	12	Power Series+ Solution of ODE by Power Series	Power Series+ Solution of ODE by Power Series	Blackboard. Examples. discussion.	exam

14. Infrastructure

The base contains a data viewer or projector (DATA SHOW), which helps the teacher deliver the scientific material in a short time..

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.;

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**COE30ᵉ** **Digital communication**
4. Available Attendance Forms	**Theoretical, Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**24\3\2023**

8. Course Objectives

The main objective of this course is to teach the student the fundamental subjects of the digital communication that used for data and information transmission

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

A1. Understand and classify digital communication techniques

A2. Understand and classify signals and how to analyze it

A3. Understand the types of modulation

B - Skills objectives of the course

B1. Clarify the basic concept of digital communication through set of tools

B2. earn the skills to detect and solve any problem

B3. Preparing the students with extensive knowledge of digital signal modulation systems, enabling the graduate to employ that knowledge in the field of computer technology engineering.

B4. Preparing students to be familiar with the theoretical and practical aspects.

10. Teaching and learning methods

- Theoretical lectures
- Practical application in the laboratory of curriculum vocabulary.

11. Assessment methods

Quizzes, midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goals

C1- Realizing the requirements of the engineering profession and ethical responsibility.

C2- Understanding the impact of engineering solutions on economic and environmental activities and the societal context.

C3- Recognizing the need for lifelong learning and the ability to engage in it

D- General and qualifying skills transferred (other skills related to employability and personal development).

D1- The ability to identify, formulate and solve engineering problems.

D2- The ability to design and conduct experiments and analyze and interpret data.

D3- The ability to use modern engineering techniques, skills, and tools necessary to practice the engineering profession.

D-4 Leadership skills and taking responsibility.

D-5 Self-education and lifelong learning skills

13.Course Structure					
The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1	4	Introduction to digital communication	Introduction to digital communication	Theoretical+ practical	exam
2	4	Unit signal and Fourier transform	Unit signal and Fourier transform	Theoretical+ practical	exam
3	4	Sampling theorem	Sampling theorem	Theoretical+ practical	exam
4	4	Pulse amplitude modulation	Pulse amplitude modulation	Theoretical+ practical	exam
5	4	Pulse code modulation	Pulse code modulation	Theoretical+ practical	exam
6	4	Noise consideration in PCM	Noise consideration in PCM	Theoretical+ practical	exam
7	**4**	Limitation and modification of PCM	Limitation and modification of PCM	Theoretical+ practical	exam
8	4	Delta modulation, delta-sigma modulation, adaptive delta modulation	Delta modulation, delta-sigma modulation, adaptive delta modulation	Theoretical+ practical	exam
9	4	Digital base band transmission	Digital base band transmission	Theoretical+ practical	exam
10	4	Inter-symbol interference	Inter-symbol interference	Theoretical+ practical	exam
11	4	Amplitude shift keying	Amplitude shift keying	Theoretical+ practical	exam
12	4	Frequency shift	Frequency shift	Theoretical+	exam

		keying	keying	practical	
13	4	Quadrature shift keying, offset QPSK	Quadrature shift keying, offset QPSK	Theoretical+ practical	exam
14	4	Minimum shift keying, M-ray PSK and M-ray QAM	Minimum shift keying, M-ray PSK and M-ray QAM	Theoretical+ practical	exam
15	4	Spread spectrum system, frequency hopping FH	Spread spectrum system, frequency hopping FH	Theoretical+ practical	exam

14. Infrastructure

16-   The Department of Computer Engineering Technologies has four scientific

17-   Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

18-   The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plan

1- Familiarity with everything new and innovative in teaching and learning strategies
2- Providing seminars through the student that address digital communications systems.

Course Description Form

Course Description

This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description.

1. Educational Institution	**Northern Technical University**
2. Scientific Department	**Computer Engineering Techniques**
3. Course Name/Code	**Electronic systems simulators / COE001**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Courses**
6. Number of credit hours (total)	
7. Date of preparation of this description	**1\6\2023**
8. Course Objective	

8. Course Objective

Delivering the scientific material that the student must receive in accordance with the instructions mentioned in the special skills item in the required educational outcomes and methods of teaching, learning and evaluation. In addition to giving

the student information about the basic concepts of advanced digital electronic circuits using electronic simulators and knowing the most important basic advanced digital circuits used in electronic devices and equipment.

9. Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

If the student successfully completes this course, he will be able to:

A1- Distinguish between digital electronic systems, the operation of these circuits, and the purpose of their use

A2- Distinguish the most important basic concepts in the logical design of (MSI components and programmable logic devices) through a set of tools.

A3- Acquire basic skills as an introduction to building advanced digital circuits.

A4- It uses theoretical concepts to deal with advanced digital circuits such as (Algorithmic State Machines, Synchronous and Asynchronous Sequential Networks).

B - Skills objectives of the course

If the student successfully completes this course, he will be able to:

B1 - Analysis and design of advanced digital circuits.

B2 - Identify the problem and address the problem according to certain rules.

B3 - Implementing advanced digital electronic circuits using electronic simulators.

B4- Know the comparison between (Synchronous Sequential Networks) and (Asynchronous Sequential Networks) and their various applications.

10. Teaching and Learning Methods

1- Theoretical presentation of the curriculum vocabulary by using some general engineering principles that lead to the analysis and design of the engineering problem, in addition to using the special rules for electronic circuit engineering (obtaining A1-A-4 from paragraph 9)

2- Exercises and activities in the classroom and their discussion.

3- Laboratory training of curriculum vocabulary using computer programs such as VHDL (Get B1-B-4 of Paragraph 9)

11. Assessment Methods

Daily tests, daily assignments, lab reports, and semester and final exams.

C- Emotional and value goals

C1. Building confidence in dealing with and solving complex engineering problems.

C2. Promoting a growth mindset, encouraging students to embrace mistakes as opportunities for learning.

C3. Encouraging teamwork and collaboration in laboratory experiments and group projects.

D- General and Qualifying Skills Transferred (Other Skills Related to Employability and Personal Development).

D1. Communication skills: Effectively conveying technical concepts through written reports, presentations, and discussions.

D2. Teamwork and collaboration: Working collaboratively with peers on laboratory experiments, projects, and assignments.

D3. Time management: Planning and organizing tasks to meet project deadlines and academic requirements.

12. Course Structure					
The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
١,٢,٣,٤	1Theoretical + 2 Practical	Fundamental concepts	Logic design with MSI components and programmable logic devices: • Comparators, Decoders, Encoders and Multiplexers. • Programmable Logic Devices (PLDs) • Programmable Logic Arrays (PLAs) Programmable Array Logic (PAL)	Theoretical+ practical	Daily Exam
٥,٦,٧	1Theoretical	Understand, analyze,	Synchronous Sequential	Theoretical+	Daily

٨,٩,١٠	+ 2 Practical	model and design Synchronous Sequential Networks	Networks: • Structure and Operation of Clocked Synchronous Sequential Networks. • Analysis of Clocked Synchronous Sequential Networks. • Modeling Clocked Synchronous Sequential Network Behavior. • State Table Reduction. Completing Design Of Clocked Synchronous Sequential Networks	practical	Exam
،١١,١٢ ١٣,١٤,١٥	1Theoretical + 2 Practical	Understand algorithm (ASM)	Algorithmic State Machines: • The Algorithmic State Machine (ASM) • ASM Charts	Theoretical+ practical	Daily Exam

			• State Assignments • ASM Tables ASM Realizations		

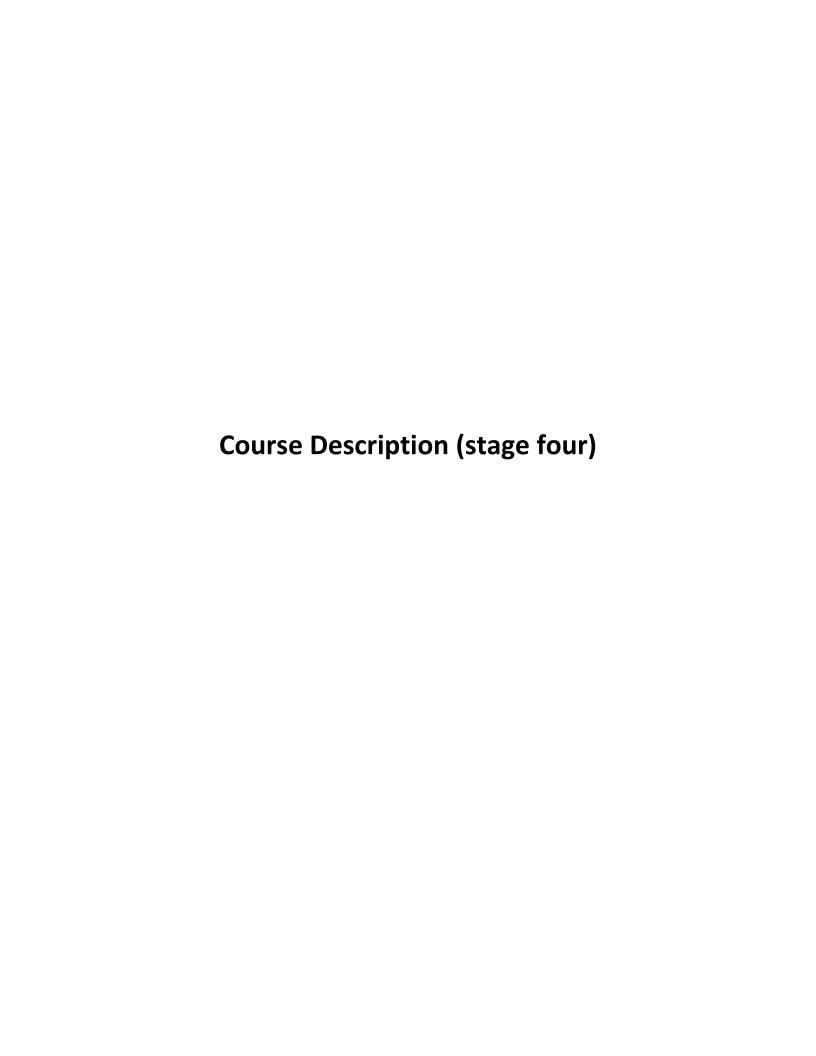## 13. Infrastructure

37-   The Department of Computer Engineering Technologies has four scientific laboratories.

38-   Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for number of students.

39-   Each laboratory also contains a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14. Course Development Plan
The course can be created and developed based on labor market requirements. Therefore, the course is created in an organized and interesting manner that effectively teaches the basic concepts of electronic systems simulators for the purpose of preparing students for future study and careers in this field.
Increasing the number of hours of theoretical lectures in order to make better use of practical application in establishing a better understanding of the largest possible amount of vocabulary taught in practical lectures.

Course Description (stage four)

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.;

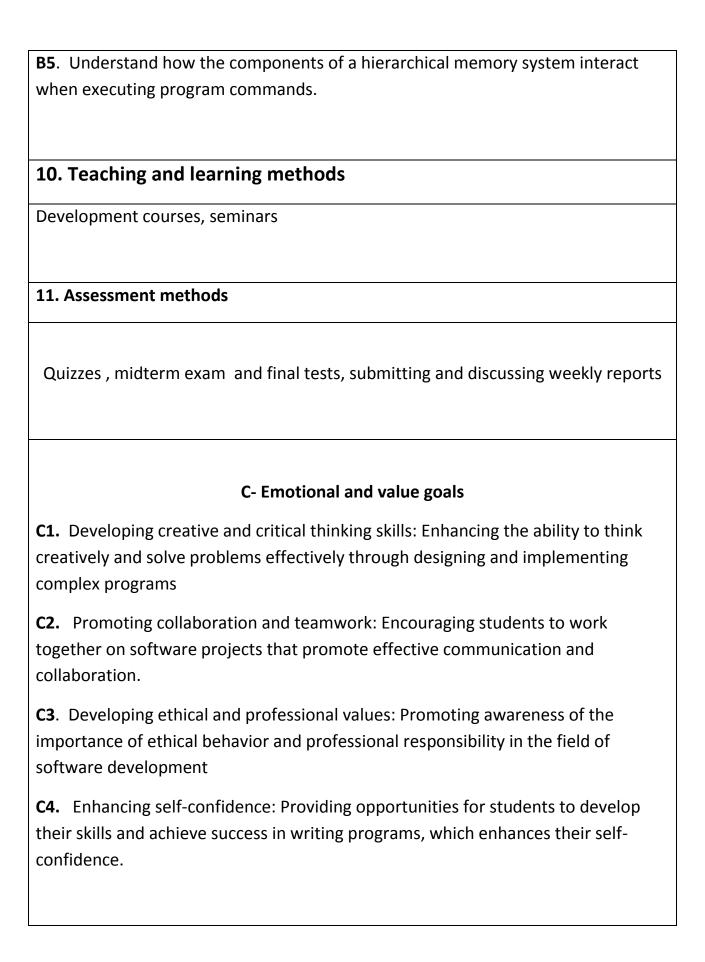|	
1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**COE008 \ Advanced Computer Technology**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**25\3\2024**
8. Course Objectives	
Delivering the scientific curricula that the student must receive according to the instructions mentioned in the special skills section	

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

A1. To study the computer architecture and the type of addressing and the type of memory.

A2. This course aims to provide the students with an appreciation of the role of advanced computers technology.

A3. Study of the advanced internal architecture of the 80386 microprocessor.

A4. Study addressing methods.

A5. Studying the modus operandi of the processor that operates on the system of fragmentation and imports. Architectural study and features of some designs of recent generations of Processors.

A6. Architectural study and features of some designs of recent generations of processors Parallel processing capability.

B - Skills objectives of the course

B1. Understand how the parts of a computer interact to carry out a command.

B2. Understanding how to exploit the active parts of the computer in determining the speed of execution of program commands, to reach to optimum performance.

B3. Understanding how to develop a more comprehensive and understanding measure of processor speed than processor speed

B4. Understanding the basics of the hierarchical memory system and its performance measures.

B5. Understand how the components of a hierarchical memory system interact when executing program commands.
10. Teaching and learning methods
Development courses, seminars
11. Assessment methods
Quizzes , midterm exam and final tests, submitting and discussing weekly reports
C- Emotional and value goals **C1.** Developing creative and critical thinking skills: Enhancing the ability to think creatively and solve problems effectively through designing and implementing complex programs **C2.**   Promoting collaboration and teamwork: Encouraging students to work together on software projects that promote effective communication and collaboration. **C3**. Developing ethical and professional values: Promoting awareness of the importance of ethical behavior and professional responsibility in the field of software development **C4.**   Enhancing self-confidence: Providing opportunities for students to develop their skills and achieve success in writing programs, which enhances their self-confidence.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure					
The week	**Hours**	**Required Learning Outcomes**	**Unit / Subject Name**	**Method of education**	**Evaluation method**
1	4	Introduction to computer – Internal organization of computer	Introduction to computer	Theoretical+ practical	exam
2+3	8	Introduction to assembly programming	assembly programming	Theoretical+ practical	exam
4+5+6+7	16	The architecture of Microprocessor 8086 ,Segment in 80x86 Protected mode memory addressing Selectors and	80286 80386 MP	Theoretical+ practical	exam

		descriptors .Local and global descriptor tables Descriptor and page table entries -Program – invisible registers			
8+9	8	Memory paging -Virtual memory Paging mechanism .Segment translation .Page translation	Paging	Theoretical+ practical	exam
10+11+12	4	Major changes in the 80386 Pipelining design Techniques	80386 MP	Theoretical+ practical	exam
13+14+15	4	Cache memory	Cache	Theoretical+ practical	exam

14.Course Development Plan

14. Infrastructure

19-   The Department of Computer Engineering
  Technologies has four scientific

20-   Each of the four laboratories has a large
  collection of desktop and laptop computers that are
  suitable for the number of students

21-   The laboratories also contain a DATA SHOW,
  which helps lecturers to deliver the scientific lecture
  in a short time.

This course focuses on studying communication protocols and networks, which form the basis for exchanging information and data across computer networks. The course covers key concepts of network protocols, such as the communication layer, routing, flow control, and services. Students learn how protocols work and are designed, in addition to using specialized software tools for protocol analysis and development. The course also includes studying famous protocols such as TCP/IP, UDP, and others, and how to apply and configure them in real network environments.

15.Course Development Plan

Advanced Computer Technology can be developed by opening a line of communication between the department and private companies to know the requirements of the labor market. Students can also be assigned to develop or simulate design of simple computer that meet the needs of these companies.

Course Description Form

Course Description

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**COE012 Network Protocols**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**7\1\2023**

8. Course Objectives

Providing a comprehensive understanding of communication layers and protocols used in computer networks, with a focus on famous protocols such as TCP/IP, UDP, and others, to enable students to understand how information and data are exchanged across computer networks. Introducing students to advanced concepts and techniques in the field of network protocols, such as routing and flow control, and providing them with the necessary knowledge to design and develop protocols according to current environment requirements. Equipping students with practical skills in using specialized software tools for protocol analysis and development, configuring them, and applying them in real network environments, thereby preparing them to face real challenges in the job market

9 .Course Outcomes and Methods of Teaching, Learning and Assessment	

- Identifying the fundamental concepts and necessary skills in each topic of the course.
- Providing an interactive learning environment that encourages active student participation

B - Skills objectives of the course

9. **Enhancing practical skills through the use of applied lessons and solving practical cases.**
10. **Guiding students to understand the relationships and interactions between different concepts in the course.**
11. **Reinforcing critical and analytical thinking skills in solving problems related to the studied topics.**
12. **Promoting cooperative learning through group projects and collaborative activities.**
13. **Providing opportunities to develop effective communication skills through presentations, discussions, and reports.**
14. **Enhancing the ability to interact with advanced technology used in the field.**
15. **Encouraging students to use multiple sources for research and self-learning.**
16. **Introducing comprehensive assessment mechanisms that evaluate understanding, practical application, analytical ability, and critical thinking skills required.**

.

10. Teaching and learning methods

Development courses, seminars

11. Assessment methods

Quizzes , midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goals

Enhancing Emotional Awareness: The course aims to enhance awareness of the importance of ethical and social values in the field of digital controls and network protocols.

Developing Ethical Consistency: The course aims to develop students' ability to think ethically and make sound decisions in the context of technology and communications.

Fostering Social Responsibility: The course aims to guide students towards understanding their roles and responsibilities as professionals in the field of information technology and communications in serving society.

Promoting Academic Values: The course aims to promote values of commitment to continuous learning and professional development in the field of digital controls and network protocols.

> Encouraging Innovation and Creativity: The course seeks to encourage students to engage in creative thinking and innovation in solving relevant technical and social problems.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure

عدد الساعات الاسبوعية				اسم المادة	
عدد الوحدات	م	ع	ن	باللغة الانكليزية	باللغة العربية
6	4	2	2	Computer Networks Protocols	بروتوكولات شبكات الحاسوب

أهداف المادة: تهدف المادة الى تعريف الطالب بالبروتوكولات المستخدمة في شبكات الحاسوب و طريقة عملها.

Weeks	Syllabus
1st, 2nd	Introduction to the OSI Reference Mode, and the TCP/IP Reference Model. Protocol Hierarchies in these models.
3rd, 4th, 5th, 6th 7th, 8th	Application Layer Protocols • WWW (HTTP, HTTPs, FTP) • Electronic Mail (SMTP, POP) • DHCP, DNS, SNMP, SSH, Telnet, BGP, RIP
9th, 10th, 11th, 12th	Transport Layer Protocols • Congestion Control , Flow Control • End to End Protocols (UDP, TCP, RPC)
13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd 23rd, 24th	Network Layer Protocols • Routing Algorithms • Flooding • Shortest path routing • Distance Vector routing • Link Sate routing • Hierarchical routing • Broadcast and multicast routings • Routing in the Internet • Path Vector routing • OSPF routing • EIGRP routing • IPv4 , IPv6, IPsec, • ICMP , IGMP
25th, 26th, 27th, 28th	Data Link Layers Error control and flow control algorithms • ARP, L2TP, PPP • MAC (Ethernet, DSL, ISDN, FDDI). • STP • CSMA/CD • Check Sum algorithms • CRC
29th, 30th	Physical Layer Protocols Protocols • The Bluetooth Protocol Stack • OTN, SONET/SDH

14. Infrastructure

22-   The Department of Computer Engineering Technologies has four scientific

23-   Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

24-   The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plan
The course can be developed by establishing a connection between the department and private companies to understand the requirements of the job market. Additionally, students can be assigned to write programs or design systems that meet the needs of these companies.

Course Description Form

Course Description

This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description.

1. Educational institution Northern Technical University	Northern Technical University
2. Scientific Department	Computer engineering techniques
3. Course Name/Code	COE016 \ Mobile communications systems
4. Available Attendance Forms	Theoretical , Practical
5. Courses /Year	Course
6. Number of credit hours (total)	60 h
7. Date of preparation of this description	7\1\2023
8. Course Objectives	
The course aims for the student to study mobile cellular communications in all generation systems and to study the internal structure of the cells and the coverage of the communication process.	

9 .Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives If the student successfully completes this course, he will be able to: A1- Understands the types of mobile communications systems and their generations A2- Understands the communication mechanism between cellular devices and the process of publishing tower sites according to the plan and population density A3- Understands the mechanism of transferring information and signals between devices with the ground station and to the company's main headquarters. A4- Understands the mechanism of propagation of the microwave signal, the mechanism for selecting special frequencies, and the volume of information transmitted through them.
B - Skills objectives of the program B1 - Knows the methods of transmitting signals and information through cellular devices and ground stations B2 - Designs microwave stations to transmit the signal B3 - Design a map for the distribution of ground station towers
10. Teaching and learning methods
Development courses, seminars

11. Assessment methods
Quizzes , midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goals

C1. Recognizes the demands and ethical responsibility of the engineering profession, as well as the need for and ability to engage in lifelong learning.

C2- Understands the impact of engineering solutions on economic activities.

D- General and qualifying skills transferred (other skills related to employability and personal development).

D1-Ability to identify, formulate and solve engineering problems.

D2- The ability to design and conduct experiments and analyze and interpret the results.

D3- The ability to use modern engineering techniques, skills, and tools necessary to practice the engineering profession.

13.Course Structure					
Evaluation method	Teaching method	Name of unit/or subject	Required learning outcomes	Hours	The week

Daily exam	Presentation of slides and illustrative pictures of the types and generations of mobile communication systems and their uses	**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	Understanding the different types and generations of mobile systems	6	1-3
Daily exam	Explaining the mechanism for extracting the frequencies of ground stations to users, how	**The Cellular Concept-System Design Fundamentals:** Cellular system,	Identify the types of ground stations, how to distribute them, and how to select	٨	٧-٤

	to use these frequencies, and methods of redistributing them on the network.	Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Cha^lnnel & cochannel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Handoff Strategies, Umbrella Cell Concept	frequencies.		
Monthly Exam	Explaining the mechanism and volume of information transmitted between devices and ground stations and calculating mathematical laws to obtain the required results	**Traffic Engineering:** Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization	Calculating the volume of information transmitted through ground stations and how to obtain the best results	٨	٨- ١١
Daily exam	Explain, clarify, and carry out the	**Large scale path loss:** Free Space	Design of macrowave	٨	١٢- ١٥

| | calculations required to operate microwave stations, taking into account the standards of signal strength and the possibility of changing temperatures and rain. | Propagation loss equation, Path-loss of

NLOS and LOS systems, Reflection, Ray ground reflection model,

Diffraction, Scattering, Link budget design, | stations | | |
|---|---|---|---|---|---|
| Monthly Exam | Calculate the propagation of the microwave signal by designing a station using the Pathloss 4.0 program | **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 | Calculate the propagation of the microwave signal by designing a station using the Pathloss 4.0 program | ٦ | ١٦- ١٨ |
| | Identify the types of signal modulation and methods of using transmission through FDMA, TDMA or CDMA, the benefits of | **Modulation Techniques for Mobile Radio:** Review for basic digital

modulation | The importance of methods of inclusion and transfer | ٨ | ١٩- ٢٢ |

each method and how to use it.	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)			

	Required prescribed books
2- Wireless communications principles and practise	Main references (sources)
2- WIRELESS COMMUNICATIONS AND NETWORKING 3- Wireless and Cellular Telecommunications	Recommended books and references (scientific journals, reports,...)
	Electronic references, Internet sites…

.Course development plan
3- Familiarity with everything new and innovative in teaching and learning strategies.

Course Description Form

Course Description

In this course, student will learn the fundamental principles of computer and network security by studying attacks on computer systems, network, and the Web. Students will learn how those attacks work and how to prevent and detect them.

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	COE018 \ Security of Computers
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Course**
6. Number of credit hours (total)	**60 h**
7. Date of preparation of this description	**7\1\2023**

8. Course Objectives

The article aims to explain the means and methods that must be followed to protect the computer from unauthorized access and tampering with it, as well as protecting data and databases from hackers, as well as protecting the computer network, especially private networks, from hacker attacks through activating and investing in network protection protocols.

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

8. Course objectives

The Course aims to explain the means and methods that must be followed to protect the computer from unauthorized access and tampering with it, as well as protecting data and databases from hackers, as well as protecting the computer network, especially private networks, from hacker attacks through activating and investing in network protection protocols.

B - Skills objectives of the course

B1.It aims to learn programming skills and work on projects that require high skills in programming   of objects

B2.It aims to use modern and advanced tools to deliver largest amount of knowledge to the student

B3.It aims to make the student aware of his programming capabilities and the extent of their compatibility with the level of the required project

B4.Blended learning (electronic and in-person), scientific films and videos, laboratories, training at summer And graduation projects

10. Teaching and learning methods
Development courses, seminars

11. Assessment methods
Quizzes , midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goals

C1. Developing creative and critical thinking skills: Enhancing the ability to think creatively and solve problems effectively through designing and implementing complex programs

C2.   Promoting collaboration and teamwork: Encouraging students to work together on software projects that promote effective communication and collaboration.

C3. Developing ethical and professional values: Promoting awareness of the importance of ethical behavior and professional responsibility in the field of software development

C4.   Enhancing self-confidence: Providing opportunities for students to develop their skills and achieve success in writing programs, which enhances their self-confidence.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

week	Hours	ILOS	Unit/modulor topic title	Teaching method	Assessment Method
1-3	6		Symmetric Ciphers model: plaintext, encryption algorithm, secret key, cihper text, decryption algorithm, A Model of conventional encryption. Cryptography, Cryptanalysis, block and stream cipher		
4	2		Caeser Cipher The affine Cipher		
5-6	4		Mono alphabetic substitution ciphers Shift ciphers		
7	2		Hill cipher		
8	2		Playfair cipher		
9	2		Polyalphabetic ciphers Vigenere cipher		
10-11	4		The Transposition cipher		
12	2		Affine cipher		
13	2		One time pad		
14-16	6		Cryptanalysis of a Symmetric key		
17	2		Euclid's Algorithm		
18-19	4		SYMMETRIC-KEY ALGORITHMS -DES—The Data Encryption Standard, hers - 16 round Feistel system		
20-22	6		PUBLIC-KEY ALGORITHMS, -RSA, - Other Public-Key Algorithms		
23-27	10		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		
28	2		OSI security Architecture , a model for network security EMAIL SECURITY -PGP—Pretty Good Privacy,		

11. Course Structure

13.Infrastructure

1- The Department of Computer Engineering Technologies has four scientific

2- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

3- The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plaى

The security of network and computers can be developed by opening a line of communication between the department and private companies to know the requirements of the labor market. Students can also be assigned to write programs or design simple websites that

 meet the needs of these companies.

Course Description Form

COE019 \ Multimedia

Course Description

In This course study Digital image processing and Digital Audio also. The outcome of this subject: the students are learn to deal with images using arithmetic operation by MATLAB language and using audio functions in MATAB to change sound properties. Additionally, the students learn how deal with digital Video processing.

1. Educational institution Northern Technical University	**Northern Technical University**
2. Scientific Department	**Computer engineering techniques**
3. Course Name/Code	**COE019 \ Multimedia**
4. Available Attendance Forms	**Theoretical , Practical**
5. Courses /Year	**Year**
6. Number of credit hours (total)	**80 h**
7. Date of preparation of this description	**7\1\2023**

8. Course Objectives

Delivering the scientific curricula that the student must receive according to the instructions mentioned in the special skills section

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9 .Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

A1. It aims to know the concepts of Image processing using MATLAB

A2. It aims to learn how to using MATLAB functions to facilitates websites arithmetic operation in Image Matrices

A3. It aims to know the deal with Audio processing.

A4.It aims to know the necessary requirements to work in private companies as a programmer or technical engineer

B - Skills objectives of the course

B1.It aims to learn programming skills and work on projects that require high skills in programming on images and video

B2.It aims to use modern and advanced tools to deliver largest amount of knowledge to the student

B3. Blended learning (electronic and in-person), scientific films and videos, laboratories, training at summer And graduation projects

10. Teaching and learning methods
Development courses, seminars

11. Assessment methods
Quizzes , midterm exam and final tests

C- Emotional and value goals

C1. Developing creative and critical thinking skills: Enhancing the ability to think creatively through designing and implementing multimedia (image processing, Audio and video processing).

C2.   Teamwork project: Encouraging students to work together on project (Multimedia).

C3. Enhancing self-confidence: Providing opportunities for students to develop their skills and achieve success in writing programs, which enhances their self-confidence.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure					
The week	**Hours**	**Required Learning Outcomes**	**Unit / Subject Name**	**Method of education**	**Evaluation method**
1	4	Component of multimedia	Component of multimedia	Theoretical+ practical	exam
2+3	8	image and Graphic representation	image and Graphic representation	Theoretical+ practical	exam
4+5+6+7	16	Arithmetic operation on images	Arithmetic operation on images	Theoretical+ practical	exam
8+9	8	Image quantization	Arithmetic operation on images	Theoretical+ practical	exam
10+11	8	Image Histogram and equalization	Image Histogram and equalization	Theoretical+ practical	exam
12+13+14	8	Image Enhancement	Image Histogram and equalization	Theoretical+ practical	exam
15+16+17	12	Image Compression	Image Compression	Theoretical+ practical	exam
18	4	Sound and Audio basics	Sound and Audio basics	Theoretical+ practical	exam
19	4	DPCM Audio Encoding and Decoding	DPCM Audio Encoding and Decoding	Theoretical+ practical	exam

				13.Infrastructure		
20+21	8	Video Processing	Video Processing	Theoretical+ practical	exam
22	4	Video Compression	Video Compression	Theoretical+ practical	exam
23	4	Multimedia Tops and researches	Multimedia Tops and researches	Theoretical+ practical	exam

14. Infrastructure

25-   The Department of Computer Engineering Technologies has four scientific

26-   Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

27-   The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plan
OOP can be developed by opening a line of communication between the department and private companies to know the requirements of the labor market. Students can also be assigned to write programs or design simple websites that   meet the needs of these companies.

Course Description Form

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.;

1. Educational institution Northern Technical University	Northern Technical University
2. Scientific Department	Computer engineering techniques
3. Course Name/Code	COE005 Pc interfacing
4. Available Attendance Forms	Theoretical, Practical
5. Courses /Year	Year
6. Number of credit hours (total)	120 h
7. Date of preparation of this description	3\24\2024

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

A1. It aims to learn about Pc interfacing circuits and how to design it

A2. It aims to learn about Pc ports and to use it to interface

A3. It aims to know about digital signal generator and converter

B - Skills objectives of the course

B1. The ability to design, connect and programming the electronic circuits with Pc

B2.the student will be able to choose the right port to connect the electronic circuit with Pc

10. Teaching and learning methods

Development courses, seminars, scientific films and videos, laboratories

11. Assessment methods

Quizzes, midterm exam and final tests, submitting and discussing weekly reports

C- Emotional and value goals

C1. Developing creative and critical thinking skills: Enhancing the ability to think creatively and solve problems effectively through designing and implementing complex programs

C2. Promoting collaboration and teamwork: Encouraging students to work together on software projects that promote effective communication and collaboration.

C3. Developing ethical and professional values: Promoting awareness of the importance of ethical behavior and professional responsibility in the field of software development

C4. Enhancing self-confidence: Providing opportunities for students to develop their skills and achieve success in writing programs, which enhances their self-confidence.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1+2+3	12	C++ review	Regulated design of power supply	Theoretical+ practical	exam
4+5+6+7+8	20	Object + class	Parallel (Centronic) port interface	Theoretical+ practical	exam
9+10+11+12+13	20	Inheritance	Rs232 serial interface	Theoretical+ practical	exam
14+15+16+17	16	Polymorphism	Universal serial bus (USB) interface	Theoretical+ practical	exam
18+19	8	I/O and File management	Parallel to serial Serial to parallel	Theoretical+ practical	exam
20+21+22+23	16	Template	Analog to Digital converter	Theoretical+ practical	exam
24+25+26	12		Digital to Analog converter	Theoretical+ practical	exam
27+28+29+30	16		Application project	Theoretical+ practical	exam

13.Course Structure

14. Infrastructure

28- The Department of Computer Engineering Technologies has four scientific

29- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

30- The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plan
Linking the course to modern studies to motivate students to benefit from modern means and the Internet to develop their cognitive and practical skills

Course Description Form

Course Description

This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description.

1. Educational Institution	**Northern Technical University**
2. Scientific Department	**Computer Engineering Techniques**
3. Course Name/Code	**Advanced digital electronics COE010 \ COE010**
4. Available Attendance Forms	**Weekly**
5. Courses /Year	**Annual/Fourth Academic year**
6. Number of credit hours (total)	**120**
7. Date of preparation of this description	**1\6\2023**
8. Course Objectives	
Delivering the scientific material that the student must receive in accordance with the instructions mentioned in the special skills item in the required educational	

outcomes and methods of teaching, learning and evaluation. In addition to studying advanced digital electronics represented by programmable logic gates and the use of entity language (VHDL) to design digital circuits.

9. Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

If the student successfully completes this course, he will be able to:

A1- Understanding the installation, operation and programming of programmable logic gates.

A2- Understanding the structure, operation and programming of the FPGA.

A3- Design digital circuits using the entity language VHDL.

B - Skills objectives of the course

B1 - The student should be able to use modern design techniques for logic circuits.

B2 - The learner must be able to use hardware explanation languages such as VHDL.

B3 - It aims to teach the student how to communicate technical information effectively through written reports and presentations.

10. Teaching and Learning Methods

A- Theoretical presentation of the curriculum vocabulary through:

1 -Using some basic principles to design logic circuits.

2 -Use illustrative diagrams.

3 -Using programming principles for programming languages.

Laboratory application of curriculum vocabulary using computer programs to represent and simulate digital systems, such as Proteus and VHDL writing programs such as Warp 6.

11. Assessment Methods

The student is evaluated by:

1 -Achievement test with the concepts below:

A- Paragraphs with selected answers.

B - Structured questions (the answer is made by understanding the information available in the question form and in the illustrative forms).

C- Multiple choice items.

Homework and class assignments. And semester and final exams

C- Emotional and value goals

C1. Building confidence in dealing with and solving complex engineering problems.

C2. Promoting a growth mindset, encouraging students to embrace mistakes as opportunities for learning.

C3. Encouraging teamwork and collaboration in laboratory experiments and group projects.

D- General and Qualifying Skills Transferred (Other Skills Related to Employability and Personal Development).

D1. Communication skills: Effectively conveying technical concepts through written reports, presentations, and discussions.

D2. Teamwork and collaboration: Working collaboratively with peers on laboratory experiments, projects, and assignments.

D3. Time management: Planning and organizing tasks to meet project deadlines and academic requirements.

	12. Course Structure				
The week	**Hours**	**Required Learning Outcomes**	**Unit / Subject Name**	**Method of education**	**Evaluation method**
1,2,3	2Theoretical + 2 Practical	Fundamental concepts	Introduction – what is FPGA? And Where it used.	Theoretical+ practical	Daily Exam
4	2Theoretical + 2 Practical	Fundamental concepts	Programming technologies: fusible link technologies, Anti fuse technologies, mask programming, PROMs, EPROM-based technologies, EEPROM-based technologies, FLASH-based technologies, SRAM-based technologies	Theoretical+ practical	Daily Exam
5,6	2Theoretical + 2 Practical	Fundamental concepts	Types of FPLDS: 1.SPLDswhich include: PROMs, PALAs, PALs and	Theoretical+ practical	Daily Exam

			GALs, 2.CPLDs		
7	2Theoretical + 2 Practical	Fundamental concepts	FPGA architecture: • configurable logic block • configurable I/O standards • additional features of modern FPGAs: embedded RAMs, embedded multiplier, adders, MACs, clockes trees and clock managers.	Theoretical+ practical	Daily Exam
8	2Theoretical + 2 Practical	Programming	Programming (configuring) an FPGA	Theoretical+ practical	Daily Exam
9	2Theoretical + 2 Practical	Programming	INTODUCTION to VHDL: Fundamental VHDL units: library, entity and architecture.	Theoretical+ practical	Daily Exam
10,11	2Theoretical + 2 Practical	Fundamental concepts	VHDL Data Types : pre-defined data types, user-defined data types	Theoretical+ practical	Daily Exam
12	2Theoretical + 2 Practical	Operations	Operators, data attributes, signal attributes	Theoretical+ practical	Daily Exam
13,14	2Theoretical + 2 Practical	Programming	Concurrent code: • WHEN (simple and selected) GENERATE: FOR/GENERAT,	Theoretical+ practical	Daily Exam

			IF/GENERAT		
15,16	2Theoretical + 2 Practical	Programming	Sequential code: process: IF, WAIT, CASE , LOOP	Theoretical+ practical	Daily Exam
17,18	2Theoretical + 2 Practical	Programming	State machine	Theoretical+ practical	Daily Exam
19,20,21	2Theoretical + 2 Practical	Programming	Packages and components	Theoretical+ practical	Daily Exam
22,23,, 24	2Theoretical + 2 Practical	Programming	Functions and procedures	Theoretical+ practical	Daily Exam
٢٥,٢٦,٢٧، ٢٨,٢٩,٣٠	2Theoretical + 2 Practical	Designing	Design examples	Theoretical+ practical	Daily Exam

13. Infrastructure

1- The Department of Computer Engineering Technologies has four scientific laboratories.

2- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for number of students.

3- Each laboratory also contains a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14. Course Development Plan

The course can be created and developed based on labor market requirements. Therefore, the course is created in an organized and interesting manner that effectively teaches the basic concepts of electronic systems technologies presented for the purpose of preparing students for future study and careers in this field.

In addition to being familiar with everything new and innovative in teaching and learning strategies.

Also, the process of redistributing the weekly hours across the curriculum items in a way that is compatible with the size of each topic within the curriculum can have an impact on developing the curriculum

Course Description Form

COE404\ Information Theory

Course Description

This course study Theory coding and data compression. The outcome of this subject: the students are learn to deal with data and huge of array and matrices using arithmetic encoding operations by MATLAB language and using. Additionally, the students learn how deal with compress data.

1. Educational institution Northern Technical University	Northern Technical University
2. Scientific Department	Computer engineering techniques
3. Course Name/Code	COE404\ Information Theory
4. Available Attendance Forms	Theoretical , Practical
5. Courses /Year	Year
6. Number of credit hours (total)	60 h

7. Date of preparation of this description	7\1\2023

9 .Course Outcomes and Methods of Teaching, Learning and Assessment

A - Cognitive objectives

A1. It aims to know the concepts of Encoding and decoding using MATLAB

A2. It aims to learn how to using MATLAB functions to facilitates arithmetic operations

A3. It aims to know the deal with lossless data compression.

A4.It aims to know the necessary requirements to work in private companies as a programmer or technical engineer

B - Skills objectives of the course

B1.It aims to learn programming skills and work on projects that require high skills in programming on lossy image compression

B2.It aims to use modern and advanced tools to deliver largest amount of knowledge to the student

B3. Blended learning (electronic and in-person), scientific films and videos, laboratories, training at summer And graduation projects

10. Teaching and learning methods

Development courses, seminars

11. Assessment methods

Quizzes , midterm exam and final tests

C- Emotional and value goals

C1. Developing creative and critical thinking skills: Enhancing the ability to think creatively through designing and implementing theory coding.

C2. Teamwork project: Encouraging students to work together on project (encoding).

C3. Enhancing self-confidence: Providing opportunities for students to develop their skills and achieve success in writing programs, which enhances their self-confidence.

D- General and qualifying skills transferred (other skills related to employability and personal development).

Teamwork skills by dividing work segments between individuals

13.Course Structure

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
1+2	8	Probabilities and Bayes Rules. Venn's Diagram	Probabilities and diagrams	Theoretical+ practical	exam
3	4	Information transmission	Information transmission	Theoretical+ practical	exam
4+5	4	Shannon representation of source information	Shannon representation	Theoretical+ practical	exam
6+7	8	Entropy for continues uniform and Gaussian distribution	Entropy for continues uniform and Gaussian distribution	Theoretical+ practical	exam
8+9+10	8	Information transmission over symmetric channel	Information transmission over symmetric channel	Theoretical+ practical	exam
11+12+ 13+14	8	Source encoding :fixed length and variable length (codes)	Source encoding	Theoretical+ practical	exam

15+16+17	8	Shannon Fano coding method	Shannon Fano coding method	Theoretical+ practical	exam
18+19	4	Huffman Coding	Huffman Coding	Theoretical+ practical	exam
20	4	Data Compression	Data Compression	Theoretical+ practical	exam
20+21	8	RLE and ZIP	RLE and ZIP	Theoretical+ practical	exam
22	4	Image compression	Image compression	Theoretical+ practical	exam
23	4	DPCM Audio Encoding and Decoding	DPCM Audio Encoding and Decoding	Theoretical+ practical	exam

14. Infrastructure

4- The Department of Computer Engineering Technologies has four scientific

5- Each of the four laboratories has a large collection of desktop and laptop computers that are suitable for the number of students

6- The laboratories also contain a DATA SHOW, which helps lecturers to deliver the scientific lecture in a short time.

14.Course Development Plan
OOP can be developed by opening a line of communication between the department and private companies to know the requirements of the labor market. Students can also be assigned to write programs or design simple websites that   meet the needs of these companies.