Computer Science
Program Specification
(2025)

1. Basic Information

ProgramTitle (according to what is stated in the bylaw):	Computer Science
Total number of credit hours/points of the program:	138 Hours
Number of academic years/levels (expected program duration):	4 Academic Years (8 Semesters)
Department (s) Participating (if any) in teaching the program:	Computer Science Department
Faculty/Institute:	Faculty of Computers and informatics
University/Academy:	Tanta University
Program majors/divisions/tracks/specialties in the final year (if any):	
Partnerships with other parties and the nature of each (if any):	
Name of the program coordinator (attach the assignment decision):	Dr. Moustafa El-Ashry
Program Specification Approval Date:	Click or tap to enter a date.
Council responsible for Program Specification Approval (Attach the Decision / Minutes):	

2. Program Aims (Brief description of the overall purpose the program)

The program aims to:

- Provide students with solid theoretical and practical foundations in computer science and computing.
- Develop students' abilities to analyze complex problems and design efficient and innovative CS solutions.
- Prepare graduates for Design and implement software.
- Supervise other programs by keeping them aware of new approaches.
- Devise new ways to use computers. Progress in the CS areas of networking, database, and human-computer-interface enabled the development of the World Wide Web.
- Develop effective methods for solving computing problems. For instance, computer scientists design optimal techniques for storing data in databases, transmitting information across networks, and rendering complex images. Their theoretical foundation enables them to evaluate maximum performance limits, while their knowledge of algorithms supports the creation of innovative approaches that improve efficiency.
- Strengthen skills in communication, teamwork, leadership, and project management.
- Encourage ethical conduct, social responsibility, and awareness of legal and professional considerations.

3. Program Structure (Curriculum)

Program structure:

studying 138 credit hours distributed as follows:

A- General requirements (12) credit hours:

• (6) compulsory hours

• (6) hours chosen by the student from among the elective general courses.

• Passing the community issues course.

B- College requirements (60) hours:

It is divided into two parts:

- Mathematics and basic sciences (21) compulsory credit hours.
- Basic computer science (39) compulsory credit hours.

C- Specialization requirements (60) hours:

It is divided into:

- Applied sciences (48) are compulsory accredited according to specialization.
- Applied sciences (12) optional accreditations within the specialization.

D- Project (6) compulsory credit hours.

E - Training (3) compulsory, non-accredited hours

- **Program Components**

Requirement Category/Type	**Percentage from the total number of hours/points%**
Humanities, ethical and Social Sciences (Univ. Req)	8-10 %
Mathematics and Basic Sciences	16-18 %
Basic Computing Sciences (institution req.)	26-28 %
Applied Computing sciences (Specialisation)	28-30 %
Training	3-5 %
Projects	3-5 %
Subtotal	84-96 %
Optional (institution character-identifying Subjects)	16-4 %
Total	100

- **Program courses according to the expected study plan**

Level 1 semester 1

Level 1 Semester 1		Course Title	Credits	No. of hours /week	
Code No	Prerequisites			Lec.	Prac.
UNV112	-	Societal issues	0	2	-
UNV113	-	English Language (1)	2	2	-
BS111	-	Math (1)	3	2	2
BS112	-	Discrete Mathematics	3	2	2
BS116	-	Probability and Statistics (1)	3	2	2
CS111	-	Fundamentals of Computer Science	3	2	2
IS111	-	Introduction to information systems	3	2	2
Total			17		

Level 1 Semester 2

Level 1 Semester 2		Course Title	Credits	No. of hours /week	
Code No	Prerequisites			Lec.	Prac.
UNV114	-	Communication Skills	2	2	-
UNV111		Technical Report Writing	2	2	-
	-	General Elective course (1)	2	2	-
BS113	BS111	Math (2)	3	2	2
BS115	-	Electronics	3	2	2
CS112	CS111	Structured Programming	3	2	2
IT111	-	Fundamentals of Information Technology	3	2	2
Total			18		

Level 2 Semester 1

Level 2 Semester 1		Course Title	Credits	No. of hours /week	
Code No	Prerequisites			Lec.	Prac.
BS117	BS116	Operations Research	3	2	2
BS114	BS113	Math (3)	3	2	2
CS211	CS112	Object Oriented Programming	3	2	2
CS212	CS112	Data Structures	3	2	2
CS214	CS212	Operating Systems	3	2	2
IT211	BS115	Digital Logic Design	3	2	2
Total			18		

Level 2 Semester 2

Level 2 Semester 2		Course Title	Credits	No. of hours /week	
Code No	Prerequisites			Lec.	Prac.
SE211	-	Introduction to Software Engineering	3	2	2
IS211	IS111	Introduction to Database Systems	3	2	2
IS212	BS112	Optimization methods	3	2	2
IT212	CS111	Computer network Technology	3	2	2
CS213	CS212	Algorithm Analysis and Design	3	2	2
		General Elective course (2)	2	2	-
Total			17		

Level 3 Semester 1

Level 3 Semester 1	Course Title	Credits	No. of hours /week

Code No	Prerequisites			Lec.	Prac.
IS 311	IS 211	Analysis and Design of Information Systems	3	2	2
CS 311	IT 212	Computer security	3	2	2
CS 312	IT 211	Computer Organization and Architecture	3	2	2
CS 313	CS212	Artificial Intelligence	3	2	2
IT311	CS112	Computer graphic	3	2	2
		Major Elective course (1)	3	2	2
		Total	18		

Level 3 Semester 2

Level 3 Semester 2		Course Title	Credits	No. of hours /week	
Code No	Prerequisites			Lec.	Prac.
CS 314	CS 211	Machine Learning	3	2	2
CS 315	IS 311	Big Data Analysis	3	2	2
CS 316	CS 214	Advanced Operating Systems	3	2	2
SE 315	SE 211	Advanced Software Engineering	3	2	2
IS318	BS 112	Information Theory and Data Compression	3	2	2
		Major Elective course (2)	3	2	2
TR301		Summer training	0		
		Total	18		

Level 4 Semester 1

Level 4 Semester 1	Course Title	Credits	No. of hours

				/week	
Code No	**Prerequisites**			**Lec.**	**Prac.**
CS 412	**IT 212**	**Internet of Things (IOT)**	**3**	**2**	**2**
CS 413	**CS 213**	**Problem Solving and Decision Making**	**3**	**2**	**2**
CS 414	**CS 314**	**Data Science**	**3**	**2**	**2**
		Major Elective course (3)	**3**	**2**	**2**
PR 411		**Graduation project (1)**	**3**	**-**	**3**
Total			**15**		

Level 4 Semester 2

Level 4 Semester 2		**Course Title**	**Credits**	**No. of hours /week**	
Code No	**Prerequisites**			**Lec.**	**Prac.**
CS 415	**CS 316**	**Cloud Computing**	**3**	**2**	**2**
CS 416	**CS 411**	**Compilers**	**3**	**2**	**2**
CS411	**BS 112**	**Computation Theory**	**3**	**2**	**2**
PR412	**PR 411**	**Graduation project (2)**	**3**	**-**	**3**
		Major Elective course (4)	**3**	**2**	**2**
		General Elective course (3)	**2**	**2**	**-**
Total			**17**		

elective course

Elective Courses for Computer Science Program					
		Course Title	Credit	No. of hours /week	
Code	Prerequisites			Lect.	Prac.
CS321	CS311	Cryptography	3	2	2
CS322	CS311	Network And Internet Security	3	2	2
CS423	CS316	Mobile Computing	3	2	2
CS424	CS316	Mobile Application Programming	3	2	2
CS331	CS213	Human computer interaction	3	2	2
CS332	CS331	Knowledge Discovery	3	2	2
CS433	CS313	Selected Topics in Artificial Intelligence	3	2	2
CS434	CS214	High performance computing	3	2	2
IS351	CS311	Data processing and analysis	3	2	2
CS443	CS314	Natural Language Processing	3	2	2
CS342	IS351	Data Models and Visualization	3	2	2
IS444	CS351	Selected Topics in advanced information Systems	3	2	2

-

4. Academic Standards

- **Adopted Academic Standards NARS**

A. Knowledge and Understanding (A)

By the end of the program, graduates should be able to:

A1. Understand the essential mathematics relevant to computer science.
A2. Use high-level programming languages.
A3. Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.
A4. Interpret and analyzing data qualitatively and/or quantitatively.
A5. Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases and computer graphics.
A6. Show a critical understanding of the principles of artificial intelligence, image, and pattern recognition.
A7. Understand the fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems and software tools.
A8. Select advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing

B. Intellectual Skills (B)

Graduates should be able to:

B1. Define traditional and nontraditional problems, set goals towards solving them, and. observes results.
B2. Perform comparisons between (algorithms, methods, techniques...etc).
B3. Perform classifications of (data, results, methods, techniques, algorithms. etc.).
B4. Identify attributes, components, relationships, patterns, main ideas, and errors.
B5. Summarize the proposed solutions and their results.
B6. Restrict solution methodologies upon their results.
B7. Establish criteria, and verify solutions.

B8. Identify a range of solutions and critically evaluate and justify proposed design solutions.
B9. Solve computer science problems with pressing commercial or industrial constraints.
B10. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

C. Professional and Practical Skills (C)

Graduates should be able to:

C1. Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.
C2. Communicate effectively by oral, written and visual means.
C3. Perform independent information acquisition and management, using the scientific literature and Web sources.
C4. Prepare and present seminars to a professional standard.
C5. Perform independent information acquisition and management, using the scientific literature and Web sources.
C6. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.
C7. Specify, design, and implement computer-based systems.
C8. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.
C9. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.
C10. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.
C11. Identify any risks or safety aspects that may be involved in the operation of computing equipment within a given context.
C12. Deploy effectively the tools used for the construction and documentation of software, with particular emphasis on understanding the whole process involved in using computers to solve practical problems.
C13. Prepare technical reports, and a dissertation, to a professional standard.

D. General and Transferable Skills (D)

Graduates should be able to:

D1. Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry or the academic community.

D2. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.

D3. Demonstrate skills in group working, team management, time management and organizational skills.

D4. Show the use of general computing facilities.

D5. Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.

D6. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.

5. Matrix of Academic Standards (Program Outcomes POs) with Courses

Compulsory Courses (Name and code)	Academic Standards (Mention code only)																														
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
UNV112: Societal issues																															
UNV113: English Language (1)																															
BS111: Math (1)																															
BS112: Discrete Mathematics																															
BS116: Probability and Statistics (1)																															
CS111: Fundamentals of Computer Science																															
IS111: Introduction to information systems																															
UNV114: Communication Skills																															
UNV111: Technical Report Writing																															
BS113: Math (2)																															
BS115: Electronics																															
CS112: Structured																															

Programming																														
IT111: Fundamentals of Information Technology																														
BS117: Operations Research																														
BS114: Math (3)																														
CS211: Object Oriented Programming																														
CS212: Data Structures																														
CS214: Operating Systems																														
IT211: Digital Logic Design																														
SE211: Introduction to Software Engineering																														
IS211: Introduction to Database Systems																														
IS212: Optimization methods																														
IT212: Computer network Technology																														
CS213: Algorithm Analysis and Design																														
IS311: Systems analysis and design																														
CS311:Computer security																														
CS312:Computer Organization and Architecture																														

CS313:Artificial Intelligence																														
IT311:Computer graphic																														
C314:Machine Learning																														
CS315:Big Data Analysis																														
CS316:Advanced Operating Systems																														
SE317:Advanced Software Engineering																														
IS318:Information Theory and Data Compression																														
CS412:Internet of Things (IOT)																														
CS413:Problem Solving and Decision Making																														
CS414:Data Science																														
CS411:Computation Theory																														
CS415:Cloud Computing																														
CS416:Compilers																														

- **Identification is done for each major/division/track/specialty in the final year (if any)**
- **Attach a separate matrix of elective courses (if any)**

6. Teaching and Learning strategies/methods to achieve Program Outcomes:

- Lectures
- Practical laboratories
- Case studies
- Project-based learning
- Interactive discussions
- E-learning activities

7. Student Assessment strategies/methods to verify and ensure students' acquisition of Program Outcomes:

- Midterm exams
- Final exams
- Oral examinations
- Practical exams
- Assignments and quizzes
- Course projects
- Presentations
- Graduation project evaluation

8. Program Key Performance Indicators (if any)

No.	Performance Indicator	Target Level	Method	Measurement
1.	Students' Success Rate	≥85%	Statistical analysis of students' results	Semester results reports from academic affairs
2.	Graduate Employment Rate within one year	≥70%	Alumni survey	Graduate follow-up survey reports

No.	Performance Indicator	Target Level	Method	Measurement
3.	Students' Satisfaction with the Program	≥80%	Student evaluation questionnaire	End-of-semester survey analysis

Name & Signature Program Coordinator	Name & Signature Vice Dean for Education and Student Affairs