B.Tech Programme in Engineering & Technology – New Regulation
(2012 – 13 Admitted Batch onwards)

Branch: Computer Science & Engineering

CENTURION UNIVERSITY OF TECHNOLOGY &MANAGEMENT:ODISHA
B.TECH PROGRAMME IN ENGINEERING & TECHNOLOGY –New Regulations

(2012-13 Admitted Batch onwards)

COMPUTER SCIENCE AND ENGINEERING: B.TECH IV YEAR

7th Semester				8th Semester			
Theory				*Theory*			
Code	*Subject*	*L-T-P*	*Credits*	*Code*	*Subject*	*L-T-P*	*Credits*
PCCS 4101	*Artificial Intelligence*	*3-1-0*	*4*		*Professional Elective- III*	*3-1-0*	*4*
	Professional Elective- I	*3-1-0*	*4*		*Professional Elective- IV*	*3-1-0*	*4*
	Professional Elective- II	*3-1-0*	*4*		*Free Elective -IV*	*3-1-0*	*4*
	Free Elective-III	*3-1-0*	*4*				
Theory Credits			*16*	*Theory Credits*			*12*
Practical/Sessional				*Practical/Session al*			
PLCS 4105	*Technology Seminar*	*0-0-3*	*2*	*PLCS 4204*	*Project*	*0-0-12*	*10*
PLCS 4106	*Project (Minor)*	*0-0-6*	*4*				
Practical / Sessional Credits			*6*	*Practical / Sessional Credits*			*10*
TOTAL SEMESTER CREDITS			*22*	*TOTAL SEMESTER CREDITS*			*22*
TOTAL CUMMULATIVE CREDITS			*190*	*TOTAL CUMMULATIVE CREDITS*			*212*
TOTAL CONTACT HOURS/WEEK			*25*	*TOTAL CONTACT HOURS/WEEK*			*24*

PROFESSIONAL ELECTIVE BASKET

Professional Elective			
1	**2**	**3**	**4**
PECS 4101 Data Mining & Data Warehousing	PECS 4105 Dot Net Technologies	PECS 4201 Business Intelligence and Its Application	PECS 4205 Cloud Computing
PECS 4102 Building Enterprise Application	PECS 4106 E-Commerce and ERP	PECS 4202 Mobile Computing	PECS 4206 Web Services
PECS 4103 Linux and Apache	PECS 4107 My SQL and PHP	PECS 4203 Android	PECS 4207 Computational Intelligence
PECS 4104 Computer Graphics	PECS 4108 Advanced Computer Architecture	PECS 4204 Cryptography & Network Security	PECS 4208 Parallel And Distributed System

FREE ELECTIVE BASKET

Free Elective

5-Semester	6-Semester	7-Semester	8-Semester
FECS 3101 DBE with My SQL	FECS 3201 Linux And Apache	FECS 4101 Web Services	FECS 4201 Android, GIS
FECS 3102 Core Java	FECS 3202 Internet And Web Technology	FECS 4102 Advanced Java Programming	FECS 4202 E-Commerce & ERP
FECS 3103 Foundation Program	FECS 3203 Computer Organization	FECS 4103 Operating Systems	FECS 4203 Software Engineering
FECS 3104 Dot Net Technologies	FECS 3204 Advanced Dot Net	FECS 4104 IWT with Dot Net	FECS 4204 Cloud Computing
FECS 3105 Computer Network & Data Communication	FECS 3205 Multi-Media Technology	FECS 4105 Cryptography & Network Security	FECS 4205 Internet Technology & Applications

7TH SEMESTER
PCCS 4101 ARTIFICIAL INTELLIGENCE (3-1-0) CREDITS: 4

Module-1 (18Hrs)

What is Artificial Intelligence? AI Technique, Level of the Model, Problem Spaces, and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs.

Heuristic Search Techniques: Generate-and-Test, Hill Climbing, Best-first Search, Problem Reduction, Constraint Satisfaction, Means-ends Analysis,

Knowledge Representation: Representations and Mappings, Approaches to Knowledge Representation,

Using Predicate Logic: Representing Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.

Using Rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching, Control Knowledge.

Symbolic Reasoning under Uncertainty: Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic

Reasoning, Implementation Issues, Augmenting a Problem-solver, Depth-first Search, Breadth-first Search.

Weak and Strong Slot-and-Filler Structures: Semantic Nets, Frames, Conceptual DependencyScripts, CYC.

Module- 2 (16Hrs)

Game Playing: The Minimax Search Procedure, Adding Alpha-beta Cutoffs, Iterative Deepening.

Planning: The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical PlanningOther Planning Techniques.

Understanding: What is Understanding, What Makes Understanding Hard?, Understanding as Constraint Satisfaction.

Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing, Statistical Natural Language Processing, Spell Checking.

Module-3 (16Hrs)

Learning: Rote Learning, Learning by Taking Advice, Learning in Problem-solving,

Learning from Examples: Induction, Explanation-based Learning, Discovery, Analogy, Formal Learning Theory, Neural Net Learning and Genetic Learning.

Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition.

Text Book:

1. Elaine Rich, Kevin Knight, &Shivashankar B Nair, Artificial Intelligence, McGraw Hill, 3rd ed.,2009

References:

1. Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI.,2010 2) S Kaushik, Artificial Intelligence, Cengage Learning, 1st ed.2011

PROFESSIONAL ELECTIVES – I
PECS 4101 DATA MINING & DATA WAREHOUSING (3-1-0)

After the completion of the course, students will able to:

1. Understand the concepts of data warehousing and OLAP,
2. Understand the data mining concepts and techniques,
3. Be able to efficiently design and manage data storages using data warehousing, OLAP, and data mining techniques,
4. Select and apply appropriate data mining techniques for different applications.

Pre-requisite: DBMS taught in 3rd semester

Module - I 16 Hours

Overview: Data warehousing, the compelling need for data warehousing, the Building blocks of data warehouse, overview of the components, trends In data warehousing, emergence of standards, understanding data warehousing Architecture, Data warehousing implementation, Introduction to the data warehouse project.

Module - II 18 Hours

Introduction to Data mining, Data mining Functionalities, Data preprocessing (data summarization, data cleaning, data integration and transformation, data reduction, data discretization), Mining frequent patterns, associations, correlations (market basket analysis, the apriori algorithm, mining various kinds of association rules, from association mining to correlation analysis) Classification: classification by decision tree induction, Rule based classification.

Module - III 16 Hours

Cluster Analysis: types of data in cluster analysis, a categorization of major clustering methods (partitioning methods, hierarchical methods), clustering high dimensional data, outlieranalysis,advanced techniques: web mining, spatial mining, temporal mining, Data mining applications.

Text Books:

1. Data warehousing Fundamentals: PaulrajPonniah, Willey India.
2. Data Mining: Concepts and techniques: J.Han and M.Camber, Elsevier.

Reference books:

1. Data Mining: ArunPujari, University Press
2. Data Mining –a Tutorial based primer by R.J.Roiger, M.W.Geatz, Pearson Education.
3. Data Mining & Data Warehousing Using OLAP: Berson, TMH.
4. Data Warehousing: ReemaThareja, Oxford University

Teaching Methodology: The course will be run in project mode, thus:

1. At the beginning of the semester, some projects will be announced, & those can be chosen by the students, which may be converted to their major projects.
2. Evaluation:

    Project-30 Mark

Seminar-20 Mark
End semester-50 Marks

3. Faculty guidance will be provided for this.
4. Viva is necessary at the completion.

PECS 4102 BUILDING ENTERPRISE APPLICATION (3-1-0)

Module-1:16 Hrs

Introduction to enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise applications, Inception of enterprise applications, enterprise analysis, business modelling, requirements elicitation, use case modelling, prototyping, non-functional requirements, requirements validation, planning and estimation

Module-2: 16 Hrs

Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture - design, different technical layers, best practices, data architecture and design – relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design

Module-3: 18 Hrs

Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage, Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application.

Courseware & reference books:

The courseware including PowerPoint is available for the Elective. In addition, following reference book can also be used:

Text Book :

1. Raising Enterprise Applications – Published by John Wiley, authored by AnubhavPradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, VeerakumarEsakimuthu
2. Building Java Enterprise Applications – Published by O'Reilly Media, authored by Brett McLaughlin

Reference Book:

1. Software Requirements: Styles & Techniques – published by Addison-Wesley Professional
2. Software Systems Requirements Engineering: In Practice – published by McGraw-Hill/Osborne Media
3. Managing Software Requirements: A Use Case Approach, 2/e – published by Pearson
4. Software Architecture: A Case Based Approach – published by Pearson
5. Designing Enterprise Applications with the J2EE Platform (PDF available at-http://java.sun.com/blueprints/guidelines/designing_enterprise_applications_2e/)
6. Software Testing, 2/e – published by Pearson
7. SOFTWARE TESTING Principles and Practices – published by Oxford University Press

PECS 4103 LINUX AND APACHE (3-1-0)

Module – I (Basic Linux)   12 Hours

Introduction to UNIX & LINUX, System Structure, Installation of LINUX, Startup and Shutdown Script, Software Package Administration, User and Group Administration, Advanced File Permissions, Disk Partitioning and Mounting File System, Quotas, Backup and Recovery

Module – II (Linux Administration)   12 Hours

NFS, Network Information Service (NIS), Dynamic Host Configuration Protocol (DHCP), DNS with BIND 9, Mail Server (SMTP, POP3, IMAP), Web Server (Apache), FTP Server (vsftp daemon), Proxy Server (Squid)

Module – III (Linux Troubleshooting)   12 Hours

Samba Service, Troubleshooting your system, RAID (Redundant Array of InExpensive Disks) &LVM, Web based Administration, Virtualization, Log Server, Kernel Up gradation, IP Bonding

Text Book:

1. Red Hat®Linux®NetworkingandSystemAdministrationby Terry Collings and Kurt WallM& T BooksAn imprint of Hungry Minds, Inc. Red Hat Press

Reference Books:

1. UNIX and Linux System Administration HandbookbyEvi Nemeth, Garth Snyder, Publisher: DORLING KINDERSLEY (RS)
2. Linux Network Administrator's Guide By Olaf Kirch& Terry Dawson, Publisher: O'Reilly

PECS 4104 COMPUTER GRAPHICS (3-1-0)

Module – I (16 hours)

Overview of Graphics System: Video Display Units, Raster-Scan and Random Scan Systems, Graphics Input and Output Devices; Output Primitives: Line drawing Algorithms: DDA and Bresenham's Line Algorithm, Circle drawing Algorithms: Midpoint Circle Algorithm and Bresenham's Circle drawing Algorithm; Two Dimensional Geometric Transformation: Basic Transformation (Translation, rotation, Scaling) Matrix Representation, Composite Transformations, Reflection, Shear, Transformation between coordinate systems.

Two Dimensional Viewing: Window-to- View port Coordinate Transformation.

Module –II (16 hours)

Line Clipping (Cohen-Sutherland Algorithm) and Polygon Clipping (Sutherland-Hodgeman Algorithm)

Aliasing and Antialiasing, Half toning, Thresholding and Dithering, Scan conversion of Character; Polygon Filling: Seed Fill Algorithm, Scan line Algorithm; Two Dimensional Object Representation: Spline Representation, Bezier Curves and B-Spline Curves. Fractal Geometry: Fractal Classification and Fractal Dimension; Three Dimensional Geometric and Modelling Transformations: Translation Rotation, Scaling, Reflections, shear, Composite Transformation. Projections: Parallel Projection and Perspective Projection.

Module –III (18 hours)

Visible Surface Detection Methods: Back-face Detection, Depth Buffer, A- Buffer, Scan- line Algorithm and Painters Algorithm; Illumination Models: Basic Models, Displaying Light Intensities; Surface Rendering Methods: Polygon Rendering Methods: Gouraud Shading and Phong Shading; Computer Animation: Types of Animation, Key frame Vs. Procedural Animation, methods of controlling Animation, Morphing; Virtual Reality: Types of Virtual reality systems, Input and Output Virtual Reality devices.

Textbook

1. Computer Graphics with Virtual Reality System, Rajesh K.Maurya, Wiley-Dreamtech.
2. Computer Graphics, D. Hearn and M.P. Baker (C Version), Pearson Education

Reference Books

1. Computer Graphics Principle and Practice , J.D. Foley, A.Dam, S.K. Feiner, Addison, Wesley
2. Procedural Elements of Computer Graphics- David Rogers (TMH)

3. Computer Graphics: Algorithms and Implementations – D.P Mukherjee &Debasish Jana (PHI)
4. Introduction to Computer Graphics & Multimedia – AnirbanMukhopadhyay& Arup Chattopadhyay (Vikas)

PROFESSIONAL ELECTIVES – II

PECS 4105 DOT NET TECHNOLOGY (3-1-0)

Unit I. (10) Introduction Vision and goals of .NET, Building blocks of .Net, overview of .Net applications, .Net evolution, The .Net Framework Architecture, Intermediate Language(IL), Common Language Runtime (CLR), JIT Compilation, Common Type System (CTS), Common Language System (CLS), Assemblies, IL Disassembler (ILdasm.exe), Namespaces. **C# features** Working with methods- understanding method structure, calling a method, understanding parameter types, overloading methods, virtual methods, overriding methods.

Unit II. (10) C# classes Constants, fields, methods, properties, events, indexers, operators, constructors, destructors, static modifiers. **Class Inheritance** Compiling with multiple classes, virtual and override methods, abstract methods, sealed classes, Boxing and Unboxing, Working with namespaces, Understanding interfaces, handling exceptions.

Unit III. (09) Windows Applications Understanding Windows Forms Architecture, Windows controls: Common, Containers, Menus and Tool strips, Data, Reporting. Adding and using windows controls to the form.

Unit IV. (08)
Database programming with ADO.NET Understanding the Dataset classes and their relatives, Understanding OLEDB and SQL Server Support, Understanding common database operations using ADO.NET – Operations that don't return rows, Data operations that return single, row entities, data operations that affect single-row entities, data operations returning sets of rows, data operations affecting sets of rows, operations that return hierarchical

Unit V. (08)
Creating web applications with web forms [Asp.NET]Difference between ASP and ASP.Net, Defining a web application, ASP.NET architecture, ASP.net web forms, Code behind model, Validation controls in ASP.NET, Server controls and data binding, Grid view, data repeater, data list, Data binding in ASP.NET, Data source controls- sqldata source, Data controls – grid view and details view, Login controls.

Text Book:
1. Jeff Ferguson, Brian Patterson, Jason Beres, *C# Programming Bible,* Wiley Publishing Inc., Reprint 2006.

Reference Books:
1. Jeff Prosise, *Programming .Net,* 2nd Edition, WP Publishers & Distributors Pvt. Ltd, 2009.
2. Kevin Hoffman & Jeff Gabriel, *Professional .Net Framework*, 1ˢᵗ Edition, Wrox Press Publishers, 2006.

PECS 4106 E-COMMERCE AND ERP (3-1-0)

Course Objective:
– Discover how e-commerce evolved from electronic communications
– Name the characteristics that define e-commerce
– Examine the basic purpose of e-commerce

– Explain how e-commerce can increase a business's revenue

Pre-requisite: IWT, DBMS, DM& DH, Programming knowledge for project

Module –I (18 Hour)

Basics of E-commerce-Electronic Commerce: Overview, Definitions, Advantages & Disadvantages of E-Commerce, Threats of E-Commerce, Cyber Laws; Technologies: Relationship Between E-Commerce & Networking, Different Types of Networking for E-Commerce, internet, Intranet, EDI Systems; Business Models of E-commerce: Model Based on Transaction Type, Model Based on Transaction Party - B2B, B2C, C2B, C2C, E-Governance; Four C's (Convergence, Collaborative Computing, Content Management & Call Centre); Supply Chain Management: E-logistics, Supply Chain Portal, Supply Chain planning Tools (SCP Tools), and Supply Chain Execution (SCE).

Module –II (16 Hour)

Payment System for E-commerce; E-Payment Mechanism; Payment through card system, E-Cheque, E-Cash, E-Payment Threats & Protections; E-Marketing: Home - shopping, E-Marketing, Tele-marketing; Risk of E-Commerce: Overview, Security for E-Commerce, Security Standards, Firewall, Cryptography, Key Management, Password Systems, Digital Certificates, Digital Signatures; Internet Business Strategies; Electronic marketplaces, Electronic Auctions, Mobile Commerce, Virtual Communities

Module - III (16 Hour)

Enterprise Resource Planning (ERP): Features, capabilities and Overview of Commercial Software, re-engineering work processes for IT applications, Business Process Redesign, Knowledge Engineering and Data Warehouse; Business Modules; Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials, Management, Quality Management Sales & Distribution ERP Package. ERP Market, ERP-Present and Future, Enterprise Application Integration (EAI), ERP and E-Commerce, ERP and Internet, Future Directions in ERP

Textbooks

1. Ecommerce, Gary P. Schneider, Cengage Learning
2. Electronic Commerce: Framework Technologies & Applications, Bharat Bhasker, TMH

Reference Books

1. E-commerce: Concepts, models & strategies, C.V.S Murthy, Himalaya Publishing
2. Electronic Commerce: A Manager's Guide, Kalakota&Whinston, Pearson
3. Kalakotia, Whinston : Frontiers of Electronic Commerce, Pearson Education.
4. Loshinpete, Murphy P.A. : Electronic Commerce, Jaico Publishing Housing
5. E-commerce, Jibitesh Mishra, Macmillan
6. E-commerce : Strategy Technologies & Applications, Tata McGraw Hill.

Teaching Methodology: The course will be run in project mode, thus:

1. At the beginning of the semester, some projects will be announced, & those can be chosen by the students, which may be converted to their major projects.
2. Evaluation:
    i.   Project-30 Mark
    ii. Seminar-20 Mark
    iii. End semester-50 Marks
3. Faculty guidance will be provided for this.
4. Viva is necessary at the completion.

PECS 4107 MySQL AND PHP (3-1-0)

Module – I (HTML and PHP)   12 Hours

HTML: Planning for designing Web pages, Model and structure for a Website, Developing Websites, Basic HTML using images links, Lists, Tables and Forms,

PHP: Introduction, Environment, Syntax Overview, Variable Types, Constants, Operator Types, Decision Making, Loop Types, Arrays, Strings, Web Concepts, GET & POST, File Inclusion, Files& I/O, Functions, Cookies, Sessions, Sending Emails, File Uploading. Coding Standard

Module – II (MySQL)   12 Hours

Introduction, Installation, Administration, Syntax, Connection, Create Database, Drop Database, Select Database, Data Types, Create Tables, Drop Tables, Insert Query, Select Query, Where Clause, Update Query, Delete Query, Like Clause, Sorting Results, Using Join, NULL Values, Regexps, Transactions, Alter Command, Indexes, Temporary Tables, Clone Tables, Database Info, Using Sequences, Handling Duplicates, SQL Injection, Database Export, Database Import

Module – III (PHP with MySQL)   12 Hours

Connecting to MySQL database, Create MySQL Database Using PHP,Delete MySQL Database Using PHP, Insert Data To MySQL Database, Retrieving Data From MySQL Database, Using Paging through PHP, Updating Data Into MySQL Database, Deleting Data From MySQL Database, Using PHP To Backup MySQL Database

Text Book:
1. Beginning Php And Mysql From Novice To Professional; SKU: BK9788184897456; ISBN-13: #9788184897456; ISBN: 8184897456; Author: W.Jason Gilmore; Publisher: Om Books

Reference Books:
1. PHP and MySQL in Easy Steps by Mike McgrathPublisher: Tata Mcgraw Hill
2. PHP: The Complete Reference by Steven HolznerPublisher: Tata Mcgraw Hill
3. Mysql: The Complete Reference by Author: VikramVaswaniPublisher: Tata Mcgraw Hill

PECS 4108 ADVANCED COMPUTER ARCHITECTURE (3-1-0)

Module-1 (16 hours)

Input-output organization: Accessing I/O devices, Programmed I/O, Interrupt driven I/O, DMA, Buses, Interface circuits, standard I/O interfaces (PCI,SCSI,USB).

Module-2 (16hours)

Architectural classification of parallel processing (FLYNN'S), Pipelining: Basic concepts, Instruction and arithmetic pipelining, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data path and control considerations, superscalar operations, Ultra SPARC II example, performance considerations, pipeline reservation tables and scheduling.

Module-3 (18 hours)

Array processors: SIMD Array processors, SIMD Interconnection networks.

SIMD Computers and performance Enhancement: The space of SIMD Computers, The Illiac-IV and the BSP systems, The massively parallel processor, Performance Enhancement methods.

Multiprocessor: Functional structures, Interconnection networks, Parallel memory organizations.

Text Book :

1. Computer Organization by Carl Hamacher, ZvonkoVranesic, SafwatZaky, INTERNATIONAL EDITION
2. Computer Architecture and parallel processing by Kai Hwang & Faye A. Briggs, McGrawHill International Edition

PROFESSIONAL ELECTIVES – III

PECS 4201 BUSINESS INTELLIGENCE AND ITS APPLICATION (3-1-0)

Module-1: Introduction to Business Intelligence, Duration-16 hours

Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI

Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities

Module-2: Basics of Data Integration (Extraction Transformation Loading), Duration- 16 hrs

Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL using SSIS, Introduction to data quality, data profiling concepts and applications

Module-3: Introduction to Multi-Dimensional Data Modelling, Duration-16 hrs

Introduction to data and dimension modelling, multidimensional data model, ER Modelling vs. multi dimensional modelling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS

Basics of Enterprise Reporting, Duration-

Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to

SSRS Architecture, enterprise reporting using SSRS

Courseware & Reference Books: The courseware including PowerPoint and notes will be made available by Infosys for the Elective. In addition, following reference books can also be used:

1. Business Intelligence by David Loshin
2. Business intelligence for the enterprise by Mike Biere
3. Business intelligence roadmap by Larissa Terpeluk Moss, ShakuAtre
4. Successful Business Intelligence: Secrets to making Killer BI Applications by CindiHowson
5. Delivering business intelligence with Microsoft SQL server 2008 by Brain, Larson
6. Foundations of SQL Server 2005 Business Intelligence by Lynn Langit
7. Information dashboard design by Stephen Few

PECS 4202 MOBILE COMPUTING (3-1-0)

Module - I (16 hours)

Introduction to Personal Communications Services (PCS) : PCS Architecture, mobility management, Networks signaling, Global System for Mobile Communication (GSM) System overview : GSM Architecture, Mobility management, Network signaling. General Packet Radio Services (GPRS) : GPRS Architecture, GPRS Network Nodes, Mobile Data Communication ; WLANs (Wireless LANs) IEEE 802.II standard, Mobile IP.

Module - II (18 hours)

Wireless Application Protocol 9WAP) : The Mobile Internet standard, WAP Gateway and Protocols, wireless mark-upLanguages (WML), Wireless Local Loop (WLL) : Introduction to WLL Architecture, wireless Local Loop Technologies. Third Generation (3G) Mobile Services : Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Module - III (16 hours)

Global Mobile Satellite Systems ; case studies of the IRIDIUM and GLOBALSTAR systems. Wireless Enterprise Networks : Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

Text Book:

1. "Pervasive Computing", Burkhardt, Pearson
2. "Mobile Communication", J. Schiller, Pearson
3. "The Wireless Application Protocol", SandeepSinghal, Pearson
4. "Mobile and Personal Communication Systems and Services", Raj Pandya, Prentice Hall of India, 2001.

Reference:

1. "Guide to Designing and Implementing Wireless LANs", Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
2. "Wireless Web Development", Ray Rischpater, Springer Publishing
3. "The Wireless Application Protocol", SandeepSinghal, Pearson.
4. "Third Generation Mobile Telecommunication Systems", by P. Stavronlakis, Springer Publishers,

PECS 4203 ANDROID (3-1-0)

Module-1

Introduction to Android: What is Android? Setting up development environment, Dalvik Virtual, Machine & .apk file extension, Fundamentals:
a. Basic Building blocks -Activities, Services, Broadcast Receivers & Content providers
b. UI Components - Views & notifications
c. Components for communication -Android API levels (versions & version names)

Application Structure (in detail): AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts &Drawable , Resources Activities and Activity lifecycle, First sample Application

Emulator-Android Virtual Device: Launching emulator, Editing emulator settings, Emulator shortcuts, Log cat usage, Introduction to DDMS, Second App:- (switching between activities),Develop an app for demonstrating the communication between Intents Multi Setting Dalvik Intents & Intent Filters

Basic UI design: Form widgets, Text Fields, Layouts,[dip, dp, sip, sp] versus px

Preferences: Shared Preferences, Preferences from xml

Menu: Option menu, Context menu, Sub menu, menu from xml, menu via codes

Intents (in detail): Explicit Intents, Implicit intents

Module-2

UI design: Time and Date, Images and media, Composite, Alert Dialogs & Toast, Popup

Styles & Themes: styles.xml, drawable resources for shapes, gradients (selectors),style attribute in layout file,Applying themes via code and manifest file, drawable

Content Providers: SQLite Programming, SQLiteOpenHelper, SQLiteDatabse, Cursor, Reading and updating Contacts, Reading bookmarks

Linkify: Web URLs, Email address, text, map address, phone numbers, Match Filter & Transform Filter

Adapters and Widgets: Adapters:-ArrayAdapters, BaseAdapters, ListView and ListActivity, Custom listview, GridView using adapters,
Gallery using adapters

Module-3

Notifications: Broadcast Receivers, Services and notifications, Toast, Alarms

Custom components: Custom Tabs, Custom animated popup panels, other components

Threads: Threads running on UI thread (runOnUiThread), Worker thread, Handlers & Runnable, AsynTask (in detail)

Advanced: Live Folders, Using sdcards, XML Parsing, JSON Parsing, Maps, GPS, Location based Services, Accessing Phone services (Call, SMS, MMS),Network connectivity services, Sensors, Maps

PECS 4204 CRYPTOGRAPHY AND NETWORK SECURITY (3-1-0)

Module-I(16Hrs)

Introduction to Information Security: Security Goals, Attacks, Security Services and Mechanisms; Mathematical Background: Integer and Modular Arithmetic, Matrices, Linear Congruence. Groups, Rings, and Fields, GF(p), Euclidean and Extended Euclidean Algorithms, Polynomial Arithmetic, GF(2n). Random Number Generation, Prime Numbers, Fermat's and Euler's Theorems, Primality Testing Methods, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Discrete Logarithms.

Module-II(18Hrs)

Traditional Encryption Methods: Symmetric Cipher Model, Substitution Ciphers, Transposition Ciphers, Block and Stream Ciphers, Rotor Cipher, Steganography; Symmetric Key Ciphers: Data Encryption Standard, Advanced Encryption Standard; Asymmetric Key Ciphers: RSA Cryptosystem, ElGamal Cryptosystem, Elliptic Curve Cryptosystem; Message Integrity, Authentication: Message Integrity, Random Oracle Model, Message Authentication, MAC Algorithms; Cryptographic Hash Functions: MD Hash Family, Whirlpool, Secure Hash Algorithm; Digital Signature and Authentication: Digital Signature Schemes, Variations and Applications, Entity Authentication; Key Management: Diffie-Hellman Key Exchange.

Module-III(16Hrs)

Network and System Security:Security at the Application Layer: e-mail security, PGP and S/MIME.

Security at the Transport Layer: Secure Socket Layer (SSL) and Transport Layer Security (TLS); Security at the Network Layer: IP Security; System Security: Malicious Software, Malicious Programs, Viruses, Worms, Malware, Intrusion Detection System, Firewalls.

Text Books:

1. B. A. Forouzan& D Mukhopadhyay ,Cryptography and Network Security., McGraw Hill, 2nd ed.2010

References:

1. B. Menezes ,Network Security and Cryptography., Cengage Learning, 1st ed.2010
2. Stallings ,Cryptography and Network Security., PHI, 4th ed.2010

PROFESSIONAL ELECTIVES – III

PECS 4205 CLOUD COMPUTING (3-1-0)

Module 1

Introduction to cloud computing, Brief on different computing Paradigms, Evolution of cloud computing, features and benefits of cloud paradigm, Roots of cloud computing, The 3-4-5 Rule. 3 services/ delivery models: IaaS, PaaS, SaaS, Cloud deployment models: private, public, community and hybrid models, 5 characteristics of cloud, cloud architecture, issues and challenges in cloud computing, Enterprise cloud computing paradigm; SaaS-Introduction, Pros-Cons, Traditional packaged software vs SAAS, Examples of SaaS. Case Study-Facebook, Google Docs; IaaS-Introduction, Reference Model, Examples, Case study-Amazon Web Services(AWS): Amazon EC2, Auto scaling, Elastic Load Balancing, Availability Zones, Region, Edge Location, EBS,S3, Amazon cloudFront, RDS, DynamoDB, VPC, Route 53

Module 2

Virtualization, types of virtualization, uses of virtualization, Types of Hypervisors(VMM), Full Virtualization vs Para Virtualization, virtual machines provisioning and management, VM migration, VM migration techniques, VM life cycle, VM monitoring, Amazon EC2, Eucalyptus, OpenNebula, distributed management of VMs; PaaS- Introduction, Examples, Case Study- Google App Engine

Module 3

Resource provisioning, resource contention, resource fragmentation, over- and under- provisioning of resources, resource allocation techniques, Use of Map-Reduce in cloud computing, SLA management in cloud computing with sample SLA examples, Cloud security issues, Multi-tenancy, applications of cloud computing in education, business and healthcare domains, data security in cloud.

Text book:
1. Cloud computing: Principles and paradigm, by RajkumarBuyya, James Broberg, AndrzejGoscinski, Wiley India Pvt. Ltd.
2. Moving to the Cloud: DinkarSitaram, GeethaManjunath, Syngress

Reference books:
1. Cloud Computing for Dummies, Judith Hurwitz, Robin Bloor, Marcia Kaufman and Fern Halper, Wiley Publication

PECS 4206 WEB SERVICES (3-1-0)

Module-I (16 Hours)

INTRODUCTION TO SOA and WEB SERVICES:SOA - Definition, Principles, Benefits, Challenges & SOA manifesto; Enterprise Integration - Definition, Patterns;Web Services – Definition and concepts; Web Service standards – What and Why? XML, SOAP and WSDL

Module-II (12 Hours)

SOA Design Principles:SOA architecture concepts, Principles of Service Design, SOA using Java, Service versioning

Module-III (14 Hours)

Web Services: WSDL, SOAP, Java Web Services frameworks, How to write Web Services in Java? A project to implement Web Services

Books:
1. Service Oriented Architecture by Thomas Erl
2. Java Web Services by Martin Kalin (O'Reilly)

References:

1. www.enterpriseintegrationpatterns.com

PECS 4207 COMPUTATIONAL INTELLIGENCE (3-1-0)

MODULE-I   (16 Hours)

Introduction To Soft Computing, Neural Networks: Fundamentals, Single layer networks, Perceptron. Activation functions. Adaline, Madaline: its training and capabilities, weights learning, Multilayer perceptrons : error back propagation, generalized delta rule. Radial basis function networks and least square training algorithm, Competitive Learning Network, Kohenen self – organizing map and learning vector quantization networks

MODULE-II (14 Hours)

Fuzzy Logic:Fuzzy set theory: crisp sets, fuzzy sets, crisp relations, fuzzy relations, Fuzzy Systems: Crisp logic predicate logic, fuzzy logic, fuzzy Rule based system, Defuzzification Methods, Fuzzy rule based reasoning , ANFIS

MODULE-III (12 Hours)

Evolutionary Computing: Genetic Algorithms: Basic concepts, encoding, fitness function and reproduction. Basic genetic programming concepts Applications. Differences of GA and traditional optimization methods; Particle Swarm Optimization: Introduction to optimization, Optimization Procedure, Different Optimization algorithms, Different Global Optimization Algorithms, PSO Algorithm , Hybrid Techniques

Text Book:
1. "Neural Networks Fuzzy Logic & Genetic Algorithms; Synthesis & Applications, S.Rajasekaran& G.A. VijayaLaxmiPai, Prentice Hall, India, May'2006- LakshmiPai
2. Principle of Soft Computing, S.N. Sivanandan& S.N. Deepa, Wiley India Edition,2010.

ReferenceBook:
1. "Neural Networks: A Classroom Approach" By Satish Kumar, TMH Education

PECS 4208 PARALLEL AND DISTRIBUTED SYSTEM (3-1-0)

Module – I(16Hrs.)

Introduction to parallel computing; Parallel programming platforms: Trends in microprocessor Architectures, Limitations of memory system; performance, Dichotomy of parallel computing platforms, physical organization of parallel platforms, communication costs in parallel machines, Routing mechanisms for interconnection network, Impact of process processors mapping and mapping techniques.

Module – II (16Hrs.)

Principles of parallel algorithm design: Preliminaries, Decomposition techniques, Characteristics of tasks; and interactions, Mapping techniques for load balancing, Methods for containing; Interactions overheads, Parallel algorithm models. Basic communication operations: One-to-All Broadcast and Allto-One Reduction, All-to-All broadcast and reduction All-Reduce and prefix sum operations, scatter and gather,All-to-All personalized communication, circular shift, Improving the speed of some communication operation.

Module – III (18Hrs.)

Analytical modeling of parallel programs: Performance metrics for parallel systems, Effect of granularity of performance, scalability of parallel system, Minimum execution time and minimum costoptimal execution time, Asymptotic analysis of parallel programs, other scalability

metrics; Programming using the message passing paradigm: Principle of message – Passing programming, Send and receive operations, The message passing interface, Topologies and embedding, Overlapping communication with computation, collective communication andComputation operations, Groups and communicators Dense matrix algorithm: Matrix-vector multiplication, Matrix-matrix algorithm, Solving a system of linear equations.

Text Book:
1. Introduction to Parallel Computing, Second Edition, Ananth Gram, Anshul Gupta, GeorgeKarypis, Vipin Kumar Person Education.
2. Parallel computing Theory and Practice, Second Edition, Michael J. Quinn, TMH.

FECS 3101 DBE WITH MY SQL (3-1-0)

Module1: (12 Hrs)
Introduction to database Systems, Basic concepts &Definitions, Data Dictionary, DBA, File-oriented system vs. Database System, Database Language.
Database System Architecture-Schemas, Sub Schemas & Instances, 3-level database architecture, Data Abstraction, Data Independence, Mappings, Structure, Components & functions of DBMS, Data models, Mapping E-R model to Relational, Network and Object Oriented Data models, types of Database systems.

Module2: (16 Hrs) Relational Algebra, Tuple & Domain Relational Calculus, Relational Query Languages: SQL and QBE. Database Design:-Database development life cycle (DDLC), automated design tools, Functional dependency and Decomposition, Dependency Preservation & lossless Design, Normalization, Normal forms: 1NF, 2NF, 3NF, and BCNF, Multi-valued Dependencies, 4NF & 5NF. Query processing and optimization: Evaluation of Relational Algebra Expressions, Query optimization.

Module3: (12 Hrs) Transaction processing and concurrency control: Transaction concepts, concurrency control, locking and Timestamp methods for concurrency control. Database Recovery System: Types of Data Base failure & Types of Database Recovery, Recovery techniques. Advanced topics: Object-Oriented & Object – Relational Database, Parallel & Distributed Database, Introduction to Data warehousing & Data Mining.

Text Books: 1. Database Systems by Thomas Connolly and Carolyn Begg-Pearson Education-3rd edition (Chapters: 1-2, 4,6,7, 9.1-9.3,13,20,19.1-19.3,22.1-22.3,25.1-25.4,30.1-30.3, 32)
2. Fundamentals of Database System By Elmasari &Navathe- Pearson Education-5th Edition.(Chapters: 1,2,3,5,6,7.1,8,10,11,15,17,18,19,20,22,25,28,29)

References Books:
(1) An introduction to Database System – Bipin Desai, Galgotia Publications
(2) Database System: concept, Design & Application by S.K.Singh (Pearson Education)
(3) Database management system by leon &leon (Vikas publishing House). 1
(4) Database Modeling and Design: Logical Design by Toby J. Teorey, Sam S. Lightstone, and Tom Nadeau,4th Edition, 2005, Elsevier India Publications, New Delhi

FECS 3102 CORE JAVA (3-1-0)

Module – I (10hours)
Introduction to Java and Java programming Environment. Object Oriented Programming; Fundamental Programming; Structure: Data Types, variable, Typecasting Arrays, Operators and their precedence. Control Flow: Java's Selection statements, Concept of Objects and Classes, constructor overloading, static, final this keyword , Inheritance, Method overriding, Dynamic method Dispatch, Using Abstract Classes Packages and interfaces: Packages, Access Protection, Importing package, Interface, Implementing Interfaces, variables in Interfaces, Interfaces can be extended.

Module – II (14hours)
Excepting Handling: Fundamentals, Types Checked , Unchecked exceptions, Using try & catch, Multiple catch, throw , throws, finally, Java's Built in exceptions, user defined exception; Multithreading Java Thread Model, Thread Priorities,

Synchronization, Creating a thread, Creating Multiple threads, Using is Alive ( ) and join ( ), wait () & notify ( ).String Handling : String constructors, String length , Character Extraction , String Comparision, Modifying a string. Exploring Java -lang: Simple type wrappers, Runtime memory management, object (using clone () and the cloneable Interface).Java util, Java
I/O, Java Networking:

Module III (16 hours)
Applets : Basics , Architecture , Skeleton, The HTML APPLET Tag, Passing Parameters to Applets, Applet context and show documents ().Event Handing :Delegation Event model, Event Classes , Event Listener Interfaces, Adapter classes AWT :AWT Classes window fundamentals, component, container, panel, Window, Frame , Canvas, Creating a frame window in an Applet , working with Graphics , Control Fundamentals , Layout managers, Handling Events by Extending AWT components. Core java API package, reflection, Swing :J applet, Icons & Labels , Text fields , Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees, Tables.JDBC : Fundamentals, Type I,Type II, Type III, Type IV drivers.

Text Books
1. Java complete Reference, Herbert Schildt, fifth edition chapters (1, 2, 3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,26)

Reference Books:
1. Balguruswamy, Programming with JAVA, TMH.
2. Programming with Java :Bhave&. Patekar, Pearson Education.

3. Big Java: Horstman, Willey India, 2nd Edition.
4. Java Programming Advanced Topics: Wigglesworth, Cengage Learning.
5. Java How to Program: H.M.Deitel& Paul J. Deitel, PHI, 8th Editio

FECS 3103 FOUNDATION PROGRAM (3-1-0)

MODULE - I
Problem Solving Techniques : Classification of Problems, Brute force Techniques, Greedy Approach, Divide and Conquer Approach, Dynamic Programming, Flowcharts and Tools ; Case Study Basics of Operating Systems and Essentials of System Software–OS, Introduction to Memory, Process, File and Device Management. System Software, Working of Assemblers, Loaders and Linkers, Compilers, Interpreters.Integrated Development Environments IDE and its usage of features –Editors, Debuggers, Testing Tools etc.Different Programming Environments and usage of Language Translators. Case Study

MODULE- II
Software Development Methodology : Software Development Life Cycle (SDLC), Software Development Models, Requirement Analysis and Design; Code Review and Unit Testing; Software Testing; Levels of Testing; Regression Testing; Test Plans; Test Case Design; Alpha and Beta Testing; Software Quality factors and Management; Case Study

MODULE- III
Programming and Project Practices : Programming Methodologies, Program Life Cycle, Coding Standards and Best Practices, Testing and Debugging, File Handling, Code Tuning and Optimization Techniques, Usage of IDE"s and Tools. Hands on Basics of Database Management: Data Processing; Data Models; ER Modeling; Relational Database Design; SQL Case Study and Hands on. User Interface Design: Introduction, The Process of User Interface Design, Elements of User Interface Design, Good vs Bad User Interface, Reports,
Case Study Project: Project specification –Briefing, Preparation of High level design and detailed design Document, Unit, Test Plan and Integrated Test Plan, Coding and Unit Testing, Integration Testing
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FECS 3104 DOT NET TECHNOLOGIES (3-1-0)

Module-I (16 Hours)
Dot Net Overview, Introduction to .Net Framework, Web Services and XML, Common Language Runtime, Base Class Library, Common Type System , Common Language Specification, Intermediate Language, Overview of assemblies, Namespaces, Windows Forms, ASP.Net , Languages, Tools, IDE and Visual Studio

Module-II (16 Hours)
Object Oriented Programming and C# Introduction to Object Oriented Programming, Variables & Operators, Methods(Functions), Decision Making & Iteration Techniques, Error Handling, Classes & Objects, Type Casting, Structures, Arrays & Collections, Inheritance, Interfaces & Abstract Classes, Garbage Collection, Introduction to ADO.Net

Module-III (16 Hours)
ASP.Net with C# Understanding HTML, java Script and ASP.Net ,Controls in Asp.Net, Advanced Controls, Consistent Look & Feel, Caching, Tracing & Debugging, Web Service, ADO.Net

Text Book:
1. Pro ASP.Net 4 in C# 2010 by Matthew Macdonald
2. C# 5.0 in a Nutshell: The Definitive Reference by Joseph Albahari and Ben Albahari

FECS 3105 COMPUTER NETWORK & DATA COMMUNICATION (3-1-0)

Module –I 18Hrs
Overview of Data Communications and Networking. Physical Layer : Analog and Digital, Analog Signals, Digital Signals, Analog versus Digital, Data Rate Limits, Digital Transmission: Line coding, Block coding, Sampling, Transmission mode. Analog Transmission: Modulation of Digital Data; Telephone modems, modulation of Analog signals. Multiplexing : FDM , WDM , TDM , Transmission Media: Guided Media, Unguided media (wireless) Circuit switching and Telephone Network: Circuit switching, Telephone network.

Module –II 16Hrs
Data Link Layer Error Detection and correction: Types of Errors, Detection, Error Correction Data LinkControl and Protocols: Flow and Error Control, Stop-and-wait ARQ.Go-Back-N ARQ, Selective Repeat ARQ, HDLC. Point-to –Point Access: PPP Point –to-Point Protocol, PPP Stack, Multiple Access Random Access, Controlled Access, Channelization. Local area Network: Ethernet. Traditional Ethernet, Fast Ethernet, Gigabit Ethernet. Token bus, token ring Wireless LANs: IEEE 802.11, Bluetooth virtual circuits: Frame Relay and ATM.

Module –III 16Hrs
Network Layer: Host to Host Delivery: Internetworking, addressing and Routing Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6 Transport Layer: Process to Process Delivery: UDP; TCP congestion control and Quality of service. Application Layer :Client Server Model, Domain Name System (DNS): Electronic Mail (SMTP) and file transfer (FTP) HTTP and WWW.

Text Books:
1. Data Communications and Networking: Behrouz A. Forouzan, Tata McGraw-Hill, 4thEd
2. Computer Networks: A. S. Tannenbum, D. Wetherall, Prentice Hall, Imprint of Pearson 5thEd

Reference Book
1. Computer Networks:A system Approach:Larry L, Peterson and Bruce S. Davie,Elsevier, 4thEd
2. Computer Networks: Natalia Olifer, Victor Olifer, Willey India
3. Data and Computer Communications: William Stallings, Prentice Hall, Imprint of Pearson, 9thEd.
4. Data communication & Computer Networks: Gupta, Prentice Hall of India
5. Network for Computer Scientists & Engineers: Zheng, Oxford University Press
6. Data Communications and Networking: White, Cengage Learning

FECS 3201 VLINUX AND APACHE (3-1-0)

Module – I (Basic Linux)   12 Hours
Introduction to UNIX & LINUX, System Structure, Installation of LINUX, Startup and Shutdown Script, Software Package Administration, User and Group Administration, Advanced File Permissions, Disk Partitioning and Mounting File System, Quotas, Backup and Recovery

Module – II (Linux Administration)   12 Hours
NFS, Network Information Service (NIS), Dynamic Host Configuration Protocol (DHCP), DNS with BIND 9, Mail Server (SMTP, POP3, IMAP), Web Server (Apache), FTP Server (vsftp daemon), Proxy Server (Squid)

Module – III (Linux Troubleshooting)   12 Hours
Samba Service, Troubleshooting your system, RAID (Redundant Array of InExpensive Disks) & LVM, Web based Administration, Virtualization, Log Server, Kernel Up gradation, IP Bonding

Text Book:
2. Red Hat®Linux®NetworkingandSystemAdministrationby Terry Collings and Kurt Wall M& T BooksAn imprint of Hungry Minds, Inc. Red Hat Press

Reference Books:

3. UNIX and Linux System Administration HandbookbyEvi Nemeth, Garth Snyder, Publisher: DORLING KINDERSLEY (RS)
4. Linux Network Administrator's Guide By Olaf Kirch& Terry Dawson, Publisher: O'Reilly

FECS 3202 INTERNET AND WEB TECHNOLOGY (3-1-0)

Module –I (Lecture Hour 16)
The Internet and WWW Understanding the WWW and the Internet, Emergence of Web, Web Servers, Web Browsers, Protocols, Building Web Sites HTML Planning for designing Web pages, Model and structure for a Website, Developing Websites, Basic HTML using images links, Lists, Tables and Forms, Frames for designing a good interactive website

Module –II (Lecture Hour 16)
JAVA Script Programming Fundamentals, Statements, Expressions, Operators, Popup Boxes, Control Statements, Try.... Catch Statement, Throw Statement, Objects of Javascript: Date object, array object, Boolean object, math object CSS External Style Sheets, Internal Style Sheets, Inline Style, The class selector, div & span tag DOM HTML DOM, inner HTML, Dynamic HTML (DHTML), DHTML form, XML DOM

Module –III (Lecture Hour 18)
CGI/PERL Introduction to CGI, Testing & Debugging Perl CGI Script, Using Scalar variables and operators in Perl Java Applet Introduction to Java, Writing Java Applets, Life cycle of applet

Textbooks
1. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar& others, Cengage Learning

Reference Books
1. Web Programming: Building Internet Applications, Chris Bates, Wiley Dreamtech
2. Programming the World Wide Web, Robert W Sebesta, Pearson
3. Web Technologies, Uttam K Roy, Oxford
4. Web Technology: A developer perspective, Gopalan&Akilandeswari, PHI

FECS 3203 COMPUTER ORGANIZATION (3-1-0)

Module –I 16 Hrs
Basic structures of Computers: Functional units, operational concepts, Bus structures, Software, Performance, Computer Architecture vs Computer Organization. Machine Instruction and Programs: Memory location and addresses, Big-endian and Little-endian representation. Memory Operations, Instructions and instruction Sequencing, Addressing modes, Basic Input/output operations, subroutine, additional Instructions.

Module –II 16 Hrs
Arithmetic : Addition and subtraction of signed Numbers, Design of Fast Adders, Multiplication of po sitive Numbers, Signed-operand multiplication , Fast multiplication, Integer Division, Floating -point Numbers, (IEEE754 s...) and operations.

Module –III 18 Hrs
Basic Processing units: Fundamental concepts, execution of complete Instructions, Multi bus o rganization, Hardwired control, Micro programmed control, RISC vs CISC architecture.Memory System: Basic Concepts, cache Memory, Cache memory mapping policies, Cache updating schemes, performance consideration, Virtual memories, Paging and Page replacement policies, Memory Management requirement, secondary storage.

Text Books:
1. Computer Organization:CarlHamacher, Zvonkovranesic, SafwatZaky,McGraw Hill,5th Ed
2. Computer Organization and Design Hardware/ Software Interface: David A. Patterson, John L. Hennessy, Elsevier, 4th Edition.

Reference Book :

1. Computer Architecture and Organization: William Stallings, Pearson Education.
2. Computer Architecture and Organizations, Design principles and Application: B. GovindaRajalu, Tata McGraw-Hill Publishing company Ltd.
3. Computer Architecture: Parhami, Oxford University Press
4. Computer system Architecture: Morris M. Mano PHI NewDelhi.
5. Computer Architecture and Organization: John P. Hayes McGraw Hill introduction.
6. Structured Computer Organization: A.S. Tanenbum, PHI
7. Computer Architecture And Organization: An Integrated Approach, Murdocca, Heuring Willey India, 1st Edition.

FECS3204 ADVANCED DOT NET (3-1-0)

Module-1

Intro to .NET framework; Framework Architecture- Types of Applications- Net Languages- Common language Runtime(CLR)- Common Type System(CTS)- Base Class Libraries, Assemblies- advantages over other Languages; Managed Code- CTS and CLS…; Data Type & Operators; Variables- Initialization of Variables- Type Inference- Variable Scope- Constants- Pre defined Data Types -Value Types and Reference Types- data Types -CTS Types- Predefined Value Types- Reference Types- Arithmetic Operators- Concatenation Operators- Comparison Operators- Logical Operators- Bitwise Operators- Operator Precedence- Assignment Operators- The StringBuilder Class- Date and TimeSpan- Operator Overloading…; Arrays; Array, Structure &Ennum- Characteristics- Single Dimension Array- 2D Arrays- 3D Arrays- Arrays-Jagged Arrays & Mixed Arrays- Structure- Enumerations…; Classes & Objects; Defining Classes- Defining Class members- Object Declaration & Instantiation- Object References- De referencing Objects- Early binding vs late Binding- Sessions- name spaces- Importing and Aliasing Namespaces- Creating your own name spaces- The My keyword- Extending the name spaces…

Module-2

Inheritance & Polymorphism; Introduction- Types- properties- Object Types & Casting- Types of polymorphism- Interfaces & Abstract classes- Implementing an interface- Implementing multiple interface- Extending interface- Interface casting- The IS & AS operators- Overriding Interface Implementations- Abstraction - Abstract Class- Abstract Methods; Exception Handling- Handling Exceptions- Handling Exceptions using the try catch statements- Handling Multiple exceptions- Throwing exceptions using the throw statements- Rethrowing Exceptions- Exception chaining- Using exception Objects- The finally statement- creating custom exceptions…; Files & streamsFiles & Directories - Working with directories- Working with files- Creating File Explorer- The Stream Class - Buffered Stream , The File Stream Class- The Stream Class - Memory system- Network Stream Class- Cryptography – hashing- Salted Hash- Encryption & Decryption…; Delegants& EventsCreating delegate- Delegates Chaining- Implementing callbacks using delegates- AsynchronusCallbacks- Asynchronous methods & lambda expressions- Handling events- Implementing Events Difference between events & delegates- passing state information to an event handler- Sessions; Threading- The need for multithreading - starting a thread- aborting a thread- passing parameters to thread- Thread synchronization - user interlocked class- Using exception Objects- Using C# Lock- Monitor class- Thread safety in windows forms - using the back ground worker control- Testing the applications

Module-3

Introduction - Overview windows programming; Features- Controls- Properties- Anchoring, Docking, and Snapping Controls- Events- Button control- Label & Linked control- text box control- Radio Button & Check box controls- The group box control- The rich text box control- List box & Checked list box controls- list view controls- Image list control- Tab control- creating controls- Menus & Toolbars; Database Connectivity-Intro to SQL- ADO.NET- SQL connections object- Reading data

with the sql data reader- working with disconnected data- Adding parameter to commands- Dialog Box & Timer Control- Dialog box - Common Dialogs- File Dialogs- printing- print Preview- Font &Color Dialog- Sessions- Folder browser dialog- Timer Control- MDI Forms; Collections & GenericsQueues- Stacks- Linked Lists- Sorted Lists- Dictionaries- Hash set- Bit Arrays; Web Application Basics; ASP.Net Basics- The Goals of ASP.NET- developerProductivity- Administration and Management- Performance and Scalability- The ASP.NET Compilation System- Health Monitoring for Your ASP.NET Applications- Reading and Writing configuration Settings- Localization- Objects for Accessing Data- HTML Documents- CSS- JavaScript- Adding Properties to the Server Control- Working with ViewState Data- Adding Methods & Child Controls- Adding the Custom Control Builder- Raising Events & Retrieving Postback Data- Composite Controls- Inheriting from Existing Controls- User Controls- Dynamically Loading Controls- Raising Events to the Page…

FECS 3205 MULTI- MEDIA TECHNOLOGY (3-1-0)

Module –I (16 hours)

Introduction: Definition, properties and uses of Multimedia Systems. Traditional Data streams characteristics, Characteristics of continuous media data based on time, space and continu ity. Sound/Audio: Basic sound concepts, MIDI devices and MIDI messages. Image: Digital image representation, Image Format, Graphics format, Computer Image Processing: Image Synthesis, Image Analysis and Image Transmission. Video: Video Signal Representation, Computer Video and Television format.

Module –II (18 hours)

Data Compression: Source, Entropy and Hybrid Encoding, Some basic compression techniques, JPEG, MPEG and MHEG. Multimedia Operating Systems: Process Management-Real-time Scheduling System Model, Rate Monotonic & Earliest Deadline First Algorithm, Process Utilization, Multimedia File System Paradigm, Disk Scheduling. Multimedia Communication Systems: Application Subsystem, Transport Subsystem, QOS and Resource Management. Synchronization: Notion of Synchronization, Presentation Requirements, Reference model for Multimedia Synchronization, Synchronization Specification.

Module –III (16 hours)

Multimedia Authoring Tools, Multimedia Systems Frameworks: Multimedia Information System: Multimedia Information Model and Multimedia Distributed Processing Model. Multimedia Communication System: Multimedia Conferencing Model and Multimedia Network Model. QOS layer Architecture, Distributed Multimedia Systems: Features of Distributed Multimedia System, Types of Distributed Multimedia Application, QOS in Distributed Multimedia System.

Textbooks:
1. Multimedia: Computing, Communications & Applications, Ralf Steinmetz and KlaraNahrstedt, Pearson Education.
2. Multimedia Systems, P.K.Buford, Pearson Education

Reference Books:
1. Fundamentals of Multimedia-ZeNian and Mark S Drew (PHI

FECS4101 WEB SERVICES (3-1-0)

Module-I (16 Hours)

INTRODUCTION TO SOA and WEB SERVICES:SOA - Definition, Principles, Benefits, Challenges & SOA manifesto; Enterprise Integration - Definition, Patterns;Web Services – Definition and concepts; Web Service standards – What and Why? XML, SOAP and WSDL

Module-II (12 Hours)

SOA Design Principles:SOA architecture concepts, Principles of Service Design, SOA using Java, Service versioning

Module-III (14 Hours)

Web Services: WSDL, SOAP, Java Web Services frameworks, How to write Web Services in Java? A project to implement Web Services

Books:

3. Service Oriented Architecture by Thomas Erl
4. Java Web Services by Martin Kalin (O'Reilly)

References:

2. www.enterpriseintegrationpatterns.com

FECS 4102 ADVANCED JAVA PROGRAMMING (3-1-0)

MODULE-I (16Hrs)

Java Fundamentals Java I/O streaming –filter and pipe streams –Byte Code interpretation -reflection – Dynamic Reflexive Classes –Threading –Java Native Interfaces-Swing. Network Programming In Java Sockets –Secure Sockets –Custom Sockets –Udp Datagrams –multicast sockets –URL classes – Reading Data from the server –writing data –configuring the connection –Reading the header –telnet application –Java Messaging services

MODULE-II(16Hrs)

Applications In Distributed Environment Remote method Invocation –activation models –RMI custom sockets –Object Serialization –RMI –IIOP implementation –CORBA –IDL technology –Naming Services –CORBA programming Models -JAR file creation

MODULE-III(18Hrs)

Multi-Tier Application Development Server side programming –servlets –Java Server Pages -Applet to Applet communication –applet to Servlet communication -JDBC –Using BLOB and CLOB objects –storing Multimedia data into databases –Multimedia streaming applications –Java Media Framework. Enterprise Applications Server Side Component Architecture –Introduction to J2EE –Session Beans – Entity Beans –Persistent Entity Beans –Transactions.

REFERENCE BOOKS

1. Elliotte Rusty Harold, " Java Network Programming", O"Reilly publishers, 2000 (UNIT II)
2. Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999. (UNIT III and UNIT V)
3. Hortsmann& Cornell, "CORE JAVA 2 ADVANCED FEATURES, VOL II", Pearson Education, 2002. (UNIT I and UNIT IV)
4. Web reference: http://java.sun.com.
5. J2EE The Complete Reference

6. Server Programming , Black Book

FECS 4103 OPERATING SYSTEM (3-1-0)

MODULE-I 16 Hours

Introduction To Operating System:What Is An Operating System? Simple Batch Systems, Multiprogramming and Time Sharing Systems .Personal Computer Systems, Parallel Systems, Distributed Systems And Real Time Systems. OperatingSystemStructures: Operating System Services, System Components, Protection System, Operating System Services, System Calls; Process Management: Process Concept, Process Scheduling, Operation On Processes, Inter-process Communication, Examples Of IPC Systems, Multithreading Models, Threading Issues, Process Scheduling Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling.

MODULE-II 16 Hours

Process Coordination: Synchronization: The Critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classical problems of synchronization, Monitors.

Deadlocks: System model, Deadlock Characterization Methods for Handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, recovery from Deadlock. Memory Management: Memory Management strategies, Logical versus Physical Address space, swapping, contiguous Allocation, Paging, Segmentation. Virtual Memory: Background, Demand paging, performance of Demand paging, Page Replacement, Page Replacement Algorithms. Allocation of frames, Thrashing, Demand Segmentation.

MODULE-III 18 Hours

Storage Management: File System Concept, Access Methods, File System Structure, File System Structure, File System Implementation, Directory implementation, Efficiency and Performance, Recovery, Overview of Mass Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, I/O System Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Request to Hardware Operation. Case Studies: The LINUX System, Windows XP,Unix system.

TEXT BOOK:
1. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 8thedition, Wiley-India, 2009.
2. Mordern Operating Systems – Andrew S. Tanenbaum, 3rdEdition, PHI
3. Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition

REFERENCE BOOK:
1. Operating Systems – Flynn, McHoes, Cengage Learning
2. Operating Systems – Pabitra Pal Choudhury, PHI
3. Operating Systems – William Stallings, Prentice Hall
4. Operating Systems – H.M. Deitel, P. J. Deitel, D. R. Choffnes, 3rdEdition,

FECS 4104 IWT WITH DOT NET (3-1-0)

Module –I (Lecture Hour 18)

The Internet and WWW: Internet and WWW, Web Servers, Web Browsers, Related Protocols; Overview of the ASP.NET: Introduction of different Web Technology, What is Asp.Net, How Asp.Net Works, Use of visual studio, Different Languages used in Asp.Net; Framework: Common Language Runtime (CLR), .NET Framework Class Library; Microsoft SQL Server 2008:Overview of SQL Server 2008, Installation of SQL Server 2008, Features of SQL Server Express, SQL Server 2008 Express management tools; HTML, CSS & JavaScript: Web Page – design strategy, Website - Model and structure, Basic HTML Tags, images, links, lists, tables, frames, forms, Dynamic HTML;JAVA Script: Statements, Expressions, Operators, Popup Boxes, Control Statements,

JavaScript Objects, Exception handling; CSS: Style sheets: External, Internal and Inline, Selectors; HTML Document Object Model

Module –II (Lecture Hour 18)

Asp.Net Standard Controls: Displaying information: Label Controls, Literal Controls, Bulleted List ; Accepting User Input: Textbox Controls, RadioButton and RadioButtonList Controls, CheckBox and CheckBoxList Controls, Button Controls, LinkButton Control, ImageButton Control, Using Hyperlink Control, DropDownList, ListBox;Displaying Images: Image Control, Image Map Control, Using Panel Control, Using Hyperlink Control; Asp.Net: Page & State Management, Overview of events in page Asp.Net Validation Controls with JavaScript Validation:Required Field Validator Control, Regular Expression Validator Control, Compare Field Validator Control, Range Validator Control, Validation Summary Control, Custom Validator Control;Designing Websites with master pages: Creating master pages, Creating default contents, Nesting master pages, Registering master pages in web configuration; Using the Rich Controls:Accepting File Uploads, Saving files to file system, Calendar Control, Displaying advertisements, Displaying Different Page view, Displaying a Tabbed Page View, Wizard Control; SQL Server Basic: Database Architecture, Data Manipulation Language (DML), Data Definition Language (DDL), Manipulation of Data (SQL Command), Stored Procedure, Function, Trigger, Views, Cursor; Overview of Data Access: Creating database connections, Connecting to MSSQL Server and MS Access, DataSet&DataTable Features, Using inline SQL Statements, Using Stored Procedures, Executing select commands, SQL Transaction; C#: Data Type and syntax Language Fundamentals, Classes, Namespaces, Object Oriented Programming concepts, Overview of Asp.Net inbuilt Classes and method, File Handling; Using the Grid View Control: Grid View Control fundamentals, Displaying Data, Using Data Keys, Sorting Data, Paging through Data; Using the Details View and Form View Controls: Using the Details View control, Displaying data with the DetailsView control, Using Fields with the DetailsView control, Displaying Empty data with the DetailsView control; Using Repeater and Data List Controls: Using Repeater Control, Displaying data with the Repeater Control, Displaying Data with the Data List Control

Module –III (Lecture Hour 14)

Using Navigation Controls: Understanding Site Maps, Using the Sitemap Path Control, Formatting the Sitemap Path Control, Using the Menu Control, Using Tree View Control; Working with XML and Web Services: Overview of XML, Creating /Reading/Deleting XML Files, XML DOM, Web Services; AJAX (Asynchronous JavaScript and XML): About Ajax, Setting up and implementing Ajax; FTP Management: Understanding FTP, Setting up FTP Server (Live), Uploading and downloading FTP contents Sending Emails: Designing email panel, How to send an email to various users, Sending auto emails Deployment: Deploying application on Web Server ; Working on Live Project: Getting customer's requirements, Preparing database and business logics, Developing application, Testing and implementing the project, Troubleshooting the project application after implementation

TEXT BOOKS:
1. Internet and Web Technologies, Raj Kamal, TMH
2. Programming the World Wide Web, Robert W Sebesta, Pearson Education
3. Web Technologies, Uttam K Roy, Oxford
4. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar& others, Cengage Learning
5. Programming Microsoft® ASP.NET, Dino Esposito, Microsoft Press
6. Pro ASP.Net 4 in C# 2010 by Matthew Macdonald

FECS4105 CRYPTOGRAPHY & NETWORK SECURITY (3-1-0)

Module -1 16Hrs

Introduction to Information Security: Security Goals, Attacks, Security Services and Mechanisms.Mathematical Background: Integer and Modular Arithmetic, Matrices, Linear Congruence. Groups, Rings, and Fields, GF(p), Euclidean and Extended Euclidean Algorithms, Polynomial Arithmetic, GF(2n). Random Number Generation, Prime Numbers, Fermat's and Euler's Theorems, Primality Testing Methods, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Discrete Logarithms.

Module- 2 18Hrs

Traditional Encryption Methods: Symmetric Cipher Model, Substitution Ciphers, Transposition Ciphers, Block and Stream Ciphers, Rotor Cipher, Steganography. Symmetric Key Ciphers: Data Encryption Standard, Advanced Encryption Standard. Asymmetric Key Ciphers: RSA Cryptosystem, ElGamal Cryptosystem, Elliptic Curve Cryptosystem. Message Integrity & Authentication: Message Integrity, Random Oracle Model, Message Authentication, MAC Algorithms. Cryptographic Hash Functions: MD Hash Family, Whirlpool, Secure Hash Algorithm. Digital Signature and Authentication: Digital Signature Schemes, Variations and Applications, Entity Authentication.Key Management: Diffie-Hellman Key Exchange.

Module 3 16Hrs

Network and System Security: Security at the Application Layer: e-mail security, PGP and S/MIME. Security at the Transport Layer: Secure Socket Layer (SSL) and Transport Layer Security (TLS). Security at the Network Layer: IP Security. System Security: Malicious Software, Malicious Programs, Viruses, Worms, Malware, IntrusionDetection System, Firewalls.

Text Books:
1. B. A. Forouzan& D Mukhopadhyay ,Cryptography and Network Security., McGraw Hill, 2nd ed.2010

References:
1. B. Menezes ,Network Security and Cryptography., Cengage Learning, 1st ed.2010
2. Stallings ,Cryptography and Network Security., PHI, 4th ed.2010

FECS 4201 ANDROID, GIS (3-1-0)

Module-1

Introducing GIS and spatial data: Definition - maps and spatial information -computer assisted mapping and map analysis - components of GIS - people and GIS - maps and spatial data - thematic characteristics of spatial data - other sources of spatial data: census, survey data, air photos, satellite images, and field data.

Module-2

Spatial and attributes data modeling: Data quality and data standards: Concepts - Definition - Components and assessment of data quality: Spatial entities - generalization - Raster and Vector spatial data structures - comparison of Vector and Raster Methods - Acquisition of spatial data for terrain modeling - Raster and Vector approach to digital terrain modeling . Data Input and Editing: Integrated GIS database - Encoding methods of data input: keyboard, manual digitizing scanning and automatic digitizing methods, electronic data transfer - data editing: methods of developing and correcting errors in attributes and spatial data: reproduction,

Module-3

 Analyzing Operation in GIS: Terminologies - Measurements of lengths, perimeter and area in GIS. - queries - reclassification - buffering and neighborhood functions - integrated data - Raster and Vector overlay method: point-in-polygon, line-in-polygon and polygon- on-polygon - problems of Raster and Vector overlays - spatial interpolation - GIS for surface analysis - network analysis: shortest path problem, travailing problem, location allocation of resources - route tracing.

REFERENCES

1. Haywood.L, Comelius.S and S. Carver (1988) An Introduction to Geographical Information Systems, Addison Wiley Longmont, New York.
2. Burgh P.A (1986) Principles of geographical Information System for Land Resources Assessment, Clarendon Press, Oxford.
3. Burrough P A 2000 P A McDonnell [2000] Principles of Geographical Information systems, London: Oxford University Press.
4. Lo.C.P., Yeung. K.W. Albert (2002) Concepts And Techniques of Geographic Information Systems, Prentice-Hall of India Pvt ltd, New Delhi

FECS 4202 E-COMMERCE & ERP (3-1-0)

Module –I (18 Hour)

Basics of E-commerce; Electronic Commerce: Overview, Definitions, Advantages &Disadvantages of E-Commerce, Threats of E-Commerce, Managerial Prospective, Rules & Regulations for Controlling E-Commerce, Cyber Laws; Technologies: Relationship Between E-Commerce & Networking, Different Types of Networking for E-Commerce, internet, Intranet, EDI Systems ; Business Models of E-commerce; Model Based on Transaction Type, Model Based on Transaction Party - B2B, B2C, C2B, C2C, E-Governance; Four C's (Convergence, Collaborative Computing, Content Management & Call Centre); Convergence: Technological Advances in Convergence - Types, Convergence and its implications, Convergence &Electronic Commerce; Collaborative Computing: Collaborative product development, contract as per CAD, Simultaneous Collaboration, Security; Content Management: Definition of content, Authoring Tools and Content Management, Content - partnership, repositories, convergence, providers, Web Traffic & Traffic management: Content Marketing; Call Centre: Definition, Need, Tasks Handled, Mode of Operation
Supply Chain Management: E-logistics, Supply Chain Portal, Supply Chain planning Tools (SCP Tools), SupplyChain Execution (SCE), SCE - Framework

Module –II (16 Hour)

Payment System for E-commerce; E-Payment Mechanism; Payment through card system, E-Cheque, E-Cash, E-Payment Threats & Protections. E-Marketing: Home - shopping, E-Marketing, Tele-marketing; Electronic Data Interchange (EDI): Meaning, Benefits, Concepts, Application, EDI Model Risk of E-Commerce: Overview, Security for E-Commerce, Security Standards, Firewall, Cryptography, Key Management, Password Systems, Digital Certificates, Digital Signatures.Internet Business Strategies   Electronic marketplaces, Electronic Auctions, Mobile Commerce,Virtual Communities

Module - III (16 Hour)

Enterprise Resource Planning (ERP): Features, capabilities and Overview of Commercial Software, re-engineering work processes for IT applications, Business Process Redesign, Knowledge Engineering and Data Warehouse. Business Modules; Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials, Management, Quality Management Sales & Distribution ERP Package. ERP Market; ERP Market Place, SAP AG, PeopleSoft, BAAN, JD Edwards, Oracle Corporation.ERP-Present and Future: Enterprise Application Integration (EAI), ERP and E-Commerce, ERP and Internet, Future Directions in ERP

Textbooks

1. Ecommerce, Gary P. Schneider, Cengage Learning
2. Electronic Commerce: Framework Technologies & Applications, Bharat Bhasker, TMH

Reference Books

1. E-commerce: Concepts, models & strategies, C.V.S Murthy, Himalaya Publishing
2. Electronic Commerce: A Manager"s Guide, Kalakota&Whinston, Pearson
3. Kalakotia, Whinston : Frontiers of Electronic Commerce, Pearson Education.
4. Loshinpete, Murphy P.A. : Electronic Commerce, Jaico Publishing Housing
5. E-commerce, Jibitesh Mishra, Macmillan
6. E-commerce : Strategy Technologies & Applications, Tata McGraw Hill.

FECS 4203 SOFTWARE ENGINEERING (3-1-0)

Module –I (Lecture Hour 16)
Process Models: Software Processes, Software Development Life Cycle Models, Waterfall Model, „V" Model, Prototyping Model, The Iterative Waterfall Model, The Spiral Model Software Requirement Engineering: Requirement Engineering Process, Requirement Inception, Identification of Stakeholders, Requirement, Requirement Elaboration: User Requirements, Initial Technical Requirements, Final Functional Requirements, Negotiation, Requirement Structured Analysis & Design: Introduction to Structured Analysis, Data Flow Diagram, Process Specification,
Entity Relationship Model, Structured Design Methodologies: Coupling and Cohesion, Structure Chart, Mapping DFD into Structure Chart

Module –II (Lecture Hour 18)
Object Oriented Concepts & Principles: Key OO Concepts: Object, Class, Message, Inheritance, Abstraction, Encapsulation, Polymorphism, Relationships: Is-A Relationship, Has-A Relationship, Uses-A Relationship Modelling Techniques: Booch OO Design Model, Rumbaugh"s Object Modelling Technique, Jacobson"s model, The Unified Approach to Modelling, Unified Modelling Language Object Oriented Analysis & Design: Use-Case Modelling, Use-Case Realization,Types of Classes: Class Classification Approaches: Noun Phrase Approach, CRC Card Approach, Use-case Driven Approach Identification of Classes, Relationship, Attributes and Method System Context and Architectural Design, Defining System Boundary, Identification of Subsystems, Principles of Class Design, Types of Design Classes UML diagrams: Class diagram, Object diagram, Activity diagram, State diagram, Interaction diagrams, Sequence diagram, Collaboration Diagram, Component Diagram, Deployment Diagram, Patterns

Module –III (Lecture Hour 16)
Software Testing: Testing Fundamentals, Verification & Validation, Black Box Testing, White Box Testing, Unit Testing, Integration Testing, Object Oriented Testing, System Testing, Usability Testing Software Metrics- Software Metrics and its Classification, Software Size Metrics: LOC Metrics, Function Point Metrics, Feature Point Metrics, Bang Metrics, Halstead"s Metrics; Quality Metrics, Process Metrics, Design Metrics: High Level Design Metrics, Component Level Design Metrics Object Oriented Metrics: CK Metrics Suite, Metrics for Object Oriented Design (MOOD) Project Estimation Techniques, COCOMO Model: Basic COCOMO Model, Intermediate COCOMO model, Complete COCOMO model, COCOMO II ; Web Engineering: General Web Characteristics, Emergence of Web Engineering, Web Engineering Process, Web Design Principles.

Text Books
1. Software Engineering, Roger S Pressman, TMH
2. Fundamentals of Software Engineering, Rajib Mall, PHI

Reference Books
1. Software Engineering, Sommerville, Pearson
2. Software Engineering Fundamentals, Behforooz& Hudson, Oxford

FECS 4204 CLOUD COMPUTING (3-1-0)

Module 1
Introduction to cloud computing, Brief on different computing Paradigms, Evolution of cloud computing, features and benefits of cloud paradigm, Roots of cloud computing, The 3-4-5 Rule. 3 services/ delivery models: IaaS, PaaS, SaaS, Cloud deployment models: private, public, community and hybrid models, 5 characteristics of cloud, cloud architecture, issues and challenges in cloud computing, Enterprise cloud computing paradigm; SaaS-Introduction, Pros-Cons, Traditional packaged software vs SAAS, Examples of SaaS. Case Study-Facebook, Google Docs; IaaS-Introduction, Reference Model, Examples, Case study-Amazon Web Services(AWS): Amazon EC2, Auto scaling, Elastic Load Balancing, Availability Zones, Region, Edge Location, EBS,S3, Amazon cloudFront, RDS, DynamoDB, VPC, Route 53

Module 2
Virtualization, types of virtualization, uses of virtualization, Types of Hypervisors(VMM), Full Virtualization vs Para Virtualization, virtual machines provisioning and management, VM migration, VM migration techniques, VM life cycle, VM monitoring, Amazon EC2, Eucalyptus, OpenNebula, distributed management of VMs; PaaS- Introduction, Examples, Case Study- Google App Engine

Module 3
Resource provisioning, resource contention, resource fragmentation, over- and under- provisioning of resources, resource allocation techniques, Use of Map-Reduce in cloud computing, SLA management in cloud computing with sample SLA examples, Cloud security issues, Multi-tenancy, applications of cloud computing in education, business and healthcare domains, data security in cloud.

Text book:
1. Cloud computing: Principles and paradigm, by RajkumarBuyya, James Broberg, AndrzejGoscinski, Wiley India Pvt. Ltd.
2. Moving to the Cloud: DinkarSitaram, GeethaManjunath, Syngress

Reference books:
2. Cloud Computing for Dummies, Judith Hurwitz, Robin Bloor, Marcia Kaufman and Fern Halper, Wiley Publication

FECS 4205 INTERNET TECHNOLOGY & APPLICATIONS (3-1-0)

Module-1(16 Hrs)
Evolution of Internet, TCP/IP: addressing and Routing. Internet applications: FTP, Telnet, World Wide Web: HTTP protocol. ;Designing web pages: HTML, forms, Tables, Frames, CGI scripts, JAVA script, DHTML, Introduction to XML.

Module-2(12Hrs)
E-Commerce and security issues including symmetric and asymmetric key, encryption and digital signature, Data Integrity, authentication, Network Address Translator, SSL, Emerging trends, Internet telephony, Intranet and extranet, HTTPS protocol, Role of DNS, Role of W3C

Module-3(12HRs)

Electronic Mail: POP3, SMTP. IMAP & Webmail. Cookies: Definition of cookies, Create and Store a cookie with example, Threats: Malicious code-viruses, Trojan horses, Worms; eavesdropping, spoofing, modification, denial of service attacks. Firewall, Types of Firewall, designing issues. Introduction to Search Engine and Web Crawler.

Text Book:
1. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar& others, Cengage Learning.
2. Data Communications and Networking: Behrouz A. Forouzan, Tata McGraw-Hill, 4th Ed
3. Forouzan& D Mukhopadhyay ,Cryptography and Network Security., McGraw Hill, 2nded.2010.