

## **Bachelor of Science in Information Technology**

### **Course Descriptions**

#### **Year 1**

**Course Title: Calculus I**

**Course Code: MATH 101**

**Credits: 3**

**Pre- Requisite(s):**

This course introduces higher mathematics by examining the fundamental principles of calculus-- functions, graphs, and limits, applications of the derivative, anti-derivatives, area, and the integral. Course presents additional mathematical applications in business, the arts, and the social sciences.

**Course Title: Physics I**

**Course Code: PYH 107**

**Credits: 3**

**Pre- Requisite(s):**

This course is the first part of introduction to general physics for CS and IT undergraduate students. Topics include vector algebra, equilibrium of particles and rigid bodies, and kinematics and dynamics of particles, simple rigid body systems, heat and light. Emphasis is on laws of motion, thermodynamics and conservation principles of work, energy and power.

**Course Title: Introduction to Information Technology**

**Course Code: IT 110**

**Credits: 3**

**Pre-Requisite(s):**

This course provides students with the basis for understanding the main concepts in the field of information technology. Topics to be included are basics and specialized applications software, system software, input and output devices and the system unit (HW), moreover in this course an emphasis will be on practical skills such as word processing, spreadsheet, and presentation applications software.

**Course Title: Calculus II**

**Course Code: MATH 102**

**Credits: 3**

**Pre- Requisite(s): MATH 101**

This course continues the introduction of higher mathematics from pre-request course by exploring the fundamental concepts of calculus integration and anti-derivatives, definite integrals and its applications, integration techniques, integration by parts, integration tables and infinite series.

**Course Title: Computer Programming I**

**Course Code: CS 160**

**Credits: 4**

**Pre- Requisite(s): IT 110**

This course designed to give student a comprehensive introduction to computer programming with a focus on C++ language, a basic explanation of how a computer program is built and run is given in this course as well as it provides task-driven experience which allow students to perform advance complex programming tasks, details of the syntax of the C++ programming language including most keywords and operators are taught. Programming topics includes decision making, loops, arrays, string manipulation and functions, there is an extensive accompanying lab to reinforce all the concepts covered with practical examples.

**Course Title: Discrete Mathematics**

**Course Code: CS 180**

**Credits: 3**

**Pre- Requisite(s): MATH 101**

This course introduces discrete mathematical concepts relevant to computer science. It illustrates how concepts and notations from discrete mathematics are useful to study or describe objects or problems in computer algorithms and programming languages. Topics include Logic, Combinatorics, Coding Theory, Partially Ordered Sets, Discrete Probability, Counting and Relations, Collections and linear algebra.

**Course Title: Physics II**

**Course Code: PYH 108**

**Credits: 3**

**Pre- Requisite(s): PYH 107**

This course guides students through the principles of electromagnetism and electronic, wave theory, optics and elements of modern physics with applications to IT and computer science. Topics include electrostatics, electric circuits, magnetic theory, transistors, operational amplifiers circuits, filters,

oscillatory motion, wave motion, sound motion and geometrical optics. Lab experiments are performed using computer software based on topics discussed in lecture.

### **Three LAR Courses**

**Credits: 3**

**Year2**

#### **Course Title: Computer Programming II**

**Course Code: CS 200**

**Credits: 4**

**Pre- Requisite(s): CS 160**

This course offers a more advanced study of theoretical object-oriented concepts illustrated and practiced using the C++ programming language. It provides both a thorough knowledge of object-oriented features as well as concrete programming skills to develop an object oriented software system.

#### **Course Title: Management Information Systems (MIS)**

**Course Code: IT 220**

**Credits: 3**

**Pre-Requisite: IT 110**

This course is designed to introduce students to contemporary information systems and demonstrate how these systems are used throughout global organizations. The focus of this course will be on the key components of information systems - people, software, hardware, data, and communication technologies, and how these components can be integrated and managed to create competitive advantage. Though the knowledge of how IS provides a competitive advantage students will gain an understanding of how information is used in organizations and how IT enables improvement in quality, speed, and agility. This course also provides an introduction to systems and development concepts, technology acquisition, and various types of application software that have become prevalent or are emerging in modern organizations and society.

#### **Course Title: Probability and Statistics**

**Course Code: MATH 201**

**Credits: 3**

**Pre- Requisite(s): MATH 101**

The purpose of this course is to introduce probability theory and statistics, with an emphasis on solving problems related to computer science and engineering fields such as machine learning, computer graphic, simulation and artificial intelligence. The probability theory includes concepts such as combinations, conditional probability, discrete and continuous probability distributions,

random variables and expectation. Topics in statistics include sample mean and variance, the law of large numbers and central limit theory, parameters estimation, correlation and hypothesis testing.

**Course Title: Numerical Analysis**

**Course Code: MATH 215**

**Credits: 3**

**Pre- Requisite(s): MATH 102**

The content of the course studies computational methods for solving numerical problems in linear, non-linear equations and approximation. The aim is to provide students a basic understanding of numerical algorithms for error analysis, numerical differentiation and integration, floating-point arithmetic and function evaluation. Emphasis is on the stability and efficiency properties of the algorithms.

**Course Title: Data Structures**

**Course Code: CS 240**

**Credits: 4**

**Pre - Requisite(s): CS 200**

This course is an introduction to commonly used computer data structuring techniques. Topics include stacks, queues, lists, trees, sorting, searching, and memory management with only a brief overview of algorithms. The course also explores the implementation of a range of data structures and algorithms using C++ programming language.

**Course Title: Internet and Web Technology**

**Course Code: IT 260**

**Credits: 3**

**Pre- Requisite(s): CS 160**

The course focuses on designing and implementing websites, exploring interactivity and the use of web-based multimedia technology. Students will use CSS, DHTML, XML, streaming audio/video and other emerging web based technologies in the context of advanced website design.

**Course Title: Professional, Legal and Ethical Issues**

**Course Code: IT 280**

**Credits: 3**

**Pre- Requisite(s): IT 220**

This course introduces computer ethics and frameworks, students are to explore the most pressing social, legal and professional issues affecting information systems, students will be able to build information systems to appropriate ethical, legal and professional standards within an international context, main topics includes Ethical Theories, Intellectual Property and Copyright, Privacy, Computer Security and professional ethics.

### **Three LAR Courses**

**Credits: 3**

#### **Year 3**

##### **Course Title: Database Management Systems I**

**Course Code: CS 320**

**Credits: 3**

**Pre- Requisite(s): CS 240**

This course is the first in a two-courses sequence, this course provides students with a comprehensive introduction to database concepts, primary focus is on the Conceptual database design and modeling using Entity-Relationship (ER) model and diagrams (ERD), relational model and relational databases (Concepts, Constraints, Relational Algebra) will be introduced in this course , Moreover other topics such as Relational query languages (SQL) ,normalization, data integrity, and creation of simple tables, reports, and forms will be covered in this course, Emphasizes will be on both theories and hands-on experience.

##### **Course Title: Computer Networks I**

**Course Code: IT 325**

**Credits: 3**

**Pre- Requisite(s): CS 240**

This course covers the basic principles and technologies of data communications and networking. The course provides the students with introduction to network architecture focusing on Physical Layer and Media, and error control of the Data Link Layer; it describes the procedures and rules involved in the process and controls of error detection and correction. Topics include communications media, an overview of the signal encoding process data and signals encoding, modulation and multiplexing, error detection and correction, network components, different network computer topology, categories of computer network, TCP/IP protocol suite, OSI model design process of a Computer Network Systems, and data link control.

##### **Course Title: Web Programming**

**Course Code: IT 335**

**Credits: 3**

**Pre- Requisite(s): IT 260, CS 320**

This course is designed to introduce students to advanced web design techniques on web application development including server-side programming and database processing, building upon your fundamental web site design and client-side development skills, this course expands into the server side technologies, frameworks, and integration with external applications; Technologies covered include the Common Language Runtime (CLR), .NET framework classes, C#, ASP.NET, and

ADO.NET. The term project will involve designing and producing an online site that allows the interaction with a database usually SQL-Server or Access.

**Course Title: Operating Systems**

**Course Code: CS 340**

**Credits: 3**

**Pre- Requisite(s): CS 240**

The operating systems course presents an introduction to the internal operation of modern operating systems. Topics include: processes and threads, synchronization, CPU scheduling, deadlock, memory management, and file systems, distributed systems and related topics are covered in brief.

**Course Title: Software Engineering I**

**Course Code: CS 345**

**Credits: 3**

**Pre- Requisite(s): IT 220**

This course discusses the processes, methods, techniques and tools that organizations use to determine how they should conduct their business, with a particular focus on how computer-based technologies can most effectively contribute to the way business is organized. The course covers a systematic methodology for analyzing a business problem or opportunity, determining what role, if any, computer-based technologies can play in addressing the business need, articulating business requirements for the technology solution, specifying alternative approaches to acquiring the technology capabilities needed to address the business requirements, and specifying the requirements for the information systems solution.

**Course Title: Database Management Systems II**

**Course Code: CS 350**

**Credits: 3**

**Pre- Requisite(s): CS 320**

This course covers advanced aspects of database management systems including advanced normalization and denormalization, query optimization, object-oriented and object-relational databases, data warehousing, data mining, distributed databases and databases for web applications. There is extensive coverage of SQL and database instance tuning. Students learn about the advanced object-relational features in DBMS such as Oracle, including navigational query, BLOBs, abstract data types, and methods. Students learn about database programming in Oracle's PL/SQL language, including triggers, stored

procedures, and methods. By the end of the course, students should understand the basic concepts in all of these advanced database topics.

**Course Title: Computer Networks II**

**Course Code: IT 360**

**Credits: 3**

**Pre- Requisite(s): IT 325**

This course is an advanced course in computer networks; the course provides the students with a deep understanding of computer networking architecture, focusing on Data Link Layer, Network Layer, Transport Layer, and Application Layer. Topics include Wired LANs; Wireless LANs; Connecting LANs; Virtual-Circuit Networks; Logical Addressing; Internet Protocol; Address Mapping; Error Reporting; Multicasting; Delivery; Forwarding; Routing; Process-to-Process Delivery; Domain Name System; Remote Logging; Electronic Mail and File Transfer; WWW and HTTP.

**Course Title: IT Systems Administration**

**Course Code: IT 370**

**Credits: 3**

**Pre- Requisite(s): CS 340, IT 325**

This course introduces students to basic skills and concepts that are essential to the administration of operating systems, networks, software, file systems, file servers, web systems, database systems, and system documentation, policies, and procedures. This also includes education and support of the users of these systems. The course offers a practical grounding in the principles of system administration and demystifies why IT departments do the things they do, such as imposing limitations on users.

**Course Title: E-Business**

**Course Code: IT 380**

**Credits: 3**

**Pre-Requisite: IT 325**

E-business is a dynamic topic utilizing concepts from business and technology, in this course the basics concepts of e-commerce will be introduced from both technological and managerial perspectives, discuss the effect of e-business on traditional business and reasons that lead to the current use of e-business as well as the future potential of e-business; The main focus for this course is to help students develop a broad understanding of the emerging forces that shape e-business and how e-business can be used as a tool for business value.

**Course Title: Internship**

**Course Code: IT 390**

**Credits: 3**

**Pre- Requisite(s): 66 credits**

This course provides students with an opportunity to receive academic credit for supervised professional training and experience in an actual work environment; it is an on-going seminar between the student, the faculty member and the employment supervisor, It involves a learning Contract, periodic meeting with the faculty representative, professional experience at a level equivalent to other senior-level courses, interns are requested to submit and present final report at the end of the training course.

**One LAR Course**

**Credits: 3**

**One Elective Course**

**Credits: 3**

**Year 4**

**Course Title: IT Project Management**

**Course Code: IT 405**

**Credits: 3**

**Pre- Requisite(s): CS 345**

This course provides an introduction to the concepts of information technology project management and techniques for initiating, planning, executing, monitoring and controlling of resources to accomplish specific project goals. Both technical and behavioral aspects of project management are discussed. While the focus is on information technology projects, the principles follow the nine project management knowledge areas outlines in the Project Management Institute's PMBOK<sup>®</sup> Guide Third Edition and thus are applicable to the management of any project. Topics will include integration, scope, time, cost, quality, human resource, communications, risk, and procurement management. Project management software utilization is emphasized.

**Course Title: Software Engineering II**

**Course Code: CS 410**

**Credits: 3**

**Pre- Requisite(s): CS 345**

This course is aimed at helping students build up an understanding of how to develop a software system by guiding them thru the development process and giving them the fundamental principles of system development with object oriented technology using UML. The course will initiate students to the different software process models, project management, software requirements engineering process, Requirements Modelling using Object-Oriented techniques, designing various aspects of software systems, software testing and software quality assurance.

**Course Title: Enterprise Systems**

**Course Code: IT 430**

**Credits: 3**

**Pre-Requisite: CS 340, CS 345**

This course is designed to provide students with an understanding of the theoretic and practical issues related to the application of Enterprise Systems within organizations. The main focus of this course is to demonstrate how Enterprise Systems integrate information and organizational processes across functional areas with a unified system comprised of a single database and shared reporting tools. Enterprise systems, by their multi-dimensional integrative nature, offer the depth of functionality and breadth of integration to demonstrate how global operations of organizations are managed. Thus, students will gain an appreciation of the scope of Enterprise Systems and the motivation for implementing them.

**Course Title: Human-Computer Interaction**

**Course Code: CS 440**

**Credits: 3**

**Pre- Requisite(s): CS 345**

This course introduces students to human-computer interaction strategies from a number of perspectives including knowledge and skills required for designing interactive products, major contents include principles of design, user interface guidelines, understanding users categories and their tasks, expert review and usability testing, principles of direct manipulation, designing for collaboration and communication interface, understanding command language, introduces interaction devices, as well as user documentation.

**Course Title: Computer Security**

**Course Code: IT 450**

**Credits: 3**

**Pre- Requisite(s): IT 360**

This course provide students with basic concepts relevant to computer security and the protection of computer systems and data from threats which may compromise integrity, availability, or

confidentiality. The module covers the following topics: Security of the computer; security of networks; security and the Internet; software and hardware security; mobile and database security; basic cryptography.

**Course Title: Final Year Project I**

**Course Code: IT 490**

**Credits: 3**

**Pre-Requisite(s): 4<sup>th</sup> Year Status**

The final year project involves students working on a larger problem throughout the year, under the supervision of a member of staff. This part of the project include formulation of particular problem, preparing detailed back ground study, method, and to ensure students learn the basic tools/techniques of scientific investigation. The project may be oriented towards research or towards production of a useful IT system. The final year project gives students the opportunity to be creative and explore an area not covered in the curriculum and of particular technical interest, integrating knowledge and professional practices acquired on this programme.

**Course Title: Information System Management**

**Course Code: IT 460**

**Credits: 3**

**Pre-Requisite: CS 340, CS 320**

This course emphasizes the management of information technology. This course reinforces the basic concepts and technical perspectives of information technology presented in prior courses. As a capstone course for the students to begin their careers, the course would summarize the practice of information systems. Topics include The Top IS Job, Strategic uses of Information Technology, Strategic Information Systems Planning, Managing Corporate IT Architecture, Managing Telecommunications, Managing Corporate Information Resources, Managing Partnership-Based IT Operations, Managing System Development, Supporting Information centric Decision Making, Supporting IT-enabled Collaboration, and Supporting Knowledge Work.

**Course Title: IT Strategy**

**Course Code: IT 470**

**Credits: 3**

**Pre-Requisite: CS 340, CS 345**

This course explores the issues and approaches in managing the information systems function in organizations and how the IS function integrates / supports / enables various types of organizational capabilities. It takes a senior management perspective in exploring the acquisition, development and implementation of plans and policies to achieve efficient and effective information systems. The course addresses issues relating to defining the high-level IS infrastructure and the systems that support the operational, administrative and strategic needs of the organization. The remainder of the course is focused on developing an intellectual framework that will allow leaders of organizations to critically assess existing IS infrastructures and emerging technologies as well as how

these enabling technologies might affect organizational strategy. The ideas developed and cultivated in this course are intended to provide an enduring perspective that can help leaders make sense of an increasingly globalized and technology intensive business environment.

**Course Title: Final Year Project II**

**Course Code: IT 495**

**Credits: 3**

**Pre-Requisite: IT 490**

The final year project involves students working on a larger problem throughout the year, under the supervision of a member of staff. This part of the project include the detailed design, implementation, and discussion of the project finding. As much as possible the project should involves the development of an actual information/technical system and the submission of a final project report.

**Major Elective Courses for Information Technology Programme**

<b>Course Code</b>	<b>Course Title</b>	<b>Cr. Hrs.</b>	<b>Prerequisites</b>
IT 351	<p><b>Visual Programming</b></p> <p>This course is designed for students who knows the basics of programming languages, it covers the main concepts which enable programmers to design professional user interfaces for Windows environments, most of the Visual Basic language structure, syntax and effective programming languages concepts are to be introduced, also how to use features of Windows Forms and Controls to create windows based applications with full functionality and professional graphical user interfaces, Moreover ADO.Net technology for accessing data in a database will be covered.</p>	3	CS 160
IT 371	<p><b>Operation Research</b></p> <p>An Introduction to basic concepts of operations research and simulation modeling. Study of deterministic methods for solving real-world decision problems covers linear programming model and solutions, network/graph theory models such as transportation and assignment problems, shortest path and maximum flow problems. In addition,</p>	3	MATH 215

	concepts related to computer science that rely on probability such as queuing theory, decision theory, Monte-Carlo methods and simulations are covered.		
<b>IT 422</b>	<b>Selected Topics in Information Technology</b>	<b>3</b>	<b>Dept. Approval</b>
<b>IT 442</b>	<b>Decision Support Systems</b> This course aims to develop the students' ability to understand and comprehend the capabilities of technologies in support of decision making and collaboration in organizations. This course will introduce the students to the nature of managerial business decision making as well as a working knowledge of Decision Support Systems (DSS) for facilitating the process of semi-structured decision making. Issues associated with the development of these systems are introduced, along with some of the underlying mathematical modeling techniques that provide DSS with a problem solving capability.	<b>3</b>	<b>IT 220, CS 410</b>
<b>IT 445</b>	<b>Knowledge Management</b> This course aims to develop the students' ability to understand theoretical requirements and to obtain the necessary skills, to be able to plan, analyze, design, and implement a knowledge management (KM) initiative. Specifically, the course will: Develop the students' skills of selecting the suitable KM model and strategy and the right tools and mechanisms (for better KM project management).	<b>3</b>	<b>IT 220, CS 350</b>