

COURSE SPECIFICATION

**Choice based Credit System (CBCS)
Scheme and course structure for
Information Technology 2nd semester effective from academic session 2016 and onwards**

Course Code	Name of the Subject	Paper Category	Hours/Week			Credits
IT16201CR	Advanced Java Programming	Core(CR)	3	0	2	4
IT16202CR	Database System	Core(CR)	3	0	2	4
IT16203CR	Data Communications	Core(CR)	4	0	0	4
IT16204DCE	System Programming	Elective (DCE)	3	0	0	3
IT16205DCE	Object Oriented Analysis and Design	Elective (DCE)	3	0	0	3
IT16206GE	Numerical and statistical Computing	Elective (GE)	3	0	0	3
IT16207GE	Discrete Mathematics	Elective (GE)	3	0	0	3
IT16208OE	Fundamentals of Multimedia	Elective (OE)	2	0	0	2
IT16209OE	Fundamentals of Network and Internet	Elective (OE)	2	0	0	2
24 Credits						

Course No: IT16201CR**Course Title: Advanced Java Programming****Unit I**

Features of Java, OOPs concepts, Java virtual machine, Reflection byte codes , Byte code interpretation, Data types, variable, arrays, expressions, operators, and control structures Objects and classes Abstract classes, Static classes, Inner classes, Packages, Wrapper classes , Interfaces, This, Super Access control.

Unit II

Exception handling - Exception as objects , Exception hierarchy, Try catch finally, Throw, throws IO package - Input streams, Output streams, Object serialization, Deserialization, Sample programs on IO files, Filter and pipe streams Multi threading - Thread Life cycle, Multi threading advantages and issues , Simple thread program Thread synchronization

Unit III

JDBC architecture, Establishing connectivity and working with connection interface, Working with statements, Creating and executing SQL statements , Working with ResultSet

Unit IV

Overview of JSP, JSP Architecture & life cycle, Components of Java Server Pages, Implicit Objects & Standard JSP Tags, Scope of JSP objects, EJB overview & Architecture, Features of EJB , Developing Web Application with MySQL Database by implementing EJB

References:

1. Programming with Java A Primer, E.Balaguruswamy Tata McGraw Hill Companies
2. Java Programming John P. Flynt Thomson 2nd
3. Java Programming Language Ken Arnold Pearson
4. The complete reference JAVA2, Herbert schildt. TMH
5. Big Java, Cay Horstmann 2nd edition, Wiley India Edition
6. Core Java, Dietel and Dietel
7. Java – Balaguruswamy
8. Java server programming, Ivan Bayross SPD

Course Code: IT16202CR
Course Title: Database Systems

Unit I

Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Architecture, Data Mining and Information Retrieval, Database Models and Comparison, Relation Algebra, ER Model, CODDS Rules, Normalization..

Unit II

Introduction to SQL, Data Types, Data Definition Language, Data Manipulation Language, Transaction Control Language, Integrity Constraints, SQL Functions, Set Operators and Joins, View, Synonym and Index, Sub Queries and Database Objects, Locks and SQL Formatting Commands.

Unit III

Introduction to PLSQL, Architecture, Data Types, Control Structures, Concept of Error Handling, Cursors and Database Triggers, Subprograms and Packages.

Unit IV

Data Storage and Querying using various storage structures, Indexing and Hashing, Query Processing and Optimization. Transaction Management Concepts, Concurrency Control and Recovery.

Reference Books:

William Page, "Using Oracle 9i – Special Edition", Que/PHI.

Database System Concepts by A. Silbershatz, H.F. Korth and S. Sudarshan, 6th edition, 1997, McGraw-Hill, International Edition.

Ivan Bayross, "SQL & PL/SQL Using Oracle 8i & 9i with SQLJ", BPB.

Desai.B , "An introduction to Database Concepts", Galgotia Publications, N.Delhi

Dates.C , " An introduction to Database Systems", Pearson Education, Asia

Course Code: IT16203CR
Course Title: Data Communications

Unit I

Bandwidth and Channel Capacity. Quantifying Channel Capacity for noiseless channel (Nyquist Law) and noisy channel (Shannon's Law). Example of a digital telephone system to explain basic concepts of analog signals, digital signals, sampling. Data Rate versus Baud Rate. Nyquist Criterion for Sampling. Data transmission concepts. Characteristics of signals (amplitude, frequency, period, wavelength, Signal-to-Noise ratio). Key components in data communications systems. Simplified model. Local area network (LAN) concepts and characteristics.

Unit II

Wide area networks (WANs). WAN technologies (traditional packet and circuit switching, Frame Relay, ATM). ISDN (narrowband) concepts and services. Overview of the OSI model. Transmission media – factors affecting distance and data rate. Guided transmission media: Twisted-Pair, Co-axial Cable. Principles and advantages of optical networks. Types of optical fibers and lasers.

Unit III

Unguided transmission media: Terrestrial Microwave & Satellite Microwave systems and applications. Data encoding. Difference between modulation and encoding. NRZ-L, NRZ-I encoding. Multilevel Binary and Biphasic Coding techniques and their implementations. ASK, FSK, PSK and QPSK. PCM concepts: sampling, quantization. Delta Modulation. Amplitude Modulation.

Unit IV

Reliable transmission of data: Asynchronous and Synchronous transmission. Error detection: Parity-based, CRC-based. FCS computation. Error control and recovery techniques. Concept of ARQ standard and its versions. Concept of Multiplexing. FDM. Synchronous and Statistical TDM.

Reference Books:

1. William Stallings, "Data and Computer Communications", Pearson Education
2. Andrew Tanenbaum, "Computer Networks", Pearson Education 4/e.
3. Ulysses Black, "Principles of Data Communications", PHI.
4. Morley, Gelber, "The Emerging Digital Future", Addison-Wesley.

Course Code: IT16204DCE
Course Title: System Programming

Unit I

Introduction, Machine Structure , Evolution of the Components of programming system
Evolution of Operating Systems, General Machine Structure , General Approach to a New
Machine , Machine Structure 360-370, Machine Language. Assembly Language

Unit II

General Design Procedure, Assemblers, Design of an single pass assembler and multi pass
assembler, Macros: two pass algorithm, single pass algorithm, Implementation of macro calls
within macros

Unit III

Loaders and Linkers, Loader Schemes, subroutine linkages, relocating loaders, Linking
loaders, Design of an absolute loader, Design of a direct linking loader.

Unit IV

Formal Systems and Programming Languages: Formal specification, Hierarchy of
Languages, BNF, Canonic Systems and Formal Systems.

Compilers, Statement of problem, phases of Compiler-Lexical phase, syntax phase
Interpretation phase, optimization, storage assignment code generation and assembly phase,
Passes of a compiler.

Text Book: John J. Donovan, “Systems Programming”, Tata McGrawHill

Reference Books:

Leland L.Beck."System Software" 4th edition Pearson 1997

Barron.D.W."Assemblers and Loaders" Mc Donald and Javes 1978

Ullman.J.D."Fundamentals of Programming System" Addison and Wesley

D.M.Dhamdhere."System Programming and Operating Systems"2nd edition

Course Code: IT16205DCE**Course Title: Object Oriented Analysis & Design****Unit I**

OOAD – Introduction , Applying UML and Patterns in OOAD , Assigning Responsibilities , What is analysis and Design , An Example , The UML , Iterative Development –an Unified Process idea , Additional UP Best Practices and Concepts , The UP Phases and Schedule oriented Terms , The UP disciplines. Process Customization and the development case. The Agile UP.The Sequential Waterfall Lifecycle.Inception. Artifacts that may start in inception, Understanding requirements , types of requirements.

Unit II

Use –case Model , Writing requirements in context , goals and stories , background , use cases and adding value , use cases and functional requirements , use case types and formats . Goal and scope of a use case , Finding primary actors , goals and use cases , writing use cases in an essential UI-free style , Actors , Use Case Diagrams , Use Cases within the UP , Case Study. Identifying other requirements.From inception to elaboration.

Unit III

Use Case Model : Drawing System Sequence Diagrams. Example of an SSD. Inter System SSDs , SSDs and Use Cases , System Events and the System Boundary , Name System Events and Operations , Showing Use Case Text , SSDs within the UP. Domain Model : Visualizing Concepts , Domain Models , Conceptual Class Identification , Candidate Conceptual classes , Adding Associations , The UML association notation , NextGen POS Domain Model Associations , NextGen POS Domain Model , Adding Attributes , Non Primitive Data Type Classes , Adding Detail with Operation Contracts , Contract Sections , Post Conditions , Contracts , Operations and the UML. Operation Contracts within the UP.

Unit IV

From Requirements to Design , Interaction Diagram Notation , Sequence and Collaboration Diagrams , GRASP , Responsibilities and methods , interactions diagrams , Patterns , GRASP : Pattern of General Principles in Assigning Responsibilities , Information Expert , creator , Low Coupling , High Cohesion , Controller , Object Design and CRC Cards , Design Model : Use Case Realization with GRASP Patterns , Determining Visibility , Creating Design Class Diagrams , Mapping Design to Code

Reference Books:

1. James Rumbaugh, “Object Oriented Models and Design” Pearson Education 2/e
2. Ali Bahrani “Object Oriented Systems Development” McGraw -Hill 1999
3. Lafore Robert, “Object Oriented Programming in C++”, Galgotia Publications.
4. Balagurusami, E, “Object Oriented with C++”, Tata McGraw-Hill.
5. D. Ravichandran, “Programming with C++”, McGraw-Hill Publications

Course Code: IT16206GE

Course Title: Numerical and statistical Computing

UNIT I

Introduction. Requirements for computer-oriented solutions to numerical problems. Approximations & Errors – Types of Programming Errors, Computer & Arithmetic Errors, Accuracy and Precision, Round Off and Truncation Errors. Propagation of Error. Algorithms to Compute Roots of Equation – Methods of Tabulation or Brute Force Method, Method of Bisection, Secant Method, Newton-Raphson Method, Method for False Position. Implementations of these methods.

UNIT II

Algorithms to Solve Linear Algebraic Equations : Gauss Elimination, Gauss Jordan, Gauss Seidel, L.U. Decomposition, Lagrange Interpolated Polynomial, Newton Divided Differences Interpolating Polynomial. Implementation of these methods.

UNIT III

Algorithms to solve Ordinary Differential Equations – Euler Method and Modification. The trapezoidal Rule, Simpson's Rule. R-K Method. Implementation of these methods.

UNIT IV

Standard Deviation, Correlation, Regression Analysis, Algorithms for Curve Fitting straight line: Least Square Approximation. Concept of Hypothesis, Statistical Tests: Chi-Square Test, Student t-Test, f-Test.

REFERENCE BOOKS:

1. S.C.Chapra & R.P.Canale: “Numerical methods for Engineering”. Tata McGraw Hill.
2. Krishenmurty and Sen : “Numerical Algorithms”
3. V. Rajaraman “Computer oriented numerical methods.” Prentice Hall of India.
4. McCalla, Thomas Richard: “Introduction to Numerical Methods and FORTRAN Programming”, John Wiley & Sons, Inc.
5. Grewal, B. S.: “Higher Engineering Mathematics”, Hindustan Offset Problems Series.
6. “SCHAUM’S Solved Problems Series”.
7. Sharma, K. D.:“Programming in Fortran”.
8. Jain, M. K., Iyengav, S. R. K., Jain, R. K.: “Numerical Methods for Scientific and Engineering Computation”+, Wiley Eastern Ltd, New Delhi

Course Code: IT16207GE
Course Title: Discrete Mathematics

UNIT I

Proposition, Logic, Truth tables, Propositional Equivalence, Logical Equivalence, Predicates and Quantifiers, Sets: operations on sets, Computer representation of sets, Functions: Domain, Range, One-to-One, Onto, Inverses and Composition, Cardinality of a Set, sequences and summations, The growth of functions . Methods of Proof: Different methods of proof, Direct Proof, Indirect Proof, Mathematical Induction for proving algorithms.

UNIT II

Counting: Basic Counting Principle, The Pigeon-Hole Principle, Permutation, combinations, repetitions, discrete probability, Advanced Counting Techniques: Inclusion-Exclusion, Applications of inclusion-exclusion principle, recurrence relations, solving recurrence relation. Relations: Relations and their properties, Binary Relations, Equivalence relations, Diagraphs, Matrix representation of relations and digraphs, Computer representation of relations and digraphs, Transitive Closures, Warshall's Algorithm.

UNIT III

Partially Ordered Sets (Posets), External elements of partially ordered sets, Hasse diagram of partially ordered set, isomorphic ordered set ,Lattices: Properties of Lattices, complemented Lattices. Graph theory: Introduction to graphs, Graph Terminology Weighted graphs, Representing Graphs, Connectivity of Graphs: Paths and Circuits, Eulerian and Hamiltonian Paths, Matrix representation of graphs. Graph Coloring.

UNIT IV

Trees: Rooted trees, Application of trees: Binary Search Trees, Decision Trees, Prefix Codes, Tree traversal, trees and sorting, spanning trees, minimal spanning trees. Finite Boolean algebra, Functions on Boolean algebra, Boolean functions as Boolean polynomials. Groups and applications: Subgroups, Semigroups, Monoids, Product and quotients of algebraic structures, Isomorphism, Homomorphism,

Text Book :

KENNETH H. ROSEN "Discrete Mathematics and Its Applications" The Random House/Birkhauser Mathematics series

Reference Books:

1. LIU "Elements of Discrete Mathematics " Tata McGraw Hill
2. SCHAUMS "Discrete Mathematics " Tata McGraw Hill
3. KOLMAN/REHMAN "Discrete Mathematical Structures " Pearson Education
4. NICODEMI "Discrete Mathematics " CBS

Course Code: IT16208OE
Course Title: Fundamentals of Multimedia

UNIT I

Introduction to Multimedia. Definition, Components of multimedia, Multimedia Past and Present; History, Hypermedia, WWW and Internet, Multimedia Today. Users of multimedia, Applications of Multimedia; Education and Training, Entertainment and Art Industry, Engineering, Research, Communication, Medicine, Marketing and Advertising, Journalism, Sports, Gaming

UNIT II

A Multimedia System. Features of a Multimedia System, Multimedia PC workstation components; Input Devices / Capture devices, Storage Devices, Communication Ports, Output / Display Devices. Graphics Processor (Internal and external). Examples of Various Multimedia Systems.

UNIT III

Multimedia Configuration: Converging technologies, Functions & subsystems (input, development & output). Multimedia Development Tools: Presentation Tools, Authoring Tools and relevant Examples. Data Compression.

UNIT IV

Graphics and Images: Image Properties; Resolution, Bit Depth, Color, Aspect Ratio, Dpi , Pixels. Popular Image File Formats: JPEG, GIF,PNG, TIFF. Basics of Image Capture. Multimedia Video: Frame Rate, Display; interlaced vs Non-interlaced. Video File Formats: MPEG, AVI. Multimedia Audio: Digital and Analog, Some Audio File Formats. Animation Basics.

References:

1. Fundamentals of Multimedia Ze-Nian Li, Mark S.Drew, Jiangchuan Liu, 2nd Edition (Pearson)
2. Multimedia in Practice Judith Jeffcote (PHI).

Course Code: IT16209OE**Course Title: Fundamentals of Network and Internet****UNIT I**

Definitions of data communication and network; communication modes: (simplex, duplex, half duplex), point-to-point, and broadcast. Analog & Digital signal, types of networks: (local area network, wide area network, metropolitan area network). A Data Communication Model and Examples.

UNIT II

Networking Devices: Repeaters, Hubs, Switches, Bridges, Routers, and Gateways. Network Topologies; Bus, Star, Ring, Mesh, Tree and Hybrid. A Computer network diagram. Addressing: Logical and Physical. Concept of a Protocol. Programs and Processes, Protocol Layering Concepts, Encapsulation and De-capsulation. OSI and TCP/IP model Introduction.

UNIT III

Transmission Medium. Types of transmission media: cable/wired media (coaxial, fibre-optic, twisted pair), wireless media (satellite, microwave, infra-red), wireless network technology: (Bluetooth, Wi-Fi), hotspot, modem, bandwidth. Concept of Internet and Intranet.

UNIT IV

Server, Client and The Client/Server Model. Mail server and Chat Server, HTTP, File Transfer Protocol (FTP), upload, download, World Wide Web (WWW), web browser, web page, website, blogging, Social Networking sites, URL, e-commerce, e-learning, , pod-casting, bulletin board, VoIP. Information Security Basics.

References:

1. "Data Communications and Networking Hardcover" Behrouz A. Forouza, McGraw Hill Education; 5 edition
2. Andrew Tanenbaum, "Computer Networks", Pearson Education 4/e.