



PSU PRINCE
SULTAN
UNIVERSITY
جامعة الأمير سلطان ، كلية البنائ

DEPARTMENT OF
COMPUTER & INFORMATION SCIENCES

Courses Catalog

A. COMPUTER SCIENCE COURSES

CS 101

Computer Programming I

Credits: 4 (3,1,2). Prerequisite: None.

The basic programming and problem solving concepts. Emphasis is on techniques of problem analysis and the development of algorithms and programs. An introduction to modern object-oriented programming concepts.

CS 102

Computer Programming II

Credits: 3 (3,1,0). Prerequisite: CS 101.

An intermediate level object-oriented programming concepts. Some sophisticated uses of object-oriented concepts (inheritance, polymorphism, method overloading, and multiple inheritance of interfaces) and techniques for building systems of multiple interacting components.

CS 151

Introduction to Digital Design

Credits 3 (3,1,0). Prerequisite: CS 101.

This course is an Introduction to digital systems design. It enables the student to understand how the basic components of computers are specified, optimized and implemented using current digital electronics technology. This knowledge is a key factor in preparing the student to understand how computers work in subsequent courses.

CS 202

Computer Applications for Business

Credits: 3 (2,0,2). Prerequisite: at least 60 credit hours. (*For non-IS and CS major*)

This main purpose of this course is to provide students with computer application skills especially in the areas of accounting, finance, and marketing. Applications covered include, electronic spreadsheet and its macros, statistical analysis, graphics and presentations tools, and database management. In addition, students must be proficient in word processing in order to complete graded assignments.

COURSES DESCRIPTIONS

CS 210

Data Structures and Algorithms

Credits: 3 (3,1,0). Prerequisite: CS 102.

The fundamental data structures and their effective use in a variety of applications. Emphasis is on data structure abstraction and choice, modeling of real problems, and implementation for obtaining an efficient algorithm for solving a given problem. The implementation and analysis of important algorithms for sorting, searching, string processing, geometric applications, graph manipulation, and matrix operations.

CS 225 Software Engineering: Design and Development

Credits: 3 (3,1,0). Prerequisite: CS 210.

An overview of software engineering (definitions, evolutions, applications). Software process models. Software life cycle. Software requirement analysis.

Software documentation. Software design methodologies. Development strategies and project management.

CS 251

Introduction to Computer Organization and Assembly Language

Credits: 3 (3,1,0). Prerequisite: CS 151.

This course is an introduction to computer organization and assembly language. It describes how computers are organized and programmed at different abstraction

levels. It covers a wide range of topics in both computer hardware organization and assembly code programming.

CS 285

Discrete Mathematics for Computing

Credits: 3 (3,1,0). Prerequisite: CS 210, STAT 101

Sets, functions, logic, truth tables, Boolean algebra. Algorithms, integers and

matrices. Mathematical reasoning Combinatorics, discrete probability and probability theory. Discrete structures.

CS 311

Design and Analysis of Algorithms

Credits 3 (3, 1,0). Prerequisite: CS 285.

Techniques for designing algorithms, analyzing them, and proving their correctness Algorithm design paradigms, such as, greedy, divide-and-conquer, backtracking.

dynamic programming, and randomization. Time and space. complexity classes introduction to NP-completeness.

CS 320

Programming Languages: Concepts and Paradigms

Credits: 3 (3, 1,0). Prerequisite: CS 210.

Theory and implementation of modern programming languages.

Language-based programming methodologies, including procedural, object-oriented, functional, and logic programming. Design and criticism of programming languages.

CS 330 Introduction to Operating Systems

Credits: 3 (3,1,0). Prerequisite: CS 210, CS251.

An introductory study of evolution, services, and structure of operating systems.

It covers the basic concepts of operating system design and implementation an management of system resources such as Central Processing Unit (CPU),

Input/Output (I/O) devices, memory, and software. Examples given from modern operating systems such as Unix and Windows-driven operating systems. The students are given practical hands-on experience in implementation and testing of some components of small multi-programmed operating systems.

CS 331

Data Communication and Computer Networks

Credits: 3 (3,1,0). Prerequisite: CS 210.

An overview (definitions, evolutions, examples and applications).

Fundamentals

of data communication. Network types, structures, architectures and topologies.

The OSI model and its layers. TCP/IP networks and the Internet.

CS 336

Network Operations and Administration

Credits: 3 (3,0,0). Prerequisite: CS 331.

An overview of network operations. TCP/IP network management.

Network planning, configuring, installing and diagnosing. Network monitoring, analysis and performance tuning. User accounts. Network security. Managing system resources.

CS 340

Introduction to Database Systems

Credits: 3 (3,1,0). Prerequisite: CS 210.

An overview of database systems (definitions, evolution, architecture and applications) Data modeling .Entity-relationship and relational data models. Database query languages and standards. Database design: theory and methodology.

CS 355

Computer Architecture

Credits: 3 (3,1,0). Prerequisite: CS 251.

Review of logic design fundamentals. History of computers.

Representation of

data. Basic processor organization, data and control paths of the simple processor, hardwired and micro-programmed control unit, RISC vs. CISC organization. Abstract view of the computer at various levels: the high-level language, OS, assembly language and internal register-transfer level (RTL).

110 organization. Memory hierarchy and virtual memory. Examples of current

microprocessors. Introduction to pipelined and parallel computing

CS 365

Human-Computer Interaction

Credits: 3 (3,1,0). Prerequisite: CS 210.

Introduction to the concepts underlying the design of human-computer interaction: usability, direct manipulation, systematic design methods, user

conceptual models and interface metaphors, design languages and genres, human cognitive and physical ergonomics, information and interactivity structures, design tools and environments.

CS 370

Introduction to Artificial Intelligence

Credits: 3 (3,1,0). Prerequisite: CS 210.

An overview of Artificial Intelligence (definitions, evolutions and applications). Problem solving. Knowledge representation methods and techniques. Structures and strategies for state space search Heuristic search techniques.

CS 381

Systems Programming

Credits: 3 (2,0,2). Prerequisite: CS 330.

The course covers the following topics Systems programming at hardware or operating system levels. The software for systems programming (e.g., C++

builder). Shell! Windows Interface programming Design and implementation of applications! system's functions (such as interrupt and event handling, timer handling, signals, device drivers, process and thread creation and manipulation, etc.) and their integration with contemporary operating systems (either Windows-based or command-driven operating systems). Debugging tools.

CS 412**Theory of Computation**

Credits: 3 (3,1,0). Prerequisite: CS 210

Foundations: sets relations and languages. Finite Automata. Context-free Languages. Turing Machines. Desirability and computability. Computational Complexity and NP-completeness.

CS 425**Advanced Software Engineering**

Credits: 3 (3,0,0). Prerequisite: CS 225.

Review of fundamentals of Software Engineering. Software qualities and principles Verification and validation process. Software testing. Software tools and environments Software maintenance. Interactive software technology. Software project management.

CS 430**Advanced Operating Systems**

Credits: 3 (3,0,0). Prerequisite: CS 330.

A study of advanced concepts in operating systems, such as management of concurrent processes, security and protection of computer systems, distributed file systems and virtual memory. Students are given a practical hands-on experience in programming concurrent applications.

CS 432**Computer-Data Security and Privacy**

Credits: 3 (3,0,0). Prerequisite: CS 331, CS 340 or IS 223.

An overview (definitions, motivations and applications). Security and privacy solution components: policy, principles, mechanism and assurance. Database, network and Internet security. Authentication, access control, auditing intrusion detection and threats. Routing, TCP/IP, Firewalls, client/server issues and cryptography.

CS 433**Internet Technologies**

Credits: 3 (3,0,0). Prerequisite: CS 331.

Internet technologies such as publishing and browsing technologies, Internet protocols, standards and languages.

CS 435**Distributed Systems**

Credits: 3 (3,0,0). Prerequisite: CS 330, CS 331.

An overview (definitions, evolutions and trends, applications). Distributed system architectures .Client-server systems. Distributed data and object, and transaction management. Distributed operating systems Distributed algorithms and protocols

CS 437

Introduction to Parallel Computing

Credits: 3 (3,0,0). Prerequisite: CS 311.

An overview of parallel computing (definitions, evolutions, applications, and issues). Models of parallel computers: parallel architectures, idealized parallel computer, and interconnection networks. Basic communication operations. Performance and scalability of parallel systems. MPI/PVM standard. Parallel applications and programming.

CS 440

Database Management Systems: Design and Implementation

Credits: 3 (3,0,0). Prerequisite: CS 340.

An overview of a database management system. Different logical data models relational, hierarchical, network and object-oriented. Architectures and components of relational database management system.

CS 462

Topics in Multimedia

Credits: 3 (3,0,0). Prerequisite: CS 360, CS 365.

Introduction to applications and techniques in multimedia. A study of the principles and practice in computer-enhanced multimedia. Developing the skills to produce multimedia products by learning and presenting information incorporating graphics, animation, video, sound and text.

CS 470

Advanced Artificial Intelligence

Credits: 3 (3,0,0). Prerequisite: CS 370.

Advanced topics in artificial intelligence. Knowledge-based systems, natural language processing, automated reasoning. Machine learning.

CS 476

Natural Language Processing

Credits: 3 (3,0,0). Prerequisite: CS 370.

An introduction to natural language processing: representation, parsing, natural language generation, and the interaction between long-term knowledge and understanding. Arabic language processing.

CS 483

Computer Arabization

Credits: 3 (3,0,0). Prerequisite: Instructor consent.

Introduction to areas of computer Arabization, including: layout, characters shapes and processing, Arabic code pages, Arabic language structure and features.

CS 489

Selected Topics in Computer Science

Credits: 3 (3,0,0). Prerequisite: Instructor consent.

This course covers topics in the computer science discipline, which are not covered by the

other computer science courses. The students are encouraged to propose topics for this course.

CS 490

Internship in Computer Science

Credits: 3. Prerequisite: Advisor consent.

The student is asked to spend 2 months (around 300 working hours) in an approved company or institute. It is up to the student to choose the place he wishes to enroll in butb

nevertheless, prior approval of the department is required. This course has normal grading (A, B, etc.). For more information, see the section of "Experiential Learning/Community Link At PSC".

CS 492

Cooperative Education

Credits: 10. Prerequisite: Department consent

This course is an elective (on the student part) and selective (on the department part) track, subject to the approval of the department. It carries a 10 credit hours weight and has

normal grading (A, B, etc.). Students who are allowed to take this track will be waived from the following courses: CS 490, CS 498, CS 499, and a free-elective course. Typically a co-op program will last 7 months (at least 1200 working hours) and will span one summer and one regular semester. Prior approval of the department is required. Furthermore, close supervision by both the department and the company is maintained to ensure that the student is following the proposed work plan. For more information, see the section of "Experiential Learning/Community Link At PSC".

CS 494

Industry Link

Credits: 3. Prerequisite: Department consent.

This is an elective course that follows a pre-planned program administered by the college/department. It involves spending a specified period of time in several local and possibly outside computing institutions and companies and/or enrolling in their orientation programs. This course has normal grading (A, B, etc.). For more information, see the section of "Experiential Learning/Community Link At PSC".

CS 498

Senior Project I

Credits: 1. Prerequisite: Instructor consent, and completion of 90 credit hours.

A software project applying previously learned concepts and methods, substantial and suitable in nature, under the supervision of a faculty member. The senior project consists of a sequence of two courses: CS 498 and CS 499. In CS 498, the student is typically expected to study the problem, analyze and determine the requirements and design the solution.

CS 499

Senior Project II

Credits: 3. Prerequisite: CS 498.

This course is a continuation of CS 498. The student is typically expected to carry the implementation, testing, evaluation and tuning phases in this course.

B. INFORMATION SYSTEMS COURSES

IS 101

Introduction to Information Technology

(For non-IS and CS majors)

Credits: 2 (2,0,1). Prerequisite: None.

A survey of computers and information technology and their applications in society. Topics covered include: database applications and implications, telecommunications and networking, artificial intelligence, graphics, hypermedia, and multimedia. Computers at work, at home, and at schools. Computer security, and risks. An out-look on computers current and future impacts on individuals, business, and society as a whole. Students are introduced to simple Web page design and development with tools.

IS 201

Introduction to Information Systems

Credits: 3 (3,1,0). Prerequisite: CS 101.

An overview of information systems. Introduction to systems and development concepts, information technology, and, application software. Information use in organizations. The competitive advantage, timeliness, and improvement in quality which information technology provides.

IS 223

Database Management Systems

Credits: 3 (3,1,0). Prerequisite: IS 201.

Management of an organization's data needs. Emphasis is on management and implementation issues pertinent in a business information systems environment. Topics include data access methods; relational, hierarchical, and, network database management systems; query languages; database design and performance; data administration; and, data dictionaries.

IS 225

Systems Analysis and Design I

Credits: 3 (3,1,0). Prerequisite: IS 201.

An overview of systems analysis and design. Concepts and methods used in the analysis, design, and deployment of information systems. Explore the major issues at each stage in the system development life cycle, including requirements analysis, logical design, functional design, and implementation. Technical tools such as data flow diagrams, entity-relationship diagrams, and CASE tools are introduced.

IS 325

Systems Analysis and Design D

Credits: 3 (3,1,0). Prerequisite: IS 223, IS 225.

Advanced systems analysis and design with an emphasis on object oriented or other modern methodologies. The latest data analysis and design methods and tools are introduced and compared with traditional analysis and design methods and tools. Students take on a project analyzing and designing a business system making use of

available CASE tools.

IS 333

Information Systems Development

Credits: 3 (3,1,0). Prerequisite: IS 325.

Information systems physical design, and implementation, within a database management

system environment. Students design and construct a physical system using database software. Topics include data models and modeling tools/techniques; structured and object design approaches; models for databases: relational, hierarchical, networked and

object oriented design; Graphical User Interface (GUI) coding and implementation; and,

client-server planning, testing, and installation. Students work in small teams applying previously learned knowledge. Students complete a major development project and are

expected to present work they have accomplished to other students in the class using audio-visual tools.

IS 370

Project Management

Credits: 3 (3,1,0). Prerequisite: IS 325.

Functions, and techniques for effective management of systems development. Quality assurance, configuration management, and, alternative planning strategies. System requirements definition; scheduling, size, and cost estimation; risk analysis; and, effective

project leadership. Tools for planning and controlling of project development.

IS 421

Operations Research

Credits: 3 (3,0,0). Prerequisite: STAT 101, MATH 101 or MATH III.

This course focuses on the fundamental concepts, applications and techniques of management science in analytical decision making. The major topics covered include linear programming, integer programming, and, network models. Applications of these

techniques in functional areas such as production, marketing, finance, and accounting are

covered. Students arrive at solutions through the application of computer software packages.

IS 423

Decision Support Systems

Credits: 3 (3,1,0). Prerequisite: IS 325.

An overview (definitions, evolutions, examples, and, applications) of decision support systems. Decision theory. Organizational systems. Unstructured problem solving Introduction to modeling techniques such as linear programming, forecasting, and, simulation. Decision support system construction. Introduction to group decision support

systems, executive information systems, and expert systems.

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IS 444

Data Warehousing

Credits: 3 (3,0,0). Prerequisite: IS 223.

An overview of data warehousing (definitions, evolutions, trends, and applications).

Aspects of planning, designing, developing, implementing, and administering a data

warehouse are introduced. Data warehousing as a valuable decision making tool, and a means for gaining a competitive advantage.

IS 451

Knowledge-Based Systems

Credits: 3 (3,0,0). Prerequisite: IS 325.

An overview of Knowledge based and expert systems, their use as an organizational decision making tool and a method for saving valuable knowledge. Fundamental techniques for developing knowledge-based systems. Topics covered include, blackboards; inference engines; knowledge engineering; knowledge acquisition; and, rule-based systems.

IS 464

Health Information Systems

Credits: 3 (3,0,0). Prerequisite: BUS 373.

An overview of health information systems (definitions, evolutions, trends, and, applications). Computerized patient records, medical decision support systems, clinical information systems, Internet-based medical decision support systems, and computer based training for health professionals and patients.

IS 465

Geographic Information Systems

Credits: 3 (3,0,0). Prerequisite: BUS 373.

An overview of geographic information systems (GIS) (definitions, evolutions, trends, and, applications). Sources of information on GIS; map information; presenting maps as numbers; structuring maps; formats for GIS data; analog to digital maps; spatial analysis, and GIS software.

IS 470

Information Systems Total Quality Management

Credits: 3 (3,0,0). Prerequisite: IS 370.

Overview of Total Quality Management (TQM); the role of total quality management within organizations; The contribution of TQM to the high quality services of the IS department as well as the parent organization; business planning and process reengineering; and, applying an Information Systems quality strategy.

IS 484

Computer Modeling and Simulation

Credits: 3 (3,0,0). Prerequisite: CS 210 and STA 101.

An overview of simulation and modeling (definitions, evolutions, and, applications). Random number generators. Introduction to queuing theory and stochastic processes. Simulation methodology. Time flow mechanism. Event graphs. Discrete event-based simulations. Simulation languages. Design and optimization of simulation experiments.

Data collection, analysis, verification, and, validation of results.

IS 489

Selected Topics in Information Systems

Credits: 3 (3,0,0). Prerequisite: Instructor consent.

This course covers topics in the information systems discipline, which are not covered by the other information systems courses. The students are encouraged to propose topics for

this course.

IS 490

Internship in Information Systems

Credits: 3. Prerequisite: Advisor consent.

The student is asked to spend 2 months (around 300 working hours) in an approved company or institute. It is up to the student to choose the place he wishes to enroll in but

nevertheless, prior approval of the department is required. The practical training carries a

3 credit hours weight and has normal grading (A, B, ..). For more information, see the section of "Experiential Learning/Community Link At PSC".

IS 492

Cooperative Education

Credits: 1 O. Prerequisite: Department consent

This course is elective (on the student part) and selective (on the department part) track

subject to the approval of the department. It carries a 10 credit hours weight and has normal grading (A, B, etc.). Students allowed to take this track will be waived from the

following courses: IS 490, IS 498, IS 499, and a free-elective course. Typically a co-op

program will last 7 months (at least 1200 working hours) and will span one summer and one regular semester. Prior approval of the department is required.

Furthermore, close supervision by both the department and the company is maintained to

ensure that the student is following the proposed work plan. For more information, see

the section of "Experiential Learning/Community Link At PSC".

IS 494 Industry Link

Credits: 3. Prerequisite: Department consent.

This is an elective course that follows a pre-planned program administered by the college/department. It involves spending sometime in several local, and possibly outside

computing institutions and companies, and/or enrolling in their orientation programs. The

objective of the course is to expose the student to various work environments in the leading industry and public computing institutions. The course carries 3 credit hours of

normal grading points. For more information, see the section of "Experiential Learning/Community Link At PSC".

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IS 498

Senior Project I

Credits: 1. Prerequisite: Instructor consent, and completion of 90 credit hours.

A management information systems application development project applying previously

learned concepts and methods, substantial and suitable in nature, under the supervision of

a faculty member. The senior project consists of a sequence of two courses: IS 498 and

IS 499. In IS 498, the student is typically expected to study a problem, analyze and determine the requirements, and design the solution for a system to be developed in a

database management system environment or a business programming environment.

IS 499

Senior Project II

Credits: 3. Prerequisite: IS 498.

This course is a continuation of IS 498. The student is typically expected to carry the management information system application construction, integration, testing, evaluation and tuning, delivery, and user training.

C. GENERAL BUSINESS COURSES

BUS 101 Introduction to Business

Credits: 3 (3,0,0).

This course is a survey of the modern business world. It provides the student with a general knowledge of the composition and functions of the business organization as well

as its role as a social institution. The course deals with business environments, management functions (planning, organization, and control), and business functions (marketing, human resources, operations, and finance). This course is a prerequisite to all higher courses in business.

BUS 371

Production and Operations Management

Credits: 3 (3,0,0). Prerequisite: BUS 101, STAT 101, MATH 101 or MATH 111. ..

This course describes the tools used in designing, operating, and controlling the production/operations function in manufacturing/service organizations. A systems approach is followed in explaining the basic operating function, the problems and decisions a manager encounters, and solution techniques and models.

BUS 373

Management Information Systems

Credits: 3 (3,0,0). Prerequisite: BUS 101, STAT 101, MATH 101 or MATH 111.

This course provides students with an understanding of how information technologies (i.e., computer hardware, computer software, and computer networks) are used in organizations to support and enhance strategic goals. Emphasis is placed on technical concepts fundamental to business applications and management control of information systems.

D. ACCOUNTING COURSES

ACC 101

Introduction to Financial Accounting

Credits: 3 (3,1,0).

This course introduces the student to the basic accounting concepts, the operation of accounting systems, and the preparation and interpretation of financial statements in business firms. Topics include the need for accounting information, concepts underlying

the preparation of financial statements in business firms, the accounting cycle, and other

measurement and disclosure issues.

FIN 301

Principles of Finance

Credits: 3 (3,1,0). Prerequisite: BUS 101, ACC 101.

The course is an introduction to financial management and finance functions. Topics include financial analysis, planning and control, time value of money, risk analysis, valuation, capital budgeting, cost of capital, acquisition of fund through borrowing, stock issue, and dividend policies. This course is a prerequisite to all higher finance courses.

E. MARKETING COURSES

MKT 301 Principles of Marketing

This course presents an overview of the marketing activities and the decisions affecting

them in consumer, industrial, and international markets. Marketing planning and decision

making are examined from firms' and consumers' points of view. Topics include the marketing concept and its company-wide implications, integration of marketing with other functions, the activities of marketing research, identification of marketing opportunities, and the development of marketing mix strategies including the decisions

concerning pricing, distribution, promotion and product design, and marketing systems

views in terms of both public and private policy. This course is a prerequisite to all higher

marketing courses.

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F. DESCRIPTION OF COMMUNICATION COURSES

COM 201

Communication Skills

Credits: 3 (3,0,0). Prerequisite: ENGL 103.

The course is designed to familiarize students with the processes of communication in interpersonal, organizational, mass and inter-cultural contexts. Topics covered include:

communication paradigms, perceptual processes, personal and professional relationships. The course also includes materials related to verbal and non-verbal communication, communication technology, and the role communication plays in culture. The main objectives of the course are: (1) understanding the theoretical principles underlying effective communication behavior; and (2) practical application of

those principles in various communicative exercises.

COM 301

Speech Communication of Technical Information

Credits: 2 (2,0,0). Prerequisite: COM 201.

The organization and presentation of information of a practical technical nature. Emphasis is placed upon the study, preparation, and use of audio-visual materials in such presentations.

COM 401

Personal Skills

Credits: 3 (2,0,7). Prerequisite: BUS 1^o 1 + at least 60 credit hours.

This course is a multi-disciplinary and a multi-topic training course that addresses skills

needed in any business or work related situations. The course is conducted via modules

approach where each module represents a topic or a skill and lasts from 2-4 weeks.

Some of the skills that are covered include: Negotiation strategies and tactics, meeting

and time management, creative thinking, personal financing, and career preparation skills such as writing resumes and conducting effective interviews. The Department may

change, from time to time, the skills that are addressed in the course.

G. DESCRIPTION OF ENGLISH COURSES

ENGL 101 English Writing I

Credits: 3 (3,0,0).

This first college-level writing course is designed to provide students with basic skills necessary for writing in general. It focuses on writing essays using various rhetorical methods and devices such as narration, description, persuasion, and argumentation. Students are required to write several essays, both in and out of class, in addition to one research paper.

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ENGL 103 English Writing

Credits: 3 (3,0,0). Prerequisite: ENGL 101. ,

This second-level writing course is designed to provide students with the skills necessary for writing technical and scientific reports. This includes learning certain skills necessary for technical and scientific writing styles and format, including making

definitions, describing functions, explaining processes, establishing comparisons, as well as analyzing diagrams. This requires making the student acquainted with aspects of linguistic structures commonly used in scientific language register, such as the use of

subordinate clauses, the passive construction, reported speech, different verb modalities

,etc . students are asked to make two oral presentations at least, as well as a number of written assignments in and out of class.

H. DESCRIPTION OF ISLAMIC CULTURE COURSES

ISC 101

Islamic Ethics

Credits: 2 (2,0,0).

This course aims at defining the concept of ethics and its importance to human life. It also touches upon related areas, such as, the origins of morals and ethics~ types of human behavior and their motives, human ethics and their purposes. It also defines the

various categories and classifications of ethical behavior, the degrees of ethics, the types and manifestations of vice, and how the Holy Quran and the Sunnah honor, purge

and exalt the human soul. The course also offers examples of ethical behavior such as, truthfulness, honesty, faithfulness, modesty, benevolence and good conduct.

ISC 103

Islamic Economic System

Credits: 2 (2,0,0).

The course aims at expounding the Islamic economic system and shows how to implement it in our daily affairs. It also touches upon Islamic economic system in its relationship to Islamic Law, in its handling of modern economic problems, as well as its

views on property, ownership, inheritance, and economic welfare. The course also compares Islamic solutions to modern economic problems with those of other secular economic systems. Issues like, production., distribution, consumption, contracts, finances are

also treated from an Islamic point of view.

I. DESCRIPTION OF MATHEMATICS COURSES

MATH 101 Finite Mathematics

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Credits: 3 (3,0,0). Prerequisite: None.

Systems of linear equations, matrices, Introduction to linear programming. Sets and counting techniques. Introduction to probability theory. Introduction to finance mathematics.

MATH 111 Calculus I

Credits: 3 (3,1,0). Prerequisite: None.

Real numbers, real valued functions, limits, continuity, differentiation, consequences of differentiability, applications.

MATH 113 Calculus II

Credits: 3 (3,1,0). Prerequisite: MATH 111.

Definition of the Riemann integral, the Fundamental Theorem of Calculus, the substitution rule. Simple applications of the integral. Logarithmic, exponential and hyperbolic functions. Inverse trigonometric and hyperbolic functions. Techniques of integration. L'Hopital's Rule and Improper integrals A brief introduction to first order differential equations.

MATH 221 Numerical Analysis

Credits: 3 (3,1,0). Prerequisite: MATH 113.

Computational methods for nonlinear equations, systems of linear equations, interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations.

MATH 223 Linear Algebra

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Credits: 3 (3,1,0). Prerequisite: MATH 113.

Matrices, determinants, systems of linear equations, Euclidean vector spaces, real vector spaces, inner product spaces, eigenvalues and eigenvectors, linear transformations, application

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