

BI103 Basic Computer Science (2025)

Basic Computer Science(BI103)

1. Basic Information

Course Title (according to the bylaw)	Basic Computer Science			
Course Code (according to the bylaw)	BI103			
Department/s participating in delivery of the course	General Department			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	1	2	--	3
Course Type	اجباري			
Academic level at which the course is taught	الفرقة/المستوي الاول			
Academic Program	Basic science			
Faculty/Institute	High Technology Institute of Applied Health Science			
University/Academy	High Technology Institute of Applied Health Science			
Name of Course Coordinator	Dr. Emad Abd El aziz			
Course Specification Approval Date	.Click or tap to enter a date			
Course Specification Approval (Attach the decision/minutes of the department /committee/council)				

2. Course Overview (Brief summary of scientific content)

This course aims to provide students with fundamental concepts of computer science and its applications. The course covers an introduction to the history of computers, their hardware and software components, operating systems, networks, the Internet, programming fundamentals, databases, and information security. Students will gain a comprehensive understanding of how computers work, how to use them effectively, and develop logical thinking and problem-solving skills, which are cornerstones in the field of computer science. The course focuses on building a strong foundation for students intending to specialize in computer-related fields or those who need to understand basic computer concepts in their other disciplines, particularly within the context of health sciences where technology plays an increasingly vital role in data management, analysis, and medical equipment operation.

3. Course Learning Outcomes CLOs

3. Intended Learning Outcomes (ILOs)

Upon successful completion of this course, students will be able to:

3.1. Knowledge and Understanding

- **K1:** Describe the fundamental hardware components of a computer (e.g., CPU, memory, I/O devices, storage) and explain their functions, relating them to their roles in medical devices and laboratory equipment.
- **K2:** Explain basic software concepts and their different types, including operating systems, application software, and programming languages, with an understanding of their use in healthcare applications.
- **K3:** Identify the basic principles of computer networks, network types (LAN, WAN), and common communication protocols (e.g., TCP/IP), relevant to data sharing in health information systems.
- **K4:** Understand the structure of the Internet and its essential services (e.g., web, email, file transfer), and their application in accessing medical information and telehealth.
- **K5:** Grasp initial concepts of algorithms and simple data structures, and their role in solving computational problems relevant to health data processing.
- **K6:** Recognize the fundamentals of databases, including data, information, database management systems, and the importance of data integrity in managing patient records and research data.

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- **K7:** Understand common security threats in computer and Internet environments (e.g., viruses, malware, phishing attacks) and basic information security concepts, emphasizing patient data privacy and compliance with healthcare regulations (e.g., HIPAA, GDPR).

3.2. Intellectual Skills

- **I1:** Analyze simple problems and determine how computers can be used to solve them, particularly in health data analysis or laboratory automation scenarios.
- **I2:** Design basic algorithms to solve specific problems using logical thinking, such as for data sorting or simple diagnostic processes.
- **I3:** Evaluate the effectiveness and security of various computing technologies in diverse contexts, especially concerning patient data and medical device integration.
- **I4:** Deduce the relationship between computer hardware and software components and their impact on overall system performance in healthcare IT systems.
- **I5:** Differentiate between various types of security threats and identify appropriate preventive measures to protect sensitive health information and laboratory data, aligning with ARS for data integrity and confidentiality.

3.3. Practical and Professional Skills

- **P1:** Effectively use common operating systems (e.g., Windows, macOS, Linux) to manage files and folders and run applications, specifically those used in health information systems or laboratory settings.
 - **P2:** Apply information retrieval skills using various search engines to find relevant health-related information online and evaluate the credibility of sources.
 - **P3:** Utilize office suite applications (e.g., Word, Excel, PowerPoint) to create and edit documents, spreadsheets, and presentations for reporting health data or research findings.
 - **P4:** Write simple programs using a basic programming language (e.g., Python) to solve computational or logical problems, such as basic data analysis or automation of simple laboratory tasks.
 - **P5:** Implement basic procedures to protect personal data and computer systems from security threats, adhering to data privacy regulations and best practices in health data management, consistent with ARS for data security in laboratories.
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- **P6:** Operate and interact with basic computer-controlled medical or laboratory equipment interfaces, understanding the fundamental principles of data input and output.

3.4. General and Transferable Skills

- **G1:** Communicate effectively, both orally and in writing, about technical concepts related to computer science, especially when collaborating with healthcare professionals.
- **G2:** Work effectively in a team to solve common problems or complete small projects, fostering interdisciplinary collaboration in healthcare.
- **G3:** Engage in continuous self-learning and keep abreast of rapid developments in information technology, crucial for adapting to evolving healthcare technologies.
- **G4:** Manage time and resources effectively to accomplish assigned tasks, including those involving health data or IT projects.
- **G5:** Demonstrate ethical and professional responsibility when handling information and computer technologies, particularly concerning patient confidentiality and data integrity in health sciences.

3.5 Course ILOs Matrix with Program Outcomes (POs)

(This matrix is to be filled by the academic department to link the Course Learning Outcomes (CLOs) with the Program Learning Outcomes (POs) of the program to which the course belongs, ensuring alignment and achievement of program objectives. For a general program in Applied Health Sciences, POs might include aspects like foundational scientific knowledge, critical thinking, practical skills, communication, and ethical conduct.)

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
K1	<i>Describe the fundamental hardware components of a computer (e.g., CPU, memory, I/O devices, storage) and explain their functions, relating them to their roles in medical devices and laboratory equipment.</i>	PO1	(Foundational Knowledge), PO2 (Scientific Reasoning)
		PO1	(Foundational Knowledge), PO2 (Scientific Reasoning)
		PO1	(Foundational Knowledge), PO3 (Technical Skills)
K2	<i>Explain basic software concepts and their</i>	PO1	(Foundational Knowledge),

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	<i>different types, including operating systems, application software, and programming languages, with an understanding of their use in healthcare applications.</i>		PO3 (Technical Skills)
		PO1	(Foundational Knowledge), PO2 (Scientific Reasoning)
		PO1	(Foundational Knowledge), PO3 (Technical Skills)
K3	<i>Identify the basic principles of computer networks, network types (LAN, WAN), and common communication protocols (e.g., TCP/IP), relevant to data sharing in health information systems.</i>	PO1	(Foundational Knowledge), PO4 (Ethical Conduct)
		PO2	(Scientific Reasoning), PO5 (Problem Solving)
K4	<i>Understand the structure of the Internet and its essential services (e.g., web, email, file transfer), and their application in accessing medical information and telehealth.</i>	PO2	(Scientific Reasoning), PO5 (Problem Solving)
		PO2	(Scientific Reasoning), PO4 (Ethical Conduct)
K5	<i>Grasp initial concepts of algorithms and simple data structures, and their role in solving computational problems relevant to health data processing.</i>	PO2	(Scientific Reasoning), PO5 (Problem Solving)
		PO2	(Scientific Reasoning), PO4 (Ethical Conduct)
		PO3	(Technical Skills), PO5 (Problem Solving)

4. Teaching and Learning Methods

This course employs a variety of teaching and learning methods to ensure maximum student engagement and achievement of learning outcomes, including:

- 1- **Lectures:** To explain fundamental concepts and theories of computer science, with examples relevant to health sciences.
- 2- **Practical Sessions/Labs:** To apply theoretical concepts through hands-on exercises and using various software in computer labs, simulating real-world health data scenarios.

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- 3- **Class Discussions:** To encourage critical thinking and exchange of ideas among students and the instructor, particularly on ethical considerations in health informatics.
 - 4- **Homework Assignments and Small Projects:** To reinforce understanding and apply acquired skills individually or in groups, focusing on health-related data processing or simple application development.
 - 5- **Problem-Based Learning:** By presenting scenarios and problems that require students to use their computational skills to solve them, such as analyzing health datasets or troubleshooting IT issues in a clinic.
 - 6- **Collaborative Learning:** Through group work on specific projects or tasks to enhance teamwork skills, preparing students for interdisciplinary collaboration in healthcare settings.

Course Schedule

5. Methods of students' assessment

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/)	Training (Practical/ Clinical/)	Self-learning (Tasks/ Assignments/ Projects/ ...)	Other (to be determined)
1	<i>Introduction to Computer Science: History, Evolution, and Role in Modern Society, especially in .healthcare</i>	3	1	2	1	---
2	<i>Computer Hardware: Components (CPU, Memory, I/O, Storage) and their Functionality, with examples from medical devices</i>	3	1	2	1	---
3	<i>Computer Software: Types (OS, Application, Programming Languages) and Operating Systems (Windows, macOS, Linux) for data .management</i>	3	1	2	1	---
4	Basics of Computer Networks: Types (LAN, WAN), Topologies, and their importance in hospital networks and .data sharing	3	1	2	1	---
5	The Internet and its Essential Services: Web, Email, File Transfer, and their use in accessing medical research and .telehealth	3	1	2	1	---
6	Introduction to Algorithms and Problem Solving: Logical Thinking and Flowcharts for simple .health-related scenarios	3	1	2	1	---
7	Programming Fundamentals: Basic Concepts, Variables, Data	3	1	2	1	---

	Types (e.g., handling .patient IDs, lab results)						
8	Control Flow: Conditional Statements (if/else) and Loops (for/while) for basic .data processing	3	1	2	1	---	
9	Functions and Procedures: Modular Programming for organizing code in data .analysis scripts	3	1	2	1	---	
10	Introduction to Databases: Concepts of Data, Information, DBMS, and their role in Electronic .Health Records (EHR)	3	1	2	1	---	
11	Information Security: Common Threats (Viruses, Malware, Phishing) and Basic Security Measures for patient data protection, aligning with .ARS	3	1	2	1	---	
12	Office Applications (I): Microsoft Word for medical reports and Excel for data organization and basic calculations of lab .results	3	1	2	1	---	
13	Office Applications (II): Microsoft PowerPoint for presenting health .research and case studies	3	1	2	1	---	

14	Review and Practical Applications: Case studies on computer applications in health sciences and laboratory settings	3	1	2	1	---
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Methods of students' assessment

No .	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (Semester work)	4	5	5%
2	Exam 2 (Semester work)	7	5	5%
3	Final Written Exam	14	70	70%
4	Final Practical/Clinical/... Exam	12	5	5%
5	Final Oral Exam	11	5	5%
6	Assignments / Project /Portfolio/ Logbook	15	10	10%
7	Field training	---	---	-----
8	Other (Mention)	---	---	-----

*** The methods mentioned are examples, the organization may add and/or delete**

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	Learning Solutions. (Latest Edition). Introduction to Computers and Information Technology. Cengage Learning. (Focuses on practical applications and IT fundamentals).
	Other References	Brookshear, J. G., & Brylow, D. (Latest Edition). Computer Science: An Overview. Pearson. (Provides a broad introduction to computer science concepts).
	Electronic Sources	Academic databases and digital libraries

	(Links must be added)	(e.g., PubMed, ScienceDirect) for research on health-related technology.
	Learning Platforms (Links must be added)	
	Other (to be mentioned)	
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computer laboratories equipped with up-to-date hardware and software, including relevant health-related applications.
	Supplies	Campus-wide wireless internet service.
	Electronic Programs	University library with a wide collection of books and scientific journals in computer science and health informatics.
	Skill Labs/ Simulators	Course Learning Management System (LMS) for providing educational materials, assignments, and announcements.
	Virtual Labs	
	Other (to be mentioned)	

*** The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

Name and Signature
Course Coordinator

Name and Signature
Program Coordinator