Network Engineering & Security				
Course Code	Course Name	PreRequisite	CH	Course Description
CIS 103	Programming I	Co-registered in ORN 04C & ORN 04R	4	In this course students will learn the basics of Java language syntax, elementary programming, selection and repetition, methods and arrays. They will gain experience by designing, writing, compiling and executing simple java programs.
ENG 101	English Essay Writing	ORN 05R & ORN 05C	3	This course gives knowledge of English Essay Writing to the students. Topics include Introduction to course and characteristics of academic writing, The Writing Process with a review of grammar, punctuation, sentence structure, paragraph structure, and organization (introduction, body, conclusion), The Process Essay, Writing a Research Essay, Paraphrasing Techniques, The Process Essay, More Practice for Revising and Editing, The Cause and/or Effect Essay, The Cause and/or Effect Essay, The Descriptive Essay, The Comparison/ Contrast Essay
PHY 101	Introduction To Physical Sciences	ORN 04R & ORN 04C	3	This course will introduce students to Physical Sciences, especially to the discipline of Physics and Chemistry. It is an introductory course designed to explore the basic concepts of Physical Science. The course includes an introduction to the fundamental concepts of Physics and Chemistry. Students will be encouraged to explore the relationship between

				science and everyday life. This course will provide opportunities to study the concepts of matter, energy, speed, velocity, acceleration, Static and Current electricity, metals, nonmetals, efficiency, periodic table and forces and their application through investigations and activities that develop thinking skills and independent thinking. This course will establish a base with which the non-science student can view nature more perceptively.
MTH 104	Calculus I	MTH 001 and ORN 03C and ORN 03R	3	This three-credit course provides Students to learn different types of functions and their behavior, differentiation and integration and how to apply for engineering problems. Topics include: Functions (Logarithmic, Exponential and Trigonometric), Differentiation and Integration and their applications.
ISL 101	Foundations of Islamic Culture	ORN 02R & ORN 02C	2	Students are novelist, and this course introduces the students to the foundation of Islamic Principles and culture and helps the student appreciate the way Islam views the human beings, life and the universe.
CIS 104	Programming II	CIS 103 and ORN 05C and ORN 05R	4	This course gives a thorough grounding in the basics of Object Oriented design and programming including Abstraction, Encapsulation, Polymorphism, Inheritance and

				Exception Handling. Emphasis will be placed on creating and manipulating objects and classes. They will also learn event-driven programming. Students will learn about these concepts in a Java development environment.
ISY 102	Introduction to IS	ORN 04C & ORN 04R	3	An introduction to computer based information systems and to their applications in business, including a discussion of issues involved in the use of information systems by management. The course also provides hands on tutorial experience in the use of computers, with particular emphasis on business applications of microcomputers.
PHY 103	Physics-I	PHY 101	4	This course provides students' knowledge of mechanics. Topics include details of vector's analysis (two and three dimensions), Newton's laws using graphs and vectors, linear motion, circular motion, work and energy, energy transfer, linear and angular momentum and their conservation, universal gravitation, periodic and wave motion, dynamics and statics of particles and rigid bodies, harmonic vibrations and fluid mechanics of motion.
STT 103	Probability and Statistics	MTH 001 and ORN 03C and ORN 03R	3	This three-credit course provides Students to learn the science of statistics, types of data, graphical methods and numerical methods of describing data, probabilities,

				normal, binomial, Poisson distributions, sampling distribution and central limit theorem, large and small sample confidence intervals for mean and proportions and determining the sample size. Topics include: Describing Data, Graphical and numerical Methods, Probability and Large and Small confidence interval.
MTH 105	Discrete Mathematics	MTH 001 and ORN 03C and ORN 03R	4	This three-credit course provides Students to study the mathematical topics which are most directly related to computer science. Emphasis will be placed on providing a context for the application of the mathematics within computer science. The students will learn to recognize and express mathematical ideas graphically, numerically, symbolically and in writing. Topics include: Logic and proofs, Relations, Graph and Trees.
ARB 102	Communication Skills in Arabic	ORN 02R & ORN 02C	2	This course teaches students basic communication skills in Arabic Language, including verbal communication and presentation skills.
CIS 201	Fundamentals of Web Design	CIS 103	3	This course introduces basic concepts of the Internet and World-Wide Web. Students will learn how to create web pages with HTML, and use JavaScript for dynamic effects. Major topics include the roles and operation of web browsers and servers, including interacting with web

				applications through forms; and the separation of formatting and logical structure in HTML documents, stylesheets, and the basic principles of effective interface design for the web
CIS 202	Data Structures	CIS 104	3	Object-oriented modeling techniques for analysis and design. Provides the tools and techniques needed to solve complex, real-world software engineering problems in an object-oriented manner, using the most effective elements of the Unified Process. The course covers the essential concepts and notation of the Unified Modeling Language (UML), the standard notation for object-oriented analysis and design. Team project.
ENG 201	Technical Report Writing	ENG 101	3	This course introduces the students about Technical Report Writing. Topics include Introduction to Technical Writing, Audience Analysis, Procedural Technical Writing, Report Writing, CV & Job Application Letter.
PHY 203	Physics-II	PHY 103	4	This course provides students' knowledge about Electricity, Magnetism and Electronics. Topics include electric and magnetic fields, Coulomb's and Gauss' Law, electric fields and potentials, electrical and magnetic properties of matter, Ampere's and Faraday's laws, elementary DC and AC circuits, RC,RL and RLC circuits, Maxwell's equations,

				circuit theory and electromagnetic induction, semi-conductors, PN Junction, diode of different types, transistors of different types, working of transistors in different configurations, logic gates using diodes and different types of transistors.
MTH 211	Calculus II	MTH 104	3	This three-credit course provides Students to use different kind of Series like Infinite series, power series, and parametric equations for a class of different problems. Functions of several variables and multiple integrals are power tools in this course. Topics include: Series (Finite and Infinite ones), Partial Differentiation, Multiple Integration and their applications.
SWE 202	Introduction to Software Engineering	CIS 104	3	Topics include software project management, software life cycle, software specifications, and software maintenance. In addition, through a group project the students will gain experience that enables them to idea about software engineering in general.
NES 212	Communication and Computer Networks	CIS 201	3	This course is an introductory course in networking technology. Students are taught data communications concepts in both Computer Networks and Mobile Communication Systems/Networks. First the layered architecture of a network is discussed, and then

				fundamental concepts related to Signal are taught. These concepts are then related with bandwidth, data rate, encoding and modulation of the signals. Different error detection and correction schemes along with flow control are discussed. Finally, different communication protocols are discussed in detail.
ISL 201	Foundation of Islamic Economy	ORN 02R & ORN 02C	4	This course provides students with economic principles form an Islamic Perspective. It addresses Islamic economic concepts, such as protection of property, ownership, inheritance, consumption, Islamic finance and economic welfare. The course provides an introduction to Islamic Banking Systems.
NES 221	Digital Logic and Design	MTH 105	4	This course provides a solid foundation in design and analysis of the operation of digital gates. This course aims to familiarize the student with the basic concepts in digital logic design. Two basic categories are emphasized: combinational and sequential logic circuits. Topics include different types of gates, design and implementation of combinational and sequential logic circuits and information storage circuits. Concepts of Boolean algebra, Karnaugh maps, flip-flops, registers, and counters along with various logic families and comparison of their behavior are presented.

ISY 221	Introduction to Database System	CIS 104	3	This course is intended to give students a solid background in database systems. Topics include characteristics and advantages of the database management systems (DBMS), database concepts and architecture; data models, database schemes and instances, DBMS and the concept of program-data independence, database languages and interfaces, database models, relational data model and relational algebra, relational model constraints; domains, keys, and integrity constraints, the structured query language (SQL); data definition, queries, update, statements, and views in SQL, database design; functional dependencies, normal forms.
ARB 202	Writing Skills in Arabic	ORN 02R & ORN 02C	2	The course provides students with skills necessary for scientific and technical writing. Students have the opportunity to learn about writing in clear and concise Arabic and to apply specific strategies learned to writing business reports, articles and memos.
CIS 304	Computer Architecture	NES 221	3	Computer systems topics, focusing on machine-level programming and architecture and their relevance for application programming. Information representations, assembly language and debuggers, processor architecture, program

				optimization, memory hierarchy and caching.
MTH 301	Linear Algebra	MTH 001 and ORN 03C and ORN 03R	3	This three-credit course provides an introduction to System of equations, Matrices, Cauchy-Schwarz inequality, orthogonal bases, Vector spaces, Determinants, and Crammer's rule and show how these techniques are applied in computer engineering.
MTH 302	Differential Equations	MTH 211	4	This four-credit course provides an introduction to Ordinary differential equations involving different types of equations as linear as non-linear as well, separable, homogeneous and exact. Also ODE's of higher order, Series of Fourier and Laplace transforms and applications to ODE's. Topics include: Several ODE's of higher order, Fourier series and Laplace Transforms. It shows how these mathematical tools are used to derive an understanding of computer engineering problems
NES 341	Computer Networks	NES 212	4	Students will learn the design, configuration and maintenance of LAN, and WAN utilizing layer 2 switches, and layer 3 routers. Ethernet technologies, including high-speed Ethernet, Metro Ethernet and ATM LAN emulation will be included. Concepts related to Layer 3, including IP address management and router operations and management along with associated Internet

				protocols, advanced routing technologies, BGP protocols, multi-area routing protocols, security protocols, IP multicasting protocols are covered. Students will be given an introduction to IPv6. Concepts related to Layer 4 (here the TCP and UDP protocols) will be studied in detail, Concepts related to Layer 5 including DNS and Email will also be taught.
CIS 321	Operating Systems	CIS 304	3	A course on computer systems topics, focusing on operating systems components and their relevance for application programming. Linking, processes, virtual memory, dynamic memory allocation, system level I/O, networking and network programming, concurrent servers and web services.
CIS 386	Project Management	ISY 102	3	This course examines the defining characteristics of IT projects and introduces the student to a variety of project management techniques that can be applied in an IT project context. Managing project team, conduct feasibility study, create work breakdown structure, write project scope, time, cost, and quality are provided in detail in this course. The course will cover management issues associated with packaged software implementation (e.g., ERP systems), in-house developed systems, and outsourced projects.

NES 322	Signals and Systems	MTH 302	3	'Signals and Systems,' aims to prepare students with the instinctive and conventional skills needed for evaluating signals and systems. Students will not only develop an understanding of the principles of Linear Time Invariant (LTI) continuous-time and discrete-time systems and its association with signals, but they will also study the mathematical representations and methods for analyzing signals and systems. The course combines lectures and Matlab simulation exercises to expose students to the theories and concepts of both continuous-time and discrete-time forms of signals and systems.
NES 342	Wireless and Mobile Computing	NES 341	3	Students will gain an understanding of the capabilities and limitations of wireless technologies to enable new business applications. Students will learn about communications in cellular systems, satellite systems, wireless local area network and wide area network transmission technologies. Evolving 3rd and 4th generation wireless data network standards, such as WCDMA, HSDPA, CDMA2000 and LTE, will be discussed, as well as Wi-Fi, WiMax, Bluetooth, RFID, Ultra-Wideband and Wireless Sensor Networks.
CIS 351	Client-Server Programming	CIS 104	3	This is a programming course focusing on advanced Internet

				technologies such as tiered design of Internet applications, transactions, creating components, and Web services.
CIS 381	Computer Ethics	ISY 221	3	This course will examine the ethical issues that arise as a result of increasing use of computers, and the responsibilities of those who work with computers, either as computer science professionals or end users. The course will stress the ways in which computers challenge traditional ethical and philosophical concepts, and raise old issues in a new way. Students will be expected to: read and understand the ideas in the readings; explain the ideas; analyze issues and see them from diverse perspectives; and formulate and critique arguments. The readings will include technical issues in computer science and may focus on a particular area such as software design as well as more traditional topics such as philosophical theories (e.g. ethical relativism, utilitarianism, deontological theories, rights, and virtue ethics), privacy, intellectual property rights and proprietary software, security, accountability, liability, the digital divide, hacking, and viruses.
CIS 491	Graduation Project -I	90 CH, NES 322, NES 341	3	The project is constituted of two parts, Graduation Project-I and Graduation Project -II. Capstone-I is in the first semester of fourth

				year and Capstone-II is offered in second semester of fourth semester. During Capstone-I, students are supposed to submit their project/ research proposal and then during Capstone-II students complete their projects
NES 423	Digital Communication Systems	NES 322	3	This course provides students treatment of the basic signaling concepts involved in the communication of digital information. Topics include transmission requirements and distortion of digital signals; discrete amplitude, frequency, and phase modulation; Pulse Code Modulation; error control coding, Sampling theorem and aliasing error; random process and white noise; source encoders and decoders; matched filter; timing considerations; baseband systems; ASK, FSK, PSK; error analysis; design considerations; Information Theory.
NES 481	Security Policies and Procedures	NES 341	3	This course enables the students to identify different types of security risks in any organization. Then students learn to design and implement security policies and procedures to support organizational goals. Students also learn how to survey/ audit an organization from physical/IT/network security point of view in the light of different standards set by International Standardizing bodies.

NES 443	Enterprise Networking	NES 341	3	Students will learn the design of different enterprise networks. They will also learn functionalities of important network components including different types of routers, core switches, edge switches, aggregation switches, distribution switches, multi-layer switches, and firewall are taught to the students. They will also be learning selection and management of wide-area data services, such as frame relay, ISDN or IP VPNs. In particular, IP addressing and sub-netting plans will be addressed in detail. Network management processes that provide service availability in the presence of network errors and outages are also included. A final case study project will allow students to integrate all areas of networking knowledge into a detailed corporate network business plan.
CIS 492	Graduation Project -II	CIS 491, CIS 351, NES 481	3	The project is constituted of two parts, Graduation Project-I and Graduation Project -II is in the first semester of fourth year and Capstone-II is offered in second semester of fourth semester. During Capstone-I, students are supposed to submit their project/ research proposal and then during Capstone-II students complete their projects.
NES 482	Network Security	NES 341	4	This course provides an extensive overview of network security and information

				assurance topics. Students will learn security fundamentals concerning privacy, secrecy, integrity, authentication, access control and risk management. Students will then apply these principles to the design and operations of networks, including typical threats and responses, firewalls and network address translation (NAT), host hardening, password management, virtual private network (VPNs), vulnerability assessment; and common attack/defense methods.
NES 483	Forensics and Incident Response	NES 481	3	Introduction to the topics of computer forensics, computer crimes, response to security incidents, Cybercrime investigation and prosecution. Students will learn how an organization can set up a security response team, prepare for Security incidents and manage these incidents