Courses Description for Computer Information Systems

1902100   Computer Skills – 1:   (Prerequisite none)
An introduction to Computing and Information Technology. Topics covered include the basic Structure of digital computer systems, microcomputers, operating systems. Application software, database technology, data communication and networks, and the Internet. Hands-on learning using Windows, MS-office and the Internet. Weekly practice in the lab.

1902101   Visual Programming: (Prerequisite 1902100)
Introduction to Visual Basic and Visual Studio environment: Controls, components, wizards; Language constructs and structures: Variables, assignment, arithmetic, selection, repetition, arrays, functions; Advanced controls: Frames, labels, Boxes and others; MDI models; Vbasic DB: Data Report, data designer, data form, data object, queries, intellilist; Classes; ActiveX: Encapsulation, relationships, interfaces, automation, tools; API Applications: windows API, keyboard, mouse, display; Applications. Weekly practice in the lab.

1902102 Computer Skills-2 (Humanities and medicals)
 (Prerequisite 1902100)
Solving Problems using the computer: Variables, Algorithms and its representation, Data: types and definitions. Advanced applications using software packages such as: MS Word: templates, comparing documents, master, Table of contents, Index, inserting, mailing merge, macros, MS Excel: Charts, Functions, sorting and filtering, Solver, Macros, MS Access: Tables, relations, forms, queries, reports, import and export files and data, macros; introduction to the Web applications. Small Projects and applications. Weekly practice in the lab.

1902201 Interpersonal Communication: (Prerequisite:1903101)
Technical definition, development documentation, system definition and specification –proposals, program reports, feasibility reports, instructions and manuals, project reports, research reports, resumes and interviews, team meeting reports, presentation and briefings, abstracts and summaries . Weekly practice in the lab.

1902211 Object Oriented Programming – 1:   (Prerequisite 1902101)

Object-Oriented (OO) Programming Environment; OO Building Blocks; Input/Output; Loops; Decisions; Functions; Arrays and Strings; Data structures; Encapsulation; Advanced variables; Object Oriented Programming; Useful OO features; Classes and objects; Inheritance; Polymorphism; Exceptions handling; Threads; Files; Writing programs in JAVA languages. Weekly practice in the lab.

1902212 Object Oriented Programming – 2:   (Prerequisite 1902211)

Strings and string tokenization, simple and advance graphical user interface, integrated visual environment: Project, libraries, multimedia: images, animation, audio anr video. Java database connectivity and ODBCs. Servlets. Weekly practice in the lab.

1902321 Database Systems: (Prerequisite 1901231)

Data Base (DB) Environment; DBMS architecture; Data modeling: Conceptual model, Entity relationship model (ERM), Extended ERM, Object Modeling Technique (OMT); Relational DBs; Data Base design; Data Base language: Structured Query Language (SQL); Views; Data Dictionary; Normalization process: 1NF, 2NF, 3NF; DB Integrity; DB Security; Modern DBMSs: Object-Oriented DBMSs; Physical Data Base design; Centralized and distributed Database systems; Case study. Weekly practice in the lab.

1902322 Information Systems Security: (Prerequisite 1901231)

Identify a range of methods, techniques and current issues of security and privacy problems associated with the use of CISs; Security models: Take-Grant model, Acton (Action-entity) model, wood model, bell-lapadula model, biba model, sea view model, and other models; Ways to minimize risks and losses; Apply the information security methods and management to the development and management of information system security within an organization; Encryption and decryption; Security controls: flow control, interface control, access control; Security packages; Trusted and secure DBMS; User Identification / Authentication; Applications. Weekly practice in the lab.

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1902341   Artificial Intelligence: (Prerequisite 1901231)
Introduction to AI and application; Exhaustive Search methods; Heuristic search Methods; First Order Logic for knowledge representation; Programming in PROLOG; Production rule systems; Principles of expert systems; Expert systems Programming in PROLOG; Knowledge Acquisition. Weekly practice in the lab.

1902351   Multimedia: (Prerequisite 1902212)
Introduction: basic concepts of multimedia; Media types; Concepts and techniques; Multimedia information servers; Design support; Production and evaluation of multimedia information servers; Software and hardware requirements; Image compression; Image database: Feature-based retrieval, content-based retrieval; Audio signal processing; Speech analysis; Music analysis and synthesizing; Teleconferencing and video compression; Animation; Virtual reality; Web publishing; Multimedia Programming: Composition mechanisms, metaphors; Synchronization: aspects of synchronization, techniques; Interaction; Case study. Weekly practice in the lab.

1902353   Human-Computer Interaction :   (Prerequisite 1901359)
Designing, building, and programming graphical user interfaces, Human-centered software evaluation, Human-centered software development, HCI aspects of multimedia systems and Web-based systems, these topics are intended as an introduction to human-computer interaction. Emphasis will be placed on understanding human behavior with interactive objects, knowing how to develop and evaluate interactive software using a human-centered approach, and general knowledge of HCI design issues with multiple types of interactive software. Weekly practice in the lab.

1902355   Computer Assisted Learning: (Prerequisite 1902212)
Introduction to Computer use in teaching; Teaching Authoring Tools; Human computer interaction; Software and hardware requirements; Task analysis and design; Multimedia and task development; Internet in Education; Question answer design; Student computer interaction; Static and dynamic interaction; Computerized examination; Virtual teaching; Case Study. Weekly practice in the lab.

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1902425   Distributed Databases: (Prerequisite 1902321)

Distributed Database (DB) environment; Distributed Database (DDB) processing: Homogeneous distributed Database (DB) systems, heterogeneous distributed systems; Distributed (DB) design: Fragmentation, allocation, replication; Distributed query processing; Concurrency control: Serializability, locking-based algorithms, time stamp-based algorithms, optimistic algorithms, deadlock management; Reliability and recovery; Distributed data servers; Distributed parallel data servers; Integrity and Security issues in distributed systems; Applications. Weekly practice in the lab.

1902442   Machine Learning   (Prerequisite 1901231)

Introduction and learning bayesian learning, decision tree learning; learning sets of rules, genetic algorithms, analytical learning; reinforcement learning; applications. Weekly practice in the lab.

1902445   Natural Languages Processing: (Prerequisite 1902341)

Origins of Natural Language Processing (NLP); Language structure representation; The role of knowledge; Knowledge representation; Parsing techniques; Finite-state techniques; Recursive and augmented transition networks; Language ambiguity; Well-Formed constructs; Features and the lexicon; Language semantics; Applications. Weekly practice in the lab.

1902451 Geographical Information Systems: (Prerequisite   1901359)

Geographical Information Systems (GIS) and information age; Geographic data in the computer; What does GIS do: Spatial data; Raster and Vector Data; Topology and spatial relationships; Data entry and data acquisition; Database and inventory operations; Basic analysis (overall map algebra); Advanced analysis (proximity and terrain analysis); Site suitability and models; Data issues and problems; GIS software systems; Applications. Weekly practice in the lab.

20402452 Virtual Reality: **(Prerequisite 1902471)**
Introduction to virtual reality (VR); software and hardware requirements; Human computer interaction ; VR in education; VR in science; Imager displays and simulation software; Display methods; Auditory, Haptic, Locomotory; Position tracking and mapping; Animation and rendering techniques; Digital illusion; Move production: Frame set-up, Frame elements, Frame speed, Frame sequence organization, Frame control, move play and playback; VR Modeling and Programming; Design of VR environment; case development; Applications . Weekly practice in the lab.

1902455 Image Processing: **(Prerequisite 1901359)**
Introduction, Data structure for image analysis; Shape representation; Image preprocessing; Image formats; Recognition; Feature extraction; Processing primitives; Modeling (e.g. quad applications); Local and global operations; Clustering: hierarchical and non-hierarchical methods, clustering using neural networks and genetic algorithms; Classifications; Nearest neighbors; Neural nets; Image enhancement; Segmentation application and measurement; Image storage and retrieval; Applications. Weekly practice in the lab.

1902456   Expert Systems and Neural Networks: (Prerequisite 1902341)
Knowledge representation; Uncertainty Management; Inferences and Explanation; Knowledge Acquisition and Validation; Tools for Expert Systems; Neural Computational Models, Neural Networks Learning Training; Knowledge-based Neural Networks; Rule Generation from Neural Networks. Weekly practice in the lab.

1902457   Database Languages and Tools: **(Prerequisite 1902321)**
A selected DB Language such as Oracle or Access; Additional support tools for business applications: DDL and DML commands, Forms design, triggers, Case study. Weekly practice in the lab.

1902458   Certified Software: (Department Approval)
This course offers a variety of intensive certificate programs, which help the student to be prepared to apply for a certificate according to the offered training. The course will be taught by qualified and certified instructors in different fields. The offered programs include: Advanced oracle PL/SQL program, Practices in Web Design program, Java Developer program, .Net Developer program, and other microsoft software. Weekly practice in the lab.

1902471 Software Engineering: (Prerequisite 1902321)
Software engineering processing methods; Software life cycle; Computer-based system engineering; Software project Management; Requirements and Specification: Requirement engineering, requirement analysis, models, prototyping, formal and algebraic specification; Software design: Architectural design, object-oriented, function-oriented, real-time and user interface design; Reliability; Maintenance; Portability; Documentation; Re-engineering and reverse-engineering; Case study. Weekly practice in the lab.

1902475   System Analysis: (Prerequisite 1902321)
 Introduction to systems development; Development life cycle; System Development feasibility; Development of fact finding methods; Context diagram; Data flow diagram; Decision tables and trees; Data dictionary; Installation; Training; Development Tools: Documentation, Maintenance, Conceptual design, DB design, Reverse engineering, Graphical user interface, Systems life cycle, System conversion, System charts and flow of control; Case study. Weekly practice in the lab.

1902477   Object Oriented Design: (Prerequisite 1902471)
Understanding the (object-oriented) software development process; object-oriented paradigm, with all the support such as object-oriented languages, a formal presentation of the design, Object-oriented design concepts, features and problems of object-oriented design, evolution the object-oriented model, foundations and elements of the object-oriented model, classes and objects, relationships among classes, relationships among objects, approaches to identifying classes and objects, object-oriented design methodologies, standardized representation for design: the Unified Modelling Language

(UML), and design patterns for high-level design re-use. Weekly practice in the lab.

1902494   Special Topics   (Department Approval)
Selected Topics in advanced areas of Computer Information Systems, Report and Documentation required. Weekly practice in the lab.

1902495   Project: (Department Approval)
Project includes theoretical and practical aspects in Computer Information Systems, related to the currrent problems and applications in IT, Research oriented, technical report, and presentation. Weekly practice in the lab.

1902498   Training: (Department Approval)
A student is required to training in one of organisations for not less than 6 weeks, presents a report from the organisation to describe the effectiveness of the practice according to the training regulations of Dean's council for KASIT Departments. Or have a specialized certificate in one of technological information subjects that considered and published from a certified organiaztion.

1901101   Discrete Mathematics: (Prerequisite   none)
Logical and Symbolic statements: true values of a statement; Connection tools, Truth table, Equivalent; Counting methods; Methods of proof: induction and recursion; Sets and operations; Languages; Relations: directed graph, characteristics of relations; Functions: characteristics, domain and range; Matrices: algebra of matrices, simple operations, determinants, Cramer's rule.

1901102   Computer Skills-2:   (Prerequisite 1902100)
Fundamental concepts of programming using C++; Basic structures of programming tools: variable names; Data types; Control structures; Arrays; Functions; Pointers; Introduction to classes and objects; Inheritance; Applications using C++. Weekly practice in the lab.

1901215   Advanced Programming: (Prerequisite 1901102)
A deeper look to C++ programming. Advanced topics include pointers and strings memory management (dynamic memory allocation), object oriented design, classes and data abstraction, operator overloading, inheritance, virtual functions and polymorphism, and templates. Other topics are,

exception handling, file processing, standard templates library, detailed bits and strings operations, and the pre-processor, I/O Streams.

11901231   Data Structures: (Prerequisite 11901102)

Data type and structures; Abstract data types and encapsulation; Stacks; Queues; Recursion; Linked Lists; Binary trees; General trees; File organization: sequential and indexed files; Graphs: representation, traversing, shortest path; Sorting: exchange, insertion, quick sort, heap and others; Searching. Weekly practice in the lab.

1901241   Theory of Computation: (Prerequisite 1901101)

Sets; Relations; Closure and Languages; Finite automata: deterministic and nondeterministic; Closure and pumping lemma; Regular languages and expressions; Context-free grammar: regular languages and context-free languages, pushdown automata, closure, determinism and parsing, LL(1) grammar; Turing machines, combining Turing machines and machine schemas, examples; Introduction to P and NP classes.

1902341   Applications of Algorithms: (Prerequisite 1901231)

Definition of an algorithm, algorithm design and techniques, algorithm analysis. Concept of basic operation, concept of worst, best, and average case analysis, complexity analysis: big O, Omega and theta notations. Recurrence equations and recursive algorithms. Concept of algorithm correctness. Basic searching and sorting algorithms, hashing. Concepts of NP-completeness, Classical NP-complete problems. Weekly practice in the lab.

1901359   Computer Graphics   (Prerequisite 1901231)

introduction to graphics systems: screens, input / output units, application coordinate systems, output primitives: points, lines, polygons, circles, ellipses, area filling, attributes of output primitives, colors, patterns, aliases, transformation: translation, scaling, rotation, reflection, clipping: windows and view ports, line clipping, area clipping, text clipping, segments: structures, creating, updating, deleting,. Interactive graphics systems: windows, icons, menus, virtual reality, 3D graphics: representation, transformation, computer animation, applications. Weekly practice in the lab.

1901361   Computer Networks-1:   (Prerequisite 1901231)

This course explores key concepts and essential technologies of computer networks and broad range of topics in networking, including: General overview: Networks applications, Network classifications and topologies, Network layers, Channel performance measures, transmission media, Communication Network Protocols and architecture; Data link layer: framing, error detection and correction, CSMA/CD, LAN IEEE standards; Network layer: IP service model, IP 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, persistent and non-persistent HTTP connection

1901473   Operating Systems: (Prerequisite 1901231 or 1901101)

Definition and role of the operating systems; history of operating systems and development; functionality and structuring methods of a typical operating system. Concepts of a process vs. the concept of a thread; scheduling and dispatching and context switching; concurrent execution: the "mutual exclusion" problem and some solutions. Deadlocks: causes, conditions, methods for resolution. Memory management; virtual memory management. I/O management; files: data, metadata, operations, buffering, sequential, nonsequential. Weekly practice in the lab.

1903101 Fundamentals Of Information Technology:(Prerequisite none)

Information Technology components, computer hardware: memory, CPU, machine cycle. numbering system: decimal, binary, octal, hexadecimal, operations, data representation, cooding. communications and networks multimedia, E-business, system software and applications, information system: analysis and development, problem solving : algorithm, flowchart, pseudo code. Weekly practice in the lab.

1903121   Web Application Development-1:   **(Prerequisite 1903101)**

The course introduces students to the tools and techniques used for building Web-based applications. Students will gain an understanding of the fundamental workings of the Web. Students will be taught how to develop web applications using client-side tools such as HTML and Java Script and server-side tools such as ASP. Weekly practice in the lab.

1903232   Management Information System: (Prerequisite 1903101)

Fundamentals of Information Systems; Types and levels of MIS; IT in Business; Business Application of Information Technology; Managing Information Technology: global management, planning and information change; Security and protection issues. Weekly practice in the lab.

1903332   Decision Support Systems: (Prerequisite 1903232)

Definition; DSS Framework; Modeling and model management; Modeling process; Characteristics and capabilities of DSS; Component of DSS; DSS Hardware and Software; Constructing a DSS; DSS development tools; Group DSS; Executive DSS; Hybrid DSS; Distributed DSS; case study. Weekly practice in the lab.

1903345   Computer Ethics: (Prerequisite 1903101)

Identifying ethical problems; Reaching decisions; Legal constraints; professional organization and codes of conduct; Systems management and hacking; Ethical, social, political, legal and economic aspects of the application of computers; Customer rights; Copy rights; Ownership; Protocols and agreements; Security and ethical issues; Viruses detection; Protection and ethical issues; Internet and ethical implications; Computer crimes. Weekly practice in the lab.

1903352   Web Publishing: (Prerequisite 1903121)

Introduction to concepts and techniques for WWW information services; WWW design support; Production and evaluation of WWW information services; Developing strategies for locating resources; HTML (Hyper Text Markup Language); Publishing information; Web Page Design (Microsoft Front Page); Publishing HTML pages using HTML Tags and HTML Tools; Java Script; Java Applets and XML. Weekly practice in the lab.

1903353   Web Application Development-2:   (Prerequisite 1903121)

Application of server-side scripting programming, Implementation of Web servers, SQL & MySQL, Database Interfaces (DBIs), Advanced ActiveX Data Objects (ADO.NET), Active Server Pages.NET (ASP.NET), Implementing Active Server Pages.NET using XML (Extensible Markup language), programming using Perl, Common Gateway Interface (CGI), PHP, Python, Java Servelets and JSP. Weekly practice in lab.

1903481   Quality Management: (Prerequisite 1902321or 0301131)
Introduction; Views of quality; Profiles; Management and improvement;
Quality management system; Human quality culture; The problem of user
requirements ; Assurance; The ISO9001-2000 series: Standards, generic,
guidance; Capability maturity models; individual levels of the CMM;
Human resource quality; Training; Supplier quality; Quality assessment.