



**Philadelphia University
Department of Computer Science
Undergraduate Programme Specification**

January, 2018

1. GENERAL INFORMATION

UCAS Code	Award	Programme Title	Duration	Mode of study
N/A	B.Sc.	Computer Science	4 years	Day Mode

School	Not Applicable
Faculty	Information Technology
Awarding Institution	Faculty of Information Technology/ Computer Science Department
Programme Accreditation	The Higher Education Accreditation Council in Jordan (HEAC)
Relevant QAA benchmark(s)	Computing Benchmark, Computing Curricula 2013 (CC2013), Higher Education Specific Accreditation Norms in Jordan (HESAN) for Computer Science

2. AIMS OF THE PROGRAMME

The programme aims to:

1.	Enable students to develop their capacity to learn and participate in society as competent professionals;
2.	Prepare students for the world of work and develop self-confidence and problem solving abilities;
3.	Develop among students the awareness of the social, organizational, and professional context in which they will be working;
4.	Produce graduates who will be able to contribute to and take active part in a variety of industrial, commercial, and academic activities;
5.	Produce graduates who exhibit a range of broad based skills and activities related to Computer Science;
6.	Produce graduates who can adapt to changing technology and have the ability to recognize technological and human trends;
7.	Produce graduates who meet the industry standard in Computer Science and have experience in the use of general tools and technologies used in the design and implementation of software;
8.	Provide study opportunities, which are comparable with national, and international academic qualifications;
9.	Engender among students the spirit of research and enquiry through suitable mechanism such as departmental research;
10.	Enable students to develop transferable skills such as verbal and written communication, teamwork leadership, etc.

3. INTENDED LEARNING OUTCOMES OF THE PROGRAMME

A. Knowledge & Understanding	
Able to:	
A1.	Understand the essential mathematics relevant to Computer Science.
A2.	Know & understand a wide range of principles and tools available to the software developer, such as design methodologies, choice of algorithm, language, software libraries and user interface technique.
A3.	Understand the principles of various current applications and research areas of the subject including artificial intelligence, databases, software engineering, networks, and distributed systems.
A4.	Know & understand a wide range of software and hardware used in development of computer systems.
A5.	Know & understand the professional and ethical responsibilities of the practising computer professional including understanding the need for quality, security, and computer ethics.



Learning & Teaching Processes (to allow students to achieve intended learning outcomes)
Acquisition (A1) is developed through lectures and tutorials and supported by regular coursework.
In years 1 and 2, acquisition of (A2)-(A5) is developed through a combination of lectures / labs and supported by directed study of textbooks and journal articles (hard copy or electronic). For the 3 rd and 4 th years, acquisition of (A2)-(A5) is through lectures, seminars, and recently with e-learning method to give opportunity to students to be self-learners.

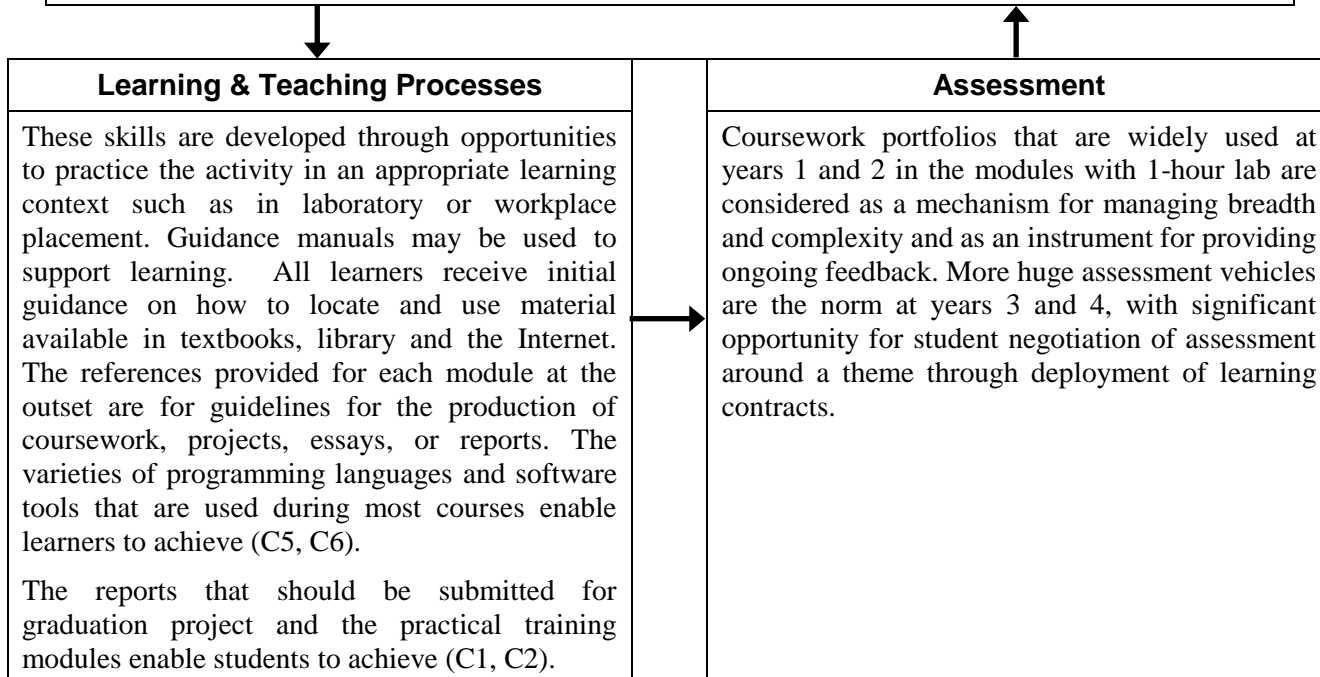


Assessment (of intended learning outcomes)
Testing of knowledge base is through a combination of unseen written examinations and assessed coursework. (A1) is assessed in this way.
(A2 – A5) are assessed in the form of lab work, essays, reports, assignments, single and/or group projects, and other set of assignments including e-learning assessment that includes answering MCQs and T/F questions at the end of each e-learning session. For the time being, such assessment is not used by the module instructor because the e-learning part is used as a supporting material to the module and a further development for this part of the project is under way.

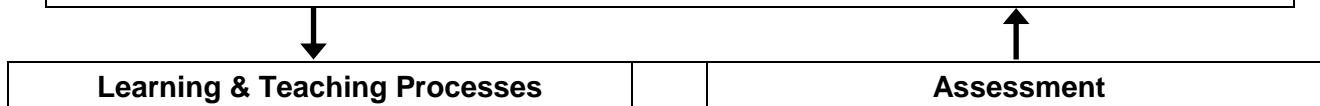
B. Intellectual Skills	
Able to:	
B1.	Analyse a wide range of problems and provide solutions through suitable algorithms, structures, diagrams, and other appropriate methods.
B2.	Design and implement a software system of significant size.
B3.	Identify a range of solutions and critically evaluate and justify proposed design solutions.
B4.	Practice self-learning by using the e-courses.


Learning & Teaching Processes	Assessment
<p>Intellectual skills are developed through the teaching and learning program. Each course, whatever the format of the teaching, involves practice in applying concepts orally and in writing, analysis and interpretation of materials, and individual feedback sessions for learners on work produced. Workshops and practical exercises more usually support skill development curricula and open learning materials are used extensively to facilitate individually paced skill acquisition and development.</p> <p>As the study program progresses through years 3 and 4, project-based and student-tutor directed approaches are introduced to encourage the notion of learner independence and to promote application of developing competencies</p>	<p>The assessment methods place great emphasis on the learner's ability to demonstrate skills (B1)-(B3) through the unseen exams and the problem based exercises, the submission of coursework, reports, case studies, and set of assignments. Every student should submit a report for the practical training, and the graduation project, which provide a perfect vehicle to demonstrate capability in a range of intellectual skills linked to specialist knowledge, understanding and practical skills.</p>

Able to:	C. Practical Skills
C1.	Plan and undertake a major individual / group project in the areas of computer science.
C2.	Prepare and deliver coherent and structured verbal and written technical reports.
C3.	Give technical presentations suitable for the time, place, and audience.
C4.	Use the scientific literature effectively and make discriminating use of Web resources.
C5.	Design, write, and debug computer programs in appropriate languages.
C6.	Use appropriate computer-based design support tools.



D. Transferable Skills and Personal Qualities	
Able to:	
D1.	Display an integrated approach to the deployment of communication skills.
D2.	Use IT skills and display mature computer literacy.
D3.	Work effectively with and for others.
D4.	Strike the balance between self-reliance and seeking help when necessary in new situations.
D5.	Display personal responsibility by working to multiple deadlines in complex activities.
D6.	Employ discrete and continuous mathematical skills as appropriate.



<p>All modules require coursework and regular feedback, which is given to the learners to develop not only their understanding but also their ability to design and write well-structured programs or reports (D1). Skill (D2) is mainly developed through individual learning. Individuals or group learners develop skills (D3) and (D4) in classes, tutorials, seminars, workshops, which rely on discussion and interaction, as well as presentations given. Skill (D5) is learnt through the management of time to meet the various and sometimes conflicting deadlines for submissions of coursework. Skill (D6) is learnt through tutorials. These skills are also developed through extra-curricula activities including work experience n social and cultural activities.</p>		<p>Effective communication of ideas is an important criterion in assessing all areas of a learner's work, and the regular feedbacks as well as the final mark reflect this. Skill (D2) is assessed through the assembly of necessary information for writing reports especially for the graduation project and the practical training modules, or for the preparation of the coursework and their production on PCs. Skills (D3) and (D4) are assessed by both the coursework and the graduation project produced, which, although supervised, is nevertheless the result of independent thought and work/research by the learner.</p>
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4. THE STRUCTURE OF THE PROGRAMME

The University applies the American Course System which is based on the credit units. Students should complete 44 modules, each with 3 credit hours (Total of 132 credit hours) summarised as follows:

- 9 modules (University requirements) (27 credit hours) (20.45 %)
- 9 modules (Faculty requirements) (27 credit hours) (20.45 %)
- 18 modules (Departmental Compulsories) (48 credit hours) (36.36%)
- 2 modules (Departmental Electives) (6 credit hours) (04.54 %)
- 8 modules (Supportive Compulsory modules) (24 credit hours) (18.18 %)

The Department covers the Computer Science programme from the areas listed below:

No. of KA	Name of KA
1.	Programming Languages (PL)
2.	Computational Science and Algorithms (CA)
3.	Main Computer Components (MCCO)
4.	Networking (NW)
5+6	Information Sciences and Applications (ISA)
7.	Supplementary Courses (SC)
9.	Graduation Project (GP) / Practical Training (PT)

Taught Modules in the Different Areas

A – The Compulsory Specialisation Modules	B- The Elective Specialisation Modules
1. Programming (PL) 0750113 Programming Fundamentals (1) 0750114 Programming Fundamentals (2) 0750215 Visual Programming 0731213 Introduction to Web Programming 0721223 Object Oriented Programming 0750413 Concurrent and Distributed Programming *	1. Information Systems and Applications (ISA) 0750464 Information and Data Retrieval 0731423 Data mining 0750460 Special Topics
2. Computational Science and Algorithms (CSA) 0750224 Theory of Computation 0750321 Concepts of programming languages 0750323 Algorithms 0750324 Compiler construction 0721224 Data Structures * 0750120 Discrete Structures	2.. Supplementary Courses (SC) 0750474 Digital Image Processing
3. Main Computer Components (MCC) 0750230 Digital Logic Design 0750233 Computer Organization and Design 0750332 Computer Architecture 0750335 Operating Systems	
4. Networking (NW) 0750446 Information Security 0731340 Fundamentals of Computer Networks 0750445 Wireless and Mobile Computing	
5-6 Information Systems and Applications (ISA) 0750362 Database Applications Programming * 0731221 Database Fundamentals * 0731321 Systems Analysis and Design 0721111 Software Engineering Fundamentals 0721240 Computing Ethics 0731110 Introduction to Information Systems and Technology 0770110 Introduction to Internet and Web Technology 0750350 Intelligent Systems	
7 Supplementary Courses (SC) 0250101 Differentiation and Integration(1) 0250231 Introduction to Statistics and Probabilities 0750272 Numerical Analysis 0750472 Modeling and simulation	
9. Graduation Project (GP)/ Practical Training (PT) 0750399 Practical Training 0750497 Research Project 1 * 0750498 Research Project 2 *	

Guidance plan

Year	Semester	Module Number	Module Title	Prerequisite	Type of Requirements
First	First (18 Credit Hours)	0114101 0130101	Arabic Language Skills (1) English Language Skills (1)	0114099 0130099	(UR) (UR)
		0750113 0250101 0731110	University Elective (1) Programming Fundamentals (1) Differentiation and integration (1) Introduction to Information Systems and Technology	----- ----- ----- -----	(UR) (FR) (SR) (FR)
	Second (18 Credit Hours)	0111101 0780110	National Education Introduction to Internet and Web Technology	----- -----	(UR) (FR)
		0750114 0750120 0721111 0130102	Programming Fundamentals (2) Discrete Mathematics Software Engineering Fundamentals English Language Skills (2)	0750113 0750099 0731110 0130101	(FR) (DR) (SR) (UR)
Second	First (18 Credit Hours)	0721240 0721223 0731213 0750230 0750224 0750272	Computing Ethics Object-Oriented Programming Introduction to Web Programming Digital Logic Design Theory of Computation Numerical Analysis	0731110 0750114 0750114 0731110 0250104 0750114	(FR) (FR) (FR) (DR) (DR) (DR)
		0721224 0731221 0750233 0250241 0750215 0250231	Data Structures Database Fundamentals Computer Organization and Design Linear Algebra (1) Visual Programming Introduction to Statistics and Probabilities	0721223 0721223 0750230 0250101 0721223 -----	(SR) (SR) (DR) (SR) (FR) (SR)
Third	First (18 Credit Hours)	0731321 0750321 0750323 0750332 ---- 0750350	Systems Analysis and Design Concepts of Programming Languages Algorithms Computer Architecture University Elective (2) Intelligent Systems	0721111 0721224 0721224 0750233 ----- 0250231	(SR) (DR) (DR) (DR) (UR) (DR)
		0731340 0750335 0750399 0750362 0750324	Computer Networks Fundamentals Operating Systems Practical Training Database Applications Programming Compiler Construction	0721224 0750332 90h 0731221 0750224	(SR) (DR) (DR) (DR) (DR)
Fourth	First (13 Credit Hours)	0750472 0750497 ---- ---- ----	Modeling and Simulation Research Project 1 Department Elective (1) University Elective (3) Department Elective (2)	075272 ---- ---- ---- ----	(DR) (DR) (DR) (UR) (DR)
		---- 0111100 ---- 0750446 0750498	University Elective (4) Military Sciences (Or UE Non-Jordanians Students) Department Elective (3) Information Security Research project 2	---- ---- ---- 0731340 0750497	(UR) (UR) (DR) (DR) (DR)

5. CURRICULUM PROGRESSION: INTENDED LEARNING OUTCOMES FOR EACH YEAR

Year	Intended learning outcomes
Year 1	<p>The curriculum that is based on the CC2013 is designed to have a broad based structure, which utilizes the knowledge of the new entrants to build a strong foundation through Introductory Level modules (Level 1: 1st and 2nd years). Mathematical and fundamental computer skills are emphasized at the early stage to prepare for more rigors later on. Mathematical modules, computer skills modules, and OOP module are used to develop the knowledge and understanding and the intellectual skills. In addition, other University based modules help in improving students' communication skills in Arabic and English languages and social/cultural issues.</p>
Year 2	<p>The aim of the core modules taught in this year is to prepare students for more complex and specialist work which could be studied at a later stage. Never the less, a wide coverage of the topics is necessary to enable choice and coherence of the curriculum. The core modules that could form the Intermediate Level (Level 2: 2nd and 3rd) modules are designed with this purpose in mind. The intellectual skills may be developed through these modules by solving problems, writing programs, developing small software system, etc.</p> <p>The Faculty requirements that include essential transferable skills, together with professional, legal and ethical issues contribute both relevance and breadth.</p>
Year 3	<p>As the students progress to the third and final years they should be well informed about the overall subject area and are mature enough to make informed choices. The curriculum structure has clearly defined prerequisites and displays pathways providing some specializations, e.g. Artificial Intelligence, Software Engineering, etc.</p> <p>Third year modules help in developing student's cognitive abilities and skills for programming in different paradigms, theoretical aspect, modelling, building computer-based systems, problem solving by analysing criteria and specifications appropriate to certain problems, and finally, report writing. It is however important to realize that theoretical studies have to be supported with practical and real life professional experience. Other generic skills must also be developed. This is achieved by organizing suitable work experience in industry for the students in the practical training module.</p> <p>The elective modules in the 3rd and 4th years allow some flexibility for the student.</p>

Year 4	<p>The final year allows more flexibility for the student by providing the graduation project in addition to other Advanced Level (Level 3) modules. The graduate project is of cardinal importance as it represents an amalgam of various skills and key components of the programme learned so far by the student. It encourages the student to exercise flair and originality and demands strong commitment from him/her. Suitable project supervision ensures that the student is given guidance and support when required. However, the ethos of self-reliance and research has to be paramount. Regular maintenance of documentation and communication develops written and oral skills.</p> <p>With advanced modules, an appropriate depth of knowledge reflects the staff research interest and stimulates students to take the opportunity to develop their intellectual abilities.</p>
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6. STUDENT INDUCTION, SUPPORT AND DEVELOPMENT (in order to deliver the year learning outcomes)

Student induction, support and development are well-developed aspects with a framework, which provides support to the students throughout their programme. The key mechanisms include the following:

- Induction procedures for new students at admission with access to senior members of staff. Induction for returning students is also implemented as it is beneficial in specifying the progressive nature of the learning experience, for example, higher order skills and independent learning. In both cases, many meetings are held between the Dean and the students and the Head of Department with the students.
- Provision of Academic tutor for each student
- Provision of good physical and learning resources including internet, library, and up to date electronic educational media, e.g. Email and web based material.
- Provision of good social facilities, e.g. internet cafes, sport spaces, cafeterias, etc.
- Provision of Self Study Facilities:
 - The Faculty Learning Resource Centre
 - The Electronic Library
 - The Department Web page that provides students with all relevant information such as:
 - Undergraduate Handbook
 - Programme Specifications
 - Lectures and course notes.
 - Past Exams, tutorials, and assignments.
 - Distance learning has been implemented through agreement with Phoenix International and through a project financed by UNESCO.
 - Incubator lab.
- The University provides some disabled students' facilities.
- Careers Advisory Service to provide information for students and graduates of the University.
- All simultaneous sections of a module have a staff student committee. Each committee meets at least twice each semester and discusses any matter of concern with the module. The staff members of each committee are the lecturers of the concerned sections.
- Student's opinion on the quality of the teaching is considered by completing a Module Evaluation Questionnaire for each module in each semester.

- Students' Memberships of various committees can add a voice in resource allocation and other matters.
- Drop-In centre is utilized to enhance students' performance in some courses.
- Student Financial Aid is provided in two mechanisms; the first mechanism is through the Student Fund established by the University in addition to the Orphan Student Fund. The second mechanism is through special Discount Scholarships provided by the University to students based on various criteria.
- Free transportation and medical insurance.

7. CURRICULUM MAP OF COURSE UNITS AGAINST INTENDED LEARNING OUTCOMES OF THE PROGRAMME

Code	Module	C/O	Module Learning Outcomes (MLOs)																					
			Knowledge & Understanding					Intellectual Skills				Practical Skills						Transferable Skills & Personal Qualities						
			A1	A2	A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5	D6	
750113	Programming Fundamentals(1)	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750114	Programming Fundamentals (2)	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750215	Visual Programming	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750120	Discrete Mathematics		A , D					A , D	A , D	A , D	A , D	A , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750224	Theory of Computation	C	A , D					A , D	A , D	A , D	A , D	A , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750120	Discrete Structure		A , D					A , D	A , D	A , D	A , D	A , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750230	Digital Logic Design	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750233	Computer Organization and Design	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
750272	Numerical analysis	C	A , D	A , D				A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
0750321	Concepts of Programming Languages	C	A , D	A , D				A , D	A , D	A , D	A , D	A , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
0750323	Algorithms	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
0750324	Compiler Construction	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
0750332	Computer Architecture	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
0750335	Operating Systems	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D
0750350	Intelligent Systems	C	A , D	A , D	A , D	A , D	A , D	A , D	B , D	B , D	B , D	B , D	C , D	C , D	C , D	C , D	C , D	C , D	D , D	D , D	D , D	D , D	D , D	D , D

0750362	Programming of Database Applications	C	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D
0750413	Concurrent and Distributed Programming	O	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D
0750446	Information Security	C	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D
0750445	Wireless and Mobile Networks, Advanced Computer Network	O	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D
0750464	Information and Data Retrieval	O	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D
0750472	Modelling and Computer Simulation	C	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D
0750474	Digital Image Processing	O	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D	A , D

Legend for cells

D = skills are taught or developed by students within this course unit
A = skills are assessed within this course unit

C = compulsory course unit
O = optional course unit

8. CRITERIA FOR ADMISSION

Candidates must be able to satisfy the general admissions criteria of the University and of the School in one of the following ways:

- 1- They must be from the scientific, Industrial, Agricultural, Compr.Health Education branches and pass their Tawjehe exam with grade of at least 60%. The program is offered in full-time (4 years (honor)) (morning study mode) and part-time (evening study mode).
- 2- They can be bridged from the society colleges with a comprehensive exam mark of at least 65%.
- 3- They can transfer to the Department from other universities.

9. PROGRESSION AND ASSESSMENT REGULATIONS

- In order to progress from one year to the next year, a student must complete successfully at least 10 modules (30 credit hours). To achieve graduation, the student has to complete successfully 46 modules (132 credit hours) with minimum passing accumulative average of 60%. The minimum pass mark is 50% for any module.
- Undergraduates are assessed for each module independently and there is no carry over of marks from one year to the next.
- If the student fails to get 50%, he/she has to take the module again. This can be repeated three times after which the student is excluded from the programme and is given a chance to transfer to other programme in the University.
- The progression rules provide some flexibility for the student to control his/her own rate of study. The course system with flexible prerequisites enables students to smoothly progress from level to level. The assessment procedure allows generous opportunity for students to improve their grades to secure progression.
- Students will be warned if they could not obtain average of at least 60%. In this case, students are encouraged to repeat studying those modules with low marks in order to increase their accumulated averages. However, students will be dismissed from the University if this average is not achieved in the third attempt.
- The assessment are deployed within the programme, are of many types:
 - 60% is given for two 1-hour midterm exams, coursework and/or seminars, projects, or essays, and 40% for the final exam that may be a written exam only or a written exam plus final laboratory exam (if applicable), final small project, or seminar presentation. The 40% of the final exam is from the University regulations.

- “Pass” is given for the evaluation of the practical training module,
 - The University regulations governing the Work and Attendance of students are given in the Student Guide 2016. Full attendance is required at all lectures, laboratories, and any tutorials, which may be scheduled. Completed laboratory work should be handed in on time. Attendance at laboratories and at many lectures is monitored and attendance registers kept.
 - Absence for holidays is not permitted in term-time. The duty of the lecturer is to keep continuous review of the work and attendance of the students with whom he is concerned.
 - If the rate of student absences, in a module, is greater than 15% (or 20% for student representing the University in sportive or cultural activities) of the completely accredited hours and the student has no acceptable justification, then this student is excluded from that module. If the Dean of the Faculty accepts the justifications of absence, then this student is mentioned as *withdrawn* without refunding the registration fees.
- A formal process is defined to tackle the problem of any student whose work and attendance appear unsatisfactory.

Teaching and Assessment Matrix

Module Number	Module Title	Lectures		Laboratory		Tutorial		Seminars		Assignments, Projects, or other Marks %	Total	
		Hours/semester	% Exam Marks	Hours/semester	% Lab work Marks	Hours / semester	% Contribution Marks	Hours/Semester	% seminar Marks		Hours/Semester	Assessments Marks
Programming Fundamentals (1)	0750113	32	60	16	20	16	10	-	-	10	64	100%
Programming Fundamentals (2)	0750114	32	60	16	20	16	10	-	-	10	64	100%
Visual Programming	0750215	22	80	11	5	12	5	3	5	5	48	100%
Theory of Computation	0750224	33	80	-	-	12	5	3	5	10	48	100%
Discrete structure	0750120	33	80	-	-	12	5	3	5	10	48	100%
Digital Logic Design	0750230	33	80	-	-	12	5	3	5	10	48	100%

Computer Organization and Design	0750233	33	80	-	-	12	5	3	5	10	48	100%
Numerical analysis	0750272	33	80	-	-	12	5	4	10	5	48	100%
Concepts of Programming Languages	0750321	33	80	-	-	10	5	5	5	10	48	100%
Algorithms	0750323	33	80	-	-	15	10	-	-	10	48	100%
Compiler Construction	0750324	39	80	3	10	3	-	3	-	10	48	100%
Computer Architecture	0750332	33	80	-	-	12	5	3	5	10	48	100%
Operating Systems	0750335	33	80	-	-	12	5	4	10	5	48	100%
Intelligent systems	0750350	33	80	-	-	12	5	4	10	5	48	100%
Programming of Database Applications	0750362	20	56	13	15	6	-	3	5	15	48	100%
Concurrent and Distributed Programming	0750413	30	80	-	-	15	10	3	5	5	48	100%
Information Security	0750446	33	80	-	-	12	5	3	5	10	48	100%
Wireless and Mobile Networks, Advanced Computer Network	0750445	33	80	-	-	12	5	3	5	10	48	100%
Information and Data Retrieval	0750464	30	80	-	-	12	-	-	-	20	48	100%

Modeling and Computer Simulation	0750472	33	80	-	-	12	5	3	5	10	48	100%
Digital Image Processing	0750474	33	80	-	-	12	5	3	5	10	48	100%

Date of current version:	11/11/2016
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