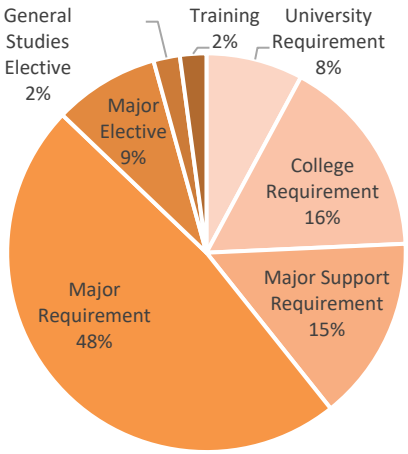
B.Sc. in Network Engineering 2024

Program Components

Course Type	CRD
University Requirement (UR)	11
College Requirement (CR)	23
Major Support Requirement (MSR)	21
Major Requirement (MR)	67
Major Elective (ME)[1]	12
General Studies Elective (GSE)[2]	3
Training (Internship, Practicum) (TR)	3
Total Credit (CRD)	140



[1]Student must select four courses from Major Elective (ME) List.
[2]Student must select one from Humanities and Social Science Component. This includes 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			
ITCE 101	Computer Technologies	3	0	3	MR	None	Yes
ITCS 106	Computer Programming I	3	2	4	CR	None	Yes
PHYCS 101	General Physics I	3	3	4	MSR	None	No
MATHS 101	Calculus I	3	0	3	CR	None	No
ENGL 157	English for Information Technology	3	0	3	CR	None	No

Year 1 - Semester 2

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITCE 114	Digital Design I	3	2	4	MR	ITCE 101	Yes
ITCS 107	Computer Programming II	3	2	4	CR	ITCS 106	Yes
PHYCS 102	General Physics II	3	3	4	MSR	PHYCS 101	No
MATHS 102	Calculus II	3	0	3	MSR	MATHS 101	No
CHEMY 101	General Chemistry I	3	3	4	MSR	None	No

Year 2 - Semester 3

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITCE 201	Electrical Circuit Analysis	3	2	4	MR	MATHS 101 & PHYCS 102	Yes
ITNE 233	Computer Networks	3	2	4	MR	ITCS 106 & ITCE 101	Yes
ITCS 214	Data Structures	3	0	3	CR	ITCS 107	Yes
MATHS 205	Differential Equations	3	0	3	MSR	MATHS 102	No
STAT 273	Probability and Statistics	3	0	3	CR	MATHS 101	No

Year 2 - Semester 4

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 240	Network Operating Systems	3	0	3	MR	ITCS 107 & ITNE 233	Yes
ITCE 232	Embedded Systems I	3	2	4	MR	ITCE 114	Yes
ITCS 330	Database Driven Websites	3	0	3	MR	ITCS 214	Yes
ITCS 258	Discrete Structures	3	0	3	MR	ITCS 106 & MATHS 101	Yes
ENGL 219	Technical Report Writing	3	0	3	CR	ENGL 157	No

Year 3 - Semester 5

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 341	Network Security I	3	0	3	MR	ITNE 233	Yes
ITNE 350	Network Management & Administration	3	0	3	MR	ITNE 233	Yes
ITNE 351	Routing and Switching	3	0	3	MR	ITNE 233	Yes
ITNE 352	Network Programming	3	0	3	MR	ITCS 214 & ITNE 233	Yes
MATHS 342	Linear Algebra and Complex Analysis Variables	3	0	3	MSR	MATHS 102	No
HIST 122	Modern History of Bahrain and Citizenship	3	0	3	UR	None	No

Year 3 - Semester 6

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 450	Wireless Networks	3	0	3	MR	ITNE 351	Yes
ITNE 361	Network Security II	3	0	3	MR	ITNE 341	Yes
ITNE 362	Network Engineering and Design	3	0	3	MR	ITNE 351	Yes
ITCE 340	Signals and Systems	3	0	3	MR	ITCE 201 & MATHS 205	Yes
ITCE 370	Professional Issues and Ethics	3	0	3	MR	ENGL 219	Yes
ARAB 110	Arabic Language Skills	3	0	3	UR	None	No

Training Requirement

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 409	Industrial Training	0	6	3	CR-Training	Passing 85 CrHr	Yes

Year 4 - Semester 7

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITIS 404	Project Management for Engineers	3	0	3	MR	ITCS 107	Yes
ITNE 402	Senior Project	0	9	3	MR	ENGL 219 & Passing 85 CrH	Yes
ITXX 4XX	Major Elective 1	3	0	3	ME	See elective list	Yes
ITXX 4XX	Major Elective 2	3	0	3	ME	See elective list	Yes
HRLC 107	Human Rights	2	0	2	UR	None	No

Year 4 - Semester 8

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 480	Ethical Hacking	3	0	3	MR	ITNE 361 & ITNE 352	Yes
ITNE 481	Cloud Computing	3	0	3	MR	ITNE 351	Yes
ITXX 4XX	Major Elective 3	3	0	3	ME	See elective list	Yes
ITXX 4XX	Major Elective 4	3	0	3	ME	See elective list	Yes
ISLM 101	Islamic Culture	3	0	3	UR	None	No
GSE XXX	Humanities/Social Sciences	3	0	3	GSE	None	No

List 1: Major Elective Courses List

Course Code	Course Title	Course Hours			Course Type	Pre-requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 492	Selected Topics in Network Engineering 1	3	0	3	ME	Department Approval	Yes
ITNE 493	Selected Topics in Network Engineering 2	3	0	3	ME	Department Approval	Yes
ITTE 401	IT Technical Selected Topics 1	3	0	3	ME	Department Approval	Yes
ITTE 402	IT Technical Selected Topics 2	3	0	3	ME	Department Approval	Yes
ITTE 403	Cooperative Learning I	0	12	6	ME - Training	Department approval Co-requisite: ITNE 402	Yes
ITNE 482	Wireless Sensor Networks	3	0	3	ME	ITNE 351	Yes
ITNE 483	Advanced Network Troubleshooting	3	0	3	ME	ITNE 350	Yes
ITNE 484	Data Center Management	3	0	3	ME	ITNE 350 & ITNE 341 & ITNE 351	Yes
ITNE 485	WLAN Architecture and Design	3	0	3	ME	ITNE 360	Yes
ITNE 486	Protocol Analysis and Design	3	0	3	ME	ITNE 351	Yes
ITNE 489	Cyber Security Risk Management and Policies	3	0	3	ME	ITNE 361	Yes
ITCE 456	Multimedia Communication	3	0	3	ME	ITNE 233 & ITCE 340	Yes
ITNE 491	Technology Entrepreneurship	3	0	3	ME	ITIS 404	Yes

List 2: 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	------
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	------
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: ITCE 101 **Course Title:** Computer Technologies
This course introduces the basics of computer information systems and IT terminology. Topics include hardware components, system software, and application software. Software and hardware installation, upgrade, and troubleshooting. Representation of textual and numerical data. Problem solving principles. Programming languages fundamentals, language translation and interpretation. Communication, Networking, and Internet basics, Network services, Network layers and protocols.

Course Code: ITCE 114 **Course Title:** Digital Design I
This course covers the fundamentals of digital logic and design. Topics include number systems; Binary codes, logic gates, Boolean algebra, simplification of logic functions: Karnaugh maps, combinational logic circuits (adders, decoders, encoders, multiplexer, etc.). Analysis and design of sequential circuits: latches, Flip-Flops, counters, registers. Design of state machines (Mealy, Moore). The laboratory experiments will provide students with hands-on experience of designing, implementing, testing, and simulating digital logic circuits.

Course Code: ITCE 201 **Course Title:** Electrical Circuit Analysis
This course covers the fundamental concepts, laws, and theorems of electrical circuits. Topics include units, charge, current, voltage, power, and energy. Ohm's and Kirchhoff's laws. Analysis techniques and theorems for both DC and AC circuits. (Examples: nodal analysis, mesh analysis, source transformation, superposition, and Thevenin's and Norton's theorems). Transient analysis of RC and RL circuits, sinusoids and phasors, impedance and admittance, AC power analysis, power factor correction, and series and parallel resonance.

Course Code: ITNE 233 **Course Title:** Computer Networks
The course provides a comprehensive understanding of network architectures, protocols, and communication models. It covers topics such as network applications, topologies, IP addressing, subnetting, and routing protocols. Learners will explore popular network technologies such as Ethernet, TCP/IP, Wi-Fi, VLANs and DNS, and gain hands-on experience in configuring and managing network devices such as routers and switches.

Course Code: ITNE 240 **Course Title:** Network Operating Systems
This course provides fundamentals of network operating systems and applications. Topics covered are Standards & Protocols, Addressing, Address Resolution, Network OS, File Systems, Intro to Linux, File Sharing, System Administration, Software installation, Network Services, Security and backup and recovery.

Course Code: ITCE 232 **Course Title:** Embedded Systems I
This course covers the microprocessor and microcontroller architectures and peripherals. Topics covered include: µP and µC Architectures, Instruction Set, Assembly language programming, high-level language programming, Timers, ADC, USART, Interrupt, Interfacing with sensors and actuators.

Course Code: ITCS 285 **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: ITCS 258 **Course Title:** Discrete Structures
This course covers basic discrete structures that are the backbones of computer science. Topics include logic, predicate calculus, proofs, sets, relations, recurrence relations, graphs, and trees.

Course Code: ITNE 341 **Course Title:** Network Security I
The course will cover the security topics in the following areas: Access control, simple authentication protocols, password-based security, ACLs and capabilities, multilevel and multilateral security, covert channels and inference control, firewalls and intrusion detection systems. Software: flows and malware, buffer overflows, viruses and worms, software reverse engineering, digitals rights management, secure software development and operating systems security.

Course Code: ITNE 350 **Course Title:** Network Management & Administration
The network management course is concerned with providing the principal background theory and practical skills that are vital to understand the tools that are necessary to manage and maintain the operation of computer networks. Network management protocols such as SNMP 1,2,3, RMON1, RMON2.

Course Code: ITNE 351 **Course Title:** Routing and Switching
This course focuses on the routing and switching architectures, algorithms, and protocols for packet switched networks with an emphasis on the Internet Protocol (IP) based networks. Routing techniques for both traditional wired networks and the emerging wireless and mobile networks will be examined. The course teaches the fundamental routing concepts using open standards. Topics covered in this course are: Advanced IPv4 addressing, NAT, IPv6, internal and external routing protocols, Multicasting, MPLS, MANET (Mobile Ad Hoc Network) Routing, Geographic Routing, Geocasting, DTN (delay tolerant network) Routing.

Course Code: ITNE 352 **Course Title:** Network Programming
This course introduces the basics of computer network programming. Topics include: designing and implementation of software for distributed systems (client/server and peer-to-peer), creating and managing sockets and interfaces, addressing, TCP and UDP programming, programming for web services (RESTful AP), message passing, securing connections, multithreading, remote procedure call, and remote object access.

Course Code: ITNE 450 **Course Title:** Wireless Networks
This course covers the fundamental concepts of mobile and wireless communication networks. Topics include: radio channel characteristics and propagation, multiple access techniques, frequency reuse, interference, link budget, hand-off procedures, mobile communication standards.

Course Code: ITNE 361 **Course Title:** Network Security II
Basic of cryptographic systems, symmetric block ciphers (DES, AES, other contemporary symmetric ciphers), linear and differential cryptanalysis, perfect secrecy, public-key cryptography (RSA, discrete logarithms), algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, and signature schemes.

Course Code: ITNE 362 **Course Title:** Network Engineering and Design
The objective of this course is to teach a practical methodology for designing enterprise networks that are reliable, secure, and manageable. The course content includes: logical network design, customer to technology mapping, physical network design, and testing network designs. Additionally, the students will be exposed to various security and network management strategies. Various hardware and software building blocks of the networks will be studied and compared to facilitate effective network design.

Course Code: ITCE 340 **Course Title:** Signals and Systems
This course covers the fundamental concept used in analogue and digital signals and systems. Topics include: elementary continuous and discrete-time signals, sampling theory and Nyquist theorem, signal decomposition, Linear Time-Invariant (LTI) systems: properties, impulse responses, convolution, Fourier series and integral with applications, frequency responses, pole-zero description, difference and differential equations, Laplace and Z transforms, transient and steady-state time responses to elementary signals, FIR and IIR filter design.

Course Code: ITCE 370 **Course Title:** Professional Issues and Ethics
This course covers professional and legal issues in computer engineering and research methodology. Topics include: research methodology, technical report writing and effective communication, teamwork, ethical theories, privacy, intellectual property, copyrights, legal computing issues and regulations, professional societies and code of conduct, philosophical frameworks and cultural issues.

Course Code: ITIS 404 **Course Title:** Project Management for Engineers
This course covers the essential components of engineering and IT Project Management (PM). Topics covered include defining and planning an engineering and IT project using different planning techniques; defining scope, time, cost, quality, and risk management in the context of computer engineering; monitoring and controlling projects; project management software; using different testing techniques for the validation and verification of a project.

Course Code: ITNE 402 **Course Title:** Senior Project
Senior students are required to undertake a design project in the department or within an industrial workplace, using knowledge and skills obtained in prior courses wherein they incorporate engineering standards and multiple realistic constraints such as economic, ethical, social, political, environmental, health and safety, manufacturability, and sustainability. The students are expected to work in teams and are required to submit a written report and conduct an oral presentation.

Course Code: ITNE 480 **Course Title:** Ethical Hacking
Practice and methodology of ethical hackers are identified to provide the learners with an understanding of networks threats and possible attacks, ability to plan and apply penetration test, distinguish recommended countermeasures, and compose a penetration test report.

Course Code: ITNE 481 **Course Title:** Cloud Computing
This course covers concepts required to build cloud infrastructure. Topics include cloud infrastructure reference model, resource management, programming models, application models, system characterizations, implementations, deployment of cloud computing systems.

Major Elective Course Descriptions

Course Code: ITNE 492 **Course Title:** Selected Topic in Network Engineering 1
This course is to give room for offering newly emerging topics in Network Engineering. Topics proposed for this purpose shall be submitted to the department at least one semester ahead and will be offered only upon department approval.

Course Code: ITNE 493 **Course Title:** Selected Topic in Network Engineering 2
This course is to give room for offering newly emerging topics in Network Engineering. Topics proposed for this purpose shall be submitted to the department at least one semester ahead and will be offered only upon department approval.

Course Code: ITNE 482 **Course Title:** Wireless Sensor Networks
This course covers an introduction to wireless sensor networks. Topics include the architecture of wireless sensor nodes and networks, applications and implementations, Media Access Control protocols, routing protocols (flat, hierarchal, geographical, and data-centric), data aggregation and fusion, topology control, localization, and time synchronization.

Course Code: ITNE 483 **Course Title:** Advanced Network Troubleshooting
This course provides the student with the knowledge to troubleshoot computer networks. The course discusses network troubleshooting strategies, troubleshooting tools, host troubleshooting, connectivity testing, traffic capturing, traffic analyzing, and performance measurements. By taking this course the learner will be able to identify network problems, analyze, and troubleshoot them using the appropriate tools.

Course Code: ITNE 484 **Course Title:** Data Center Management
The primary objective of this course is to deliver broad awareness of datacenter requirements, design and management technologies and methodologies. This includes: reliability, security, network systems, storage systems, systems management, operating environments, application environments/management, operations, logistics and energy efficiencies.

Course Code: ITNE 485 **Course Title:** WLAN Architecture and Design
This course introduces the architecture, design and implementation of wireless LANs. It provide a detailed discussion of the 802.11 WLAN standard which is necessary to construct and manage reliable WLANs. The course focuses on designing efficient WLANs to provide optimal coverage, capacity and mobility to users. The essential components necessary for building WLANs are also covered as well as the deployment of these elements.

Course Code: ITNE 486 **Course Title:** Protocol Analysis and Design
This course will cover the key topics in protocol analysis and design. Topics include Communication Protocol Definition/Representation, Formal and Informal Protocol Development Methods, Protocol Engineering process, Protocol Specification, Protocol Specification Languages, Protocol Verification/ Validation, Protocol Conformance and Performance Testing.

Course Code: ITCE 456 **Course Title:** Multimedia Communication

Introduction to multimedia, Multimedia information presentation, transmission of continuous media such as digital audio and video, text compression, image compression, audio and video compression, Multimedia services, broadband networks, network technologies for real-time, low-latency delivery of multimedia, QoS, Multimedia protocols, Multimedia services, audio and video streaming.

Course Code: ITNE 489 **Course Title:** Cyber Security Risk Management and Policies

This course covers the principles of applied information security management and is suitable for those who are looking for an in-depth understanding of security management in medium to large organizations. The course comprises the following topics: governance and security policy, threats and vulnerability management, incident management, risk management, information leakage, crisis management and business continuity, legal and compliance, security awareness and security implantation considerations, dealing with classified sensitive data, and the practical consideration when implementing the frameworks to address current and future threats.

Course Code: ITNE 491 **Course Title:** Technology Entrepreneurship

The course covers fundamentals of technology entrepreneurship, key frameworks, models, and guidance to creativity and innovation to bring idea into opportunities. It also covers Fundamentals of values and principles in entrepreneurship, associated with legal matters, venture opportunities, strategies, business models, and intellectual property.

Course Code: ITTE 403 **Course Title:** Cooperative learning

This course provides the students an opportunity to work 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.

Major Support Course Requirements

Course Code: PHYCS 101 **Course Title:** General Physics I
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: PHYCS 102 **Course Title:** General Physics II
"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; RLC circuit)."

Course Code: CHEMY 101 **Course Title:** General Chemistry I
Significant figures, chemical formulas and equations; mass relations, limiting reactants and theoretical yield; Physical behavior of gases; electronic structure, periodic table, covalent bonding; Lewis structures, Molecular structures, hybridization; molecular orbitals, solutions; colligative properties. Related practical work.

Course Code: MATHS 102 **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: MATHS 205 **Course Title:** Differential Equations
Differential equations of first order and their solution. Separable and exact equations. Equations convertible to separable type. Higher order linear equations with constant coefficients (homogeneous and non-homogeneous). Power series method for second order linear equations. Variation of parameters. Laplace transform technique. Applications of differential equations.

Course Code: MATHS 342 **Course Title:** Linear Algebra and Complex Analysis Variables
System of linear equations, Matrices, Determinants, Vector spaces, Subspaces, Linear independence, Linear transformations, Complex numbers, Analytical functions, Cauchy Integral theorem and formula, Residues, contour integration.

College Requirement Courses Descriptions

Course Code: ENGL 157 **Course Title:** English for Information Technology
The is first in a two-part series of language courses for IT students. It focuses on developing students' grammar and writing skills, specifically essay and summary writing. The level of this course is upper-intermediate (B2).

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: ITCS 106 **Course Title:** Computer Programming I
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: ITCS 107 **Course Title:** Computer Programming II
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: ITCS 214 **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.

Cr - Training:

Course Code: ITNE 409 **Course Title:** Industrial Training
This course provides the students an opportunity to get hands-on experience of working in Engineering and IT industry for two continuous months during summer. The students are expected to work in teams and are required to submit a written report describing the working experience and any project involved during the training period.

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.