

Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation

Academic Program Specification Form For The Academic

University: Northern Technical University
College or Institute: Kirkuk Polytechnic College
Department: Computer Systems Techniques
Date of form completion: 1/10/2025



Prof. Dr.: Ashty Mahdi

Dean's Name

Date: 1/10/2025

Signature

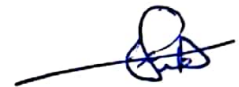


Asist. prof. Zuhair Shakoor

Dean's Assistant for Scientific Affairs

Date: 1/10/2025

Signature



Lecturer Huda Abdul Kareem

Head of Department

Date: 1/10/2025

Signature



Asist. lecture. Alaa abdullwahab Aziz

Quality Assurance and University performance manager

Date: 1/10/2025

Signature

Academic Program Description

Academic Program Description

This academic program description provides a brief summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available opportunities. It is

1. Name of university	Northern Technical University/ Technical Institute /Kirkuk
2. Name of Department	Computer Systems techniques
3. Programme Title	Academic description program
4. Title of Final Award	Technical Diploma for Two Calendar Years
5. Study system	Courses /semester
6. Accredited Academic Program	AACSB
7. Other external influences	There is a close relationship between the department's outputs and the stakeholders who benefit from the department's curriculum and the labor market, depending on the graduates' follow-up form.
8. Description creation date	8/1/2025

9. Aims of the Program: The aims of the department :-

- 1-Preparing intermediate technical cadres with skills in the field of work on computer programs, systems and applications.
- 2- Enhancing the values of job affiliation and loyalty in the institution.
- 3-Bridging between traditional and modern scientific and training curricula in a way that helps the current reality.
- 4-Enhancing the concepts of qualitative and quantitative excellence in order to achieve standards of quality and scientific efficiency.
- 5- Creating a scientific, research and applied environment.
- 6- Evaluating the effectiveness of the annual educational and training programs to reach the best development.
- 7-Taking care of students and putting them on the right path in a way that expresses their personal and professional goals and aspirations.
- 8- Taking advantage of technical progress in the design, implementation and use of electronic and blended education To serve the educational and scientific side of the department.

10.Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

(First Class)

A1.The student's knowledge of problem analysis method, design of algorithms and systems, and application of specialized programs using programming languages(C++), Java, Python, SQL SPSSMATLAB, HTML .

A2.The student's knowledge of office, math and statically applications .

A3.Introducing the student to the types of computers and their physical components and the representation of data inside the computer in addition to the methods of installing and maintaining them and diagnosing faults.

(Second Class)

A1.The student's knowledge of the importance of computer operating systems and their types, in addition to the definition of the method of installing programs and applications.

A2.The student's knowledge of advanced programming languages (Visual Basic, FoxPro databases, C++ data structures, HITML/PHP/Java website design).

A3.The student's knowledge of the types of computer networks and methods of connecting networks add to that the definition of the importance of network and information security.

B. Subject-specific skills

B1.Skills in writing programs in different languages and identifying and correcting errors.

B2.Skills in using ready-made applications such as Word, Excel, and PowerPoint.

B3.Skills in installing systems and software applications and optimal use of memory .

B4.Skills of working on computer networks, the method of addressing and partitioning in networks, in addition to the skill of providing protection for computers and information in the network .

Teaching and Learning Methods
Adopt the style of multi-directional lecture (board data show ,workshops ,scientific films,summer training ,Scientific trips ,working within groups in the lab ,Courses and seminars).
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Skills in preparing scientific courses and lecture in the specialized fields. D2.Skills in communicating with Staff in international universities. D3. Leadership skills and Bearing responsibility. D4. Self-education skills and self-reliance.

11-program structure

Credit hours		Course or Module Title	department	Level/Year
Practice	Theoretic			
0	2	Democracy & Human Rights	Computer Systems	First level
0	2	English Language 1		
1	1	Computer		
0	2	Arabic Language		
1	1	Sport		
0	2	French Language		
2	1	Statistic Principles		
2	1	Administration Principles		
2	2	Programming in C++		
2	1	Digital Logic		
0	2	Algorithms		
2	2	Mathematics		
2	2	Programming in Java		
2	2	Fundamentals of Database in SQL		
2	1	Fundamentals in Web Design		
0	2	System Analysis		Second level
2	1	Computer Maintenance		
2	1	Programming in Python		
0	2	English Language 2		
0	2	Professional Ethics		
2	1	Electronics Business Administration		
2	1	Data Structure		
2	2	Advanced Database in SQL		
2	1	Computer Networks		

2	2	Visual Programming Language in VB.NET		
2	1	Advanced in Web Design		
2	1	Computer Architecture		
2	1	Operating System		
2	1	Cryptography and Computer Security		
2	1	Mobile Application Development		
2	1	Multimedia Software		
2	1	Research Project		
2	1	Fundamentals of Computer Drawing		
0	2	Numerical Analysis		
0	2	Computer Ethics		
0	2	Internet of Things		
0	2	Mobile Application Development		

12. Personal Development Planning

1. Courses within the Institute.
2. Courses within institutions of higher education and scientific research .
3. Single or common scientific research (applied or theoretical).
4. Episodes and scientific seminars.

13 -Acceptance standard (setting regulations related to college or institute enrollment)

1. The total degree that the student obtained after passing the general exams for the sixth.
2. To be a graduate of the scientific.
3. The results of the medical examination that the student is healthy and fit to study in the department.
4. Desire

14. Key sources of information about the program

1. Textbooks References.
2. Help references (Secondary books).
3. The Internet, self-education sites, international universities sites, and Iraqi universities sites.

Curriculum Skills Map

Please tick relevant boxes where individual programme Learning Outcomes are being assessed

Programme Learning Outcomes																			
Year/ Level	Course code	Course title	Core (c) title or option (O)	Knowledge and understanding				Subject-specific Skills				Thinking Skills				General and Transferable Skills (or) Other Skills relevant to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
First academic level / Second semester	CST100	Programming in C++	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST101	Digital Logic	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST102	Algorithms	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST103	Mathematics	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	NTU102	Computer principles 1	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

	NTU101	English Language	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	NTU100	Human Rights and democracy	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	NTU105	Sports	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
First academic level / Second semester	CST104	Programming in Java	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST105	Fundamentals Of databases in SQL	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST110	Programming in Python	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST106	Fundamentals in Web Design	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST107	Systems Analysis	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	CST108	Computer Maintenance	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	NTU103	Computer principles 2	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	NTU104	Arabic Language	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	TIK100	statics	Optional	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
First academic level / 3th semester		Summer Training	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Second class		V- basic	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Data structure	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Data base	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Web-designing	Auxiliary	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Networking	Auxiliary	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Operating system	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		System analyses	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Project	basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

NORTHERN TECHNICAL UNIVERSITY

Kirkuk Technical Polytechnic

Department of Computer Systems Techniques

Course Syllabi for Computer Systems Techniques (First Level)

Academic Year: 2025/2026

First Level / First Semester

Course Specification: Computer Fundamentals

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Computer Fundamentals	Mandatory University Requirement	Level 1 / Semester 1	2	4	4

Course Objectives:

- General knowledge of what computers are, their capabilities, and their uses.
- Identification of personal computer components.
- Understanding the fundamentals of operating systems and interacting with the most important ones.
- General knowledge of the types of computer software.
- Ability to use computer software to raise efficiency and increase individual productivity.

Evaluation Methods:

- Theoretical exams - Quizzes - Laboratory work - Practical exam - Presentation of a small project per group - Assignment grading.

Course Specification: English Language First Stage

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	English Language First Stage	Mandatory University Requirement	Level 1 / Semester 1	2	-	2

Course Objectives:

- Identify the types of verb tenses and how to formulate simple and complex sentences.
- Learn essay writing techniques.
- Develop skills to listen to conversations and solve their corresponding exercises.

Evaluation Methods:

- Daily quizzes and solving exercises.

Course Specification: Statistics

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Statistics	Mandatory Institute Requirement	Level 1 / Semester 1	2	2	3

Course Objectives:

- Introduce the student to the use of statistical measures, data processing methods, and the application of operations research techniques in studying phenomena.
- Familiarize the student with statistical methods in graphical presentation, and the uses of measures of central tendency, dispersion, correlation, regression, and future forecasting.

Evaluation Methods:

- Quizzes - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	Introduction to Statistics: Definition of statistics, importance of statistics, and its relationship with other sciences.
2 - 4	Data Collection, Classification, and Tabulation: • Cumulative ascending and descending frequency. • Measures of central tendency for ungrouped data (Arithmetic mean, Median, Mode).
5 - 6	Measures of central tendency for grouped data, and the relationship between averages.
7	Measures of Dispersion: Range, variance, standard deviation for ungrouped data.

8 - 9	Measures of Dispersion: Range, variance, standard deviation for grouped data.
10	Coefficient of variation and the standard score for grouped and ungrouped data.
11	Simple Correlation: Pearson method for ungrouped data.
12	Rank Correlation Coefficient: Spearman and Kendall.
13	Correlation Coefficient for Attributes: Association and Contingency.
14	Simple Regression.
15	Time Series: Measuring the general trend, finding the general trend line equation.

Course Description: Psychology

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Psychology	Elective Institute Requirement	Level 1 / Semester 1	2	-	2

Course Objectives & Evaluation Methods:

- Theoretical exams - Quizzes - Laboratory work - Practical exam - Presentation of a small project per group - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
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1	Introduction to Psychology (Historical development of psychology).
2	Definition of Psychology and Educational Psychology.
3	Schools of Psychology: Psychoanalytic school.
4	Behavioral School.
5	Humanistic School.
6	Definition of behavior and factors influencing behavior.
7	Learning and Motivation in learning.
8	Attention and Sensory Perception.
9	Memory and Forgetting.
10	Factors influencing memory and forgetting processes.
11	Thinking: Types of thinking, factors influencing thinking.
12	Learning Theories: Classical conditioning theory (Pavlov).
13	Operant Conditioning Theory (Skinner).
14	Insight Learning Theory (Kohler).
15	Trial and Error Learning (Thorndike).

Course Description: Ethics of Professions

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Ethics of Professions	Elective Institute Requirement	Level 1 / Semester 1	2	-	2

Course Objectives:

- Provide the student with information about professional behavior and its importance.
- Instill sound professional values by educating the student on professional etiquette.
- Provide the student with concepts of personal values and their types.

Evaluation Methods:

- Theoretical exams - Quizzes.

Course Syllabus Details:

Week	Syllabus Details
1	Professional Behavior: Definition, concept, practical applications, and the relationship between employees and their superiors.
2 - 3	Principles of Professional Etiquette: Rules of professional etiquette, manners, ethics, the importance of professional etiquette, and qualities required in an employee.
4 - 5	Professional Tools and Benefits: Definition of law, constitutional nature of professional etiquette, and benefits of professional codes. Values and their impact on practice: Definition of values, classification of values (theoretical, economic, aesthetic, social, religious, political).
6 - 7	Personal and Professional Values: Definition of personality and significant theories in its study. Types of personalities: Introverted, Humanistic, Hysterical, Depressive, Volatile, Suspicious,

	Aggressive.
8	Administrative appearance and environmental habits affecting the rules and duties of the technical administrative employee.
9	The role of the administrator in certain professional situations.
10	Regulations and instructions, the importance of commitment to compliance, and the administrator's role in obeying and applying regulations.
11 - 13	State Officials Discipline Law.
14 - 15	Behavioral approach to the profession and rules of professional conduct with practical applications.

Course Specification: Programming Language C++

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST100	Programming Language C++	Mandatory Department Requirement	Level 1 / Semester 1	2	2	3

Course Objectives:

- Introduce the student to programming languages, their types, and the C++ language.
- Understand the general structure of a program, its sections, and data types used in C++.
- Train students in writing code for programs, functions, procedures, data files, and using graphics capabilities.

Evaluation Methods:

- Theoretical exams - Quizzes - Laboratory work - Practical exam - Presentation - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	Basic essentials for C++ language / C++ language concepts. What a C++ program contains. What are the basic files? Simple explanation for basic files included in a C++ program.
2	Basic elements and tools of C++ language: • Language symbols • Definition names • Keywords • Constant representation • Variables representation Data types in C++ and representation methods in memory (char, integer, real, boolean). Converting between different data types.
3	Expression types in C++ language, how to formulate expressions: • Arithmetic expressions / different arithmetic operations and priorities / conversion manner of arithmetic expressions to C++ language / various examples.
4	• Relational expressions / relational operations and priorities / formulating relational expressions. • Logical expressions / logical operations and priorities / formulating logical expressions. • Compound expressions / priorities table of public operations / various examples.
5	• Give the primary values of constants and variables. • Spaces and brackets. • Type of comments. • Special tools / minimum tools.
6	• Assignment statement: its types with explanatory examples. • Arithmetic expressions (equations), counters and counter types. • Different forms of equations belonging to C++ language.

7 - 8	Formatted Input and Output Functions: • Output text, numeric values, and arithmetic expressions. Unformatted Input and Output Functions. Control, Conditional, and Loop Statements: • Conditional statements & tools (If conditional statement, If...else statement, Nested conditional, switch conditional statement).
9	Nested conditional statements (continued).
10 - 11	Repetition Statements: • For loop, Nested for, while statement, do...while statement. • Control in repetition: continue, exit, go to statements.
12 - 13	Dimensional Variables: Arrays and Matrices: • One-Dimensional array. • Two-Dimensional array, square matrix (as a special state of 2D arrays).
14 - 15	Functions: • Global and local variables. • Define function, call function, ways of calling functions. • Form of retrieving values from functions (parameters, arguments, factors affecting function usage). • Functions of type void, user-defined functions, library of standard functions (string functions, arithmetic functions, date and time functions).

Course Specification: Digital Logic

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST101	Digital Logic	Mandatory Department Requirement	Level 1 / Semester 1	1	2	2

Course Objectives:

- Introduce the student to the basics of logic circuits.
- Train the student to implement digital logic circuits used in computer fields.
- Familiarize the student with the main components of a computer, their functions, and their impact on overall performance.
- Introduce the student to arithmetic operations within digital systems.

Evaluation Methods:

- Theoretical exams - Quizzes - Laboratory work - Practical exam - Presentation of a small project per group - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	Essentials of information technology: Introduction, computer and software system, computer types.
2	Numeric methods, including: • Decimal method, Binary method. • Convert decimal to binary. • Four arithmetic operations in binary, and computer interest in this method.
3	Octal Method: • Convert from octal to decimal and vice versa. • Convert from binary to octal. Hexadecimal Method.
4	Convert from binary to hexadecimal. Numeric representation in computer: BCD codes, 4-bit BCD codes, check level. Integer numeric representation, real numeric representation.
5	Gates: OR, AND, NOR, NAND, XOR, XNOR gates. External pin edge diagram for integrated circuits (IC) of gates.
6 - 7	Boolean Algebra: • Boolean algebra and De Morgan's theorem. • Rules of Boolean algebra used for simplifying logical expressions.

8 - 9	Formula rules and Karnaugh Map (K-Map): • Formula rules: Sum of Products (SOP), Product of Sums (POS). • Karnaugh map for simplifying functions of two and three variables.
10	Hardware: Study of hardware parts. Characteristics and functions of the chassis (case) and power supply.
11	Study of characteristics, functions, and parts of the motherboard.
12	Study of memory functions and types: ROM and RAM.
13	Study of BIOS setup and update.
14	Study of secondary storage units technology: H.D, F.D, C.D, DVD.
15	Study of characteristics and functions of expansion slot cards (Network, Sound, Video).

Course Specification: Algorithms

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST102	Algorithms	Mandatory Department Requirement	Level 1 / Semester 1	2	-	2

Course Objectives:

- Develop organized logical thinking skills in students.
- Teach students how to construct algorithms to solve simple problems.
- Train students on converting algorithms into working programs.
- Train students to solve problems using computer software applications.

Evaluation Methods:

- Theoretical exams - Quizzes - Practical exam - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	Initial principles of programming / Definition of a program / Programming languages (High-level languages, Low-level languages) / Definition of user program / Application programs / Operating system software.
2	Problem Solving: • Understanding the problem / dividing the problem / problem-solving process. • Types of data and variables used in programming languages and defining them in a program. • Constants & variables (Numeric and String).
3	Flowcharts: • Benefits of flowcharts. • Symbols used in drawing flowcharts. • Types of flowcharts: Simple flowcharts.
4 - 5	Branched flowcharts / Loop flowcharts.
6 - 8	Algorithms: • Definition of an algorithm / Algorithm design. • Types of algorithms: Sequential, Conditional, and Repetition.
9	Characteristics of a good program / Program development stages / Writing the program / Implementation and debugging.
10	Types of programming errors: • Syntax errors / Run-time errors / Semantic errors. • Testing, Documentation, and Maintenance.
11	Top-down design / Bottom-up design.
12	Process (Program) Life Cycle inside the computer:

	1. Ready 2. Waiting 3. Running 4. Complete.
13	Subroutines / Subprograms.
14 - 15	Introduction to structured programming / Structures used in structured programming: • Sequence structures / Selection structure (IF-THEN-ELSE) / Repetition structure (Do-While).

Course Specification: Mathematics

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST103	Mathematics	Mandatory Department Requirement	Level 1 / Semester 1	2	2	3

Course Objectives:

- Extending the student's thinking scope.
- Understanding the concept of matrices and their applications for solving a system of linear equations simultaneously.
- Understanding the mathematical logic in differentiation and integration and solving non-linear and differential equations.
- Understanding the mathematical logic in testing the convergence and divergence of infinite series.
- Applying MATLAB: The mathematical program to perform operations on matrices and solve linear, non-linear, and differential equations.

Evaluation Methods:

- Quizzes - Laboratory work - Practical exam - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1 - 2	The concept of matrices, their types, and how to

	find their ranks.
3 - 4	The equality of matrices and operations on them (addition, subtraction, and multiplication).
5	The determinant of a matrix and its relation with its rank; Sarrus method to find the value of a determinant.
6 - 7	The inverse matrix and its relation with rank; cofactors method to find the inverse matrix. Solving a system of linear equations simultaneously using the inverse matrix of the coefficients.
7 - 8	Differentiation rules of algebraic, trigonometric, exponential, and logarithmic functions. Derivative of a composite function (chain rule), implicit differentiation, and partial derivatives.
9	The approximate real root of a non-linear equation in some interval applying iteration and Newton-Raphson methods.
10 - 12	Integration rules of algebraic, trigonometric, exponential, and logarithmic functions. Integration by parts and integration by partial fractions.
13 - 15	The concept of sequences and infinite series and their types; ratio and root tests for their convergence and divergence.

First Level / Second Semester

Course Specification: Human Rights and Democracy

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Human Rights and Democracy	Mandatory University Requirement	Level 1 / Semester 2	2	-	2

Course Objectives:

- Familiarize the student with citizen rights and the duties they must fulfill toward the state.

Evaluation Methods:

- Daily quizzes and participation in classroom discussions.

Course Specification: Arabic Language (First Stage)

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Arabic Language First Stage	Mandatory University Requirement	Level 1 / Semester 2	2	-	2

Evaluation Methods:

- Daily quizzes and participation in classroom discussions.

Course Specification: Sports

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
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-	Sports	Elective University Requirement	Level 1 / Semester 2	1	1	2
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Course Specification: Principles of Administration

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Principles of Administration	Mandatory Institute Requirement	Level 1 / Semester 2	2	2	3

Evaluation Methods:

- Daily quizzes and participation in classroom discussions.

Course Description: Programming in Java

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST104	Programming in Java	Mandatory Department Requirement	Level 1 / Semester 2	2	2	3

Evaluation Methods:

- Daily short written and oral quizzes, exercise solving, and assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1 - 2	Introduction to Java programming / The Java Virtual Machine / Variables and data types / Conditional and looping constructs / Arrays.

3 - 4	Object-oriented programming with Java: Classes and Objects, Fields and Methods, Constructors, Overloading methods, Garbage collection, Nested classes.
5 - 6	Inheritance: Overriding methods, Polymorphism, Making methods and classes final, Abstract classes and methods, Interfaces.
7	Exception handling with try-throw-catch-finally constructs. The Exception class.
8	The Object class, Cloning objects, The JDK LinkedList class, Strings, String conversions.
9	Working with types: Wrapper classes, Enumeration interface.
10	Packages: Package access, Documentation comments.
11	Applets: Configuring applets, Applet capabilities and restrictions.
12 - 4	Basics of AWT and Swing: Layout Managers, Event Handling, The Action Listener interface, Panels, Classes for various controls (label, choice, list, Checkbox, etc.), Dialogs and frames, Using menus, Using adapter classes, Graphics.
15	Database connectivity with JDBC / Java security.

Course Specification: Fundamentals of Databases in SQL

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST105	Fundamentals of Databases in SQL	Mandatory Department Requirement	Level 1 / Semester 2	2	2	3

Course Objectives:

- Introduce the student to basic concepts and types of databases.
- Familiarize the student with the characteristics of relational databases.
- Study Structured Query Language (SQL) used for interacting with databases.
- Train the student to create and manage simple databases using SQL.

Evaluation Methods:

- Theoretical exams - Quizzes - Laboratory work - Practical exam - Presentation of a small project per group - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1 - 2	Database definition, Database types, Characteristics of database, Comparing databases with traditional file systems.
3 - 4	Principles of records and fields, Types of data (character, string, and numeric), Types of keys (primary and secondary), Database relationships (1-1, 1-N, N-M).
5	Why Learn SQL? What Is SQL? Introduction to SQL, SQL language & its elements, Advantages & disadvantages, SQL tools.
6 - 7	Tables: Creating tables, Types of fields, Inserting data, Inserting and deleting fields in tables, Relational connections between tables.
8	Combination Insert/Update Statements.
9 - 10	Ordered Updates and Deletes.
11	Multitable Updates and Deletes.
12 - 15	Extensions to the SELECT Statement. SQL instructions: selection with conditions, AND, OR, MAX, MIN, INSERT, UPDATE.

Course Specification: Fundamentals in Web Design

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST106	Fundamentals in Web Design	Mandatory Department Requirement	Level 1 / Semester 2	1	2	2

Course Objectives:

- Introduce the student to the basics and uses of internet protocols.
- Familiarize the student with HTML basics and its applications in writing electronic web pages.
- Train the student to create and deploy electronic web pages.

Evaluation Methods:

- Theoretical exams - Quizzes - Lab work - Practical exam - Presentation of a small project per group - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1 - 2	Study of Internet characteristics and types of applications used on it.
3 - 5	Study of protocols for transferring web pages, files, and email over the Internet (HTTP, FTP, SMTP).
6 - 7	Study of HTML basics.
8 - 9	Designing/Creating a web page.
10 - 11	Programming using PHP and CSS.
12 - 13	Publishing a page on the Internet.

14 - 15	Web site management and administration.
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Course Specification: System Analysis

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST107	System Analysis	Mandatory Department Requirement	Level 1 / Semester 2	2	-	2

Course Objectives:

- Introduce students to basic systems concepts, analysis, properties, levels, and types.
- Train students to analyze and design systems using a set of analysis and design tools.

Evaluation Methods:

- Theoretical exams - Quizzes - Lab work - Practical exam - Presentation of a small project per group - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	Basic concepts in computer-based information systems analysis and design. The System: systems theory, principles, general characteristics (Objective, Environment, Boundaries, Subsystems, Feedback, Control mechanism). Classification of systems: complexity, nature, origin, relationship with environment, outputs, purpose.
2	Data & Information: Data processing, basic and advanced processing. Information: characteristics of good information, sources (paper, electronic, audio), importance and forms. Computerized Information Systems: Development stages (Analysis, Design, Implementation). Objectives and types of systems. The Systems Analyst: qualifications, personal traits, major problems

	faced, evolution of relationships with end-users.
3 - 7	Systems Analyst work environments, teams, and reasons for failure in some organizations. Analysis and Design Phases: Systems Analysis (Preliminary Study), Information gathering methods and validation (Interviews, Questionnaires, Observation, Document analysis). Presentation skills, team meetings, Joint Application Development (JAD). Problem Definition and Feasibility Study. Detailed Analysis Phase: System function model, Data Flow Diagrams (DFD) elements and levels. Data analysis, Entity-Relationship Diagram (ERD), normalized relations, Entity Life History (ELH), Petri Networks, process specification tools, structured language, decision tables, data dictionary, data coding, normalization rules (1NF, 2NF, 3NF, BCNF, 4NF, 5NF). Optimal model design, physical vs logical models. Outputs of the analysis phase.
8 - 14	Systems Development Life Cycle (SDLC) - Design Phase: General Design, logical model of the new system, business process redesign, physical model design. Detailed Design Phase: interface design, user interface types, input/output design, report design, forms design, database design points and tools, software design characteristics.
15	Graduation Projects: General guidelines, ideas, types of computerized systems. Warnings, project structure, preparation for defense/discussion. Examples: administrative computer system ('University Library'), computerized educational curriculum, website, or electronic magazine.

Course Specification: Computer Maintenance

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST108	Computer Maintenance	Mandatory Department Requirement	Level 1 / Semester 2	1	2	2

Course Objectives:

- Introduce the student to the basics of maintenance workshops.
- Train the student on how to detect faults in computer hardware components and peripherals.
- Train the student on how to repair hardware faults in computer components and peripherals.
- Train the student on how to perform periodic preventive and corrective maintenance.

Evaluation Methods:

- Theoretical exams - Quizzes - Lab work - Practical exam - Assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	How computers work.
2 - 3	Hardware and Software components.
4 - 5	Electronic and Electrical circuits.
6 - 9	Identifying computer programs and their maintenance.
10 - 14	Identifying computer hardware and methods of maintenance.
15	Software installation and installing Windows 10 Operating System.

Course Description: Object-Oriented Programming in C++

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST109	Object-Oriented Programming in C++	Elective Department Requirement	Level 1 / Semester 2	1	2	2

Course Objectives:

- What is object-oriented programming?
- Why do we need object-oriented programming?
- Characteristics of object-oriented languages (C and C++).

Evaluation Methods:

- Daily written and oral short quizzes, solving exercises, and assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	Introduction: What is object-oriented programming? Why do we need object-oriented programming? Characteristics of object-oriented languages in C++.
2	C++ Programming basics: Output using cout, Directives, Input with cin, Type bool, The setw manipulator, Type conversions.
3	Functions: Returning values from functions, Reference arguments, Overloaded functions, Inline functions, Default arguments, Returning by reference.
4	Objects and Classes: Making sense of core object concepts (Encapsulation, Abstraction, Polymorphism, Classes, Messages Association, Interfaces). Implementation of classes in C++, C++ Objects as physical objects, C++ objects as data types, constructors, Objects as function arguments, The default copy constructor, returning objects from functions. Structures and classes. Classes, objects and memory, static class data. Const and classes.
5	Arrays and string arrays fundamentals. Arrays as class Member Data: Arrays of objects, strings, The standard C++ String class.
6	Operator Overloading: Overloading unary operations, Overloading binary operators, data conversion, pitfalls of operator overloading and

	conversion keywords. Explicit and Mutable.
7	Inheritance: Concept of inheritance, Derived class and base class, Derived class constructors, member functions, inheritance in the English distance class, class hierarchies, inheritance and graphics shapes, public and private inheritance, aggregation (classes within classes), inheritance and program development.
8	Pointers: Addresses and pointers, The address-of operator, pointers and arrays, Pointers and functions, pointers and C-type strings. Memory management: New and Delete, pointers to objects, debugging pointers.
9 - 10	Virtual Functions: Virtual functions, friend functions, static functions, assignment and copy initialization, the 'this' pointer, dynamic type information.
11 - 13	Streams: Stream classes, Stream Errors, Disk File I/O with streams, file pointers, error handling in file I/O with member functions, overloading the extraction and insertion operators, memory as a stream object, command line arguments, and printer output.
14 - 15	Templates and Exceptions: Function templates, Class templates, Exceptions.

Course Description: Programming with Python

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
CST110	Programming with Python	Elective Department Requirement	Level 1 / Semester 2	1	2	2

Evaluation Methods:

- Daily written and oral short quizzes, solving exercises, and assignment grading.

Course Syllabus Details:

Week	Syllabus Details
1	The Context of Software Development: Software, Learning Programming with Python.
2	Values and Variables: Integer and String Values, Identifiers, User Input, String Formatting.
3	Expressions and Arithmetic: Expressions, Arithmetic Examples.
4	Conditional Statements: Boolean expressions, If/Else statement, Other Conditional Expressions.
5	Iteration: Loops.
6	Using Functions: Introduction to Using Functions, Functions and Modules.
7	Writing Functions - 1: Function Basics, Parameter Passing, Custom Functions vs Standard Functions, Refactoring.
8	Writing Functions - 2: Global Variables, Making Functions Reusable, Functions as Data.
9 - 10	Objects: Using Objects, String and File Objects.
11 - 12	Lists: Using Lists, Building Lists, List Traversal.
13 - 14	Tuples, Dictionaries, and Sets: Storing Aggregate Data, Enumerating the Elements of a Data Structure.
15	Class Design: Composition and Inheritance.

First Level / Third Semester (Summer)

Course Specification: Summer Training

Course Code	Course Name	Course Type	Level & Semester	Theoretical Hours	Practical Hours	Units
-	Summer Training	Mandatory Institute Requirement	Level 1 / Semester 3	-	-	-

Course Objectives:

- Give the student an opportunity to conduct training in an actual field work environment.
- Link academic study with the practical and applied reality in various institutions and organizations.
- Provide the student with real exposure to the labor market and how to handle administrative systems in institutions.
- Equip the student with skills to deal with realistic technical problems in the labor market and try to solve them using appropriate scientific methods.
- Help the student realize the importance of their specialization through training in institutions closely related to their field.

Expected Skills and Knowledge to be Acquired During Cooperative Training:

- Proficiency in using Microsoft Word to write documents and reports with high professionalism.
- Proficiency in using Microsoft Excel to manage data tables and spreadsheets with high professionalism.
- Proficiency in using Microsoft PowerPoint to present data and represent it via advanced electronic presentations in an attractive manner.

Evaluation Methods:

- Presentation - Oral Exam - Reports.

Course Syllabi for the Computer Systems Techniques Department

*Second Level / First & Second Semesters
Academic Year: 2025/2026*

LEVEL 2 / FIRST SEMESTER

Course Description: Computer Applications

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
-	Computer Applications	Mandatory Institute Req.	Level 2 / Semester 1	2	3	4

Course Objectives:

- 1. Ability to use word processing software (e.g., Microsoft Word).
- 2. Ability to use presentation software (e.g., Microsoft PowerPoint).
- 3. Understanding the use of computers in managing the educational process.
- 4. Understanding the use of computers as an educational tool.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Data Structure

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units	Prerequisite
CST201	Data Structure	Mandatory Departmental Req.	Level 2 / Semester 1	2	2	3	CST100

Course Objectives:

Introducing students to the definition of data structures, their various types, importance, properties, and applications, while explaining the advantages and disadvantages of each type. It aims to develop

the student's skills in selecting the optimal logical structure for data representation and storage according to the nature of the application and the problem being solved.

Course Description: Advanced Databases in SQL

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units	Prerequisite
CST202	Advanced Databases in SQL	Mandatory Departmental Req.	Level 2 / Semester 1	2	3	4	CST105

Course Objectives:

- 1. Developing the student's skills in database design and implementation using professional Relational Database Management Systems (RDBMS).
- 2. Enabling students to master writing complex Structured Query Language (SQL) statements for data retrieval, analysis, and management.
- 3. Training students on data constraints, referential integrity, and transaction control to ensure database accuracy and security.
- 4. Equipping students with the practical skills needed to link databases with external application development interfaces.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Software Engineering

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units	Prerequisite
CST203	Software Engineering	Mandatory Departmental Req.	Level 2 / Semester 1	2	2	3	CST107

Course Objectives:

- 1. Introducing the basic concepts of software engineering and the software development lifecycle.
- 2. Mastering various software life cycle models and engineering techniques.
- 3. Training students to design software using modern object-oriented methodologies and Unified Modeling Language (UML) diagrams.
- 4. Developing skills in software testing, quality assurance, project estimation, management, and software maintenance.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Operating Systems

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST204	Operating Systems	Mandatory Departmental Req.	Level 2 / Semester 1	2	2	3

Course Objectives:

- 1. Explaining the fundamental role, architecture, and core components of modern computer operating systems.
- 2. Training students to manage computer resources such as processors, memory, and devices effectively.
- 3. Understanding concurrency, process scheduling algorithms, deadlock scenarios, and synchronization methods.
- 4. Providing practical knowledge about file systems, security permissions, and command-line system administration.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Interactive Multimedia

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST205	Interactive Multimedia	Mandatory Departmental Req.	Level 2 / Semester 1	1	2	2

Course Objectives:

- 1. Understanding the essential media components: text, graphics, audio, animation, and video, and their integration.
- 2. Developing practical skills using multimedia production software to edit assets and create interactive digital media.
- 3. Exploring user experience (UX) and interface design principles optimized for electronic multimedia publishing.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Visual Programming

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST206	Visual Programming	Mandatory Departmental Req.	Level 2 / Semester 1	2	2	3

Course Objectives:

- 1. Introducing event-driven programming architectures and the visual design environment.
- 2. Enabling students to build fully graphical user interfaces (GUI) utilizing forms, menus, controls, and active dialog components.
- 3. Connecting front-end visual software elements seamlessly with backend operational databases.
- 4. Equipping students with structured debugging techniques and handling asynchronous application events.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Advanced English Language

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
-	Advanced English Language	Mandatory University Req.	Level 2 / Semester 1	2	-	2

Course Objectives:

Developing advanced English conversation skills, enhancing contextual reading comprehension, mastering precise technical report writing, and improving professional vocabulary tailored for administrative and computerized professional environments.

Assessment Methods:

Written examinations, reading evaluation, presentation performance, quizzes, and classroom discussions.

LEVEL 2 / SECOND SEMESTER

Course Description: Web Applications Development

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units	Prerequisite
CST207	Web	Mandatory	Level 2 /	2	2	3	CST106

Course Objectives:

- 1. Building advanced multi-tier interactive web applications using current dynamic scripting frameworks.
- 2. Learning secure session tracking, user authentication models, and custom form validation routines.
- 3. Managing deep backend server integration with online database tables for live processing.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Information and Network Security

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST208	Information and Network Security	Mandatory Departmental Req.	Level 2 / Semester 2	2	2	3

Course Objectives:

- 1. Establishing a foundational awareness of data privacy, integrity, and core concepts of cybersecurity systems.
- 2. Exploring standard cryptographic principles, data hashing methods, and symmetric/asymmetric algorithms.
- 3. Mitigating modern corporate network vulnerabilities using targeted firewalls and intrusion prevention platforms.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Quantitative Methods in Management

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
-	Quantitative Methods in Management	Mandatory Institute Req.	Level 2 / Semester 2	2	2	3

Course Objectives:

Familiarizing students with scientific mathematical models, operational research parameters, and optimizing allocation procedures. This includes linear programming formulations, assignment and transportation matrices, and standard critical path methods for operational execution.

Assessment Methods:

Theoretical tests, mathematical exercise verification, and assignment grading.

Course Description: Computer Networks

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST209	Computer Networks	Mandatory Departmental Req.	Level 2 / Semester 2	2	2	3

Course Objectives:

- 1. Analyzing standard architecture models such as the OSI layer framework and TCP/IP protocol suite.
- 2. Designing localized network topology routing schemas with advanced class-based subnet masking allocations.
- 3. Configuring networking hardware components (hubs, switches, and edge routers) for enterprise deployment.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Distributed Systems

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST210	Distributed Systems	Mandatory Departmental Req.	Level 2 / Semester 2	2	2	3

Course Objectives:

- 1. Outlining architecture paradigms governing decoupled network processing architectures and concurrent processing nodes.
- 2. Engineering asynchronous process coordination channels, dynamic synchronization, and localized multi-point states.
- 3. Deploying reliable failover execution schemas ensuring systematic network-wide system replication tolerance.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Mobile Applications Programming

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST211	Mobile Applications Programming	Mandatory Departmental Req.	Level 2 / Semester 2	1	2	2

Course Objectives:

- 1. Building functional modern software deployment packages tailored for cellular computing ecosystems.
- 2. Structuring user interface layouts optimized for responsive viewing across multi-touch surfaces.
- 3. Connecting programmatic layouts effectively with device-specific internal sensor streams and embedded databases.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Description: Graduation Project

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST212	Graduation Project	Mandatory Departmental Req.	Level 2 / Semester 2	-	4	2

Course Objectives:

Consolidating all academic concepts acquired throughout the curriculum into an integrated, functional software development or analytical research project. Students work under faculty supervision to analyze, design, and implement a computing system that provides practical solutions to realistic problems.

Assessment Methods:

Periodic progress evaluation, final software artifact analysis, comprehensive technical project documentation, and an oral presentation defense before a panel.

Course Description: Cloud Computing

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST213	Cloud	Elective	Level 2 /	2	-	2

Course Objectives:

Providing students with a thorough grounding in modern cloud platforms, storage virtualization, service paradigms (SaaS, PaaS, IaaS), remote deployment management, server-side scaling, data multi-tenancy rules, and underlying virtualization technical ecosystems.

Course Description: Cyber Ethics / Computer Professional Ethics

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST214	Computer Professional Ethics	Elective Departmental Req.	Level 2 / Semester 2	2	-	2

Course Objectives:

Familiarizing students with legal boundaries, intellectual property standards, societal responsibilities, and professional behavior paradigms governing modern software system deployments.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.

Course Curriculum Table:

Week	Syllabus Details
1st	Assignment: Student Questionnaire. Introduction and 'Introduce Yourself' Blog. The App Enigma Blog.
2nd	Milestones in computer development. Spotting ethical issues.
3rd - 4th	How law, ethics, and religion intertwine. Are Cyber ethics Different? Spotting Ethical Issues.
5th - 6th	Philosophical Ethics: Consequentialism, Deontologist, Social Contract Theory. Ethical Analysis. Reviewing the ACM Code of Ethics and Professional Conduct.
7th	Intellectual Property Basics: Trade Secrets, Copyrights, Patents, Trademarks. Assign Roles for Assignment 4.
8th - 9th	U.S. Privacy Law and international standards. Data collection principles and Data mining.
10th	Criminal Liability vs. Accountability.
11th	Review Midterm Exam Results. Responsibility vs. Liability vs. Accountability (Case Study).
12th	Global Outsourcing, The Digital Divide, and socio-economic factors.

Course Description: Internet of Things (IoT)

Course Code	Course Name	Course Type	Level/Semester	Theory Hrs	Practical Hrs	Units
CST215	Internet of Things	Elective Departmental Req.	Level 2 / Semester 2	2	-	2

Course Objectives:

Understanding how physical devices, microcontrollers, smart sensors, and functional endpoints link over the internet network, and mastering their configuration, discovery protocols, and remote identification methods.

Assessment Methods:

Theoretical exams - Quizzes - Laboratory work - Practical exam - Small group project presentation - Assignment grading.