Description of Courses offered by the Department of Computer Science\Computer Networks Systems 2019/2020.

11021101 General Physics (1) (Prerequisite: - none) (3) Cr. Hrs

Vectors, Basics of Mechanics Description of Motion in one Dimension, Motion in two Dimensions, Applications of Newton's Laws, Work Energy Theorem, Collisions and Rotational Motion

11031101 Calculus (1) (Prerequisite:- none) (3) Cr. Hrs

Functions and Limits, Continuous functions, derivative, differentiation rules, implicit differentiation, applications integrals, definite integrals, transcendental functions, inverse trigonometric functions.

06051110 Programming Methodology (Prerequisite: - none) (3) Cr. Hrs

Problem-solving concepts: constants and variables, data types, problem-solving steps, expressions, problem solving tools, algorithms, flowcharts, pseudo-code, programming logic structures (sequential, decision, and loops), Arrays.

06051200 Discrete Mathematics (Prerequisite: - none) (3) Cr. Hrs

Introduction to discrete structures and computing techniques concerning sets, graphs and trees, functions, relation properties, recursive definitions, solving recurrences, equivalence, partial order, proof techniques, inductive proof counting techniques and discrete probability

06051220 Logic Design (Prerequisite: - 11021101**) (3) Cr. Hrs**

Fundamental concepts of numbering systems, computer codes. Boolean algebra and logic gates. Simplification of Boolean functions, Karnaugh map, combinational logic implementation including PLAs, (adders, comparators, coders, decoders, code converters, multiplexers, de-multiplexers). Sequential circuits, flip flops, counters, shift registers, memories

06051211 Programming Fundamentals (Prerequisite: - 06051110**) (3) Cr. Hrs**

Fundamental concepts of programming using C++ or Java: classes and objects, modeling object (attributes and behaviors), algorithms, problem solving flowcharts, pseudo codes. Basic blocks of programming such as variable names, data types, control structures, functions, arrays.

06032102 Data Structures (Prerequisite: - 06051211**) (3) Cr. Hrs**

Introduction to problem solving, Data Structures (static & dynamic), lists, stacks, queues, graphs, trees, sets and dictionaries). Recursion and iteration. Students are expected to do lab experiments using C# or Java

06012232 Information Systems Analysis & Design (Prerequisite:-06032112**) (3) Cr. Hrs**

System Theory, information systems and information systems types, system analysis and design methods, object oriented system analysis and design methods. Study cases.

06032112 **Object Oriented Paradigm** **(Prerequisite: -** 06051211**)** **(3) Cr. Hrs**

Introduction to OOP, models, objects, methods, links, message passing, polymorphism, dynamic binding, classes constructors and destructors, association, generalization and specialization, inheritance, overridden methods, aggregation. Students are required to perform some lab experiments using the latest JAVA or C# language version and UML using Rational Rose software.

06012201 **Algorithmic** **(Prerequisite: -** 06032102**)** **(3) Cr. Hrs**

Introduction to the design and analysis of algorithms, mathematical algorithms. Greedy technique, manipulating data: sorting, searching, dynamic programming, space & time tradeoffs. The concept of algorithm efficiency, table, and information retrieval. Combinatorial problems, advancement in Java skills and techniques

06032122 **Computer Architecture** **(Prerequisite: -**06051220**)** **(3) Cr. Hrs**

Hardware components of a modern computer system, history and performance, the instruction cycle, memory organization, cache memory, I/O organization, CPU, micro-programmed control, instruction formats and modes

06033113 **Visual Programming** **(Prerequisite: -** 06032112**)** **(3) Cr. Hrs**

Basic Visual Programming, solid foundation of the syntax and semantics of a visual Programming language used to develop both windows-based and web-based application. Coverage of Microsoft's. NET platform architecture.

06013214 **Web Design (1)** **(Prerequisite: -** 06032112**)** **(3) Cr. Hrs**

Basic concepts of the Internet and Internet browsers, Internet applications, web page creation tools and languages. Basic XHTML (frames, forms), cascading style sheets, scripting and scripting languages. Dynamic XHTML (object based programming and events). Students are required to do a Mini- project.

06014115 **Web Design (2)** **(Prerequisite: -**06013214**)** **(3) Cr. Hrs**

This unit introduces students to design, development and implementation of server side applications, the use of multimedia and human interaction on the browser side. Students gain practical experience creating dynamic web applications that interact with a database using client side scripts, server side scripts and compiled server programs. Security, access right, financial transactions and legal issues are also covered. This unit incorporates substantial practical experience in applying theoretical concepts. Students are required to submit mini project.

06013130 **Databases** **(Prerequisite: -** 06012201**)** **(3) Cr. Hrs**

An in-depth examination of relational databases, modern database technologies, conceptual design and entity relationship modeling, relational algebra and calculus, data definition and manipulation languages using SQL, schema and view management, query processing and optimization, transaction management, security, privacy, integrity, and management. Students are required to do project work.

06083223 **Operating System** **(Prerequisite: -** 06032122**)** **(3) Cr. Hrs**

Definition of operating system, review of hardware, software and firmware, process concepts, asynchronous concurrent processes, real storage, virtual storage, processor scheduling, distributed computing, disk performance optimization.

06052221 **Computer Organization and Design (Prerequisite: -** 06032122**)** **(3) Cr. Hrs**

Explores the levels of architecture and organization in digital computers: logic circuit design, integrated circuits and assembly language coding.

06044251 **Digital Forensics** **(Prerequisite: -**06043256**)** **(3) Cr. Hrs**

Fundamentals of Digital Crimes and Network Forensics, Forensic Modeling, Forensic Duplication and analysis, Network Surveillance, Intrusion Detection and Prevention, Incident Response and Trace-Back. Signature and anomaly Based Intrusion Detection, Pattern Matching Algorithms, Viruses, Trojans and Worms Detection. Multicast Fingerprinting, anonymity and Pseudonym. Privacy-Protection Techniques, Cyber Law, Computer Security Policies and Guidelines, Court Testimony and Report Writing, and Case Studies.

06042150 **Information Security** **(Prerequisite: -** 11031230**)** **(3) Cr. Hrs**

Information security basics, basic cryptography, modern symmetric ciphers, public key cryptosystems, key management, message authentication, hash functions, digital signatures, IP and web security, firewalls and trusted systems, secured software design, application security software threats, social, legal, and ethical issues. Human factors in security.

06082140 **Computer Networks** **(Prerequisite: -** 06051220**)** **(3) Cr. Hrs**

Logical and physical of computer networks, architecture and transmission alternatives. OSI-reference model, ALOHA protocol, CSMA protocols, LAN, IEEE standards and protocols (token ring, token bus and Ethernet), physical layer basics, data link layer, framing protocols, error detecting and correcting, routing algorithms, flow control, congestion control algorithms, personal computer networks.

06083150 Advanced Computer Networks (Prerequisite: -06082140**) (3) Cr. Hrs**

Concepts and terminology of data communications and computer networks, logical and physical realization of computer networks, architectures and transmission alternatives. OSI-reference model, LAN, IEEE standards and protocols (token ring, token bus, and Ethernet), physical layer basics, data link layer, framing protocols, error detecting and correcting, routing algorithms, flow control, congestion control algorithms, and Personal computer networks

06043141 Wireless Computer Networks (Prerequisite: - 06082140**) (3) Cr. Hrs**

Introduction to mobile and wireless networks. Designing computer networks to support computer mobility. Mobile network architecture. Wireless technologies and protocols. Wireless LAN standards. Models for indoor and outdoor mobile networks. Systems issues such as performance. Quality of service guarantees, reliability, and security in mobile computing environment. Hardware and access protocols for mobile networks. Mobile application protocols.

06083251 Advanced Network Protocols (Prerequisite: -06083150**) (3) Cr. Hrs**

The goal of this course is to familiarize students with the concepts of data communication, computer networks, and Internetworking. At the end of this course, students will be able to understand the principles of computer networking, including protocol features, protocol layering, and addressing, routing, and basic network security issues. Students will be able to enumerate the architectural structures of the ISO/OSI and TCP/IP and explain functions of each layer. In addition, student will be able to understand Networks applications, Network Protocols and architecture; Data link layer: framing, error detection and correction. In addition, it will explain CSMA/CD, LAN IEEE standards; Network layer: IP service model, IP V4 and IPV6 Addressing, subnetting, Host configuration DHCP, ARP Protocol, ICMP protocol; Transport layer: UDP protocol, TCP protocol, TCP reliable transfer and sliding window. TCP flow and congestion control; Application layer: DNS protocol, NAT protocol, HTTP protocol. In addition Network layer routing protocols, such as Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Border Gateway Protocol (BGP) and routing Algorithms like, Link Stat, Distance Vector. In addition, the course will cover the essential wireless network protocols.

06013256 Smart Phone Programming (Prerequisite: - 06033113**) (3) Cr. Hrs**

The smart phone programming course allows students to learn the fundamentals of programming for smart phones. It covers various concepts related to layouts, widgets event handling, processing JSON files, using MySQL database with php service. The course allows students to be familiar with a mainstream of today's technology

06043256 **Networks Security** **(Prerequisite: -**06042150**)** **(3) Cr. Hrs**

Introduction to network security; network security requirements, security policy; cryptography and its applications to network security; network security threats; applications of cryptography; secret key and public key cryptographic algorithms; hash functions; authentication; security for electronic mail; Firewalls and intrusion detection techniques; building secure channels; hardening network systems and potential threats to network systems.

06084152 **Network Operating System** **(Prerequisite: -** 06083223**)** **(3) Cr. Hrs**

This course develops the necessary skills for students to develop both GUI and command line skills for using and customizing a Linux workstation. Topics include Linux file system and access permissions, GNOME Interface, VI editor, X Window System expression pattern matching, I/O redirection, network and printing utilities. Upon completion, students should be able to customize and use Linux systems for command line requirements and desktop productivity roles

06013153 **Networks Management** **(Prerequisite: -**06082140 **)** **(3) Cr. Hrs**

Principles of network, system and application management, various network management standards, network management: fault management, performance management, configuration management, security management, and accounting management, enterprise management system, telecommunication management network, and network management tools and applications.

06042261 **Network Monitoring and Documentation** **(Prerequisite:-**06082140**)** **(3) Cr. Hrs**

This course covers standard information that a network administrator can use to monitor, analyze, and troubleshoot a group of distributed local area networks (LANs) and interconnecting T-1/E-1 and T-2/E-3 lines from a central site. The course emphasizes "learning by doing", and requires students to conduct a series of lab exercises. Through these labs, students can enhance their understanding of the principles, and be able to apply those principles to solve real problems.

06043162 **Networks & Severs Programming** **(Prerequisite: -**06082140 **)** **(3) Cr. Hrs**

Introduction to networks programming advanced JAVA (covers I/O Routines, Threading Sockets, URL connections, Server-Side programming), database connectivity, distributed programming, and network security, Students are required to do lab. Assignment.

06043273 **Advanced Programming** **(Prerequisite: -** 06033113**)** **(3) Cr. Hrs**

Advanced features of the language such as handling exceptions, Files and Database connectivity. Other major topics in this course include network programming serialization, properties, multithreading, and security.

06084190 **Practical Training CNS** **(Prerequisite: -** Pass 90 Cr.hr.**)** **(3) Cr. Hrs**

Practical training in the public or private sector for at least 8 weeks

06084191 **Graduation Project –CNS** **(Prerequisite:-**Pass 90 Cr.hr.**)** **(3) Cr. Hrs**

Student picks one of the projects posted by the department as part of requirements of graduation.

06014171 **Special Topics (1)** **(Prerequisite: -** Dept. Approval**)** **(3) Cr. Hrs**

To be set by the department.

06014272 **Special Topics (2)** **(Prerequisite: -** Dept. Approval **)** **(3) Cr. Hrs**

To be set by the department.

11031230 **Statistics and Probabilities** **(Prerequisite: -** 11031101**)** **(3) Cr. Hrs**

Definitions and basic elements of probability, Rules of probability, Random Variables: Discrete and continuous random variables and their probability distribution functions, the mathematical expectation. Some discrete and continues distributions: Binomal, Poisson, geometric, Hyper geometric and Normal Distributions. Point and interval estimation of the parameters of one and two populations. Tests of hypotheses concerning the above parameters, and Goodness of fit and independence tests. Simple linear Regression and inference concerning its parameters multiple linear regression: Description and estimate using matrices.

06052253 **Numerical Analysis** **(Prerequisite: -** 11031101**)** **(3) Cr. Hrs**

The error calculation, roots of nonlinear equations, use of numerical methods to solve systems of linear equations, approximation Functions, Find derivatives, find the values of numerical integrals by numerical methods, the use of numerical methods to solve differential equations