Computer Science Program Study Plan V 1.1

Academic Advising Unit

1440-1441

Overview

The program focuses on the mathematical and theoretical foundation of computing. English will be the language for teaching specialized courses and basic sciences. Students together with some of their colleagues will participate in the implementation of a graduation project during their final year of study. Students can choose between four tracks of computer science program:

(1) Software Engineering;

(2) Computer Security

(3) Artificial Intelligence

(4) Data Science

Vision

The vision of the Computer Science Department is to provide recognized academic program that meets international standards in field of computer science in order to prepare well trained, qualified and national professionals in this field.

Mission

Prepare qualified national graduates with high skills and enough experience to join and engage into the labor market of the field of computer science by providing the graduates with the latest knowledge, advanced skills, and strong moral values to serve the kingdom of Saudi Arabia

Program Educational Objectives

Program educational objectives define the characteristics of our graduates a few years after they have graduated and are employed, or undertaking graduate studies. The program will produce graduates who:

PEO 1: Be gainfully employed in computer science or related career paths including industrial, academic, governmental and non-governmental organizations.

PEO 2: Continue their professional development by engaging in professional activities and/or training to enhance their careers and/or pursue post-graduate studies

PEO 3: Advance in their professional career of the Computer Science field.

Program Study Plan

1. Compulsory and Elective Requirements

Requirement	Type	Credit Hours	Percentage out of study plan hours	Committee Observations
Preparatory Year	Compulsory	29	18.7	
	Elective	0	0	
University	Compulsory	12	7.74	
	Elective	0	0	
College	Compulsory	42	27.1	
	Elective	0	0	
Department	Compulsory	59	38.06	
	Elective	12	7.74	
Free Elective		1	0.65	
Total Credits and Percentiles		155	100	

2. Preparatory Year Requirements

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
113	PCOM	Computer Skills (مهارات الحاسب)	2 (1,1,0)		
111	PENG	Preparatory English 1 (لغة إنجليزية تحضيرية 1)	8 (2,6,0)		
121	PENG	Preparatory English 2 (لغة إنجليزية تحضيرية 2)	6 (2,4,0)	PENG 111	
123	PENG	English for science and Engineering (الإنجليزية للعلوم والهندسة)	2 (1,1,0)		
112	PMTH	Introduction to Mathematics 1 (مقدمة في الرياضيات 1)	2 (2,0,0)		
127	PMTH	Introduction to Mathematics 2 (مقدمة في الرياضيات 2)	4 (4,0,0)	PMTH 112	
128	PPHS	General Physics (فيزياء عامة)	3 (2,1,0)		
114	PSSC	Learning & Communication Skills (مهارات التعلم والتواصل)	2 (1,1,0)		
Total			**29 Credits**		

3. University Requirements

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
101	SALM	Introduction to Islamic Culture (مقدمة للحضارة الإسلامية)	2 (2,0,0)		
102	SALM	Islam and Society Building (الإسلام وبناء المجتمع)	2 (2,0,0)		Students choose 3 courses
103	SALM	Economic System in Islam (النظام الاقتصادي في الإسلام)	2 (2,0,0)		
104	SALM	Fundamental of Political System in Islam	2 (2,0,0)		

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
		(أساسيات النظام السياسي في الإسلام)			
101	ARAB	Arabic Language Skills (مهارات اللغة العربية)	2 (2,0,0)		Students choose 1 course
103	ARAB	Arabic Writing (الكتابة باللغة العربية)	2 (2,0,0)		
101	ENG	General English (لغة إنجليزية عامة)	2 (2,0,0)		Students choose 2 courses
101	ENT	Business Entrepreneurship (ريادة الأعمال)	2 (2,0,0)		
101	FCH	Family and Childhood (الأسرة والطفولة)	2 (2,0,0)		
101	HAF	Principles of Health and Fitness (مبادئ الصحة واللياقة البدنية)	2 (2,0,0)		
101	LHR	Human Rights Systems (أنظمة حقوق الإنسان)	2 (2,0,0)		
101	SOCI	Societal Issues (قضايا مجتمعية)	2 (2,0,0)		
101	VOW	Volunteering Systems (أنظمة العمل التطوعي)	2 (2,0,0)		
Total Required			**12 Credits**		

4. College Compulsory Requirements

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
110	CS	Programming 1 (برمجة الحاسب 1)	4 (3,2,0)	PCOM 113	
120	CS	Programming 2 (برمجة الحاسب 2)	4 (3,2,0)	CS 110	
210	CS	Data Structures (هياكل البيانات)	3 (3,1,1)	CS 120	
240	CS	Operating Systems (أنظمة التشغيل)	3 (3,0,1)	CS 210	
399	CS	Seminar (ندوة)	1 (1,0,0)	100 Credits	
114	ENG	Technical English 1 (لغة إنجليزية تقنية 1)	2 (2,0,0)	PENG 121	
127	ENG	Technical English 2 (لغة إنجليزية تقنية 2)	2 (2,0,0)	ENG 114	
231	IS	Fundamental of Database (أساسيات قواعد البيانات)	3 (3,0,1)	CS 110	
334	IS	Software Project Management (إدارة مشاريع البرمجيات)	3 (3,0,1)	100 Credits	
481	IT	Ethics & Professional Practice (الأخلاقيات والممارسات المهنية)	2 (2,0,0)	90 Credits	
111	MATH	Discrete Mathematics (الرياضيات المتقطعة)	3 (3,0,1)		
112	MATH	Calculus1 (حساب التفاضل والتكامل 1)	3 (3,0,1)	PMTH 127	
126	MATH	Calculus 2 (حساب التفاضل والتكامل 2)	3 (3,0,1)	MATH 112	
104	PHY	Physics 1 (فيزياء 1)	3 (2,2,1)	PPHS 128	
102	STAT	Probability and Statistics	3 (3,0,1)	MATH 112	

		(الإحتمالات والإحصاء)			
	Total		**42 Credits**		

5. College Elective Courses

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
250	IT	Information Technology & Fundamental of Networking (تقنية المعلومات وأساسيات الشبكات)	2 (0,4,0)	CS110	Cisco
470	IT	CCNA Routing and Switching (التوجيه والتحويل في CCNA)	2 (0,4,0)	IT 250	
471	IT	CCNA Security (أمن الشبكات في CCNA)	2 (0,4,0)	IT 470	
472	IT	Network Programming & Administration (برمجة وإدارة الشبكات)	2 (0,4,0)	CS110	
473	IT	Storage Networks (شبكات التخزين)	2 (0,4,0)	CS110	
251	IT	Java Fundamentals (أساسيات لغة الجافا)	2 (0,4,0)	CS110	Oracle
474	IT	Database Design and Programming with SQL (تصميم وبرمجة قواعد البيانات باستخدام SQL)	2 (0,4,0)	CS110	
475	IT	Programming with PL/SQL (البرمجة باستخدام PL/SQL)	2 (0,4,0)	CS110	
476	IT	Database Administration (إدارة قواعد البيانات)	2 (0,4,0)	CS110	
252	IT	Configuring & Administering Windows Server 2012 (إعداد وإدارة نظام ويندوز الخادم 2012)	2 (0,4,0)	CS110	Microsoft
477	IT	Web Development (تطوير الويب)	2 (0,4,0)	CS110	

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
478	IT	Mobile Development (تطوير الهواتف المتنقلة)	2 (0,4,0)	CS110	
479	IT	Gaming Development (تطوير الألعاب)	2 (0,4,0)	CS110	
480	IT	.NET Technologies & Visual Programming (تقنية NET. والبرمجة المرئية)	2 (0,4,0)	CS110	
482	IT	IT Service Management (إدارة خدمات تقنية المعلومات)	2 (0,4,0)	CS110	
483	IT	Cloud Computing (الحوسبة السحابية)	2 (0,4,0)	CS110	
484	IT	Business Intelligence (ذكاء الأعمال)	2 (0,4,0)	CS110	IBM
485	IT	Security and Information Assurance (أمن وضمان المعلومات)	2 (0,4,0)	CS110	
Total Required			**6 Credits**		

6. Program Compulsory Requirements

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
270	CS	Programming Languages (لغات البرمجة)	3 (3,0,1)	CS 210	
305	CS	Algorithm Design and Analysis (تصميم وتحليل الخوارزميات)	3 (3, 0, 1)	CS 210	
310	CS	Computer Graphics (الرسومات باستخدام بالحاسب)	3 (3,0,1)	CS 120	
312	CS	Computer Organization (تنظيم الحاسب)	3 (3,0,1)	MATH 111, CS 210	
320	CS	Artificial Intelligence (الذكاء الإصطناعي)	3 (3,1,0)	MATH 111	
330	CS	Compilers (المترجمات)	3 (3,1,0)	CS 270	
350	CS	Parallel and Distributed Computing (الحوسبة المتوازية والموزعة)	3 (3,0,1)	CS 312	
360	CS	Software Engineering (هندسة البرمجيات)	3 (3,0,1)	CS 120	

432	CS	Software Modeling and Analysis (نمذجة وتحليل البرمجيات)	<u>3 (3,0,1)</u>	CS 360	
450	CS	Information Security (أمن المعلومات)	3 (3,0,0)	IT 341	
498	CS	Graduation Project 1 (مشروع التخرج 1)	2 (2,0,0)	120 Credits	
499	CS	Graduation Project 2 (مشروع التخرج 2)	3 (3 0,0)	CS 498	
	GE	Science Elective (مقرر إختياري علمي)	3 (3,0,1)		
250	IT	Elective Professional Course 1 (مقرر إختياري مهني 1)	2 (0,4,0)	<u>CS 110</u>	
470	IT	Elective Professional Course 2 (مقرر إختياري مهني 2)	2 (0,4,0)	IT 250	
471	IT	Elective Professional Course 3 (مقرر إختياري مهني 3)	2 (0,4,0)	IT 470	
341	IT	Data Transmission &Computer Networks (تراسل البيانات وشبكات الحاسب)	3 (3,0,1)	CS 240	
107	MATH	Linear Algebra (الجبر الخطي)	3 (3,0,1)	MATH 112	
205	MATH	Differential Equations (المعادلات التفاضلية)	3 (3,0,1)	MATH 126	
254	MATH	Numerical Methods (طرق عددية)	3 (3,0,1)	MATH 205	
125	PHY	Physics 2 (فيزياء 2)	3 (2, 2, 1)	PHY 104	
Total			**59 Credits**		

7. Program Electives

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
430	CS	Design and Architecture of Large Software Systems (تصميم وبناء نظم البرمجيات الكبيرة)	3 (3,0,1)	CS 360	
431	CS	Low-Level Design of Software (تصميم الرمجيات منخفضة المستوى)	3 (3,0,1)	CS 360	
434	CS	Software Evolution (Maintenance) (تطور البرمجيات "صيانة")	3 (3,0,1)	CS 360	**Software Engineering" Track"**
435	CS	Software Architectures (أبنية البرمجيات)	3 (3,0,1)	CS 360	
<u>436</u>	<u>CS</u>	<u>Selected Topics in Software Engineering</u> (موضوعات مختارة في هندسة البرمجيات)	<u>3 (3,0,1)</u>	<u>CS 360</u>	**Choose 12 credit**
<u>437</u>	<u>CS</u>	<u>Software Requirements Analysis</u> (تحليل متطلبات البرامج)	<u>3 (3,0,1)</u>	<u>CS 360</u>	

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
438	CS	User Interface and User Experience Design (واجهة المستخدم وتصميم تجربة المستخدم)	3 (3,0,1)	CS 360	
440	CS	Coding and Information Theory (نظرية الترميز والمعلومات)	3 (3,0,1)	IT 341	**Computer Security" Track"** **Choose 12 credit**
441	CS	Security Management (إدارة الأمن)	3 (3,0,1)	IT 341	
442	CS	Computer Security (أمن الحاسب)	3 (3,0,1)	IT 341	
443	CS	Formal Methods for Cryptography (الطرق المناسبة للتشفير)	3 (3,0,1)	IT 341	
444	CS	Internet Security, tools & techniques (أمن الإنترنت، الأدوات والتقنيات)	3 (3,0,1)	IT 341	
445	CS	Network Management and Security (إدارة وأمن الشبكات)	3 (3,0,1)	IT 341	
460	CS	Computer Vision (الرؤية باستخدام الحاسب)	3 (2,2,0)	CS 210	**"Artificial Intelligence Track"** **Choose 12 Credit**
461	CS	Intelligent Agents (العملاء الأذكياء)	3 (3,1,0)	CS 320	
462	CS	Machine Learning (تعلم الآلة)	3(3,1,0)	STAT 102	
463	CS	Natural Language Processing (معالجة اللغة الطبيعية)	3 (3,1,0)	CS 270	
464	CS	Robotics (الروبوتات)	3(3,0,1)	CS 320	
465	CS	Selected Topics in AI (مواضيع مختارة في الذكاء الاصطناعي)	3 (3,1,0)	CS 320	
470	CS	Introduction to Data Science (مقدمة في علم البيانات)	3 (3,1,0)	STAT 102	**"Data Science Track"** **Choose 12 Credit**
471	CS	Big Data Analytics (تحليل البيانات الضخمة)	3 (2,2,0)	STAT 102	
472	CS	Probability Statistics for Data Science (التحليل الإحصائي لعلم البيانات)	3 (2,2,0)	STAT 102	
473	CS	Data Visualization (التصوير المرئي للبيانات)	3 (3,1,0)	STAT 102	
474	CS	Selected Topics in Data Science (مواضيع مختارة في علم البيانات)	3 (3,1,0)	STAT 102	
Total Required			**12 Credits**		

8. Training Requirements

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
400	CS	Summer Training (تدريب صيفي)	1 (1,0,0)	120 Credits	

		Total	1 Credits		

9. Courses According to Levels

First Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
113	PCOM	Computer Skills (مهارات الحاسب)	2 (1,1,0)		
111	PENG	Preparatory English 1 (لغة إنجليزية تحضيرية 1)	8 (2,6,0)		
112	PMTH	Introduction to Mathematics 1 (مقدمة في الرياضيات 1)	2 (2,0,0)		
114	PSSC	Learning & Communication Skills (مهارات التعلم والتواصل)	2 (1,1,0)		
		Total	14 Credits		

Second Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
121	PENG	Preparatory English 2 (لغة إنجليزية تحضيرية 2)	6 (2,4,0)	PENG 111	
123	PENG	English for science and Engineering (الإنجليزية للعلوم والهندسة)	2 (1,1,0)		
127	PMTH	Introduction to Mathematics 2 (مقدمة في الرياضيات 2)	4 (4,0,0)	PMTH 112	
128	PPHS	General Physics (فيزياء عامة)	3 (2,1,0)		
		Total	15 Credits		

Third Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
110	CS	Programming 1 (برمجة الحاسب 1)	4 (3,2,0)	PCOM 113	
114	ENG	Technical English 1 (لغة إنجليزية تقنية 1)	2 (2,0,0)	PENG 121	
111	MATH	Discrete Mathematics (الرياضيات المتقطعة)	3 (3,0,1)		
112	MATH	Calculus1 (حساب التفاضل والتكامل 1)	3 (3,0,1)	PMTH 127	
104	PHY	Physics 1 (فيزياء 1)	3 (2,2,1)	PPHS 128	
----	SALM	Elective Islamic Culture (1) (مقرر إختياري حضارة إسلامية 1)	2 (2,0,0)		
		Total	17 Credits		

Fourth Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
----	ARAB	Elective Arab Culture (مقرر إختياري ثقافة عربية)	2 (2,0,0)		
120	CS	Programming 2 (برمجة الحاسب 2)	4 (3,2,0)	CS 110	
127	ENG	Technical English 2 (لغة إنجليزية تقنية 2)	2 (2,0,0)	ENG 114	
126	MATH	Calculus 2 (حساب التفاضل والتكامل 2)	3 (3,0,1)	MATH 112	
125	PHY	Physics 2 (فيزياء 2)	3 (2, 2, 1)	PHY 104	
102	STAT	Probability and Statistics (الإحتمالات والإحصاء)	3 (3,0,1)	MATH 112	
Total			**17 Credits**		

Fifth Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
210	CS	Data Structures (هياكل البيانات)	3 (3,1,1)	CS 120	
231	IS	Fundamental of Database (أساسيات قواعد البيانات)	3 (3,0,1)	CS 110	
250	IT	Elective Professional Course 1 (مقرر إختياري مهني 1)	2 (0,4,0)	CS 110	
107	MATH	Linear Algebra (الجبر الخطي)	3 (3,0,1)	MATH 112	
205	MATH	Differential Equations (المعادلات التفاضلية)	3 (3,0,1)	MATH 126	
----	SALM	Elective Islamic Culture (2) (مقرر إختياري ثقافة إسلامية 2)	2 (2,0,0)		
Total			**16 Credits**		

Sixth Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
240	CS	Operating Systems (أنظمة التشغيل)	3 (3,0,1)	CS 210	
	GE	Science Elective (مقرر إختياري علمي)	3 (3,0,1)		
----	----	Elective General Course (1) (مقرر إختياري عام 1)	2 (2,0,0)		
270	CS	Programming Languages (لغات البرمجة)	3 (3,0,1)	CS 210	
312	CS	Computer Organization (تنظيم الحاسب)	3 (3,0,1)	MATH 111, CS 210	
----	SALM	Elective Islamic Culture (3) (مقرر إختياري ثقافة إسلامية 3)	2 (2,0,0)		
Total			**16 Credits**		

Seventh Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
---	---	Elective General Course (2) (مقرر إختياري عام 2)	2 (2,0,0)		
305	CS	Algorithm Design and Analysis (تصميم وتحليل الخوارزميات)	3 (3, 0, 1)	CS 210	
310	CS	Computer Graphics (الرسومات باستخدام بالحاسب)	3 (3,0,1)	CS 120	
320	CS	Artificial Intelligence (الذكاء الإصطناعي)	3 (3,1,0)	MATH 111	
330	CS	Compilers (المترجمات)	3 (3,1,0)	CS 270	
341	IT	Data Transmission &Computer Networks (تراسل البيانات وشبكات الحاسب)	3 (3,0,1)	CS 240	
Total			**17 Credits**		

Eighth Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
350	CS	Parallel and Distributed Computing (الحوسبة المتوازية والموزعة)	3 (3,0,1)	CS 312	
360	CS	Software Engineering (هندسة البرمجيات)	3 (3,0,1)	CS 120	
399	CS	Seminar (ندوة)	1 (1,0,0)	100 Credits	
334	IS	Software Project Management (إدارة مشاريع البرمجيات)	3 (3,0,1)	100 Credits	
481	IT	Ethics & Professional Practice (الأخلاقيات والممارسات المهنية)	2 (2,0,0)	90 Credits	
254	MATH	Numerical Methods (طرق عددية)	3 (3,0,1)	MATH 205	
Total			**15 Credits**		

Ninth Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
---	CS	Track Course (مقرر مسار)	3		
---	CS	Track Course (مقرر مسار)	3		
400	CS	Summer Training (تدريب صيفي)	1 (1,0,0)	120 Credits	
450	CS	Information Security (أمن المعلومات)	3 (3,0,0)	IT 341	
498	CS	Graduation Project 1 (مشروع التخرج 1)	2 (2,0,0)	120 Credits	
470	IT	Elective Professional Course 2	2 (0,4,0)	IT 250	

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
		(مقرر إختياري مهني 2)			
Total			**14 Credits**		

Tenth Level

Course No.	Course Code	Course Title	Credit Hours	Prerequisite	Comments
---	CS	Track Course (مقرر مسار)	3		
---	CS	Track Course (مقرر مسار)	3		
432	CS	Software Modeling and Analysis (نمذجة وتحليل البرمجيات)	3 (3,0,1)	CS 360	
499	CS	Graduation Project 2 (مشروع التخرج 2)	3 (3 0,0)	CS 498	
471	IT	Elective Professional Course 3 (مقرر إختياري مهني 3)	2 (0,4,0)	IT 470	
Total			**14 Credits**		

Computer Science Program: Course Catalog

A-Core Courses

CS 110 Programming 1

Pre-requisite: PCOM 113

This course introduces the students to the fundamentals of logic formulation together with their implementation in the C++ programming language. It introduces students to structured, top-down programming design and implementation. This course should serve as a foundation for students in the Computer Science and information technology program.

CS120 Programming 2

Pre-requisite: CS 110

This course introduces the fundamental concepts of object oriented programming including classes, polymorphism, encapsulation and information hiding, and inheritance will be studied using the C++ programming language.

CS 210 Data Structures

Pre-requisite: CS 120

The purpose of this course is to provide the students with solid foundations in the basic concepts of programming: data structures and algorithms. The main objective of the course is to teach the students how to select and design data structures and algorithms that are appropriate for problems that they might encounter. This course is also about comparing algorithms and studying their correctness and computational complexity. This course offers the students a mixture of theoretical knowledge and practical experience using C++

CS 240 Operating Systems

Pre-requisite: CS 210

The purpose of this course is to provide an overview of operating systems and presents theory, design, implementation, and analysis of operating systems. Emphasis will be given on process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), file systems and storage management.

CS 270 Programming Languages

Pre-requisite: CS 120

This course describes a set of formal mathematical tools for defining and implementing the semantics of a language and demonstrates them in the context of important real-world programming languages, with emphasis on theoretical properties of type systems. Major topics include: lexical and syntax analysis, bane binding, type checking and scopes, data types, expressions, flow control, and subprograms.

CS 305: Algorithm Design and Analysis

Prerequisite: CS 210

The purpose of this course is to learn several fundamental principles of algorithm design and analysis techniques. Topics include the divide-and-conquer design approaches, fast sorting, searching, and multiplication, fundamental algorithms on graphs, such as how to find shortest paths, and how to explore graph, practical algorithms on important data structures such as: binary search trees and heaps, NP-Complete problems, whose status is unknown, or no polynomial-time algorithm has been discovered to solve such kind of problems.

CS 310 Computer Graphics

Prerequisite: CS 120

This Course is designed to impart knowledge of Computer Graphics such as line and circle drawing algorithm, projection, clipping, transformation techniques of images etc. The goal of this course is to provide an introduction to the theory and practice of computer graphics. The course will assume a good background in programming in C or C++ and a background in mathematics including familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.

CS 312 Computer Organization

Pre-requisites: MATH 111 & CS 210

This course introduces the students to the basics of computer organization: the internal structure and operation of a digital computer at the level of memory, registers, flow of control, and assembly language. This course has a theoretical and a practical component: computer organization will be studied at a theoretical level, and students will have the opportunity to practice their skills by studying the assembly language for a particular Reduced Instruction Set Computer.

CS 320 Artificial Intelligence

Pre-requisite: MATH 111

This course will serve as an introduction to artificial intelligence concepts and techniques. Specific topics we will cover include the history and philosophy of AI, the agent paradigm in AI systems, search, game playing, knowledge representation and reasoning, logical reasoning, uncertain reasoning and Bayes nets, planning, and machine learning. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously

CS 330 Compilers

Pre-requisite: CS 270

In this course students will develop a deeper understanding of modern compiler techniques applied to general-purpose programming languages. It will give students a working knowledge of the foundations, tools, and engineering approaches used in developing formal language translators. Major topics include:

CS 350 Parallel and Distributed Computing

Pre-requisite: CS 312

This course covers parallel and distributed processing concepts including concurrency and its management, architectures, programming, performance evaluation, applications and models of parallel computation, and synchronous and asynchronous parallelism.

CS360 Software Engineering

Pre-requisite: CS 120

This course introduces concepts and techniques relevant to the production of large software systems. Students are taught a programming method based on the recognition and description of useful abstractions. Topics include modularity, specification, data abstraction, object modeling, design patterns, and testing. Students complete several programming projects of varying size, working individually and in groups.

CS 432 Software Modeling and Analysis

Pre-requisite: CS 360

This course presents an integrated set of techniques for software analysis and design based on object-oriented concepts and the UML notation. Topics include introduction to object concepts, fundamentals of object oriented analysis and design process, use-case analysis, object modeling using behavioral techniques, design patterns, design quality and metrics

CS 450 Information Security

Pre-requisite: IT 341

This course helps the students to learn principles of information security, need for information security, place of security and contributed parties, legal and ethical issues, information security and risk management, information security implementation, security auditing, incident response, business continuity and disaster recovery planning.

IS 231 Fundamentals of Database

Prerequisite: CS 110

Effective use of Database software tools is one of the fundamental goals of this course. Training on different Database tools leads to provide students with solid knowledge and required practice on well-known tools. This course includes Database concepts and architecture; data models, database schemes and instances, structured query language (SQL); data definition, queries, update, statements, and views in SQL, database design; functional dependencies, normal forms.

IS 334 Software Project Management

Pre-requisite: 100 Credits

This course addresses the main issues related to software project management such as project definition, scope management, planning, organization, resources, scheduling, control, quality, cost estimation, time estimation, and, risk management. Topics include project management ethics, and effective project manager skills such as people and leadership skills. Students should get exposed to a software package used for this purpose.

IT 341 Data Transmission & Computer Networks

Prerequisite: CS 240

This course introduces students to evolution trend of computer networks. This course provides with practical knowledge and hands-on experience in transmitting data over the network .Topics include network architecture, transmission media, data encoding, error detection, MAC protocol, LAN standards, Internet Protocol (IP), Routing Algorithms, TCP and UDP and Application layer protocols.

IT 481 Ethics and Professional Practice

Pre-requisite: 90 Credits

This course will develop the ethical foundations of good professional practice in information technology. It will provide the necessary background of ethical theories and practices, and discuss the role of professional organizations in maintaining such practice, specifically in the information technology industry.

General English Courses

ENG 114 Technical English (1)

Pre-requisite:	PENG 121

This course provides students with a solid foundation of basic sentence form and function. It concentrates on grammatical structures, vocabulary expressions often used in technical and professional contexts.

ENG 127 Technical English (2)

Pre-requisite:	ENG 114

Building on the content of Technical English, this course is intended to provide students of Computer Sciences and IT with more advanced and specialized technical English needed for studying their major and functioning in their future careers.

B-Maths and Science Courses

MATH 107 Linear Algebra

Prerequisite: MATH 112

Linear Algebra is highly recommended for all majors of engineering. The course includes the topics: the system of linear equations and their solutions, determinate, vector space, linear transformation; eigen values and vectors.

MATH 111 Discrete Mathematics

Pre-requisite:	None

The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. In particular, this class is meant to introduce logic, proofs, sets, relations, functions, counting, and probability, with an emphasis on applications in computer science.

MATH 112 Calculus (1)

Prerequisite: PMATH 127

This course is designed to develop the topics of differential and integral calculus. Emphasis is placed on limits, continuity, derivatives, applications of derivatives, and integrals of algebraic and transcendental functions of one variable.

MATH 126: Calculus 2

Prerequisite: MATH 112

This course introduces the students with integral and derivativities of functions of several variables. Emphasis is placed on integration techniques, series and sequence, polar and parametric coordinates, multiple integration and partial differentiation and applications of integration.

MATH 205: Differential Equations

Prerequisite: MATH - 126

Catalogue Description: This course is introducing differential equation and applications. Emphasis is placed on first order differential equation, techniques of solving the differential equations. Higher order differential equations, mathematical modelling of standard problem.

MATH 254: Numerical Methods

Prerequisite: MATH 205

Catalogue Description: This course offers an advanced introduction to numerical algorithms such as stability and convergence. Topics include Root finding for nonlinear equations, Interpolation, Numerical differentiations and Integrations, Numerical solution of differential

equation, Systems of linear equations, Boundary Value Problems and Numerical optimization.

STAT 102: Probability and Statistics

Prerequisite: MATH 112

Probability and Statistics introduces the fundamental ideas and techniques of probability theory and statistical inference. The course includes the following topics: Sample Space, Probability, Random variable, discrete and continuous distributions, Sampling distribution, estimation and correlation and regression.

PHY 104 Physics (1)

Pre-requisite: PPHS 128

This course is designed to equip the skills and knowledge of fundamental principles of Physics to apply in computer science. This course cover the laws govern motion in one and two dimensions, static equilibrium, elasticity, vibration and waves and simple harmonic motion (SHMPHY125

PHY 125: Physics (2)

Pre-requisite: PHY104

The course prepares computer science students to apply Physics knowledge into practice of computer programming and its applications. This course includes electric and magnetic field, Coulomb's law, Gauss' Law, Kirchhoff's rules, resonance in LCR circuit and Electromagnetic waves

GE 107: GENARAL CHEMISTRY

Prerequisite: N/A

The course in Computer Science helps to acquire knowledge in manufacturers design, characterize new compounds and understand fundamental properties of atoms, molecules, and chemical reactions. The course topics include physical and chemical properties of matter, photoelectric effect, Bohr's theory of the Hydrogen Atom, periodic table, electrochemistry and Chemistry in the atmosphere.

PROFESSIONAL ELECTIVE COURSES

PROFESSIONAL ELECTIVE I

Prerequisite: CS 110

IT 250   Information technology and fundamental of networking

This course introduces the architecture, structure, functions, components, and models of the computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for Network. Routing and Switching.

IT 251   Java Fundamental

This course is an introduction to object-oriented programming using the Java language. This course focuses on Java programming language constructs to create several Java technology applications.

IT 252   Configuring and administrating Window Server

This course focuses on real skills for real jobs and prepares students to prove mastery of core services such as Active Directory and networking services.

IT 482   IT Service Management

This course focuses on Foundations in IT services, governance, and ITIL Availability management, Smart Cloud Application Performance Management, Software Quality Management and Automated Testing using IBM Rational tools.

PROFESSIONAL ELECTIVE II

IT 470   CCNA Routing and Switching

Prerequisite: IT 250

This course describes the architecture, components, and operations of routers and switches in larger and more complex networks. Also discusses the WAN technologies and network services required by converged applications in a complex network and enables students to understand the selection criteria of network devices and WAN technologies to meet network requirements.

IT 474   Database Design &Programming with SQL

Prerequisite: CS 110

This course focus to analyze complex business scenarios and create a data model—a conceptual representation of an organization's information. Students implement their database design by creating a physical database using SQL. Basic SQL syntax and the rules for constructing valid SQL statements are reviewed.

IT 477   Web Development

Prerequisite: CS 110

This course focuses on basic skills of creating basic and interactive web pages. It also covers the fundamentals of Client-Side Scripting and Ajax Concepts as well as handling debugging and errors. Skills such as configuring and deploying web applications are also covered.

PROFESSIONAL ELECTIVE III

IT 471   CCNA Security

Prerequisite: IT 470

This Course covers the core security concepts and validates the knowledge needed to install, troubleshoot, and monitor Cisco network security devices; develop a security infrastructure; recognize network vulnerabilities; and mitigate security threats, and troubleshoot converged local and wide area networks, and manage routers, switches and edge applications that integrate voice, wireless, and security into the network.

IT 475   Programming with PL/SQL

Prerequisite: CS 110

This course focuses on Program with PL/SQL write PL/SQL code, Oracle's procedural extension language for SQL and the Oracle relational database. Automate SQL to administer the Oracle database. This course culminates with a project that challenges students to program, implement, and demonstrate a database solution for a business or organization.

IT 478   Mobile Development

Prerequisite: CS 110

This Course validate fundamental technology concepts with a foundation for students' careers as well as the confidence they need to succeed in advanced studies. It also covers such valuable skills such Mobile App Development Environment.

IT 483   Business Intelligence

Prerequisite: CS 110

This course focuses on Business Intelligence (BI) and Financial Performance Management (FPM), topics includes Business intelligence, constraint programming, Predictive and advanced analytics. Turning Data into Insights and Big Data and Analytics.

C-Advanced Courses

TRACK COURSES

Track 1-Software Engineering Track

CS 430 Design and Architecture of Large Software Systems

Pre-requisite: CS 360

This course presents principles of problem analysis and solution design as applied to the development life cycle of a software system. In addition, this course will explore methods for understanding and debugging existing software systems.

CS 431 Low-Level Design of Software

Pre-requisite: CS 360

This course is designed to teach the disciplined process of software development, from formal specification through to working systems. Topics include Fundamentals of Software Design-Principles and Rules, Software Design-Practices, Program Style, Structure and Selection of Data Structures.

CS 433 Software Project Management

Pre-requisite: CS 360

This course addresses the main issues related to software project management such as project definition, scope management, planning, organization, resources, scheduling, control, quality, cost estimation, time estimation, and, risk management. Students are also introduced to project management tools such as Work Breakdown Structure, Gantt charts, PERT, and the critical path method.

CS 434 Software Evolution (Maintenance)

Pre-requisite: CS 360

This course introduces the concept of software as an evolving and complex entity. Deliver knowledge about technical and business issues connected to legacy systems. Topics include Relationships between evolving entities, Models of software evolution, Working with Legacy Systems etc.

CS 435 Software Architectures

Pre-requisite: CS 360

This course introduces basic concepts and principles about software architecture. It starts with an overview of architectural structures and styles. Practical approaches and methods for creating and analyzing software architecture are presented. The emphasis is on the interaction between quality attributes and software architecture.

Track 2- Computer Security Track

CS 440 Coding and Information Theory

Pre-requisite: IT 341

The aims of this course are to introduce the principles and applications of information theory & Coding. The course will study how information is measured in terms of probability and entropy, and the relationships among conditional and joint entropies; how these are used to calculate the capacity of a communication channel, with and without noise; coding schemes, including error correcting codes; Rate distortion theory which provides the theoretical foundations for lossy data compression and Network information theory considers the information carrying capacity of a network.

CS 441 Security Management

Pre-requisite: IT 341

This course will cover a variety of topics that will prepare students who wish to develop skills in information security management. It is a survey course that will cover a full range of information security topics, ranging from technical areas like cryptology and network security to a policy area like risk management. Technical subjects will be explored as well as other less technical topic areas where managers are required to lead an information security group and make sound business decisions surrounding information systems and security.

CS 442 Computer Security

Pre-requisite: IT 341

This course will cover computer security including cryptography, network security, application security, and web security. Traditional topics such as buffer overflows, intrusion detection, packet analysis, and malware will be discussed. Topics also include privacy, incident handling, forensics and anti-forensics, legal issues, politics, and security in emerging technologies.

CS 443 Formal Method for Cryptography

Pre-requisite: IT 341

The aim of this course is to facilitate understanding of the inherent strengths and limitations of cryptography, especially when used as a tool for information security. Armed with this knowledge, one should be able to make more informed decisions when building secure systems.

The course covers various aspects of symmetric and asymmetric cryptography, authentication, system as well as application level security mechanisms.

CS 444 Internet Security, tools & techniques

Pre-requisite: IT 341

This course aims to introduce security issues arising primarily from computer networks. Topics include node and service authentication, address spoofing, hijacking, SYN floods, smurfing, sniffing, routing tricks, and privacy of data en route. Buffer overruns and other exploitation of software development errors. Hardening of operating systems. Intrusion detection. Firewalls. Ethics.

CS 445 Network Management and Security

Pre-requisite: IT 341

This course aims to introduce NSM standards, technologies, tools, industry best practices, and case studies, NSM areas that can be automated through expert systems, current issues, and future trends to adapt to emerging and evolving Internet technologies. Specific Internet and telecommunications standards discussed in depth, including SNMPv1, SNMPv2, SNMPv3, RMON.

Graduation Project (CS 498 & CS 499)

The Graduation Project (GP) provides the opportunity to the students to showcase the talents through their learned skills and practices. The project is mandatory for all the students enrolled in the programmes. As such, students should regard their graduate projects as an ideal opportunity to implement the concept learned in most of the courses and gain hand on experience. The GP is carried over in the last two semesters (9th and 10th semesters), called Semester 1 and Semester 2 (Graduation Project 1 (CS 498) and Graduation Project 2(CS 499). Both semesters will be graded independently according to the work carried out in each semester. Work assessed will include deliverables submitted and final presentation. The general purpose of Graduation Project 1 is for the students to give a presentation showing their project proposal including

management plan, feasibility study, requirement document. At the end of their Graduation Project 2, the students are evaluated on their presentation of the final project deliverables and a project report.

Facilities

Laboratories

Six laboratories equipped with dual operating systems (Windows and Mac) are being used to conduct tutorials, experiments and/or lectures. Some of these labs are for special courses only while the others are for general programming courses. In addition to five labs available in the female side for certain courses that require lab work.

Currently, the CS program has full access to Image Processing, Robotics, Network, Computer Engineering, Database, and Operating Systems Labs totaling a capacity of (116) seats in addition to instructors' seats and a total of (121) seats in the female building in addition to instructors' seats. In addition, the innovation center is accessible to students for discussions and for using e-library from iPADs.

Selective Photos

Operating Systems Lab

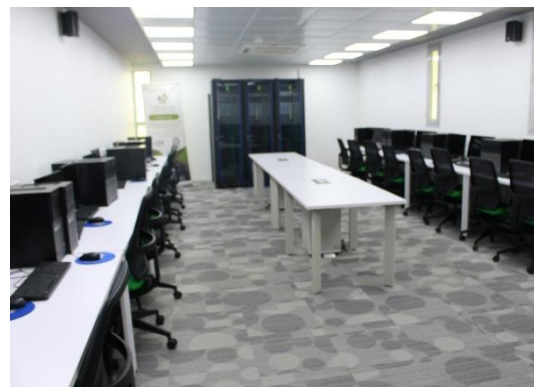**Image Processing and Robotics Lab**

Image Processing and Robotics Lab

Image Processing and Robotics Lab

Image Processing and Robotics Lab

Networking Lab

Operating Systems Lab
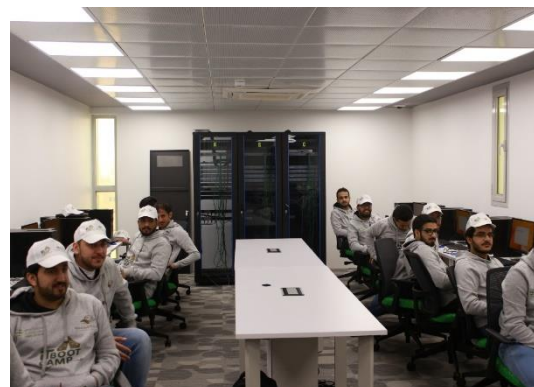

Computer Engineering Lab

Computer Engineering Lab

Database Lab

Image Processing and Robotics Lab

Networking Lab