Technical Diploma OF COMPUTER SCIENCE

1. PROGRAM SPECIFICATIONS

- **About the department**

  The Technical Diploma Computer Science   is offered on a full-time basis. The full-time program is offered only at the KTI Main Campus in Sulaimani Heights. The duration of study for the full-time program is subjected to the student's entry qualifications and lasts between two (2) years to a maximum of four (4) years.

2. General Information

1. **Awarding Institution**	Kurdistan Technical Institute
2. **Teaching Institution**	Kurdistan Technical Institute
3. **Program Name**	Technical Diploma of Computer Science
4. **Final Award**	Technical Diploma of Computer Science
5. **Program Code**	CS
6. **Professional or Statutory Body of Accreditation**	Ministry of Higher Education
7. **Language(s) of Instruction**	English
8. **Mode of Study (Conventional, distance learning, etc)**	Conventional
9. **Mode of operation (Franchise, self-govern, etc)**	Self-governing
10. **Study Scheme (Full Time/Part Time)**	Full Time
11. **Study Duration**	Minimum : 2 yrs (4 semesters) Maximum : 4 yrs (8 Semesters)

Type of Semester	No. of Semesters		No of Weeks/Semester	
	Full Time	Part Time	Full Time	Part Time
Normal	4	-	16	-
Short		-		-

3. Course Classification

No.	Classification	Credit Hours	Percentage
i.	institute Courses a. General b. Language	10 8	17.6%
ii.	Core Courses	74	56.5%
	Total	**131**	**100%**
	Total Credit Hours to Graduate	**131 credit hours**	

4. Award Requirements

To graduate, students must:
· Achieve a total of 120 credit hours with minimum CGPA of 2.0
· Pass industrial training ()

5. Entry Requirements

The minimum qualifications for candidates who intend to do a Technical Diploma Computer Science   are as follows:

1) Minimum results based on **the Kurdistan Baccalaureate High School Certificate** (results would be based on the general requirements as well as other conditions as the pre-requisites for the program set by the institute). The percentage to enter the competition is %50

2) Minimum results based on **the Kurdistan Baccalaureate Vocational School Certificate** (results would be based on the general requirements as well as other

conditions as the pre-requisites for the program set by the institute). The percentage to enter the competition is %55

3) Entry Requirements are subject to changes according annual amendments by the ministry of higher education and scientific research in the Kurdistan Region of Iraq

6. Program Educational Objectives (PEO)

After having exposed to 2 to 4 years working experience, our graduates should become professionals who demonstrate the following competencies:

PEO1	Demonstrate basic knowledge of computer applications and apply standard practices in software project development, also Understand, Analyze and Develop computer programs for efficient design of computer-based systems of varying complexity.
PEO2	Alumni students will be capable in computer information systems in several capacities, including, mobile application, programmer, systems analyst, information technology consultant, information technology support specialist, and information systems manager.
PEO3	Graduates will demonstrate continuous career improvement, evidenced by increasing responsibility and leadership, participation in further studies, or transition into other technical or professional careers. Associated skills include initiative, innovation, creativity, effective communication, and teamwork.
PEO4	Attain the ability to adapt quickly to new environments and technologies, assimilate new information, and work in multi-disciplinary areas with a strong focus on innovation and entrepreneurship.
PEO5	Graduates will possess an awareness of the social and ethical implications of their work and their behavior

7.   program Learning Outcomes (PLO)

After having completed the program, graduates should be able to demonstrate the following competencies:

Code	Intended Learning Outcomes
PLO1	Analyze a computing problem and to apply principles of computing and other relevant disciplines to identify solutions, also Ability to acquire theory and principles of Computer Science and equip with social science and personal development knowledge.
PLO2	Ability to integrate and demonstrate knowledge to solve real world problems through Computer Science principles and methodologies.
PLO3	Ability to present technical solutions to a range of audience.
PLO4	Ability to think critically and creatively in order to solve problems.
PLO5	Ability to continuously integrate computer science knowledge and skills through lifelong learning process.
PLO6	Ability to lead and work effectively in a team to achieve common goals.
PLO7	Ability to adapt and work effectively in varying cultures of communities, professional fields and environments
PLO8	Ability to behave ethically, responsibly, and professionally with integrity in carrying out responsibilities and making decisions.
PLO9	Ability to identify business opportunities and develop entrepreneurship mind-set and skills.

8. COURSE MENU

YEAR 1: SEMESTER 1

Code	Course	Credit	Pre-requisite
CS110	Programming Fundamentals and Problem Solving	7	
CS111	Information & Communications Technology (ICT)	7	
CS112	Database Concepts	7	
CS113	Mathematics for Computer Science	4	
CS114	Academic Debate	5	
	TOTAL CREDIT	30	
	CUMULATIVE ECTS	30	

YEAR 1: SEMESTER 2

Code	Course	Credit	Pre-requisite
CS120	Programming Paradigm	7	CS110
CS121	Digital Logic	6	
CS122	Static Web Development	7	
CS123	Kurdology	5	
CS124	English for Academic Purposes	5	
	TOTAL CREDIT	30	
	CUMULATIVE ECTS	60	

YEAR 2: SEMESTER 1

Code	Course	Credit	Pre-requisite
CS230	Introduction of Object-Oriented Programming	7	CS120
CS231	Dynamic Web Development	6	
CS232	Database Management System	5	CS112
CS233	Computer Network design	6	
CS234	Mobile Applications Development	6	
CS235	Graduation Project I	0	
	TOTAL CREDIT	30	
	CUMULATIVE ECTS	90	

YEAR 2: SEMESTER 2			
Code	Course	Credit	Pre-requisite
CS240	Visual Programming	6	CS230
CS241	Network and System Administration	6	
CS242	Information Security	6	
CS243	Software Engineering	6	
CS244	Graduation Project	6	
	TOTAL CREDIT	30	
	CUMULATIVE ECTS	120	

9. GRADUATION CHECKLIST

To graduate, students must pass all the stated courses in this checklist. It is the responsibility of the students to ensure that all courses are taken and passed. Students who do not complete any of the course are not allowed to graduate.

10. Carrier Opportunity

11. COURSE SYNOPSIS

a. CORE COURSES

SEMESTER 1

CS110: Programming Fundamentals and Problem Solving

The objectives of this course are to educate students to understand the key beliefs of how Programming languages can affect our daily life and help us to processes students ambitious in the future to be one of the effective society members in this field. This course allows students to understand programming language and apply that understanding to solve the issues facing businesses and organization. Through this course, students would be familiar with programming in an IDE, design and implement basic programming solutions including statements, control structures, and methods, readily use the Java programming language, applying various data types and control structure, and describing basic concepts relevant to arrays in Java.

CS111: Information & Communications Technology (ICT)

This module encourages learners to develop lifelong skills, which will be useful to you in the work across the curriculum and prepare you for future employment. You will develop understanding of the implications of technology in society, including social, economic and ethical uses and awareness of the way's ICT can help in home, learning and work environments. The module combines theoretical and practical studies focusing on the ability to use common software applications to solve practical-life problems

CS112: Database Concepts

Database Concepts is an important subject for students because it is the basis for most computer projects, for instance, web sites and applications for banks, supermarkets, libraries, travel agencies, companies, organizations, universities and institutes need databases to manage their systems. It is the first step that students require to learn because of the necessity for the other subjects in computer science. This subject includes how to build a database from creating tables until designing a form to insert, update, delete and show the data from the database.

CS113: Mathematics for Computer Science

This course is a comprehensive introduction to mathematics. We begin by introducing functions, and the notion of a limit. Limits are essential to defining derivatives and integrals. By the end of the semester, you should know precise definitions of continuity, the derivative, and the integral and understand the fundamental theorem of calculus and linear algebra. This course also provides the fundamentals of statistical methods and their applications.

CS114: Academic Debate

This course is designed to develop students' skills in academic thinking, communication, argumentation and debate. The topics of this course train students to think critically, to be creative, communicative, and a qualified manager who respects others' points of view and leads academic arguments as well. It is about Identifying problems and offering appropriate suggestions for solving such problems. The course trains them also to apply different sources for academic communication, to generate knowledge. Furthermore, students are directed to raise questions and

analyze the scientific texts logically and critically. Upon completion to this course students should have knowledge about, and be able to

• Respecting diversity of social relations in communities

• Developing Critical thinking and confident decision making

• Writing reports, includes their specific study kind of reports, paraphrasing their required texts

• Preparing and giving presentations, and doing debates as well.

• Writing a professional CV and knowing some ideas about how to do successful job interviews.

SEMESTER 2

CS120: Programming Paradigm

this course is cover:

Basic problem-solving techniques.

• To develop methods through the process of top down, stepwise refinement.

• To use arrays to store data in and retrieve data from lists and tables of values.

• To declare arrays, initialize arrays and refer to individual elements of arrays.

• To iterate through arrays with the enhanced for statement.

• To use class ArrayList to manipulate a dynamically resizable array-like data structure.

• To play with exceptions and explore the ways to catch exception in the programming codes

• To play with random numbers

• To create String methods

CS121: Digital Logic

The aim of studying this module

To give students the necessary skills and knowledge in order to:

(i) understand the numeric systems used by computers; analyze and design basic digital combinational and clocked sequential circuits.

(ii) This course also deals with sequential circuits: flip-flops, synthesis of sequential circuits, and case studies, including counters, registers, and random-access memories.

On successful completion of this course, all students will have developed knowledge and understanding of:

• the different number systems and perform system conversions

• designing logical functions with AND, OR, NAND, NOR and XOR gates with minimum number of gate delays or literals

• the procedures for simplifying Boolean functions

• the analysis of basic combinational and clocked sequential logic circuits

CS122: Static Web Development

The objective of the course is to present a complete picture of the dynamic web development field. The specific objectives of this course include:

- Keep the students with the demand of global communication.

- To produce dynamic, animated, interactive and database driven websites and to prepare students for Internet marketing and web site administration.

- Students will learn different languages like HTML, CSS, JavaScript and PHP (Server-side programming language); Students will work with different technologies and software components like web browser, web server (Apache) and database MySQL.

CS123: Kurdology

Kurdology is one of the general courses that are studied in the first stage in all the public and private institutes and universities in the higher education in Kurdistan regional government. Kurdology's coursebook, first talk about the meaning of Kurdology and its purposes, but the content of this course generally talks about the different fields of Kurdish nation such as the fields of history, geography, religion, culture, language, and economy. Furthermore, the efforts and researches that have been made by foreign researchers will be presented to the students.

Kurdology also used to introduce the Kurdish language and its dialects and the different alphabets used in the Kurdish language. Apart from the fact that the political and ideological aspects of Kurdistan and the Kurdish people are discussed in the history of the Kurds and their companions, the lesson focuses on the usage of Kurdish Latin among Kurdish people regarding its grammar and its history in Kurdish Language.

We will present the objectives of studying Kurdology in the following points:

1- Introducing students to Kurdish history, literature, geography, economy, and its culture in the eyes of foreigners.

2- Introducing the role of Kurds and protecting its manuscript, historical documents and Kurdish literature and rescuing them from destruction.

3- Strengthening the students' national beliefs and make them to love their nation and feel responsible for it.

4- Presenting the positive and negative aspects of Kurdish people's activities, learn from their mistakes and strengthening the positive points.

5- Introducing the alphabet used in Kurdish language and teaching students the Kurdish-Latin alphabet.

6- Preparing a conscious, careful and critical thinker to create a strong character and eventually to be a positive person in the community.

CS124: English for Academic Purposes

The focus of this module can be on the most relevant topics and language for students, by reading technical and realistic texts, and keep students up-to date with recent developments in the fast- moving world of computing.

Furthermore, teaching terminology combined with vocabulary, and grammar practice to give the students the tools to use English in areas such as describing features, and functions, chatting online, applying for jobs and discussing the world of ICT (Information communications Technology) is a requirement for anyone who needs to understand English of computing for study or work.

At the end of this course students will be able to talk and write about computer application in everyday life, they can identify the structure and functions of the CPU, and distinguish between RAM and ROM. They will understand the technical aspects of different computers. On the other hand, they will understand to identify and classify different parts of speech and tens in English grammar as well in order to applying them in speaking and writing influentially in English.

SEMESTER 3

CS230: Introduction of Object-Oriented Programming

This course is designed to introduce the concepts of object-oriented programming and the course begins with a brief review of control structures and data types with emphasis on structured data types and array processing. focusing on the definition and use of classes along with the fundamentals of object-oriented design. Object-oriented programming: Object-oriented design; encapsulation and information-hiding; separation of behavior and implementation; classes, subclasses, and inheritance; polymorphism; class hierarchies.

CS231: Dynamic Web Development

This course will introduce the fundamental concepts of dynamic web. Students will learn the semantics of a dynamic web page and how to abstract information in a universal form on the web with different languages such as HTML, CSS, JavaScript and PHP (server-side programming language). They will also work with different technologies and software components like web browsers, web server (Apache) and database MySQL. In addition, the course will keep the students with the demand of global communication and producing dynamic, animated, interactive and database driven websites and to prepare students for Internet marketing and web site administration.

CS232: Database Management System

The student study, what is database and how to build a database.

Nowadays, this Technology is very important to market to develop software for buy and selling goods or to develop database for Bank or another Reach institute. Student study all technic about builds a database for example (Query, Form and Report):

The objective of this course is to presents the basic of Database.

The importance of studying the subject

1. Basic Knowledge of Database Management System (Used Software Oracle)

2. All principles of SQL.

3. Basic techniques to builds of Database.

4. Relationship between two tables and more.

5. Basic knowledge of Query.

CS233: Computer Network design

• Understand the challenges of network communication, .by describe

the structure of a network, including the devices and media that are necessary for successful communications

• Understand the basics of network communication.

• Understand the operation of the protocols that are used inside the Internet and Explain the advantages of using a layered model to describe network functionality

• Describe the role of each layer in two recognized network models: The TCP/IP model and the OSI model.

• Describe the features, operation, and use of well-known TCP/IP application layer services (HTTP, DNS).

• Understand the principles used to guide the division or grouping of devices into networks

• Understand the hierarchical addressing of devices and how this allows communication between networks.

One goal is to give some insight into the rationale of why networks are structured the way they are today and to understand the issues facing the designers of next-generation data networks. Much of the course focuses on network algorithms and their performance. Students are expected to have a strong mathematical background and an understanding of probability theory. Topics discussed include: layered network architecture, Link Layer protocols, high-speed packet switching, queuing theory, Local Area Networks, and Wide Area Networking issues, including routing and flow control.

CS234: Mobile Applications Development

Mobile devices are becoming ubiquitous for a number of reasons: exponential growth in computing power and storage increased Internet accessibility, growth of cloud computing services, and etc. Developers are now devoting significant effort to build applications for these smartphone and tablet devices. In this course, we will learn how to develop applications for one of the most popular mobile platforms: Google Android. Students will work in teams to develop applications which will hopefully be placed in the Android Market.

CS235: Graduation Project I

SEMESTER 4

CS240: Visual Programming

Creating a graphical user interface (GUI) that can help your digital presence stand out in today's crowded online marketplaces is a considerably more difficult process than you might think. Graphic user interfaces should likewise attempt to give true value to each and every one of your visitors' experiences. The best user interfaces improve the relationship between brand and audience, and this value can take many different forms. At an introductory concept level, students will be exposed to the following concepts and/or skills: To create Windows programs, use Java GUI packages. Analyze program requirements; design/develop GUI-based programs

CS241: Network and System Administration

This course provides an advanced knowledge of Network and System Administration, this course cover:

Managing Windows server.

Upgrading, installing, and configuring application software and computer hardware.

Troubleshooting and providing technical support.

Creating and managing system permissions and user accounts.

Performing regular security tests and security monitoring.

Maintaining networks and network file systems.

CS242: Information Security

In this course the fundamentals of information security will be explained for the purpose of protecting computer systems. After finishing this module successful students will be able to: Address the basic security issues and defending procedures of systems that contain sensitive information. Acquire knowledge on practical techniques of cryptography.

Detect and react to threats.

Plan for security and staff functions.

CS243: Software Engineering

Software Engendering helping students build up a good understanding of how to develop a software system from scratch by guiding them thru the development process and giving them, the fundamental principles of system development with object-oriented technology using UML. The basic objective of software engineering is to develop method and develop procedures for software development that can scale up for large systems and that can be used consistently to produce high-quality software at low coast and with a small cycle of time.

CS244: Graduation Project

indicates that the learning process has been mastered by the students. They must demonstrate how they can define a problem accurately and that they are aware of the distinction between process and product, both of which are equally crucial. They are aware of how crucial how their work is presented is. Students have the opportunity to do the following through the graduation project:

1. problems and provide workable solutions.
2. Show individual initiative or collective accountability.