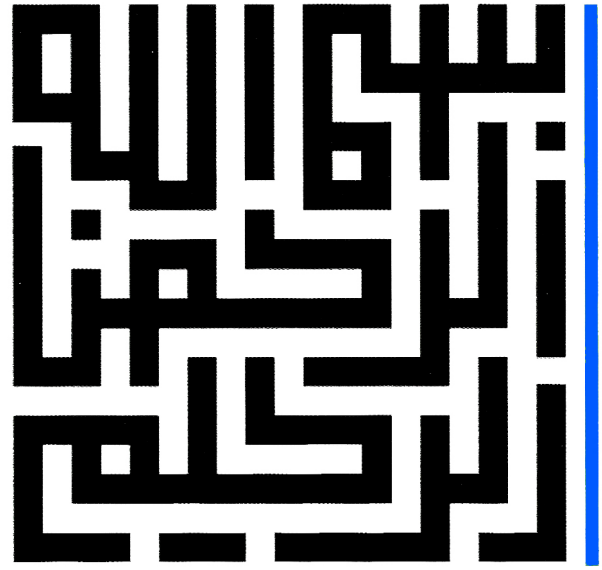
Umm Al-Qura University
University College – Jamoum
Computer Dept.

Program Guide Book



In the Name of Allah,
the Most Gracious, the Most Merciful

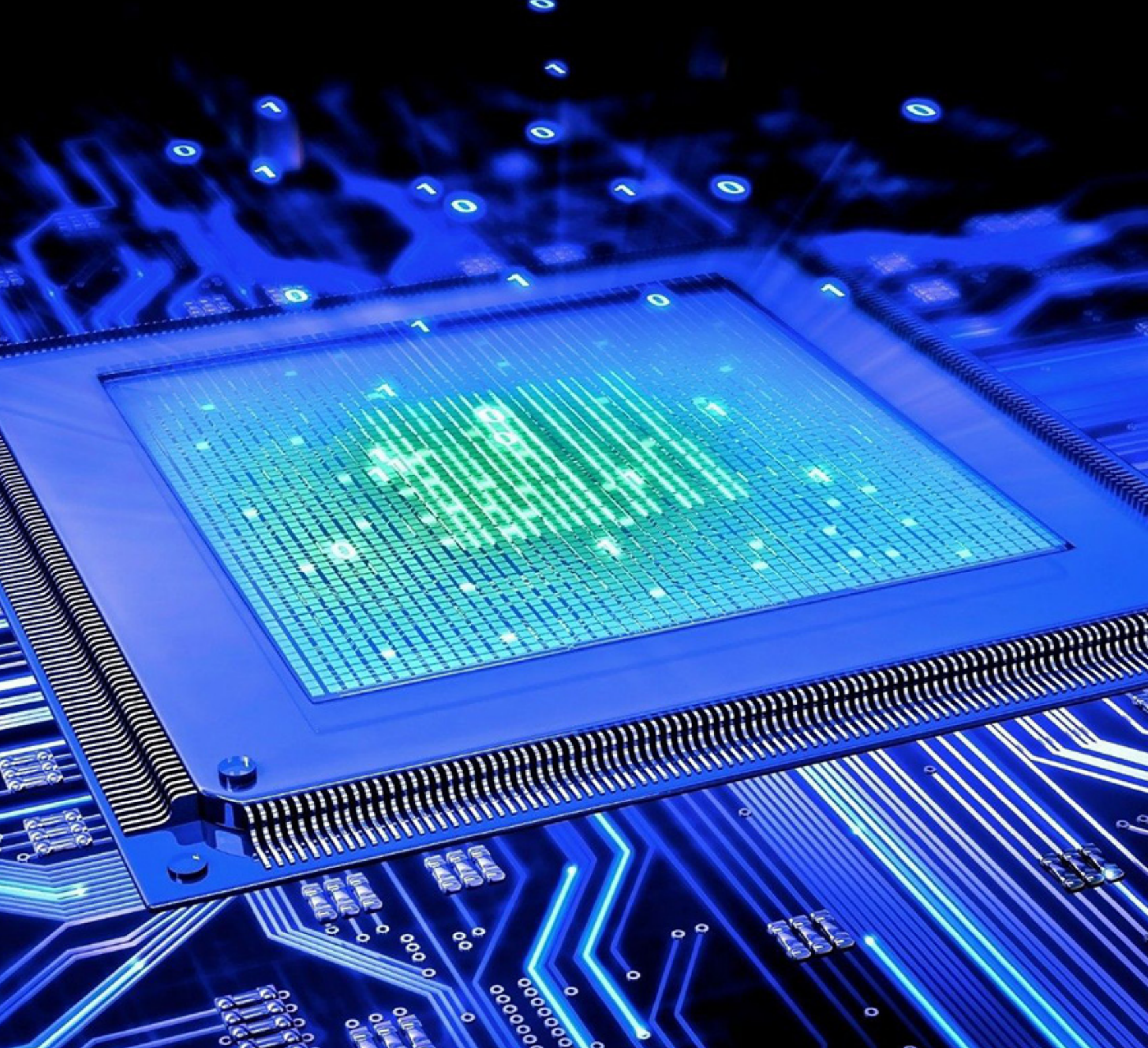


Table of Contents

1. Preface.....5

2. Organizational Structure.....5

3. Mission Statement.....6
   3.1. University Mission Statement.....6
   3.2. College Mission Statement.....7
   3.3. Department Mission Statement.....7
4. Program Objectives.....7

5. Student Outcomes.....7

6. Study Plan.....8

7. Prerequisite Map.....14

8. Courses.....15

9. Graduation Projects.....16

10. Assessments.....16
   10.1. Student Outcomes Assessment Process.....17
   10.2. Data Gathering Process.....18
   10.3. Assessment Process Schedule.....20
   10.4. Attainment Level for the Student Outcomes.....20

11. Program Review.....20

12. Accreditation.....21

\A. Appendix : Course Syllabi.....23

1. Preface

The University College in Al-Jamoum was established in the year 1976 with nine departments. The Department of Computer Science, which is shortly named (CSJ Dept.), is one of these departments. The CSJ Dept. offers a five-year full-time Bachelor of Science (BSc) program in Computer Science. The program is offered full-time/day using traditional lectures/laboratories and other class activities such as discussion, projects, workshops, etc. Some lecture classes are given via live video conferencing if the instructor is on a different campus to the students especially in female section. The university provides and maintains specialized facilities for this purpose.
The program is offered entirely at Umm Al-Qura University on Al-Jamoum campus. The campus has two sections: male and female sections.

2. Organizational Structure

The department council, which is headed by the department chair and consists of all faculty members in the department, manages the program. Therefore, all faculty members take part in any discussion related to the program. Most of the faculty members are located at the Male section, and video conferencing is usually used to hold department council meetings jointly with faculty members at the Female section. There are two deputy chairs: one in the male section and the other in the female section, and they assist by managing day-to-day issues.
The chair is a member of the college council, which is headed by the college dean, and meets to discuss issues related to all college programs that need to be reported to the college or university administration. A deputy chair may attend the college council if the department chair is unavailable.
The dean is a member of the university council, which is headed by the university rector, and meets to discuss issues related to all university programs that need to be reported to the university administration or to bodies outside the university, such as the Ministry of Education.
We identify the following as our significant stakeholders:

- Graduates of our program

- National and regional employers of computing professionals
- Graduate programs that frequently take program graduates
- Faculty of the program
- The External Advisory Board
- We have established an External Advisory Board (EAB) that convenes annually to provide input to the program. The membership on the External Advisory Board reflects the first three categories of stakeholders. The purpose of the board is to provide feedback on the program educational objectives, curriculum, facilities, continuous improvement process, and future directions.

3. Mission Statement

3.1. University Mission Statement

The provision of services at the levels of both the public and private sectors in the light of the requirements of the comprehensive development plans of the country. The major objectives of the University as set by the Council of Ministers Decree number 190 on 21/7/1981 include the following:

- Provision of higher education and graduate studies to enable citizens to contribute to the development of their country in the light of Islamic principles in the following fields:

- Islamic studies
- Natural and applied sciences
- Humanities, social sciences and languages

- Contribution to enhancement of scientific research by conducting and encouraging research and establishing research centers, and suggesting means for provision and satisfaction of present-day needs.
- Preparation of specialized scientists and teachers.
- Helping other Islamic societies in the specialized education of their citizens in the different fields of knowledge.

Source: http://www.uqu.edu.sa/page/en/203, visited on October 1, 2015.

3.2. College Mission Statement

The mission of the college is to provide scientific, practical and high quality research environments for the rehabilitation of national cadres in various scientific and theoretical disciplines included in the college and in accordance with the needs of the society.

3.3. Department Mission Statement

The mission of the department is to provide an excellent scientific environment that contributes to the preparation of national cadres who are qualified and specialized in different areas of research and development in computing in accordance with the needs of the society.

4. Program Objectives

The program educational objectives (PEOs) are driven to support the department mission; therefore, they support the college and university missions. The PEOs are disseminated to students through different media outlets such as department websites, program catalogs and brochures, the department announcement boards, etc.

The CSJ undergraduate program educational objectives are that our graduates be able to:

- **PEO1:** Practice as computer scientists, designing, developing or maintaining technical projects in various areas of computing.
- **PEO2:** Enhance their skills and gain knowledge about new technologies through self-directed training, attending workshops, joining professional societies or postgraduate education.
- **PEO3:** Progress successfully in their profession.

5. Student Outcomes

The program has documented measurable outcomes that are based on the needs of the program's constituencies. The program enables students to achieve, by the time of graduation:

SOa. An ability to apply knowledge of computing and mathematics appropriate to the discipline;

SOb. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;

SOc. An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;

SOd. An ability to function effectively on teams to accomplish a common goal;

SOe. An understanding of professional, ethical, legal, security, and social issues and responsibilities;

SOf. An ability to communicate effectively with a range of audiences;

SOg. An ability to analyze the local and global impact of computing on individuals, organizations and society;

SOh. Recognition of the need for, and an ability to engage in, continuing professional development;

SOi. An ability to use current techniques, skills, and tools necessary for computing practices.

SOj. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;

SOk. An ability to apply design and development principles in the construction of software systems of varying complexity.

6. Study Plan

The Computer Science program prepares students for computing practice through course content throughout the curriculum, culminating in a major design experience, 2316419-4 and 2316439-4 (Graduation Project I and Graduation Project II). The program includes over one year of college level mathematics and basic sciences (30 credits), over one and one-half years of computer science topics (106 credits), and general education consistent with university requirements.

The following table shows the study plan to complete the degree in 5 years (10 semesters). The recommended term for each course is given.

Course				Course Type Required (R)	Curricular Area (Credit Hours)				Last Two Terms the Course was Offered	Average Enrollment for the Last Two Terms the Course was Offered	
Term	Department	Course Number	Course Title		Course Type Required (R)	Computing Topics F or A for Fundamental or Advanced	General Education	Other		Students	Sections
1	Computer Science	2316101-3	Introduction to Computer Science	R		3F			A14-15, W14-15	834	37
1	Mathematics	2304101-4	Calculus I	R	4M				A14-15, W14-15		
1	Islamic Studies	2302116-2	Islamic Culture I	R			2		A14-15, W14-15		
1	Education	2310102-2	English Language I	R			2		A14-15, W14-15		
1	Islamic Studies	2301116-2	The Holy Qur'aan I	R			2		A14-15, W14-15		
1	Computer Science	2316102-3	Introduction to Information Systems	R		3F			W13-14, A14-15	361	11
2	Computer Science	2316103-3	Computer Programming	R		2F			A14-15, W14-15	400	31
2	Computer Science	2316103-3	Computer Programming Lab	R		1F			A14-15, W14-15	400	21
2	Mathematics	2304102-4	Calculus II	R	4M				A14-15, W14-15		
2	Islamic Studies	2302216-2	Islamic Culture II	R			2		A14-15, W14-15		
2	Education	2310105-3	Communication Skills in English I	R			3		A14-15, W14-15		
2	Physics	2306102-4	General Physics I	R	4S				A14-15, W14-15		

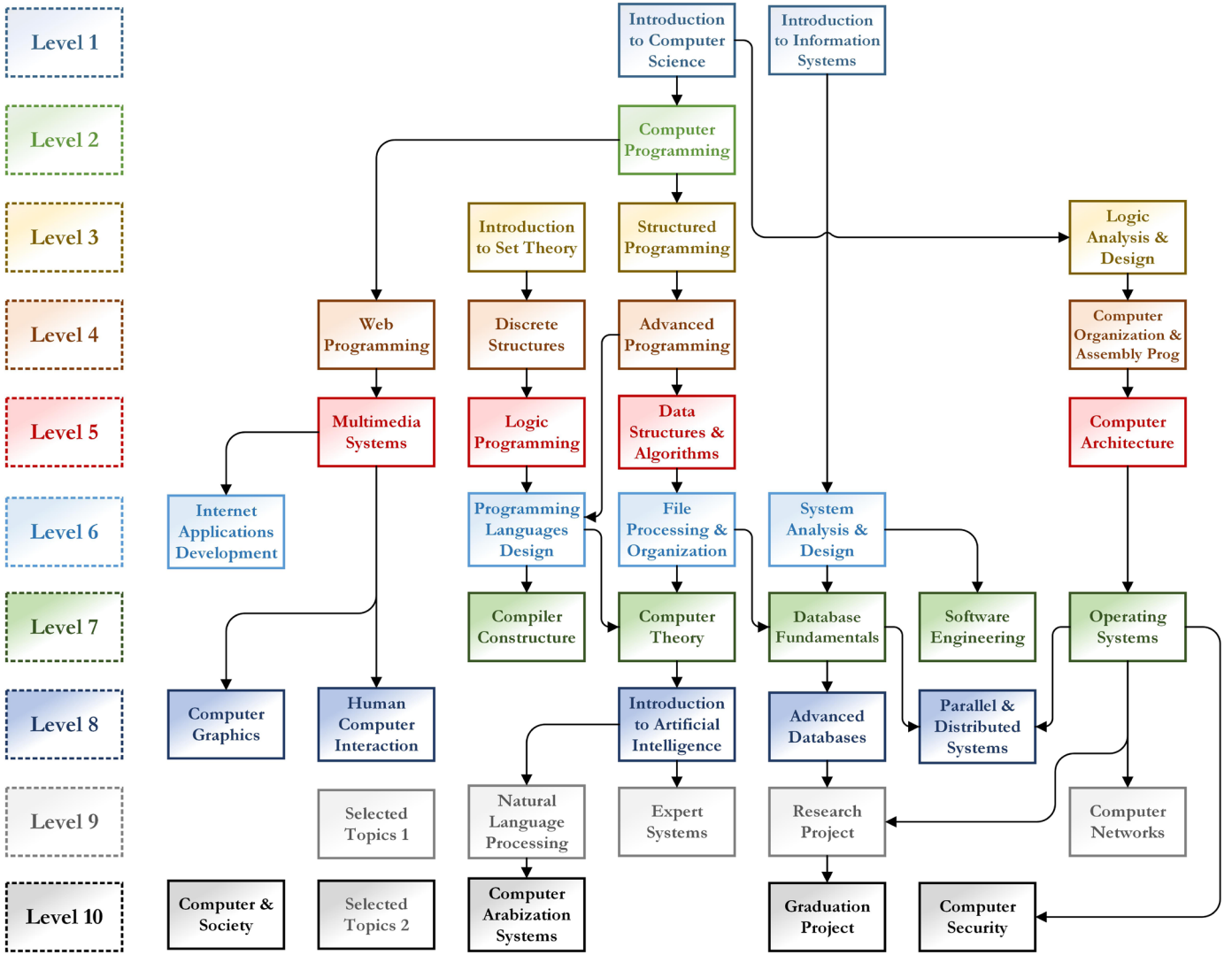
Course				Course Type Required (R)	Curricular Area (Credit Hours)				Last Two Terms the Course was Offered	Average Enrollment for the Last Two Terms the Course was Offered	
Term	Department	Course Number	Course Title		Course Type Required (R)	Computing Topics F or A for Fundamental or Advanced	General Education	Other		Students	Sections
3	Computer Science	2316204-3	Structured Programming Lab	R		1F			A14-15, W14-15	148	11
3	Mathematics	2304251-4	Introduction to Set Theory	R	4M				A14-15, W14-15		
3	Computer Science	2316213-3	Logic Analysis & Design	R		3F			A14-15, W14-15	209	9
3	Education	2309141-2	Biography of Prophet Muhammad (pbuh)	R			2		A14-15, W14-15		
3	Mathematics	2304131-3	Statistics & Probability Theory	R	3M				A14-15, W14-15		
3	Arabic Linguistics	2303109-2	Arabic Language	R			2		A14-15, W14-15		
4	Computer Science	2316205-3	Advanced Programming	R		2F			A14-15, W14-15	156	10
4	Computer Science	2316205-3	Advanced Programming Lab	R		1F			A14-15, W14-15	156	10
4	Computer Science	2316210-3	Discrete Structures	R	3M				A14-15, W14-15	218	10
4	Computer Science	2316211-3	Web Programming	R		3A			A14-15, W14-15	134	9
4	Islamic Studies	2301216-2	The Holy Qur'aan II	R			2		A14-15, W14-15		
4	Computer Science	2316214-3	Computer Organization & Assembly	R		3F			A14-15, W14-15	159	9

Course				Course Type Required (R)	Curricular Area (Credit Hours)				Last Two Terms the Course was Offered	Average Enrollment for the Last Two Terms the Course was Offered	
Term	Department	Course Number	Course Title		Course Type Required (R)	Computing Topics F or A for Fundamental or Advanced	General Education	Other		Students	Sections
5	Computer Science	2316318-4	Data Structures & Algorithms	R		2F			A14-15, W14-15		
5	Computer Science	2316318-4	Data Structures & Algorithms Lab	R		2F			A14-15, W14-15		
5	Computer Science	2316317-3	Logic Programming	R		3A			W13-14, A14-15	32	3
5	Computer Science	2316316-3	Multimedia Systems	R		3A			A14-15, W14-15	81	4
5	Islamic Studies	2301316-2	The Holy Qur'aan III	R			2		A14-15, W14-15		
5	Computer Science	2316315-3	Computer Architecture	R		3F			A14-15, W14-15	71	4
5	Islamic Studies	2302416-3	Islamic Culture IV	R			2		A14-15, W14-15		
6	Computer Science	2316327-3	File Processing & Organization	R		3F			W13-14, W14-15	51	3
6	Computer Science	2316322-3	System Analysis & Design	R		3F			W13-14, W14-15	61	5
6	Computer Science	2316331-4	Programming Languages	R		4A			W13-14, W14-15	38	3
6	Computer Science	2316333-3	Internet Applications Development	R		3A			W13-14, W14-15	69	4

Course				Course Type Required (R)	Curricular Area (Credit Hours)				Last Two Terms the Course was Offered	Average Enrollment for the Last Two Terms the Course was Offered	
Term	Department	Course Number	Course Title		Course Type Required (R)	Computing Topics F or A for Fundamental or Advanced	General Education	Other		Students	Sections
7	Computer Science	2316412-3	Fundamentals of Databases	R		3F			W13-14, A14-15	29	3
7	Computer Science	2316411-3	Operating Systems	R		3F			A14-15, W14-15	23	2
7	Computer Science	2316415-3	Computer Theory	R		3F			A14-15	13	1
7	Computer Science	2316410-3	Compiler Construction	R		3A			W13-14, A14-15	35	2
7	Computer Science	2316413-3	Software Engineering	R		3F			W13-14, A14-15	15	2
8	Computer Science	2316432-3	Introduction to Artificial Intelligence	R		3A			A14-15, W14-15	44	2
8	Computer Science	2316435-3	Advanced Database Systems	R		3A			A14-15, W14-15	28	2
8	Computer Science	2316430-3	Computer Graphics	R		3A			A14-15, W14-15	37	2
8	Computer Science	2316434-3	Parallel & Distributed Computer Systems	R		3A			W13-14, W14-15	76	2
8	Computer Science	2316433-3	Human-Computer Interaction	R		3A			A14-15, W14-15	31	2
9	Computer Science	2316514-3	Natural Language Processing	R		3A			A14-15, W14-15	19	2

Course				Course Type Required (R)	Curricular Area (Credit Hours)				Last Two Terms the Course was Offered	Average Enrollment for the Last Two Terms the Course was Offered	
Term	Department	Course Number	Course Title		Course Type Required (R)	Computing Topics F or A for Fundamental or Advanced	General Education	Other		Students	Sections
9	Computer Science	2316513-3	Expert Systems	R		3A			A14-15, W14-15	22	2
9	Computer Science	2316518-3	Selected Topics in Computer Science I	R		3A			A14-15, W14-15	39	3
9	Computer Science	2316517-3	Computer Networks	R		3A			A14-15, W14-15	49	2
10	Computer Science	2316531-3	Computers & Society	R		3F			A14-15, W14-15	24	1
10	Computer Science	2316532-3	Computer Security Systems	R		3A			A14-15, W14-15	49	2
10	Mathematics	2304382-4	Numerical Analysis	R	4M				A14-15, W14-15		
10	Computer Science	2316539-4	Graduation Project (major design)	R		4A			A14-15, W14-15	42	4
10	Chemistry	2305101-4	General Chemistry (1)	R	3S				A14-15, W14-15		
10	Chemistry	2305101-4	General Chemistry (1) Lab	R	1S				A14-15, W14-15		

7. Prerequisite Map



8. Courses

Course Code	Course Name	Prerequisite Courses
2316101-3	Introduction to Computer Science	–
2316102-3	Introduction to Information Systems	–
2316103-3	Computer Programming	2316101-3
2316204-3	Structured Programming	2316103-3
2316205-3	Advanced Programming	2316104-3
2316210-3	Discrete Structures	2304251-4
2316211-3	Web Programming	2316103-3
2316213-3	Logic Design & Analysis	2316101-3
2316214-3	Computer Organization & Assembly Prog.	2316213-3
2316315-3	Computer Architecture	2316214-3
2316316-3	Multimedia Systems	2316211-3
2316317-3	Logic Programming	2316210-3
2316318-4	Data Structures & Algorithms	2316205-3
2316322-3	System Analysis & Design	2316102-3
2316327-3	File Processing & Organization	2316318-4
2316331-4	Programming Languages	2316205-3, 2316317-3
2316333-3	Internet Applications Development	2316316-3
2316410-3	Compiler Construction	2316331-4
2316411-3	Operating Systems	2316315-3
2316412-3	Fundamentals of Databases	2316322-3, 2316327-3
2316413-3	Software Engineering	2316322-3
2316415-3	Computer Theory	2316327-3, 2316331-4
2316430-3	Computer Graphics	2316316-3
2316432-3	Artificial Intelligence	2316415-3
2316433-3	Human Computer Interaction	2316316-3
2316434-3	Parallel & Distributed Computers	2316411-3, 2316412-3

Course Code	Course Name	Prerequisite Courses
2316435-3	Advanced Databases	2316412-3
2316513-3	Expert Systems	2316432-3
2316514-3	Natural Language Processing	2316432-3
2316517-3	Computer Networks	2316411-3
2316518-3	Selected Topics	
2316519-4	Graduation Project I	2316411-3, 2316435-3
2316531-3	Computers & Society	–
2316532-3	Computer Security	2316411-3
2316539-4	Graduation Project II	2316519-4

9. Graduation Projects

The graduation project aims to let students develop projects that demonstrate their intellectual, technical and creative abilities. Students develop the projects under the direction and supervision of faculty members. Moreover, students gain lifelong learning skills and interface to real life applications. The main practical skills are related to software development processes. Specifically, students should practice in project management, system analysis and design, and software development documentation and presentation.

There are several courses preceding the graduation project courses and they are important in preparing students to the graduation project courses. Software engineering and database courses play a major role in improving students' skills needed in their graduation projects.

10. Assessments

The assessment of student outcomes is periodically done every two years. However, if a critical conclusion has been raised from analyzing the assessment results, then assessment of student outcomes is repeated in the following year. The assessment results shown in this section have been collected in the academic year 2014-2015.

However, pre-assessment results have been collected during the academic 2013—2014 in sake

of training the faculty for the assessment process and gathering ground-state data to be compared with those collected in the academic year 2014-2015.

10.1. Student Outcomes Assessment Process

The process of assessing the student outcomes consists of six steps as shown in the following figure:

1. Data Collection: Data is gathered using several types of data sources as shown later in the data gathering process.
2. Data Preprocessing: The collected data is gathered and then validated and transformed to make it ready for use in evaluation.
3. Attainment Evaluation: Assessing achievement of targets for all SOs.
4. Result Analysis: The assessment committee analyzes all evaluated data with negative or positive performance. Of course, especial attention is given if the targets are not achieved in order to determine the possible causes.
5. Improvement Discussion: The assessment committee decide the needed actions in order to remedy the shortage of attaining the student outcomes if exists. Moreover, the committee should take actions to respect and maintain the good performance attaining the student outcomes.
6. Action Plan: The decisions taken the previous step are formulated as an action plan with certain objectives, success indicators, responsibilities and achievement time.

Student Outcomes Assessment Process

10.2. Data Gathering Process

There are two types of data used in the assessment process. The first type is direct assessment and the other is overall program assessment.

Direct Assessment Data: A direct assessment process in which different course assessment methods have been invoked including:

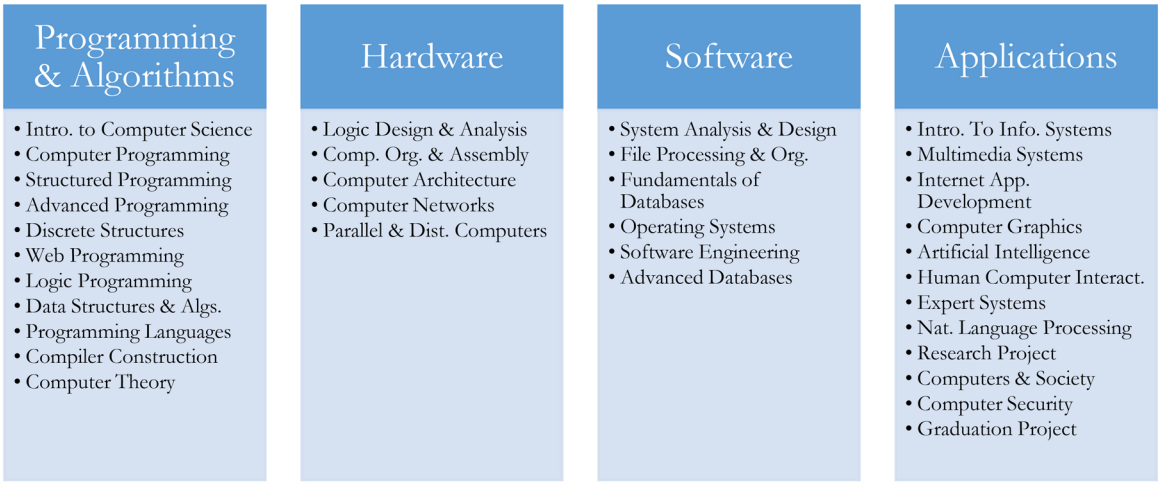
- Exam questions
- Reports
- Oral exams
- Project presentations
- Class works

Each course instructor should deliver a "Student Outcome Assessment Report" for each course he/she has taught during the semester. In order to check that the course Y covers the outcome X, the instructor should do:

1. The instructor designs a question in a homework, quiz, a midterm, class work, a project or the final exam that covers outcome X.

2. The instructor grades the question.
3. The instructor decides to have the satisfactory performance to be true if the grade of a student is above Z.
4. The instructor counts the number of students who pass the satisfactory performance level Z.
5. The instructor calculates the percentage of those students. Let us assume this percentage is K.
6. The outcome is considered covered if K is above a per-specified level C.
7. If K is lower than C, then the instructor tries to find a way to improve students› performance and repeats this evaluation process.
8. The instructor reports the assessment data in his course assessment report.

The computing courses are divided into four majors as shown in the figure below. An expert faculty is assigned to each course major, and he/she is named the "major coordinator". The major coordinators collect the course assessment reports from instructors and check the completeness and the correctness of the assessment data in those files.



Computing Course Majors

Indirect Assessment Data: Senior students and graduates participate in evaluating the attaining of the student outcomes through surveys.

10.3. Assessment Process Schedule

The assessment process is scheduled during the assigned year for evaluation through the following steps:

1. Train new staff (The first week of the semester).
2. Disseminate the assessment report if its format has been changed (The first week of the semester).
3. Distribute surveys (The last week of the semester)
4. Collect the assessment report (One week after the final exams)
5. The assessment committee disseminate the action plan (Two weeks after the final exams)
6. Follow-up reports for the action plan (During the following semester)

The assessment process is repeated every other year.

10.4. Attainment Level for the Student Outcomes

In the assessment process, we use the following values:

- Satisfactory Performance Level: 60%
- Attaining Level: 60%

11. Program Review

Program educational objectives are broad statements describing the achievements that graduates of the program should attain a few years after graduation, and their periodic review is managed by the assessment committee. Program educational objectives are the guiding principles upon which the program is based.

Program educational objectives are reviewed and revised in a largely informal manner via different ways of feedback. Specifically, PEOs are planned to be updated according to institutional

changes, national guidelines, and accreditation updates. Based on these sources, the assessment committee may propose updates to the program educational objectives, and seek approval from the program constituents. Specifically, the following table shows the main methods invoked to review and update the PEOs.

Methods to review and Updates PEOs

Code	Methods	Schedule	Participants
M1	Curriculum and Courses Committee	Annually	Its members
M2	Department Council	Available as needed	Faculty
M3	External Advisory Board	Annually	Its members
M4	Senior Surveys	Every 3 years	Senior students
M5	Alumni Surveys	Annually	Alumni 2-5 years out

Methods M1, M2, M3 and M4 have been applied during this academic year (2015-2016) yielding no change in the proposed PEOs. However, method M5 could not be applied since the program alumni are graduates from a period less than 2 years.

12. Accreditation

The program is pursuing accreditation from the ABET Computing Accreditation Commission only. The university is undergoing accreditation through NCAAA, the national accreditation body. Some colleges and departments have been accredited by some well-known international discipline-specific accreditation bodies, including ABET, Inc.

Appendix
Course Syllabi

A. Appendix: Course Syllabi

Course Code	Course Name	Prerequisite Courses
2316101-3	Introduction to Computer Science	–
2316102-3	Introduction to Information Systems	–
2316103-3	Computer Programming	2316101-3
2316204-3	Structured Programming	2316103-3
2316205-3	Advanced Programming	2316104-3
2316210-3	Discrete Structures	2304251-4
2316211-3	Web Programming	2316103-3
2316213-3	Logic Design & Analysis	2316101-3
2316214-3	Computer Organization & Assembly Prog.	2316213-3
2316315-3	Computer Architecture	2316214-3
2316316-3	Multimedia Systems	2316211-3
2316317-3	Logic Programming	2316210-3
2316318-4	Data Structures & Algorithms	2316205-3
2316322-3	System Analysis & Design	2316102-3
2316327-3	File Processing & Organization	2316318-4
2316331-4	Programming Languages	2316205-3, 2316317-3
2316333-3	Internet Applications Development	2316316-3
2316410-3	Compiler Construction	2316331-4
2316411-3	Operating Systems	2316315-3
2316412-3	Fundamentals of Databases	2316322-3, 2316327-3
2316413-3	Software Engineering	2316322-3
2316415-3	Computer Theory	2316327-3, 2316331-4
2316430-3	Computer Graphics	2316316-3
2316432-3	Artificial Intelligence	2316415-3
2316433-3	Human Computer Interaction	2316316-3

Course Code	Course Name	Prerequisite Courses
2316434-3	Parallel & Distributed Computers	2316411-3, 2316412-3
2316435-3	Advanced Databases	2316412-3
2316513-3	Expert Systems	2316432-3
2316514-3	Natural Language Processing	2316432-3
2316517-3	Computer Networks	2316411-3
2316518-3	Selected Topics	
2316519-4	Graduation Project I	2316411-3, 2316435-3
2316531-3	Computers & Society	–
2316532-3	Computer Security	2316411-3
2316539-4	Graduation Project II	2316519-4

Introduction to Computer Science

1. Course number and name: (2316101-3) Introduction to Computer Science

2. Credits and contact hours: 3 Credits (Lecture: 2/week – Practical Session: 2/week)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Upon completing this course, the student will have learned, through appropriate classroom and laboratory experiences, the basics of computers, networking, and software. Moreover, he should explain how computers store and manipulate information and understand what an operating system does, and give some examples of operating systems. Finally, he should also design simple algorithms and write their computer programs.

b. prerequisites or co-requisites:

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Overview of the physical computer components and their respective functions, and software components, the properties of computers, classification of computers
- Software: Basic Application Software – Specialized Application Software – System Software
- Hardware: The System Unit - Input and Output - Secondary Storage - Communications and Networks
- Windows Operating System – The Internet and the Web
- Data representation and Number systems
- Programming and Languages
- Algorithms and flowcharts
- C++ Programming: Input and output statements – Operations – Selection Statements

Introduction to Information Systems

1. Course number and name: (2316102-3) Introduction to Information Systems

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Upon the completion of this course, the student will have learned, through appropriate classroom and laboratory experiences, the fundamentals of information systems and understand the principles of the flow of data and the use of computers to solve some of organizational issues.

b. prerequisites or co-requisites: –

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Overview of Information Technology
- The Internet, the Web, and Electronic Commerce
- Communications and Networks
- Privacy, Security, and Ethics
- The basics and principles of information systems and organizations
- Databases basics
- New trends in information systems

Computer Programming

1. Course number and name: (2316103-3) Computer Programming

2. Credits and contact hours: 3 Credits (Lecture: 2/week – Practical Session: 2/week)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course introduces computer programming and problem solving in a structured program logic environment using the C and C++ languages. Emphasis is placed upon development of correct, efficient programs that are easy to maintain. Topics include language syntax, data types, problem analysis, program design, debugging, code comments, problem-solving methods, and logic control structures. Basic features of the C and C++ programming language such as data types, control structures, input/output statements, functions, and arrays are covered.

b. prerequisites or co-requisites: Introduction to Computer Science (2316101-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- **Introduction to Computers and Programming:** Hardware and Software – Programs and Data – Evolution of C and Advantages of C – Compiling, Linking & Debugging C programs.
- **Input, Processing, and Output:** Designing a Program – Data Types – Input, Output, and Constants & Variables Declarations – Variable Assignment and Calculations – Evaluation of expressions – Standard I/O operations – Operator precedence (order of evaluation of expressions) – Hand Tracing a Program – Documenting a Program
- **Decision Structures and Boolean Logic:** Introduction to Decision Structures – Dual Alternative Decision Structures – Comparing Strings – Nested Decision Structures – The Case Structure – Logical Operators – Boolean Variables
- **Repetition Structures:** Introduction to Repetition Structures – Condition-Controlled Loops:

While, Do-While, and Do-Until – Count-Controlled Loops and the For Statement – Calculating a Running Total – Nested Loops

- **Functions:** Introduction to Functions – User define functions – More Library Functions
- **Arrays:** Array Basics – Sequentially Searching an Array – Processing the Contents of an Array – Two-Dimensional Arrays

Structured Programming

1. Course number and name: (2316204-3) Structured Programming

2. Credits and contact hours: 3 Credits (Lecture: 2/week – Practical Session: 2/week)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course examines advanced features of modern programming languages such as pointers, files, modules. Upon the completion of this course, the student will have learned, through appropriate classroom and laboratory experiences, the essential of the concepts of the structured programming paradigm. They should identify the steps involved in creating a structured program and understand the nature and function, arrays, pointers and main file processing. They should also use these structures within a high-level language constructs and syntax (C++) to design, write and debug appropriate computer programs.

b. prerequisites or co-requisites: Computer Programming (2316103-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- **Functions:** Parameters definitions – Parameters passing – Recursion – Static functions – Local Variables, Global Variables and Global Constants
- **Data Structures (Arrays and Vectors):** One and two dimensional arrays – Passing arrays to a function – Searching and Sorting Arrays – Parallel Arrays – String, Array of Strings (use of main operations: Concatenate, string copy, compare, etc.)
- **Pointers:** Declarations – Passing pointers to a function – Operations on pointers – Pointer Arithmetic – Pointers and arrays
- **Files:** Introduction to File Input and Output – File operations and types: creating, storing, retrieving, updating, copy, delete, text file, binary file – Sequential, relative, indexed and ran-

dom access mode – Performance of Sequential Files – Direct mapping techniques: Absolute, relative and indexed sequential files

- **Modules:** Introduction to Modules – Defining and Calling a Module – Passing Arguments to Modules.

Advanced Programming

1. Course number and name: (2316205-3) Advanced Programming

2. Credits and contact hours: 3 Credits (Lecture: 2/week – Practical Session: 2/week)

3. Specific course information

a. **brief description of the content of the course (Catalog Description):** This course is to study the fundamental concepts and techniques necessary to write high-quality programs, including basic concepts of Object-Oriented programming, exception handling, and class libraries. Students will learn how to use inheritance, interfaces, exception handling, and how to incorporate graphical user interfaces (GUIs) into their programming applications. Students will also learn how to apply object-oriented design and programming principles to their programs. Typical assignments and projects include using built-in and programmer-defined classes to develop full-featured, easy-to-use programs. All of the mentioned concepts and techniques are studied using the Java language. It is important to note that this course is not a Java training course. The emphasis is on the concepts and techniques rather than the language itself.

b. **prerequisites or co-requisites:** Structured Programming (2316104-3)

c. **indicate whether a required, elective, or selected elective course in the program:** required

4. Brief list of topics to be covered

- **Introduction:** Object-Oriented concepts and design – overview of Java programming – Java program components – Java applications
- **Numerical Data:** Variables – Arithmetic Expressions – Constants – I/O operations
- **Classes and Objects:** Introductions to Classes – Constructors – Class/Object Methods – Data Members, Class/Object Constants –Methods/Constructors Overloading – Parameters Passing – Organizing Classes into Packages – Java docs Comments.

- **Object Oriented Operations:** Exceptions and Input/Output – Extending Classes – Inheritance – encapsulation
- **Graphical User Interface (GUI):** Design using AWT – Design using Swing
- **Events**

Discrete Structures

1. Course number and name: (2316210-3) Discrete Structures

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Upon completing this course the student will have learned, through appropriate classroom and laboratory experiences, the fundamental mathematical methods for characterizing and analyzing discrete systems. In addition, he should understand the modern algebraic concepts, logic theory, set theory, algorithms, and the graph theory.

b. prerequisites or co-requisites: Introduction to Group Theory (2304251-4).

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- The Mathematical Logic
- Sequences, Induction and Recursion
- Sets, Functions and Relations
- Counting and Probabilities
- Graphs and Trees
- Analysis of Algorithms

Web Programming

1. Course number and name: (2316211-3) Web Programming

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Introduction to the techniques and technologies for developing web sites. Topics include a web server, page layout with HTML and CSS, JavaScript, and web databases.

b. prerequisites or co-requisites: Computer Programming (2316103-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction to the Internet
- Introduction to HTML
- Introduction to Cascading Style Sheets
- Introduction to Scripting and JavaScript
- Web Servers and Database

Logic Analysis and Design

1. Course number and name: (2316101-3) Logic Analysis and Design

2. Credits and contact hours: 3 Credits (Lecture: 3/week–Practical Session:–)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course gives the student an overview of the numbers and uses electronic, as well as how to represent binary codes, and logic gates.

b. prerequisites or co-requisites: Introduction to Computer Science (2316101-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Number System (Decimal, Octal, Hexadecimal)
- Boolean Algebra and Logic gates
- Simplification of Boolean Functions
- Combinational Circuits
- Medium Scale Integrated Circuits
- Sequential Circuits

Computer Organization & Assembly

1. Course number and name: (2316214-3) Computer Organization & Assembly Programming

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Students will learn about the differences in instruction sets, processor design, and memory hierarchy, and their benefits and drawbacks. Students will also learn how the hardware interacts with software, and learn basic assembly language programming.

b. prerequisites or co-requisites: Logic Design & Analysis (1401213-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Machine organization
- Instruction sets
- Addressing modes
- Instruction encoding
- Datapath and control
- Memory organization

Computer Architecture

1. Course number and name: (2316315-3) Computer Architecture

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): The goals of the course are to understand computer architecture, particularly processor architecture (the key computer component), in detail, to understand computer performance, memory hierarchies and input output organization and technique such that Programmed I/O, Interrupt driven I/O and Direct Memory Access, to understand Pipeline technique, RISC and CISC architecture and advanced processor.

b. prerequisites or co-requisites: Computer Organization & Assembly Programming (2316214-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- **Introduction to computer architecture:** Central processing unit: register set, Memory Access Registers, Data-path Components, and Arithmetic-Logic Unit.
- **Performance:** performance metrics, performance evaluation, and execution time.
- **The Processor:** Data-path & Control unit: Implementing Instructions, Control Signals, Data-path with Control Signals, Single-Cycle Architecture
- **Memory System:** The Principle of Locality, Memory Hierarchy, The Motivation for Caches
- **Input–Output Design and Organization**
- **Input–Output Techniques:** Programmed I/O, Interrupt-driven I/O , Direct memory access (DMA)
- **Pipeline:** Non-pipelined design, Stages of Pipelines: Structure Hazards, Data Dependencies.
- **RISC / CISC Architecture:** Features of CISC, RISC Pipelines, CISC vs RISC.

- **Multicores, Multiprocessors, and Clusters: Shared Memory, Message Passing, Graphics Processing Units**

Multimedia Systems

1. Course number and name: (2316316-3) Multimedia Systems

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course covers the state-of-the-art technology for multimedia systems including aspects of the different media type images, animation, video, audio, graphics etc., and how they are used to create multimedia contents.

b. prerequisites or co-requisites: Web Programming (2316211-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction to Multimedia
- Multimedia Data Basics
- Audio Fundamentals
- Image and Video Fundamentals
- Animation
- Compression: Basic Algorithms
- Compression: Images (JPEG)
- Compression: Video (MPEG)

Logic Programming

1. Course number and name: (2316317-3) Logic Programming

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course introduces the meta-theory of elementary logic. Following by the basics of notation and the use of classical logic as a representation language, we concentrate on the twin notions of models and proof. An axiomatic system of first order logic is introduced and proved complete for the standard semantics, and then we give a very brief overview of the basic concepts of proof theory. This course deals with logic programming paradigm and Prolog. We discuss the syntax and the semantics of Prolog, the working of a Prolog interpreter and various applications of Prolog.

b. prerequisites or co-requisites: Structured Programming (2316210-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Logic and Argument
- Propositional Logic
- Propositional Logic: Truth table
- Propositional Logic: Logical Inference
- Propositional Logic: Conditional Proof
- Predicate Logic : Predicates and Variables
- Predicate Logic : Quantifiers
- First order logic
- Prolog: Introduction
- Prolog: Terms and unification
- Prolog: proof search

Data structures and Algorithms

1. Course number and name: (2316318-4) Data structures and Algorithms

2. Credits and contact hours: 4 Credits (Lecture: 4/week – Practical Session: –)

3. Specific course information

a. **brief description of the content of the course (Catalog Description):** This course covers fundamental principles of computer programming, with an emphasis on basic concepts of data and their representations inside a computer (scalar, structured and dynamic). Abstract data structures including manipulation of arrays, linked lists, strings, stacks, queues, linear lists, circular lists, orthogonal lists, trees and graphs. Implementations of Sorting, searching algorithms, the use of recursive algorithms, binary search trees, and hash tables. All of the mentioned concepts and techniques are studied using C++ language. It is important to note that this course emphasis is covering the abstract concepts and techniques of these algorithms rather than the practical and training programming course.

b. **prerequisites or co-requisites:** Advanced Programming (2316205-3)

c. **indicate whether a required, elective, or selected elective course in the program:** required

4. Brief list of topics to be covered

- **Introduction:** Abstract Data Types – Analysis of Algorithms – Data structures
- **Data Structures:** Arrays, Pointers, Classes – Recursion – Linked Listed – Operations on linked lists – Stack, Queue and Priority Queue structures – Operations on Stack and Queue
- **Data Structured II:** Trees and Heaps – Binary search trees – Operations on trees – Maps and Hash Tables – Introduction to graphs
- **Algorithms:** Searching algorithms – Sorting algorithms

System Analysis and Design

1. Course number and name: (2316333-3) System Analysis and Design

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Topics covered in this course include: systems, roles, and development methodologies, system development lifecycle, understanding and modeling organizational systems, project management and creating a feasibility report, information gathering, using data flow diagrams, process specification and structured decisions, and designing effective output and input.

b. prerequisites or co-requisites: Introduction to Information Systems (2316102-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Systems, Roles, and Development Methodologies
- Understanding and Modeling Organizational Systems
- Project Management
- Information Gathering
- Using Data Flow Diagrams
- Process Specifications and Structured Decisions
- Designing Effective Input and Output

File Organization and Processing

1. Course number and name: (2316327-3) File Organization and Processing

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course aims to introduce the topic of file structures design and discuss a number of advanced data structure concepts that are necessary for achieving high efficiency in file operations. In addition, students should develop important programming skills in an object-oriented language such as C++.

b. prerequisites or co-requisites: Data Structures & Algorithms (2316318-4)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction to file structures
- Fundamental file processing operations
- Secondary storage and system software
- Organizing files for performance
- File Compression
- Indexing
- Multi-level indexing and B-Trees
- Hashing

Programming Language

1. Course number and name: (2316331-4) Programming Language

2. Credits and contact hours: 4 Credits (Lecture: 4/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): The course aims to let students obtaining an understanding of programming languages, environments, translation, and implementation.

b. prerequisites or co-requisites: Advanced Programming (2316205-3),
Logic Programming (2316317-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- Computer Language History
- Language Design
- Syntax
- Basic Semantics
- Data Types and Memory Management
- Control I: Expressions and Statements
- Control II: Procedures and Environments
- Programming Paradigms: Object-Oriented, Functional & Logic

Internet Applications Development

1. Course number and name: (2316333-3) Internet Applications Development

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): The course cover the essential topics in developing web applications. Explores the issues involved in designing and building enterprise web applications: client/server architectures, database access, and web services. The course ends with a group project.

b. prerequisites or co-requisites: Multimedia (2316316-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction to Internet Protocols
- Dynamic Web Programming
- Web App Development
- Web Services
- Web Search and Mining
- Web Applications and Project

Compiler Construction

1. Course number and name: (2316410-3) Compiler Construction

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Students should learn the basic techniques that underlie the practice of compiler construction, and its phases. Moreover, they should be able to deal with compiler techniques and problems such as; ambiguous grammar, parsing types, and generating target codes, etc.

b. prerequisites or co-requisites: Programming Languages (2316331-4)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Overview of Compilation
- Scanners
- Parsers
- Code generations
- Runtime environments
- Register allocation
- Code optimization

Operating Systems

1. Course number and name: (2316411-3) Operating Systems

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course introduces the theory and practice behind modern computer operating systems The teaching approach covers both a theoretical perspective; the abstractions and algorithms, as well as a practical one; the mechanisms and how they are built.

b. prerequisites or co-requisites: Computer Architecture (2316315-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction to operating systems
- Operating system structures
- Process management
- Thread management
- CPU scheduling
- Process synchronization
- Deadlocks

Fundamentals of Databases

1. Course number and name: (2316412-3) Fundamentals of Databases

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Upon the completion of this course, the student will have learned, through appropriate classroom the basic concepts to design, create and implement database systems.

b. prerequisites or co-requisites: System Analysis & Design (2316322-3)
File Processing & Organization (2316327-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- Database System Concepts and Architecture
- Relational Database Models and Relational Algebra
- SQL
- Data Modeling Using the Entity-Relationship (ER) and Enhanced Entity-Relationship (EER) Models
- Functional Dependencies and Normalization for Relational Databases

Software Engineering

1. Course number and name: (2316413-3) Software Engineering

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Software engineering course prepares students to have background knowledge as well as core expertise in software engineering concepts, and to gain practical experiences of developing the software systems.

b. prerequisites or co-requisites: System Analysis & Design (2316322-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- Software processes
- Software requirements engineering
- Software system modeling
- Software design and implementation
- Software testing and evolution
- Software development project

Theory of Computing

1.Course number and name: (2316415-3) Theory of Computing

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): Upon the completion of this course, the student will have learned, through appropriate classroom lectures, what are the fundamental capabilities and limitations of computers, which problems can or cannot be computed, and how quickly can a problem be computed.

b. prerequisites or co-requisites: File Processing and Organization (2316327-3)
Programming Languages (2316331-4)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- Finite Automata
- Regular Languages
- Context-Free Languages
- Turing Machines
- Complexity
- NP Problems

Computer Graphics

1. Course number and name: (2316316-3) Computer Graphics

2. Credits and contact hours: 3 Credits (Lecture: 2/week – Practical Session: 3/week)

3. Specific course information

a. brief description of the content of the course (Catalog Description): The course offers an introduction to computer graphics, algorithms, and software. Topics include overview of graphics algorithms, 2D line drawing, 2D and 3D geometric transformations, 2D and 3D viewing, 2D and 3D clipping, 2D and 3D object representation.

b. prerequisites or co-requisites: Multimedia Systems (2316211-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction, Graphics Applications, Areas of research.
- **Mathematical Foundation for Graphics:** matrices, Dimension of a Space, Curves and Surfaces, Coordinate Systems.
- **2D graphics algorithms:** Line Drawing Algorithms, Circle Drawing Algorithms, Fill Area Algorithm.
- **2D and 3D Transformation and representation:** translation, scaling shear and rotation.
- **2D viewing: Clipping:** Overview of types of clipping, Cohen-Sutherland 2D clipping
- **3D Object Representations:** Boundary representation, Space partitioning, Procedural methods, Constructive solid geometry, Physically based modeling.
- **3D viewing:** Viewing Transformation, Viewing Parameters, Projection.

Artificial Intelligence

1. Course number and name: (2316432-3) Artificial Intelligence

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course introduces the basic concepts of Artificial Intelligence (AI) through covering a broad spectrum of AI concepts and methods, and apply them to solve AI problems.

b. prerequisites or co-requisites: Computer Theory (2316415-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- Intelligent Agents
- Solving Problems by Searching
- Logical Agents
- Planning
- Knowledge Representation
- Intelligent Systems
- Machine Learning

Human-Computer Interaction

1. Course number and name: (2316432-3) Human-Computer Interaction

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course gives an introduction about human-computer interaction problems from both sides of human and computer understanding. In addition, students should learn several techniques for prototyping and evaluating multiple interface alternatives.

b. prerequisites or co-requisites: Multimedia Systems (2316316-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Background--the development and scope of HCI
- HCI relevant issues in human perception, memory and thinking processes
- Approaches to modeling HCI interactions
- Task analysis, grammars, state charts
- Dialogue styles, information presentation
- User involvement, iterative design, prototyping, HCI and software engineering
- Methodologies, formative and summative
- Performance and learnability

Parallel and Distributed Systems

1. Course number and name: (2316434-3) Parallel and Distributed Systems

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. **brief description of the content of the course (Catalog Description):** This course introduces the principles, design and implementation of parallel and distributed systems. The lectures focus primarily on the principles and design of parallel and distributed systems, cover communication, distributed storage, naming, synchronization, fault tolerance, peer-to-peer systems and data centers. Developing a distributed systems middleware that provides high performance in large scale distributed and networked environment is discussed.

b. **prerequisites or co-requisites:** Operating Systems (2316411-3)

c. **indicate whether a required, elective, or selected elective course in the program:** required

4. Brief list of topics to be covered

- Introduction to parallel and distributed systems
- Distributed systems architecture
- Methods of communication in distributed systems
- Coordination in distributed systems
- Synchronization in distributed systems
- Deadlocks in distributed systems

Advanced Databases

1. Course number and name: (2316205-3) Advanced Databases

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course is intended to provide the student with an understanding of the current theory and practice of advanced database systems. To help him more fully appreciate their nature, the course provides a solid technical overview of advanced database systems such as: object and distributed database systems. In addition to technical concerns, issues that are more general are emphasized. These also include security, recovery, performance, advanced database design, and database administration.

b. prerequisites or co-requisites: Fundamentals of Databases (2316412-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Relational Calculus
- Relational Database Design by ER and EER-to-Relational Mapping
- Practical Database Design Methodology using UML Diagrams
- XML: Extensible Markup Language
- Object and Object-Relational Databases
- Algorithms for Query Processing and Optimization
- Database Security
- Distributed Databases

Expert Systems

1. Course number and name: (2316513-3) Expert Systems

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): The course aims to teach and train the students for building and using expert systems using various intelligent techniques.

b. prerequisites or co-requisites: Artificial Intelligence (2316432-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- Building a knowledge base
- Logical reasoning systems
- Expert systems design
- Fuzzy logic
- Neural networks
- Genetic algorithms
- Expert systems languages

Natural Language Processing

1. Course number and name: (2316514-3) Natural Language Processing

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description):

Upon the completion of this course, the student will have learned, through appropriate classroom lectures and projects, the fundamental algorithms and models for Natural Language Processing (NLP), how you can use them to solve practical problems in dealing with language data wherever you encounter it.

b. prerequisites or co-requisites: Artificial Intelligence (2316432-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- Finite-state methods for NLP
- Morphology
- Word prediction
- Language modeling
- Parts of speech
- Speech Synthesis
- Automatic Speech Recognition
- Arabic Language Processing

Computer Networks

1. Course number and name: (2316517-3) Computer Networks

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): This course focuses on fundamental network terminology and concepts, e.g. protocols, Open System Interconnection (OSI) and TCP/IP models, Ethernet, Internet Protocol (IP) addressing, routing protocols and network devices, such as routers and switches. The course provides an opportunity for students to understand the interconnections of various networks and to be able to design and configure small-scaled networks given some typical (customers) requirements.

b. prerequisites or co-requisites: Operating Systems (2316411-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction
- The Physical Layer
- The Data Link Layer
- The Medium Access Control Sublayer
- The Network Layer
- The Transport Layer
- The Application Layer

Research Project

1. Course number and name: (2316519-4) Graduation Project I

2. Credits and contact hours: 4 Credits (Lecture: 4/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description): The graduation project aims to let students develop projects that demonstrate their intellectual, technical and creative abilities. Students develop the projects under the direction and supervision of faculty members. Moreover, students gain lifelong learning skills and interface to real life applications. The main practical skills are related to software development processes. Specifically, students should practice in project management, system analysis and design, and software development documentation and presentation.

b. prerequisites or co-requisites: Operating Systems (2316411-3),
Advanced Databases (2316435-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Project Initialization
- Survey and research component
- System software analysis
- Software design
- Software develop documentation
- Project presentation

Computers & Society

1. Course number and name: (2316531-3) Computers & Society

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. **brief description of the content of the course (Catalog Description):** In this course, the student should learn the following topics: Historical Background, Communications and Internet, Computers in Education, Computer Ethics, Computer Privacy, Computer Security, Software Piracy, Computer in Aviation, Computer Crimes, and Popular Social Network Sites.

b. **prerequisites or co-requisites:** –

c. **indicate whether a required, elective, or selected elective course in the program:** required

4. Brief list of topics to be covered

- Communications and Internet
- Computer Ethics
- Computer Privacy
- Computer Crimes
- Software Piracy
- Computer Security
- Popular Social Network Sites

Computer Security

1. Course number and name: (2316532-3) Computer Security

2. Credits and contact hours: 3 Credits (Lecture: 3/week – Practical Session: –)

3. Specific course information

a. brief description of the content of the course (Catalog Description):

The goal of this course is to give to students the skills needed to secure computer systems and insurance programs, as well as securing equipment. As well as the study of encryption operations and to study the exposure secure operating systems, secure data systems, and secure network systems.

b. prerequisites or co-requisites: Operating System (2316411-3)

c. indicate whether a required, elective, or selected elective course in the program: required

4. Brief list of topics to be covered

- Introduction to Computer security
- Hardware security
- Memory security
- Cryptography
- Basic of TCP/IP Bugs
- Studies of some Attacks (Scan, DoS and DDoS)
- Malware attacks
- System security tools
- Network security tools
- Web security tools

Graduation Project

1. Course number and name: (2316539-4) Graduation Project II

2. Credits and contact hours: 4 Credits (Lecture: 4/week – Practical Session: –)

3. Specific course information

a. **brief description of the content of the course (Catalog Description):** The graduation project aims to let students develop projects that demonstrate their intellectual, technical and creative abilities. Students develop the projects under the direction and supervision of faculty members. Moreover, students gain lifelong learning skills and interface to real life applications. The main practical skills are related to software development processes. Specifically, students should practice in project management, system restriction, system analysis and design, software implementation and testing, software development documentation and presentation, and project demonstration.

b. **prerequisites or co-requisites:** Graduation Project I (2316519-4)

c. **indicate whether a required, elective, or selected elective course in the program:** required

4. Brief list of topics to be covered

- Project Initialization
- Feasibility study and system restrictions
- System software analysis and design
- Software implementation and testing
- Software develop documentation
- Project display and presentation