Al-Balqa' Applied University

Prince Abdullah Bin Ghazi Faculty of IT

Department of Computer Science

The Curriculum for the B.Sc. Degree in

Computer Science

3/2017

Al-Balqa Applied University
Curriculum for the Bachelor Degree in Computer Science
12, 2016

The curriculum for the B.Sc. degree in Computer Science (CS) consists of (133) credit hours distributed as follows:

Table 1: Credit Hours distributed as follows

Requirements	Credit Hours	Percentage
University Requirements	27	%4.20
Faculty Requirements	20	%15
Compulsory Specialization Requirements	65	%48.4
Elective Specialization Requirements	12	%9
Supportive Specialization Requirements	9	%6.8
Total	133	%100

University Requirements (27 credit hours) distributed as follows:

a) University Compulsory requirements (21 Credit hours)

Pre-requisite	Weekly Hours		Credit Hours	Course Name	Course Number
	Practical	Theory			
--	3	2	3	Computer Skills (1)	35005101
35005101	3	0	0	Computer Skills Lab (1)+	35005100
301501199	-	3	3	Arabic Language (1)	35003101
35003102	-	3	3	Arabic Language (2)	35003102
301502099	-	3	3	English language (1)	35004101
35004101	-	3	3	English language (2)	35004102
--	-	3	3	Military Science	35001101
--	-	3	3	Patriotic Education	35002100
	6	**20**	**21**	**Total**	

+ This is an embedded lab for Computer Skills(1) course/ is not to be considered in the student study plan/ for registration purposes only.

b) University Elective requirements (6 Credit hours)

Credit Hours	Course Name	Course Number
3	Communication Skills	36001101
3	Educational Psychology	36002102
3	Jordanian Society	36003103
3	Sport for all	36004104
3	Islamic Culture	36005105
3	Administration and Economic concepts	36006106
3	Agriculture in Jordan	36007107
3	Environment and Society	36008108
3	Righteous Caliphs History	36012109

Faculty Requirements (20 Credit Hours)

Pre-requisite	Weekly Hours		Credit hours	Course Name	Course Number
	Practical	Theory			
35005101*	0	3	3	Introduction to Computer Programming**	30801100
35005101, 30801100	3	2	3	Computer Skills (2) for Science Colleges	30801101
30801101*	3	0	0	Computer Skills (2) Lab for Science Colleges+	30801102
30801101	0	3	3	Object Oriented Programming	30801203
30801203*	3	0	1	Object Oriented Programming Lab	30801204
30801203	0	3	3	Java Programming	30801205
30801205*	3	0	1	Java Programming Lab	30801206
--	0	3	3	Calculus (1)	30202101
30202101	0	3	3	Calculus (2)	30202102
	12	17	20	**Total**	

+ This is an embedded lab for Computer Skills (2) for Science Colleges course/ is not to be considered in the student study plan/ for registration purposes only

*: corequisite **: first semester enrollment

Specialization Requirements (77 credit Hours) distributed as follows:

a) Specialization Compulsory Requirements (65 hours)

Pre-requisite	Weekly Hours		Credit Hours	Course Name	Course Number
	Practical	Theory			
30801203	0	3	3	Data Structures	30801218
30801218*	3	0	1	Data Structures Lab	30801219
30801101	0	3	3	Digital Logic	30801220
30801220*	3	0	1	Digital Logic Lab	30801221
30801214	0	3	3	Algorithms Design and Analysis	30801215
30801243	0	3	3	Internet Applications Programming	30801207
30801207*	3	0	1	Internet Applications Programming Lab	30801208
30801214	0	3	3	Databases Design and Management (1)	30801243
30801243*	3	0	1	Databases Design and Management Lab (1)	30801244
30801205, 30801207	0	3	3	Visual Programming for Smart Devices	30801300
30801300*	3	0	1	Visual Programming for Smart Devices Lab	30801301
30801215	0	3	3	Theory of Computation and Automata	30801316
30801316	0	3	3	Compliers Design and Programming Languages	30801417
30801215	0	3	3	Artificial Intelligence	30801350
30801220	0	3	3	Computer Architecture	30801427

30801322	0	3	3	Fundamentals of Operating Systems	30801426
30801220	0	3	3	Principles of Computer Networks	30801230
30801230	0	3	3	Wireless Computer Networks	30801333
30801333	0	3	3	Computers and Networks Security	30801432
30801243	0	3	3	Systems Analysis and Design	30801342
30801342	0	3	3	Modern Software Engineering	30801443
30801325	0	3	3	Design & Organization of Embedded Systems	30801325
Cr.Hrs 90	-	-	3	Project for Computer Science Students	30801473
Cr.Hrs 90	-	-	6	Field Training for Computer Science Students	30801474
65				**Total**	

*: corequisite

a) Specialization Elective Requirements (12 hours)

Pre-requisite	Weekly Hours		Credit Hours	Course Name	Course Number
	Practical	Theory			
30801243	0	3	3	Databases Design and Management (2)	30801340
30801243	0	3	3	Information Retrieval Systems and Search Engines	30801341
30801350	0	3	3	Advanced Artificial Intelligence and Machine Learning	30801454
30801281	0	3	3	Digital Vision & Image Processing	30801455
30801281	0	3	3	Computer Graphics	30801363
30801300	0	3	3	Cloud Computing	30801361
30801207	0	3	3	Multimedia	30801348
30801218	0	3	3	Advanced Data Structures	30801415
Cr.Hrs 90	0	3	3	Special Topics in Computer Science+	30801465
30801427	0	3	3	Robotics and Autonomous Systems	30801428

*: Corequisite +: Department approval

Supportive Specialization Courses (9 credit Hours)

Pre-requisite	Weekly Hours		Credit Hours	Course Name	Course Numbers
	Practical	Theory			
30202101	0	3	3	Discrete Structures and Mathematics	30801214
30202102	0	3	3	Principles of Numerical Analysis	30801281
30202101	0	3	3	Probability and Statistics	30202131
	0	**9**	**9**	**Total**	

Course Description

Course Name	**:**	**Computer Skills (1)**	**Course Number**	**:**	**35005101**
Credit Hours	**:**	**[3] Th. : [2] Pra. : [3]**	**Prerequisites**	**:**	**----------**

Components of computers, basic concepts of information technology (IT), the use of personal computers and common computer applications at adequate level of competence, hardware and software of computers, commonly used software general applications (operating systems, word processing, spreadsheets, presentation and database software), brief introduction to communication (Internet, e-mail, world-wide-web, etc.).

Course Name	**:**	**Introduction to Computer programming****	**Course Number**	**:**	**30801100**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	***35005101**

General problem solving concepts, programming concepts, flowchart , variables and constants, data types, operators , problem solving with decision, problem solving with loops, problem solving with case-logic structure, functions , arrays, sorting, linked lists, stacks, queues.

Course Name	**:**	Computer Skills(2) for Science Colleges	**Course Number**	**:**	**30801101**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801100, 35005101**

Basics of programming, algorithm development using top-down design with syntax and semantics of the C++ programming language, creating, compiling and executing C++ programs, primitive data types, operations, Loops, control structures, procedures and functions, arrays and classes.

Course Name	**:**	**Object Oriented Programming**	**Course Number**	**:**	**30801203**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801101**

Object-oriented (OO) programming environment, OO building blocks, input/output, loops, decisions, functions, arrays and strings, data structures, encapsulation, advanced variables, object oriented programming, useful OO features, classes and objects, inheritance, composition, polymorphism, method overloading, handling exceptions, thread programming and multithreading.

Course Name	**:**	**Object Oriented Programming Lab**	**Course Number**	**:**	**30801204**
Credit Hours	**:**	**[1] Th. : [0] Pra. : [3]**	**Prerequisites**	**:**	***30801203**

Structured Programming Skills Recap, Object-Oriented Programming(OOP) Skills, Classes And Objects ,Access Modifiers, Constructors, Constructor Overloading, Destructors, Using Constant in OOP, Using Static in OOP, Methods and Parameter Passing , Array of Objects, Composition, Inheritance , Abstract Classes, Derived

Classes, Interfaces, Method Override ,Polymorphism, Working with Files, Exception Handling, OOP and GUI.

Course Name	**:**	**Java Programming**	**Course Number**	**:**	**30801205**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801203**

Introduction to Java, the Java programming environment, variables, primitive data types, expressions, control constructs, strings in Java, arrays and vectors, Hash tables, files and I/O in Java, loops, Java GUI, components, events, layout managers, improved GUI libraries, threads, synchronization, Sockets, writing a server and a client.

Course Name	**:**	**Java Programming Lab**	**Course Number**	**:**	**30801206**
Credit Hours	**:**	**[1] Th. : [0] Pra. : [3]**	**Prerequisites**	**:**	***30801205**

Introduction to Java, JDK and IDE Installation, Input and Output Statements, Construct Basic Java Program with Class, Control Structures, Methods and Objects, Constructors, Arrays and Array List, Inheritance, Polymorphism, Abstract Classes and Interfaces, Exception Handling, Strings, File Processing, GUI Basics and Layout, Event Driven Programming.

Course Name	**:**	**Data Structures**	**Course Number**	**:**	**30801218**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801203**

Introduction to data structures, problem specification and program design, analysis, testing, verification, and correctness of algorithms, logical and physical representation of data, data structure operations, linked lists, queues, stacks, searching and sorting, tree data structures, sorting.

Course Name	**:**	**Data Structures Lab**	**Course Number**	**:**	**30801219**
Credit Hours	**:**	**[1] Th. : [0] Pra. : [3]**	**Prerequisites**	**:**	**30801218***

Object Oriented Programming Skills Recap, Arrays, Array Implementation of Stack and Applications, Linked List, Array Implementation of Queue and Applications, Linked List and Applications, Double Linked List and Applications, Linked List Implementation of Stack and Queue, Circular Queue and Application, Collections, Maps (Hash Table), Binary Tree and Binary Search Tree, Recursion, Searching Algorithms, Sorting Algorithms, Graph Representation, Implementation and Applications.

Course Name	:	**Digital Logic**	**Course Number**	:	**30801220**
Credit Hours	:	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	:	**30801101**

Numbering systems, Boolean algebra, logic algebra, basic logic gates, minimization of logic functions, combinational logic: adders, subtractors, encoders and decoders, multiplexers and demultiplexers, sequential logic: flip-flops, counters, registers and clocked sequential circuits.

Course Name	:	**Digital Logic LAB**	**Course Number**	:	**30801221**
Credit Hours	:	**[1] Th. : [0] Pra. : [3]**	**Prerequisites**	:	**30801220***

Digital Logic Gate (AND, OR, NAND, NOR, XOR), Simplification of Boolean Functions, Combinational Circuits, Code Converters, Decoder, Design with Multiplexers, Adder and Subtractor, Flip-Flops, Sequential Circuits, Counters, Shift Registers, Serial Addition, Memory Unit, Clock-Pulse Generator, Parallel Adder And Accumulator.

Course Name	:	**Algorithms Design and Analysis**	**Course Number**	:	**30801215**
Credit Hours	:	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	:	**30801214**

Introduction to algorithms, algorithm definition, algorithm representation، algorithm analysis, program performance, introduction to complexity analysis, asymptotic notations، divide and conquer algorithms , merge sort, quick sort, binary search, strassen matrix multiplications، writing recurrences, solving recurrences , master theorem, recursion tree, iterative method , graph algorithms, graph terminologies, graph representations, graph traversal algorithms; topological sort algorithms, minimum spanning tree, prim's and kruskal's algorithms.

Course Name	:	**Internet Applications Programming**	**Course Number**	:	**30801207**
Credit Hours	:	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	:	**30801243**

Web design using HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets), HTTP protocol planning and designing effective web pages; implementing web pages by writing HTML and CSS code; enhancing web pages with the use of page layout techniques, text formatting, graphics, images, and multimedia; and producing a functional, multi-page website, Client Server Architecture, Exploring HTML5, Introduction to server side language, Front-end Frameworks, Model View Controller Design Methodology, JQuery, Ajax and JSON, Deploying a web application, building Web Database System, Practical Aspects of Web Security, Search Engine theories

Course Name	:	**Internet Applications Programming lab**	**Course Number**	:	**30801208**

Credit Hours	:	[1]	**Th.** :	[0]	**Pra.** :	[3]		**Prerequisites**	:	**30801207***	
XHTML, Web server and Database Server, HTML5, CSS3, layout development, JavaScript, JQuery, Ajax, Form, Server Side Language, Form processing, Database system, Website Testing.											

Course Name	:	**Databases Design and Management (1)**						**Course Number**	:	**30801243**	
Credit Hours	:	[3]	**Th.** :	[3]	**Pra.** :	[0]		**Prerequisites**	:	**30801214**	
Basic concepts and terminology, database, database administrator, database management systems, characteristics of the database approach, the three level-schema architecture, data independence, the entity relationship model, notations and concepts, the relational model (concepts, constraints and operations), relational algebra, ER to relational mappings, the SQL language, functional dependencies and normalization.											

Course Name	:	**Databases Design and Management LAB (1)**						**Course Number**	:	**30801244**	
Credit Hours	:	[1]	**Th.** :	[0]	**Pra.** :	[3]		**Prerequisites**	:	***30801243**	
Introduction to SQL and environment setup, Working with SQL to query database , create and manage users, Creating schema, DDL statements including CREATE , DROP and ALTER statements , DML including INSERT, UPDATE and DELETE statements, TRUNCATE statement, Retrieving data using the SELECT statement, Restricting and sorting data, Working with single-row functions, Conversion functions and conditional expressions, Reporting aggregated data using the group functions, Displaying data from multiple tables, using subqueries to solve queries, Set operators.											

Course Name	:	**Visual Programming for Smart Devices**						**Course Number**	:	**30801300**	
Credit Hours	:	**[3]**	**Th.** :	**[3]**	**Pra.** :	**[0]**		**Prerequisites**	:	**30801205, 30801207**	
Introduction to visual programming, introduction to smart, devices, operating system for smart devices, cross-platform applications, event-driven programming, properties and methods, construction of graphical user interfaces, graphical user interface design, prototyping, evaluation, implementation, controls, toolboxes, menus and toolbars, sounds and multimedia, visual developing environment, database and Internet connectivity.											

Course Name	:	**Visual Programming for Smart Devices lab**	**Course Number**	: **30801301**

Credit Hours	**:**	**[1]**	**Th. :** **[0]** **Pra. :** **[3]**		**Prerequisites**	**:**	**30801300***

Introduction to smart device application development, Development Tools and Environment , Application Architecture , User Interface Components ,Views, Layouts, Events, Tables, Component communication, Multimedia and Animations and Gestural Inputs, Application lifecycle, working with maps, working with database (e.g. SQLite), working with web services(e.g. Google Web Services), working with cloud database(e.g. Google Cloud Datastore).

Course Name	**:**	**Theory of Computation and Automata**			**Course Number**	**:**	**30801316**
Credit Hours	**:**	**[3]**	**Th. :** **[3]** **Pra. :** **[0]**		**Prerequisites**	**:**	**30801215**

Types and representations of formal languages, grammars that generate formal languages, machines which accepts formal languages, Regular languages and regular expressions, regular grammar, finite automata (deterministic and non-deterministic), Moore's and Mealy's machines, context free languages, context free grammars, deterministic and non-deterministic pushdown automata, context sensitive languages, context sensitive grammars, phrase structure language, phrase structure grammar, turing machine, Chomsky machine, Chomsky normal form, parsing tree, Chomsky hierarchy computer.

Course Name	**:**	**Compilers Design and Programming Languages**			**Course Number**	**:**	**30801417**
Credit Hours	**:**	**[3]**	**Th. :** **[3]** **Pra. :** **[0]**		**Prerequisites**	**:**	**30801316**

Basic concepts, review of grammars, compiler components, lexical analysis, symbol table handling, parsing techniques, error handling and recovery, syntax-directed translation, type checking, run-time organization, intermediate code generation, code generation, code optimization.

Course Name	**:**	**Artificial Intelligence**			**Course Number**	**:**	**30801350**
Credit Hours	**:**	**[3]**	**Th. :** **[3]** **Pra. :** **[0]**		**Prerequisites**	**:**	**30801215**

Introduction artificial intelligence (AI), history of AI, propositional calculus, predicate calculus, first-order logic, inference, soundness, completeness, unification algorithm, resolution, structures and strategies for state space search, data driven and goal driven search, breadth first search, depth first search, depth first iterative deepening search, heuristic search and games theory, greedy best first search, A* search algorithm, using heuristic search in games, Min-Max algorithm, alpha-beta pruning, planning, the language of planning problem.

Course Name	**:**	**Computer Architecture**			**Course Number**	**:**	**30801427**

Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30801220**	
Internal structure and operation of modern computer systems, Design and operation of the system bus, Design and operation of Arithmetic, Logic, and Shift Units, Control Unit: microprogrammed vs. Hardwired control, CISC and RISC architectures, Pipelining, cache memory and memory hierarchies, Interrupts and I/O structures.											

Course Name	**:**	**Fundamentals of Operating Systems**						**Course Number**	**:**	**30801426**	
Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30801322**	
Basic concepts and mechanisms of modern operating systems, history of operating systems, computer and operating system structures, basic issues in concurrency, thread management, deadlock control, synchronization, scheduling, memory management, process management, multi-threading.											

Course Name	**:**	**Principles of Computer Networks**						**Course Number**	**:**	**30801230**	
Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30801220**	
Open system interconnection (OSI) reference model, TCP/IP reference model, physical layer, data link layer, network layer, transport layer, session layer, presentation layer, applications layer, LAN architectures, WAN architectures, network design, network management and network security.											

Course Name	**:**	**Wireless Computer Networks**						**Course Number**	**:**	**30801333**	
Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30801230**	
Introduction to wireless networks, Wireless Networks systems, Random Signal Theory, Design principles of cellular networks, Multiple access control protocols for wireless systems, Wireless routing and TCP/IP, Mobile management, Call admission control and resource allocation, Wireless security, Future-generation wireless networks.											

Course Name	**:**	**Computers and Networks Security**						**Course Number**	**:**	**30801432**	
Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30801333**	
Introduction to computer security , understanding the security issues in computing platforms and operating systems , database security, security policies, entity authentication, defense methods , writing secure programs, computer security threats and attacks including: vulnerabilities in the password authentication system, file system, virtual memory system, respond to potential violations, access control, threats and vulnerabilities to network architectures and protocols, e-mail security, IP security, web security, network attack propagation modeling ,traffic analysis, network security management techniques , firewalls.											

Course Name	:	**Systems Analysis and Design**	**Course Number**	:	**30801342**
Credit Hours	:	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	:	**30801243**

Overview, system concepts, system development life cycle, system analysis, preliminary investigation & information gathering, feasibility study & cost/benefit analysis, structured analysis, system design, introducing system design, system design activities, DFDS, system implementation, system testing and quality assurance, implementation and software maintenance.

Course Name	:	**Modern Software Engineering**	**Course Number**	:	**30801443**
Credit Hours	:	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	:	***30801342**

Principles and practices of software engineering, software quality concepts, process models, software requirements' analysis, design methodologies, software testing and software maintenance, hands-on experience in building a software system using the waterfall life cycle model in the lab environment, software development life cycle deliverables, the requirements, specification and design documents, the system code, test plan, and user manuals.

Course Name	:	**Design & Organization of Embedded Systems**	**Course Number**	:	**30801325**
Credit Hours	:	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	:	**30801320**

Introduction to embedded systems, C programming, embedded system design, introduction to Arduino, basic circuit diagrams, instruction sets, registers and memory access, digital I/O, LEDs and buttons, timers, debugging, pulse width modulation, servos, analog to digital converters, analog sensors , CPU bus, communication protocols, interrupts, communication, peripherals, sensors, embedded operating systems, embedded systems applications, power management, embedded algorithms.

Course Name	:	**Project for Computer Science Students**	**Course Number**	:	**30801473**
Credit Hours	:	**[3] Th. : [-] Pra. : [-]**	**Prerequisites**	:	**90Cr. Hrs**

The student is expected to put into action his knowledge gained from the different courses in this study plan through a graduation project.

Course Name	:	**Field Training for Computer Science Students**	**Course Number**	:	**30801474**
Credit	:	**[6] Th. : [-] Pra. : [-]**	**Prerequisites**	:	**90Cr. Hrs**

Hours					
Practical training in the field, where students should register as trainees in IT sector, under the supervision of the department.					

Course Name	**:**	**Databases Design and Management (2)**	**Course Number**	**:**	**30801340**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801243**
Advanced concepts in the design and implementation of database systems, query optimization, concurrency control, recovery, transaction processing, distributed databases, web and semi-structured data.					

Course Name	**:**	**Information Retrieval Systems and Search Engines**	**Course Number**	**:**	**30801341**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801243**
Basic concepts of information retrieval (IR) systems, introduction to IR, modeling (boolean, vector, probabilistic models), retrieval performance evaluation (recall and precision), reference collections, query languages, query operations, text operations, indexing and searching. Fundamentals of search engines, Servers, Rankers, Evaluators, Miners, Crawlers, Indexers, Logs.					

Course Name	**:**	**Multimedia**	**Course Number**	**:**	**30801348**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801207**
Current multimedia and web presentation technologies and techniques. Using skills with graphics, images, animation, and video techniques, students create dynamic marketing and promotional materials and services.					

Course Name	**:**	**Advanced Artificial Intelligence and Machine Learning**	**Course Number**	**:**	**30801454**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801350**
Introduction to machine learning, artificial intelligence and reasoning under uncertainty, supervised learning, ensemble methods and boosting, neural networks, support vector machines, kernel methods, clustering and unsupervised learning, genetic algorithms, maximum likelihood, and computational learning theory, machine learning in data mining and applications, data preprocessing , cleaning , classification and clustering, web mining.					

Course Name	**:**	**Digital Vision & Image Processing**	**Course Number**	**:**	**30801455**
Credit	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801281**

Hours					

Introduction to image processing, introduction to machine vision, human visual system, image acquisition, image enhancement in spatial and frequency domains, color image processing, image compression and analysis, image segmentation, morphological image processing, image restoration, illumination modeling, edge detectors, binary image processing, computational vision, motion vision, object recognition, object representation alignment, scale-invariant feature transform, gesture recognition.

Course Name	**:**	**Computer Graphics**	**Course Number**	**:**	**30801363**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801281**

Introduction to computer graphics, graphics pipeline, 2-d graphics, modeling, rendering, basics of image processing, geometric transformations, line drawing algorithms, geometric modeling of curves and surfaces, animation, 3-d viewing, visibility algorithms, shading, ray tracing, texture mapping algorithms.

Course Name	**:**	**Cloud Computing**	**Course Number**	**:**	**30801361**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**30801300**

Cloud computing concepts, Cloud computing environments, Cloud services, Cloud characteristics and service attributes, Cloud category, risks and benefits of implementing cloud computing, security threat within a cloud computing infrastructure, Cloud Delivery Models, Cloud Architectural Models

Course Name	**:**	**Special Topics in Computer Science^{+}**	**Course Number**	**:**	**30801465**
Credit Hours	**:**	**[3] Th. : [3] Pra. : [0]**	**Prerequisites**	**:**	**90Cr. Hrs**

Students are introduced to advanced selected topics in different areas of computing not covered in other courses. The topics covered vary from year to year, depending on the students and staff.

Course Name	**:**	**Robotics and Autonomous Systems**	**Course Number**	**:**	**30801428**

Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30801427**

Introduction to Robotics, Introduction to autonomous systems, microcontrollers, embedded systems design, PIC and Arduino Platforms, Motor Principles, Interaction between real and digital world, Concepts of artificial intelligence, Gantry robot, Polar Robots, Articulated Robots, parallel robots, vehicle robots, Bluetooth communication programming, GSM communication programming, GPS communication programming, Wi-Fi communication programming, smart houses, smart robots, machine vision, audio and video communication programming, libraries and APIs.

Course Name	**:**	**Discrete Structures and Mathematics**						**Course Number**	**:**	**30801214**
Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30202101**

Introduction to Logic, Propositional Logic, Predicate Logic, Formal and Informal Proofs, Sets, Set Operations. Functions, Countable and Uncountable Sets. Integers and Modular Arithmetic, Sequences, Summations, Mathematical Induction, Recursion, Counting, Permutations, Combinations , Probability ,Relations, Graph Theory , Trees.

Course Name	**:**	**Principles of Numerical Analysis**						**Course Number**	**:**	**30801281**
Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30202102**

This course analyzed the basic techniques for the efficient numerical solution of problems in science and engineering. Topics spanned root finding, interpolation, approximation of functions, integration, differential equations and direct and iterative methods in linear algebra.

Course Name	**:**	**Advanced Data Structures**						**Course Number**	**:**	**30801415**
Credit Hours	**:**	**[3]**	**Th. :**	**[3]**	**Pra. :**	**[0]**		**Prerequisites**	**:**	**30801218**

Essential Data structures recap: stack, queue, list, linked list. Priority Queues and their Extensions: Heaps, Binomial heaps, Leftist heaps, Skewed heaps. Universal hash functions. Advanced Search Structures such as AVL tree, Red-black trees, Splay trees, 2-3 trees, 2-3-4 trees, B-Trees. Selected Graph algorithms: Shortest path problems, Dijkstra's algorithm, K shortest path routing.

الخطة الإسترشادية

First Year					
First Semester			Second Semester		
Course No.	Course Name	C.H.	Course No.	Course Name	C.H.
30202101	Calculus - 1	3	30202102	Calculus - 2	3
35003101	Arabic - 1	3	30801101	Computer Skills(2) for Science Colleges	3
35004101	English - 1	3	35004102	English - 2	3
35005101	Computer Skills - 1	3	35002100	Patriotic Education	3
30801100	Introduction to Computer Programming**	3	35003102	Arabic - 2	3
30801214	Discrete Structures and Mathematics	3	----------	Elective University Requirement	3
Total		**18**	**Total**		**18**

Second Year					
First Semester			Second Semester		
Course No.	Course Name	C.H.	Course No.	Course Name	C.H.
30202131	Probability and Statistics	3	30801205	Java Programming	3
30801203	Object Oriented Programming	3	30801206	Java Programming Lab	1
30801204	Object Oriented Programming Lab	1	30801218	Data Structures	3
30801220	Digital Logic	3	30801219	Data Structures Lab	1
30801221	Digital Logic Lab	1	30801243	Databases Design and Management Systems (1)	3
30801215	Algorithms Design and analysis	3	30801244	Databases Design and Management Systems Lab (1)	1
----------	Elective University Requirement	3	30801281	Principles of Numerical Analysis	3
Total		**17**	**Total**		**15**

Third Year					
First Semester			Second Semester		
Course No.	**Course Name**	**C.H.**	**Course No.**	**Course Name**	**C.H.**
30801300	Visual Programming for Smart Devices	3	30801350	Artificial Intelligence	3
30801301	Visual Programming for Smart Devices lab	1	30801333	Wireless Computer Networks	3
30801342	System Analysis and Design	3	30801316	Theory of Computation and Automata	3
30801207	Internet Applications Programming	3	----------	Elective University Requirement	3
30801208	Internet Applications Programming Lab	1	----------	Elective University Requirement	3
30801325	Design & Organization of Embedded Systems	3			
30801230	Principles of Computer Networks	3			
Total		**17**	**Total**		**15**

Forth Year					
First Semester			Second Semester		
Course No.	**Course Name**	**C.H.**	**Course No.**	**Course Name**	**C.H.**
30801417	Compliers Design and Programming Languages	3	----------	Elective Specialization Requirement	3
30801443	Modern Software Engineering	3	----------	Elective Specialization Requirement	3
30801427	Computer Architecture	3	30801474	Field Training for Computer Science Students	6
30801426	Fundamentals of Operating Systems	3	30801473	Project for Computer Science Students	3
30801426	Computers and Networks Security	3	35001101	Military Science	3
Total		**15**	**Total**		**18**