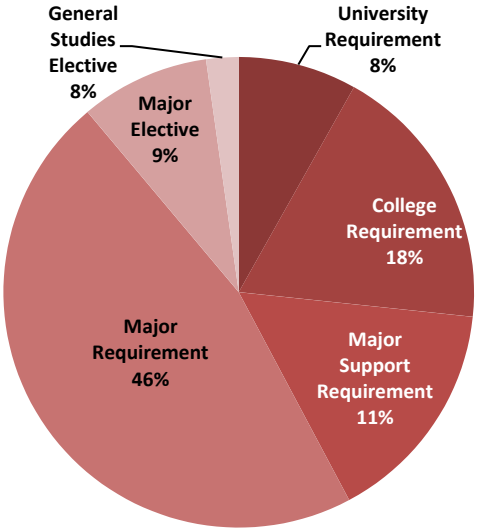
B.Sc. in Computer Science - Cloud Computing 2020

Program Components

Course Type	CRD
University Requirement (UR)	**11**
College Requirement (CR)	**24**
Major Support Requirement (MSR)	**14**
Major Requirement (MR)	**60**
Major Elective (ME)[1]	**12**
General Studies Elective (GSE)[2]	**10**
CR- Training (Internship) **Yes**	**1**
Total Credit (CRD)	**132**



[1] Student must select four courses from Major Elective(ME) List.

[2] Student must select three General Studies Electives according to the following:

- One course must be selected from any field of science: the following courses are suggested:
    1. CHEMY101 (GENERAL CHEMISTRY I)
    2. BIOLS102 (GENERAL BIOLOGY I)

  Or any other science course approved by the department chair.

- One course must be selected from Business College:
  the following courses are suggested:
    1. ACC112 (FINANCIAL ACCOUNTING)
    2. MGT131 (INTRO. TO BUSINESS ADMINISTRATION)
    3. MGT341 (SMALL BUSINESS MANAGEMENT)
    4. MKT261 (MARKETING MGT.)

  Or any other business course approved by the department chair.

- One course must be selected from Humanities and Social Science Component.
  This include any course from the following:
  Humanities: Fine Arts, History, American Studies, Classics, Communications, English, (Foreign Language) French, Music, Philosophy, Theatre, Literature (Arabic), Religion (comparative).

  Social Science: Anthropology, Economics, Education, Geography, History, Psychology, Sociology, Women's Studies, Political Science.

Teaching Language: English

Detailed Study Plan

Year 1 - Semester 1

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCS 113	Computer Programming I	3	2	3	CR	------	Yes
ITIS 103	Fundamentals of Information Systems	3	0	3	MR	------	Yes
ENGL 154	Language Development I	3	0	3	CR	------	No
MATHS 101	Calculus I	3	0	3	CR	------	No
PHYCS 101	General Physics I	3	3	4	MSR	------	No

Year 1 - Semester 2

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCS 114	Computer Programming II	3	2	3	CR	ITCS 113	Yes
ITNE 110	Introduction to Computer and Network Technology	3	0	3	MR	------	Yes
ENGL 155	Language Development II	3	0	3	CR	ENGL 154	No
PHYCS 102	General Physics II	3	3	4	MSR	PHYCS 101	No
MATHS 102	Calculus II	3	0	3	MSR	MATHS 101	No

Year 2 - Semester 3

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCS 214	Data Structures	3	0	3	CR	ITCS 114	Yes
ITNE 231	Computer Network I	3	2	3	MR	ITCS 113 & ITNE 110	Yes
ITCS 254	Discrete Structures I	3	0	3	MR	ITCS 113 & MATHS 101	Yes
ITSE 201	Introduction to Software Engineering	3	0	3	MR	ITCS114	Yes
STAT 273	Probability and Statistics	3	0	3	CR	MATHS 101	No
ISLM 101	Islamic Culture	3	0	3	UR	------	No

Year 2 - Semester 4

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCC 240	Fundamental of Cloud Computing	3	0	3	MR	ITNE 110 & ITCS 114	Yes
ITCS 285	Database Management Systems	3	0	3	MR	ITCS 214	Yes
ITCS 222	Computer Organization	3	0	3	MR	ITCS 214	Yes
ITCS 255	Discrete Structures II	3	0	3	MR	ITCS 254	Yes
ARAB 110	Arabic Language Skills	3	0	3	UR	------	No
ENGL 219	Technical Report Writing	3	0	3	CR	ENGL 155	No

Year 4 - Semester 5

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCC 341	Cloud Computing Architecture	3	0	3	MR	ITCC 240 & ITNE 231	Yes
ITCS 333	Internet Software Development	3	0	3	MR	ITCS 285	Yes
ITCS 347	Analysis and Design of Algorithms	3	0	3	MR	ITCS 214 & ITCS 255	Yes
ITCS 316	Human-Computer Interaction	3	0	3	MR	ITCS 214	Yes
ITCS 325	Operating Systems	3	0	3	MR	ITCS 214 & ITCS 222	Yes
HRLC 107	Human Rights	2	0	2	UR	------	No

Year 3 - Semester 6

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCC 345	Cloud Development	3	0	3	MR	ITCC 240 & ITCS285	Yes
ITCC 343	Cloud Operations	3	0	3	MR	ITCC 240 & ITNE 231 & ITCS325	Yes
ITCS 396	Professional Issues and Ethics	3	0	3	MR	ENGL 219	Yes
ITXX 4XX	ITCC/ITCS Major Elective I	3	0	3	ME	AS per ME list	Yes
GSE XXX	Science Elective	X	X	4	GSE	------	No

Training Requirement

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCC 481	Industrial Training	0	3	1	CR-Training	Pass 85 Credits	Yes

Year 5 - Semester 7

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCS 411	Cryptography and Computer Security	3	0	3	MR	ITCS 347	Yes
ITCS 440	Intelligent Systems	3	0	3	MR	ITCS 347	Yes
ITXX 4XX	ITCC/ITCS Major Elective II	3	0	3	ME	AS per ME list	Yes
GSE XXX	Business Free Elective	3	0	3	GSE	------	No
ITCC 498	Senior Project	0	9	3	MR	ENGL 219 & pass 85 credits	Yes

Year 4 - Semester 8

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITXX 4XX	ITCC/ITCS Major Elective III	3	0	3	ME	AS per ME list	Yes
ITXX 4XX	ITCC/ITCS Major Elective IV	3	0	3	ME	AS per ME list	Yes
MATHS 211	Linear Algebra	3	0	3	MSR	MATHS 101	No
GSE XXX	Humanities / Social Sciences	3	0	3	GSE	------	No
HIST 122	Modern History of Bahrain and Citizenship	3	0	3	UR	------	No

Major Elective Courses

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCC 442	Cloud Security	3	0	3	ME	ITCC341	Yes
ITCC 445	Advanced Cloud Development	3	0	3	ME	ITCC345	Yes
ITCC 493	Selected Topics in Cloud Computing I	3	0	3	ME	Department Approval	Yes
ITCC 494	Selected Topics in Cloud Computing II	3	0	3	ME	Department Approval	Yes
ITCS 400	IT-Based Entrepreneurship	3	0	3	ME	ITCS 396 & MGT 131	Yes
ITCS 416	Advanced Operating Systems	3	0	3	ME	ITCS 325	Yes
ITCS 421	Geographical Information Systems	3	0	3	ME	ITCS 214	Yes
ITCS 437	Computer Graphics	3	0	3	ME	ITCS 214 & MATHS 211	Yes
ITCS 441	Parallel and Distributed Computing	3	0	3	ME	ITCS 325	Yes
ITCS 443	Optimization Techniques	3	0	3	ME	ITCS 214 & MATHS 211	Yes
ITCS 444	Mobile Application Development	3	0	3	ME	ITCS 333	Yes
ITCS 449	Computer Vision	3	0	3	ME	ITCS 347 & STAT 273	Yes
ITCS 453	Multimedia and Hypermedia Systems	3	0	3	ME	ITCS 214	Yes
ITCS 455	Semantic Web	3	0	3	ME	ITCS 333	Yes
ITCS 457	Data Mining	3	0	3	ME	ITCS 285 & ITCS 347	Yes
ITCS 458	Big Data Analytics	3	0	3	ME	ITCS 255	Yes
ITCS 461	Advanced Database Management Systems	3	0	3	ME	ITCS 285	Yes
ITCS 464	Information Retrieval	3	0	3	ME	ITCS 333	Yes
ITCS 465	Numerical Computations	3	0	3	ME	ITCS 255 & MATHS 211	Yes
ITCS 496	Physical Implementation of DBMS	3	0	3	ME	ITCS 285	Yes
ITTS 401	IT Technical Selected Topics I	3	0	3	ME	Department Approval	Yes
ITTS 402	IT Technical Selected Topics II	3	0	3	ME	Department Approval	Yes
ITTS 403	Cooperative Learning	0	12	6	ME - Training	Department Approval & Co-requisite ITCC 498	Yes

General Studies Elective Courses List

Course Code	Course Title	Course Hours			Course Type	Pre requisite
		LEC	PRAC	CRD		
ARAB 141	Modern Arabic Lit.	3	0	3	GSE	------
ARAB 242	Arabic Poetry In The Renaissance Period	3	0	3	GSE	------
ART 133	Fundamentals of Music and Its Appreciation	3	0	3	GSE	------
ART 141	Drawing and Painting	2	1	3	GSE	------
ART 221	Traditional Music of Bahrain and Its Application	3	0	3	GSE	------
CHL 101	Introduction to Chinese Language	3	0	3	GSE	------
EDAR 126	Playing on Piano and Org 1	3	0	3	GSE	------
EDPS 144	Psychology of Learning and Memory	3	0	3	GSE	------
EDTC 100	Teaching and Learning Technology	3	0	3	GSE	------
ENGL 130	Introduction to Literature	3	0	3	GSE	------
FREN 141	French I	3	0	3	GSE	------
GERM 101	Introduction to German	3	0	3	GSE	------
HISTO 212	Contemporary History of The Arab World	3	0	3	GSE	------
HISTO 281	Landmarks of Islamic Civilisation	3	0	3	GSE	------
ISLM 114	Quranic Sciences	3	0	3	GSE	------
ISLM 136	Biography of The Prophet	3	0	3	GSE	------
ISLM 141	Introduction to Shari'a	3	0	3	GSE	------
ISLM 252	Islamic Doctrine	3	0	3	GSE	------
JAPN 101	Japanese Level I	3	0	3	GSE	------
KL 101	Korean Language	3	0	3	GSE	------
TL 101	Turkish Language	3	0	3	GSE	------
LAW 101	Introduction to Legal Studies	3	0	3	GSE	------
LAW 102	History of Law	3	0	3	GSE	------
LAW 106	Constitutional Law I	3	0	3	GSE	------
PSYC 103	Introduction to Psychology	3	0	3	GSE	------
PSYC 120	Psychology of Marriage	3	0	3	GSE	------
PSYC 211	Educational Psychology	3	0	3	GSE	------
SOCIO 161	Introduction to Sociology	3	0	3	GSE	------
SOCIO 181	Introduction to Anthropology	3	0	3	GSE	------
SOCIO 191	Citizenship, Identity and Globalization	3	0	3	GSE	------

Course Code	Course Title	Course Hours			Course Type	Pre requisite
		LEC	PRAC	CRD		
SOCIO 224	Sociology of Health	3	0	3	GSE	------
SOCIO 226	Sociology of Arabian Gulf	3	0	3	GSE	------
GSE XXX	Other electives	X	X	3	GSE	Department Approval

Course Description

Course Code: ITIS103 **Course Title:** Fundamentals of Information Systems

This is a foundation course that introduces students to the definitions, concepts and tools used in the IS field. It focuses on discussing the business implications of information systems, social and ethical issues it creates, their relationship with organization activities and how they support e-Commerce, knowledge management and decisions making. Topics covered include: information systems in global business today, ethical and social issues in information system, achieving operational excellence and customer intimacy, e-commerce, building and managing systems, managing knowledge and collaboration, enhancing decision making.

Course Code: ITNE 110 **Course Title:** Introduction to Computer and Network Technology

This foundational course teaches basic computer and network theory, and component identification and function. Hardware Basics: Case, Motherboard, CPU, Cards (PCI, ISA, etc..), HDD, FDD, CD, Power supply, memory, etc. BIOS, CMOS, POST, Basic connections and troubleshooting, Operating systems (Windows versions, DOS prompts), Important files (Win.ini, System.ini, config.sys, autoexec.bat, etc.), Registry, Upgrading; Networks glossary, OSI Model, Physical Media, Internet Backbones, Basic network troubleshooting.

Course Code: ITCC240 **Course Title:** Fundamental of Cloud Computing

This course introduces cloud-computing concepts. Topics include cloud fundamentals, infrastructure, architecture, deployment models, security, compute services, storage services, network services, finance.

Course Code: ITNE 231 **Course Title:** Computer Networks I

Packet-Switched Networks. Protocol Layers. Application Layer. HTTP, FTP, Electronic Mail, DNS. Socket Programming. Web Servers. Transport Layer: Multiplexing and Demultiplexing, Reliable Data Transfer and Congestion Control. Network Layer and Routing: The Internet Protocol (IP), IPv6, Multicast Routing and Mobility.

Course Code: ITSE201 **Course Title:** Introduction of Software Engineering

The course covers software evolution; introduction to software engineering, software development processes, and analysis and design methods, software engineering standards and metrics. Software and system applications, emerging software engineering for cloud services. Software development and CASE tools.

Course Code: ITCS222 **Course Title:** ComputerOrganization

This course introduces basics of computer organization. Topics include data representation, basics of digital logic, basics of Assembly language, instruction formats, addressing modes, instruction set architecture, performance evaluation, single-cycle data path, and processor control. Assembly language programming is used as a means of exploring instruction setarchitectures.

Course Code: ITCS254 **Course Title:** Discrete Structures I

This course covers basic discrete structures that are backbones of computer science. Topics include logic, predicate calculus, proofs, sets, relations, functions.

Course Code: ITCS255 **Course Title:** Discrete Structures II

This course is a continuation of discrete structures I. Topics include elementary number theory, asymptotic notations of growth of functions, recurrence relations and their solutions, graphs and trees, Combinatorics.

Course Code: ITCS285 **Course Title:** Database Management Systems

This course exposes the fundamental concepts of database management systems. Topics include information management concepts, database architecture and data independence, conceptual models, relational and object oriented data models, query mechanisms, database recovery, security, integrity, backup, transaction processing, indexing.

Course Code: ITCS316 **Course Title:** Human-ComputerInteraction

This course covers techniques used to analyze and design Human-Computer Interaction (HCI) systems. Topics include user interface design methods, social interactions, interface evaluation, human capabilities, interface technology, GUI programmingconcepts.

Course Code: ITCS325 **Course Title:** Operating Systems

This course presents fundamental concepts and practices to design and implement modern computer operating systems. Topics include functions and types of operating systems, operating system structure, process and thread management, process coordination, memory management and virtual memory, file system and I/O device management, protection andsecurity.

Course Code: ITCS333 **Course Title:** Internet Software Development

This course exposes the key technologies underlying the World-Wide Web and the principles and tools that are used to develop dynamic web applications. Topics include web design technologies (HTML, CSS style sheets), current server-sideprogramming, webserverprocessing, databaseaccess, event-driven programming.

Course Code: ITCC341 **Course Title:** Cloud Computing Architecture

This course provides technical and management skills to effectively design, operate, and maintain cloud computing systems. Topics include: transform an organization's current infrastructure to an efficient infrastructure on the cloud, Load balancing, High performance computing, Secure architecture, well designed infrastructures, designing a high available, scalable, reliable, fault tolerant cloud infrastructure.

Course Code: ITCC343 **Course Title:** Cloud Operations

This course covers in-depth knowledge in the field of cloud operations. Topics include cloud administrations, system and network troubleshooting, system deployment in the cloud, cloud infrastructure deployment, monitoring and configuration.

Course Code: ITCC345 **Course Title:** Cloud Development

This course provides technical knowledge in development of applications using cloud technologies. Topics include: Development in a cloud environment; Cloud Programming SDKs and IDEs; Programmatic configuration security and identification; Programmatic creation and utilization of object storage; Design and development of scalable applications using Caching and Content Delivery Networks; containers; Development and integration of non-relational databases; Message queues and notifications.

Course Code: ITCS347 **Course Title:** Analysis and Design of Algorithms

This course covers techniques used to design and analyze algorithms. Topics include time and space complexity analysis of recursive and non-recursive algorithms, brute force, divide- and – conquer, greedy, heaps, and dynamic programming design methods and their applications to real world problems.

Course Code: ITCS400 **Course Title:** IT-Based Entrepreneurship

This unit will give students insight into how to identify, create, and pursue opportunities for new products and services. These opportunitieshavebeen growing rapidly due tothe steadyincrease in digital workflows and digital customers. Google, Facebook, YouTube, Twitter, and Flickr are well-known examples of digital entrepreneurship; there are many thousands of additional examples. Specifically, this unit includes the study of entrepreneurship, opportunity analysis, feasibility analysis, intellectual property, market research, accounting, financial management, sources of funding, business models, teamwork, and business planning. Understanding these topics will allow students to more readily identify, analyze, and develop opportunities for the creation of new products and services.

Course Code: ITCS411 **Course Title:** Cryptography and Computer Security

This course introduces fundamentals of computer security and cryptography. Topics include network security, cryptography, symmetric encryption methods, authentication and authorization mechanisms, public key infrastructure, electronic mail security, web security and cryptographic protocols, defence mechanisms and countermeasures, malware.

Course Code: ITCS416 **Course Title:** Advanced Operating Systems

This course discusses advanced topics in design and implementation of modern operating systems. Topics include virtual machines, real-time and embedded systems, distributed operating, file systems, fault tolerance, performance evaluation.

Course Code: ITCS421 **Course Title:** Geographical Information Systems

This course introduces foundation in the science and technology of geographical information systems (GIS).Topics include interpreting geophysical, geological and related data, accessing database, data

translators, spatial data handling, storage capabilities of a GIS system, GIS programming, integrated GIS solutions.

Course Code: ITCC442 **Course Title:** Cloud Security
This course covers in-depth knowledge in the field of cloud security. Topics include cloud security basics, Security of the cloud, Security in the cloud, security services, Securing the services, Authentication, Access control, Compliance, Incident Management & Troubleshooting.

Course Code: ITCS437 **Course Title:** Computer Graphics
This course covers theories and applications of the computer graphics. Topics include 2-D and 3-D modelling and transformations, viewing transformations, projections, clipping, vectors lines and planes, rendering techniques, graphical software packages and graphics systems.

Course Code: ITCS440 **Course Title:** Intelligent Systems
This course covers analysis and design concepts of intelligent systems. Topics include problem solving methods, searching techniques, heuristic search, game playing, knowledge representations, expert systems, fuzzy logic, machine learning.

Course Code: ITCS441 **Course Title:** Parallel and Distributed Computing
This course covers theory of parallelism and distributed computing. Topics include parallelism, communication, coordination, sequential and parallel processing, parallel and scalable architecture, parallel decomposition, multiple simultaneous computations, parallel computer models, parallel and concurrent programming.

Course Code: ITCS443 **Course Title:** OptimizationTechniques
This course introduces optimization techniques and their applications to real life problems. Topics include linear programming, network flow optimization, genetic algorithms, dynamic programming, branch and bound.

Course Code: ITCS444 **Course Title:** Mobile Application Development
This course covers key technologies underlying mobile application development. Topics include mobile platforms, GUIdesign, mobileprogramming, webservicesprocessing, database accessand event-drivenprogramming.

Course Code: ITCC445 **Course Title:** **Advanced** Cloud Development
This course provides students with advanced technical expertise in development using cloud technologies. Topics include: Serverless development and workflows; Step functions; Application Programming Interfaces; Development and Operations; Continuous integration and continuous delivery (CI/CD); Development and deployment of secure applications in a cloud environment.

Course Code: ITCS449 **Course Title:** Computer Vision
This course introduces concepts and applications of computer vision. Topics include image processing, boundary detection, segmentation and clustering, feature detection, motion estimation and tracking, probabilistic and statistical methods for detection and classification, multiple view geometry, object and scene recognition.

Course Code: ITCS453 **Course Title:** Multimedia and HypermediaSystems

This course covers techniques used to design multimedia systems using conceptual frameworks and multimedia authoring tools. Topics include multimedia system elements, ethical and legal issues in using and creating multimedia contents, create and manipulate information using multimedia presentation concepts.

Course Code: ITCS455 **Course Title:** Semantic Web

This course covers core concepts of semantic Web. Topics include semantic Web technology, XML, XML document models, RDF models, schema, metadata processing, web ontology, web services.

Course Code: ITCS457 **Course Title:** Data Mining

This course introduces concepts and techniques of data mining and knowledge discovery. Topics include analysis of large data sets, algorithms and techniques for association rule mining, clustering, classification and prediction, and outlier detection.

Course Code: ITCS458 **Course Title:** Big Data Analytics

This course covers concepts, techniques and tools needed to deal with various aspects of data science practice, including data collection, cleansing, mangling, and integration, exploratory data analysis, predictive modelling, descriptive modelling, data product creation, machine learning algorithms, evaluation, andeffectivecommunication. Topics include: Datamining, Map-reduce and the new stack software, mining data streams, link analysis, clustering, classification, recommendation, and visualization of large data sets. Applications and projects using major big data tools (e.g. Spark, Hadoop, Python, or R).

Course Code: ITCS461 **Course Title:** Advanced Database Management Systems

This course covers advanced topics of database management systems. Topics Include query processing and query optimization, concurrency control, active, temporal, and multimedia databases, distributed databases and client- server architecture, data warehouse, data mining, emerging database technologies.

Course Code: ITCS464 **Course Title:** Information Retrieval

This course is an introduction to information retrieval systems. Topics include standard concepts in information retrieval (such as documents, queries, collections, and relevance), theoretical and practical aspects of information retrieval systems, recent advances in information retrieval, web retrieval systems.

Course Code: ITCS465 **Course Title:** Numerical Computations

This course covers principles of numerical computation and its application to engineering and scientific problems. Topics include floating-point, round-off analysis, solution of linear and nonlinear equations, least squares curve fitting, interpolation and extrapolation, finite differences and polynomial approximations, finite integration.

Course Code: ITCC493 **Course Title:** Selected Topics in Cloud Computing I
This course covers advanced topics from various areas of cloud computing not covered in CS curriculum

Course Code: ITCC494 **Course Title:** Selected Topics in Cloud Computing II
This course covers advanced topics from various areas of cloud computing not covered in CS curriculum

Course Code: ITCS496 **Course Title:** Physical Implementation of DBMS
This course covers practical aspects of implementation of computerized database systems. Topics include SQL programming, writing programs to interrogate databases, designing and programming, triggers, GUI forms and reports, module development and integration, testing, deployment.

Course Code: ITCC498 **Course Title:** Senior Project
This course allows the student to use cloud computing related knowledge, techniques and skills to design and develop a complete application or solve IT related problems.

Course Code: ITTS 401 **Course Title:** IT Technical Selected Topics I
This course covers advanced technical topics from various areas of information technology not covered in the curriculum.

Course Code: ITTS 402 **Course Title:** IT Technical Selected Topics II
This course covers advanced technical topics from various areas of information technology not covered in the curriculum.

Course Code: ITTS 403 **Course Title:** Cooperative Learning
This course provides the students an opportunity to working full time in a relevant industrial establishment for one academic semester. Gaining the experience of a structured job experience and working on a realistic capstone project using knowledge and skills obtained in prior courses wherein they incorporate IT standards and multiple realistic constraints such as economic, ethical, social, political, environmental, health and safety, manufacturability and sustainability. The students are expected to submit a written report of the work experience together with a written report detailing the project design efforts, and often a working prototype.

Course Code: PHYCS101 **Course Title:** General PhysicsI
Units and measurements; brief review of vectors; Newton's laws of motion; projectile motion; work and energy; impulse and momentum; rotational dynamics; equilibrium of a rigid body; periodic motion.

Course Code: PHYCS102 **Course Title:** General PhysicsII
Electric charges and fields; Coulomb's and Gauss's laws; electric potential; capacitors and dielectrics; direct current circuits; Kirchoff's rules; magnetic field and flux; ampere's law; induced emf; Lenz's law; mutual and self inductance; AC circuits; RLCcircuit.

Course Code: MATHS102 **Course Title:** Calculus II

Applications of definite integrals, including areas, volumes and surface areas of solids of revolution, arc length and centroids. Transcendental functions, indeterminate form and L'Hopital's Rule. Techniques of integration and improper integrals. Infinite series, power series. Maclaurin and Taylor Theorem.

Course Code: MATHS211 **Course Title:** Linear Algebra

Fields. Vector spaces. Linear dependence and independence. Bases. Dimensions. Subspaces. Quotient spaces. Linear transformations. Connection with matrices. Change of bases (PAQ and PAP). Eigen-values. Characteristic polynomial. Minimal polynomial. Canonical forms in simple cases. Real and complex inner-product spaces. Orthonormal bases. Orthogonal and complex unitary matrices and their eigen-values. Orthogonal and unitary reduction of real symmetric and complex Hermitian matrices.

Course Code: MGT131 **Course Title:** Introduction to Business Administration

Overview of business administration as a field of study and practice, survey of major functional specialties within business management, accounting, finance, marketing and production, interrelationships among various specialties and foundation-level, understanding of the management profession.

College Requirement Courses Descriptions

Course Code: ENGL 154 **Course Title:** Language Development I
ENGL 155 is the second of three integrated language courses designed for IT students. The level is upper-intermediate.

Course Code: ENGL 155 **Course Title:** Language Development II
The first of a series of three integrated language courses designed specifically for IT/CS and CE majors. Special attention is given to IT related vocabulary, reading texts and writing.

Course Code: ENGL 219 **Course Title:** Technical Report Writing
This course deals with professional and technical writing. It looks at the theoretical and practical aspects of technical report writing. It also teaches the vocabulary and language structures typically found in report writing with a view to producing a full-length formal research report.

Course Code: MATHS 101 **Course Title:** Calculus I
Algebra. Functions and graphs. Trigonometry. Conic sections. Limits and continuity. Derivatives and integrals. Applications of derivatives which include mean value theorem, extrema of functions and optimization. Definite integrals and the Fundamental Theorem of Calculus.

Course Code: STAT 273 **Course Title:** Probability and Statistics
Descriptive Statistics, Introduction to probability and probability distributions. Some of probability Densities, Sampling distributions. Central limit theorem. t and F distributions. Estimation. Tests of hypotheses. Goodness of fit tests. Regression and correlation.

Course Code: ITCS113 **Course Title:** Computer ProgrammingI
This course introduces problem solving and fundamental programming concepts and techniques implemented by a high-level programming language. Topics include primitive and compound data types, syntax, semantics, expressions, assignment, input, output, conditional and iterative control structures, functions.

Course Code: ITCS114 **Course Title:** Computer ProgrammingII
This course covers key concepts of object-oriented programming. Topics include object oriented design, encapsulation, event handlers, memory management, arrays, exception handlers, searching algorithms, programming applications.

Course Code: ITCS214 **Course Title:** Data Structures
This course covers data structures and their implementations in an object-oriented programming language. Topics include subtyping, abstract base class, lists, stacks, queues, trees, graphs, hash tables, strategies for choosing appropriate data structure.

Course Code: ITCC 481 Course Title: Industrial Training
This course provides the students an opportunity to get hands on experience of working in IT industry.

University Requirements Courses Descriptions

Course Code: ARAB 110 **Course Title:** Arabic Language Skills
This course focuses on basic Arabic skills including form, function, and meaning. It also helps the student to appreciate and understand structures and approach them from a critical point of view, through various genres in literature.

Course Code: HIST 122 **Course Title:** Modern History of Bahrain and Citizenship
Spatial identity of Bahrain: Brief history of Bahrain until the 18th century; the historical roots of the formation of the national identity of Bahrain since the 18th century; the modern state and evolution of constitutional life in Bahrain; the Arabic and Islamic dimensions of the identity of Bahrain; the core values of Bahrain's society and citizenship rights (legal, political, civil and economic); duties; responsibilities and community participation; economic change and development in Bahrain; Bahrain's Gulf, Arab and international relations.

Course Code: HRLC 107 **Course Title:** Human Rights
This course deals with the principles of human rights in terms of the definition of human rights, scope, sources with a focus on the International Bill of Human Rights; The Charter of the United Nations; Universal Declaration of Human Rights; The International Covenant on Economics, Social and Culture rights; Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment; Mechanics and the Constitutional Protection of Rights and Public Freedoms in Kingdom of Bahrain.

Course Code: ISLM 101 **Course Title:** Islamic Culture
An introduction to the general outline and principles of Islamic culture, its general characteristics, its relationships with other cultures, general principles of Islam in beliefs, worship, legislation and ethics.