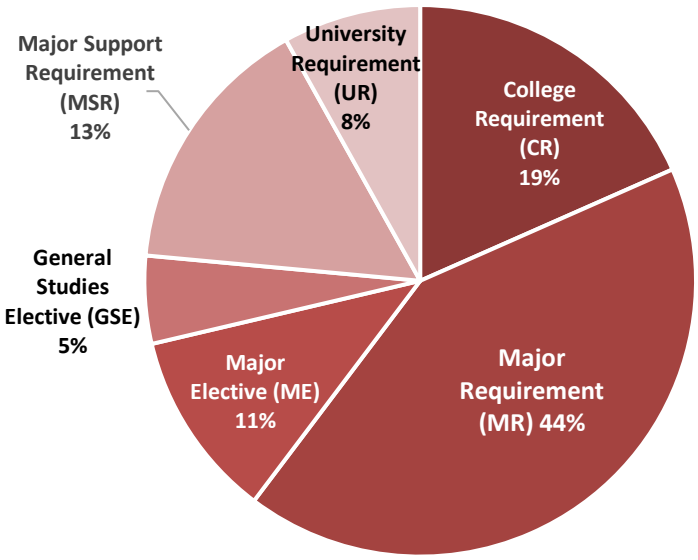
B.Sc. in Network Engineering 2021

Program Components

Course Type	CRD
University Requirement (UR)	11
College Requirement (CR)	25
Major Support Requirement (MSR)	17
Major Requirement (MR)	60
Major Elective (ME)[1]	15
General Studies Elective (GSE)[2]	7
Total Credit (CRD)	135



[1] All students must select two courses from Major Elective (ME) List. Also, student must choose another 9 credit hours that is either the cooperative learning track, or the traditional track (senior project plus two ME courses).

[2] Students must select two General Studies Electives according to the following:

- One course must be selected from the two science courses:
  1. CHEMY 101 (GENERAL CHEMISTRY I)
  2. BIOLS 102 (GENERAL BIOLOGY I)

- One course must be selected from Humanities and Social Science Component: 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.

Detailed Study Plan

Year 1 - Semester 1

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

Year 1 - Semester 2

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCE 112	Digital Design I	3	2	3	MR	ITCE 101	Yes
ITCS 114	Computer Programming II	3	2	3	CR	ITCS 113	Yes
PHYCS 102	General Physics II	3	3	4	MSR	PHYCS 101	No
MATHS 102	Calculus II	3	0	3	MSR	MATHS 101	No
ENGL 155	Language Development II	3	0	3	CR	ENGL 154	No
HRLC 107	Human Rights	2	0	2	UR	------	No

Year 2 - Semester 3

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCE 221	Electrical Circuit Analysis	3	2	3	MR	PHYCS 102 & MATHS 101	Yes
ITNE 231	Computer Networks I	3	2	3	MR	ITCS 113 & ITNE 110	Yes
ITCS 214	Data Structures	3	2	3	CR	ITCS 114	Yes
MATHS 205	Differential Equations	3	0	3	MSR	MATHS 102	No
STAT 273	Probability and Statistics	3	0	3	CR	MATHS 101	No
GSE XXX	Science Elective	3	3	4	GSE	------	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	2	3	MR	ITCS 114 & ITNE 231	Yes
ITNE 241	Computer Networks II	3	2	3	MR	ITNE 231 & ITCS 114	Yes
ITIS 265	IT Project Management I	3	2	3	MR	------	Yes

ITCS 285	Database Management Systems	3	2	3	MR	ITCS 214	Yes
ITCS 254	Discrete Structures I	3	2	3	MR	ITCS 113 & MATHS 101	Yes
ENGL 219	Technical Report Writing	3	0	3	CR	ENGL 155	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	2	3	MR	ITNE 241	Yes
ITNE 350	Network Management & Administration	3	2	3	MR	ITNE 241	Yes
ITNE 351	Routing and Switching	3	2	3	MR	ITNE 241	Yes
ITNE 352	Network Programming	3	2	3	MR	ITCS 214 and ITNE 231	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	-----	No

Year 3 - Semester 6

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 360	Wireless Networks	3	2	3	MR	ITNE241	Yes
ITNE 361	Network Security II	3	2	3	MR	ITNE 341	Yes
ITNE 362	Network Engineering and Design	3	2	3	MR	ITNE 351	Yes
ITCE 340	Signals and Systems	3	2	3	MR	ITCE 221& MATHS 205	Yes
ITCS 333	Internet Software Development	3	2	3	MR	ITCS 285	Yes
ARAB 110	Arabic Language Skills I	3	0	3	UR	------	No

Training Requirement

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 400	Industrial Training	0	3	1	CR-Training	Pass 85 Credits	Yes

Year 4 - Semester 7

Cooperative Learning Track

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 401	Cooperative Learning	0	27	9	ME	ITNE 400 & MGPA>= 2.0	Yes

OR

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 402	Senior Project	0	6	3	ME	85 credit hours & ENGL 219	Yes
ITNE XXX	ITNE Elective I	3	2	3	ME	As per ME list	Yes
ITNE XXX	ITNE Elective II	3	2	3	ME	As per ME list	Yes

Year 4 - Semester 8

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 480	Ethical Hacking	3	2	3	MR	ITNE 361 & ITNE 352	Yes
ITNE 481	Cloud Computing	3	2	3	MR	ITNE 241	Yes
ITNE XXX	ITNE Elective III	3	2	3	ME	As per ME list	Yes
ITNE XXX	ITNE Elective IV	3	2	3	ME	As per ME list	Yes
ISLM 101	Islamic Culture	3	0	3	UR	----	No
HU/SS XXX	Humanities/Social Sciences	3	0	3	GSE	-----	No

Major Elective Courses

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITNE 401	Cooperative Learning	0	27	9	ME	ITNE 400 & MGPA>= 2.0	Yes
ITNE 402	Senior Project	0	6	3	ME	85 credit hours & ENGL 219	Yes
ITNE 482	Wireless Sensor Networks	3	2	3	ME	ITNE 360	Yes
ITNE 483	Advanced Network Troubleshooting	3	2	3	ME	ITNE 350	Yes
ITNE 484	Data Center Management	3	2	3	ME	ITNE 350 & ITNE 341 & ITNE 241	Yes
ITNE 485	WLAN Architecture and Design	3	2	3	ME	ITNE 360	Yes
ITNE 486	Protocol Analysis and Design	3	2	3	ME	ITNE 351 & ITNE 241	Yes
ITNE 489	Cyber Security Risk Management and Policies	3	2	3	ME	ITNE 361	Yes
ITNE 490	Multimedia Communication	3	2	3	ME	ITNE 241	Yes
ITNE 491	Technology Entrepreneurship	3	2	3	ME	ITIS 265	Yes
ITNE 492	Selected Topics in Network Engineering 1	3	2	3	ME	As per department Approval	Yes
ITNE 493	Selected Topics in Network Engineering 2	3	2	3	ME	As per department Approval	Yes
ITNE 494	Selected Topics in Network Engineering 3	3	2	3	ME	As per department Approval	Yes

Science Elective Courses

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
CHEMY 101	General Chemistry I	3	3	4	GSE	------	No
BIOLS 102	General Biology I	3	3	4	GSE	------	No

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	------

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

Course Description

Course Code: ITNE 110 **Course Title:** Introduction to Computer and Network Technology
This foundational course introduces basic computer and network theory, and component identification and function. Hardware Basics: Case, Motherboard, CPU, Cards, HDD, FDD, CD, Power supply, memory, etc. BIOS, CMOS, POST, Basic connections and troubleshooting, Operating systems, 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: ITCE 112 **Course Title:** Digital Design I
This course covers the fundamental of digital logic and design. Topics include: number systems; logic gates, Boolean algebra, simplification of logic functions: Karnaugh maps, combinational logic circuits (adders, comparators, decoders, encoders, multiplexer, etc.). Analysis and design of sequential circuits: latches, Flip-Flops, counters, registers, memory and storage. The laboratory experiments will provide students with hands-on experience of designing, implementing, testing, and simulating digital logic circuits.

Course Code: ITCE 221 **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 231 **Course Title:** Computer Networks I
Packet-Switched Networks. Protocol Layers. Application Layer. HTTP, FTP, Electronic Mail, DNS. 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: ITNE 240 **Course Title:** Network Operating System
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.

Course Code: ITNE 241 **Course Title:** Computer Networks II
Data and Signals, Signal transmission; Bandwidth Utilization; Transmission media and systems; Signal encoding; Interfacing; Data link control; Error detection and correction; Multiple Access; Ethernet; Multimedia networking.

Course Code: ITCS 254 **Course Title:** Discrete Structures I
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: ITIS 265 **Course Title:** IT Project Management
This course provides students with the basic principles of project management, including concepts of project initiating, planning, executing, monitoring and controlling, and closing process groups. The course introduces the fundamentals of five project management areas: integration, scope, time, cost and quality.

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: 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: 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 and Administration
The network management course is concerned with providing the principle 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 Programing
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: ITCS 333 **Course Title:** Internet Software Development
Key technology underlying the World-Wide Web. Web architecture, including server design, Internet protocols standards (e.g. HTTP, TCP/IP, SMTP, POP3, MIME, FTP), Client Server data processing; Web design using HTML/XHTML/CSS that include techniques for text, images, links and forms; XML based Applications, DTD, XSL/XSLT, and RSS; Client and Server-side programming languages, JavaScript and PHP; Web-based Programming Project.

Course Code: ITNE 360 **Course Title:** Wireless Networks
This course covers the fundamental of wireless networks. Topics include: WLAN technologies, Infrared, UHF narrowband, spread spectrum, RF, microwave, design, Bluetooth, RF survey, Wireless LAN design, Wireless LAN protocol standards, Media Access Protocol, WMAN, Wireless Network Security.

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: ITNE 400 **Course Title:** Industrial Training

This course provides an opportunity to get hands-on experience of working in Network Engineering related environment that provides a comprehensive experience of the professional environment. The Internship last for at least 8 weeks and provides an opportunity for gaining knowledge and application while being supervised by experienced professionals in various industries. The students are expected to gain new technical, interpersonal, and professional skills throughout this internship. The students are required to submit a written report detailing their experience, observations and any project involved during the internship period.

Course Code: ITNE 401 **Course Title:** Cooperating 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 engineering 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: ITNE 402 **Course Title:** Senior Project

Senior students are required to undertake a design project, 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 a cloud infrastructure. Topics include cloud infrastructure reference model, resource management, programming models, application models, system characterizations, and implementations, deployment of cloud computing systems.

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 Centre 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: 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 490 **Course Title:** Multimedia Communication

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.

Major Support Requirements Courses

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.

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).

Science Elective Courses

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: BIOLS 102 **Course Title:** General Biology I
Properties of life; atoms, molecules and chemical bonds; biomolecules; cell structure and function; bioenergetics (intermediary metabolism); cell reproduction; Mendelian genetics; structure of DNA; RNA and protein synthesis; molecular genetics.

College Requirement Courses Descriptions

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

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 113 **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 114 **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.

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.