With effect from Academic Year 2015-16

SCHEME OF INSTRUCTION & EXAMINATION
B.E. III YEAR
INFORMATION TECHNOLOGY

Semester - I

S.No	Syllabus Ref.No	SUBJECT	Scheme of Instruction		Scheme of Examination			Credits
			Periods per Week		Duration in Hrs.	Maximum Marks		
			L/T	D/P		Semester-End Examination	Sessional	
		THEORY						
1.	IT 311	Principles of Operating Systems	4	-	3	75	25	3
2.	IT 312	Database Systems	4	-	3	75	25	3
3.	IT 313	Compiler Design	4	-	3	75	25	3
4.	IT 314	Information Security	4	-	3	75	25	3
5.	IT 315	Object Oriented System Development using UML	4	-	3	75	25	3
6.	CE 444	Human Values and Professional Ethics	2*	-	2	50	-	-
		PRACTICAL						
7.	IT 316	Operating Systems Lab	-	3	3	50	25	2
8.	IT 317	Database Lab	-	3	3	50	25	2
9.	IT 318	Mini Project - III		3	3	-	25	1
10.	EG 221	Soft Skills and Employability Enhancement		2	3	50	25	1
		TOTAL	**22**	**11**	**-**	**575**	**225**	**21**

*21 periods per Semester

With effect from the Academic Year 2015-16

IT 311

PRINCPLES OF OPERATING SYSTEMS

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To develop an understanding of the services provided by an operating system.
2. To understand what a process is and how processes are synchronized and scheduled.
3. To understand different approaches for resourcemanagement and to provide security.

Course Outcomes:

Students who complete this course should be able to

1. Use system calls for managing processes, memory and the file system.
2. Select an efficient algorithm for optimizing the performance in different aspects of operating systems.

Prerequisites:

Computer Organization and Microprocessor, Programming language, Data Structures.

UNIT–I

Introduction: Definition of Operating System, Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations, Process Management, Memory Management, Storage Management, Protection and Security.

Operating System Structures: Operating-System Services,System Calls, Types of System Calls, System Programs, Operating-System Design and Implementation, Operating-System Structure, System Boot.

Process: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication,

Threads: Overview, Multicore Programming, Multithreading Models, Threading Issues.

UNIT–II

Process Synchronization: Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems ofSynchronization, Monitors.

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Algorithm Evaluation.

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

UNIT–III

Main Memory: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table.

Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory, Mass-Storage Structure, Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Formatting, RAID Structure, Stable-Storage Implementation.

UNIT–IV

File-System Interface: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, Protection.

File-System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance.

I/O Systems: Overview, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations.

UNIT–V

Protection: Goals of Protection, Principles of Protection, Domain of Protection Access Matrix, Implementation of the Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems.

Security: The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication.

Text book:

1. Abraham Silberschatz, Peter Galvin, Greg Gagne, "Operating System Concepts", Ninth Edition, John wiley and sons publication,2013.

Suggested Reading:

1. A.Tanenbaum,"Modern Operation Systems", Third Edition, Pearson Education, 2008.
2. William Stallings, "Operating Systems", Fifth Edition, Pearson Education,2005.
3. Ida M.Flynn, "Understanding Operating Systems", Sixth Edition, Cengage,2011.
4. D.M.Dhamdhere,"Operating systems a concept based approach", SecondEdition, McGraw-Hill, 2007.
5. Pramod Chandra P.Bhatt,"AnIntoduction to Opearting Systems concepts and practice", Third Edition, PHI, 2014.

With effect from the Academic Year 2015-16

IT 312

DATABASE SYSTEMS

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To understand the different issues in the design and implementation of a databasesystem.
2. To understand the physical and logical database designs and various database models.
3. To study the concepts of database security,concurrency and recoverability.

Course Outcomes:

Students who complete this course should be able to

1. Design and implement a database for any specified domain according to well-known design principles that balance data retrieval performance with data consistency guarantees.
2. Formulate data retrieval queries in SQL and Relational algebra.
3. Apply normalization conceptin the design of a database.

Prerequisites:

Data Structures, Core Java.

UNIT-I

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information RetrievalSpecialty Databases, Database Users and Administrators.

Database Design and the E-R Model: Overview of the Design Process, the Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.

UNIT – II

Introduction to the RelationalModel: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages,Relational Operations.

Introduction to SQL: Overview of the SQL QueryLanguage, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database.

Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.

UNIT – III

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries, Advanced Aggregation Features.

Relational Database Design: Features of Good Relational, Designs, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition.

UNIT - IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+Tree Index Files, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL

Transactions: Transaction Concept, a Simple Transaction Model, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements

UNIT – V

Concurrency Control: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes, Snapshot Isolation, Insert Operations, Delete Operations and Predicate Reads, Weak Levels of Consistency in Practice.

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile, Storage, Early Lock Release and Logical Undo, Operations, ARIES, Remote Backup Systems.

Text book:

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, “Database System Concepts”, Sixth Edition, McGraw-Hill International Edition, 2010.

Suggested Reading:

1. Ramakrishnan, Gehrke, “Database Management Systems”, Third Edition, McGraw-Hill International Edition, 2003.
2. ElmasriNavathe, Somayajulu, “Fundamentals of Database System”, Fourth Edition, Pearson Education, 2006.
3. PatricO’Neil, Elizabeth O’Neil, “Database-principles, programming and performance”,Morgan Kaufmann Publishers, 2001.

With effect from the academic year 2015-16

IT 313

COMPILER DESIGN

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To understand various phases in Compiler Design.
2. To design Parsers and generate code for target machine.
3. Understand the role of a symbol table and error recovery strategies.

Course Outcomes:

Students who complete the course should be able to

1. Understand the translation process of a compiler
2. Design top-down and bottom-up parsers.
3. Capable to design a compiler.

Prerequisites:

Structured Programming, Data Structures and Theory of Automata.

UNIT-I

Introduction: Programs related to compilers, Translation process, Major data structures, Other issues in compiler structure, Boot strapping and porting.

Lexical analysis: The role of Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, The Lexical-Analyzer Generator Lex.

UNIT-II

Syntax Analysis: Introduction, Top-Down parsing, Bottom-Up parsing, Introduction to LR Parsing, More powerful LR parsers, Using Ambiguous Grammars, Parser Generators YACC.

UNIT-III

Syntax Directed Translation: Syntax Directed Definitions, Evaluation Orders for SDDs, Applications of Syntax Directed Translation.

Intermediate code generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow.

Symbol Table Organization: Structure of Symbol table, Symbol Table organization for Block Structured and non-Block Structured languages, Data Structures of symbol Table.

UNIT-IV

Runtime Environments: Storage Organization, Stack Allocation of Space, Access to Non local Data on the Stack, Heap Management, Introduction to Garbage Collection.

Code Generation : Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Peephole Optimization, Register Allocation and Assignment.

UNIT-V

Machine Independent Optimizations: The Principal Sources of Optimizations, Introduction to data flow analysis, Foundation of data flow analysis.

Linkers and Loaders: Basic Loader functions, Design of an Absolute Loader, A simple bootstrap loader, Machine dependent and independent features.

Text Book:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman ,"Compilers: Principles, Techniques &Tools", Pearson Education, Second Edition, 2007.

Suggested Reading:

1. Leland L Bech, "System Software: An Introduction to Systems Programming", Pearson Education , Asia.
2. Kenneth C Louden, "Compiler Construction: Principles and Practice", Cengage Learning.

With effect from the academic year 2015-16

IT 314

INFORMATION SECURITY

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To introduce students with basic concepts in information system and its relevance in modern society.
2. To understand several security requirements and operations - analysis, design, and implementation of the Security System Development Life Cycle (SecSDLC)
3. To understand and implement authentication, integrity and confidentiality along with related protocols.

Course Outcomes:

Students who complete the course should be

1. Aware of information security issues and understand its technologies.
2. Able to discover, analyse and deal with threads using advanced security issues and technologies.

Prerequisites:

Computer networks, Software Engineering.

UNIT- I

Introduction: History, critical characteristics of information, NSTISSC security model, Components of an information system, securing the components, balancing security and access, The SDLC, The security SDLC.

Need for Security: Business needs, Threats, Attacks-secure software development.

UNIT-II

Legal, Ethical and Professional Issues: Law and ethics in information security, relevant U.S laws-international laws and legal bodies, Ethics and information security.

Risk Management: Overview, Risk Identification, risk assessment, Risk Control strategies, selecting a risk control strategy, Quantitative versus qualitative risk control practices, Risk management discussion points, recommended risk control practices.

UNIT-III

Planning for Security: Security policy, Standards and practices, Security blue print, Security education, Continuity strategies.

Security Technology-Firewalls and VPNs: Physical design, firewalls,protecting remote connections.

UNIT-IV

Security Technology-Intrusion detection: Access control and other security tools - Intrusion detection and prevention systems, Scanning and analysis tools, Biometric Access Controls.

Cryptography: Foundations of cryptology, cipher methods, cryptographic Algorithms, Cryptographic tools, Protocols for secure communications, Attacks on cryptosystems.

UNIT-V

Implementing Information Security: Information security project management, Technical topics of implementation, Non-technical aspects of implementation, Security certification and accreditation.

Security and Personnel: Positioning and staffing security function, Credentials of InformationSecurity Professionals, Internal control strategies.

Information security Maintenance: Security management models, TheSecurity maintenancemodel, Digital forensics.

Text book:

1. Michael E. Whitman and Hebert J Mattord, "Principles of Information Security", Fourth Edition, Cengage Learning 2011.

Suggesting Reading:

1. Thomas R Peltier, JustingPeltier, John Blackley, "Information Security Fundamentals", Auerbacj Publications 2010.
2. Detmar W Straub, Seymor Goodman, Richard L Baskerville, "Information Security Policy proceses and practices", PHI, 2008.
3. Marks Merkow and Jim Breithaupt, "Information Security Principle and Practices", Pearson Education, 2007.

With effect from the academic year 2015-16

IT 315

OBJECT ORIENTED SYSTEM DEVELOPMENT USING UML

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. Toacquaint the student with the precise vocabulary and powerful notation used in Unified modeling language.
2. To learnmethodology for analysis and design by using object oriented concepts.
3. To strengthen software development by lucrative UML diagrams.

Course Outcomes:

Students who complete this course should be able to

1. Understand the importance of systems analysis and design in solving complex problems.
2. Construct effective UML models for software development.

Prerequisites:

Basic Programming, OOPS Concepts, Software Engineering.

UNIT-I

UML Introduction: Why we Model, Introducing the UML, Elements of UML.Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams, ClassDiagrams.

Advanced Structural Modeling: Advanced Classes, Advanced Relationships, Interfaces, Typesand Roles, Packages, Instances, Object Diagrams, Components, Case studies on class diagrams.

UNIT-II

Basic BehavioralModeling: Interactions, Use Cases, Use Case Diagrams, Interaction diagrams,Activity diagrams, Case studies on Use Case diagrams, Interaction diagrams.

Advanced BehavioralModeling: Events and Signals, State Machines, Processes and Threads, Time and space, State Chart Diagrams, Case studies on State chart diagrams.

UNIT-III

Architectural Modeling: Artifacts, Deployment Collaborations, Patterns and Frame-works,Artifact Diagrams, Deployment Diagrams, Systems and Models, Case studies on Deployment diagrams.

UNIT-IV

Unified Software Development Process: The Unified Process, The Four Ps, A Use-Case DrivenProcess, An Architecture-Centric Processes, An Iterative and Incremental Process.

UNIT-V

Core Workflows: Requirements Capture, Capturing Requirements as Use Cases, Analysis,Design, Implementation, Test.

Text book:

1. Ivor Jacobson, Grady Booch, James Rumbaugh, "The Unified Software DevelopmentProcess", Pearson Education, India, 2008.

Suggested Reading:

1. Grady Booch, James Rumbaugh, Ivor Jacobson, "The Unified Modeling Language-UserGuide(Covering UML 2.0)", Second Edition, Pearson Education, India, 2007.
2. Martin Fowler, "UML Distilled", Addison Wesley, Third Edition, 2003.

With effect from the academic year 2015-16

CE 444 HUMAN VALUES AND PROFESSIONAL ETHICS

Instructions	: 21 Periods per semester (7*3)
Duration of University Examination	: 2 Hours
University Examination	: 50 Marks
Sessional	: Nil
Credits	: Nil

Course Objectives:

1. To develop the critical ability among students to distinguish between what is of value and what is superficial in life
2. To enable the students understand the values, the need for value adoption and prepare them meet the challenges
3. To enable the students develop the potential to adopt values, develop a good character and personality and lead a happy life
4. To motivate the students practice the values in life and contribute for the society around them and for the development of the institutions /organisation around they are in.
5. To make the students understand the professional ethics and their applications to engineering profession

Course Outcomes

1. Students develop the capability of shaping themselves into outstanding personalities, through a value based life.
2. Students turn themselves into champions of their lives.
3. Students take things positively, convert everything into happiness and contribute for the happiness of others.
4. Students become potential sources for contributing to the development of the society around them and institutions / organisations they work in.
5. Students shape themselves into valuable professionals, follow professional ethics and are able to solve their ethical dilemmas.

UNIT-1 Concepts and Classification of Values –Need and challenges for value Adoption

Definition of Values – Concept of Values – Classification of Values – Hierarchy of Values – Types of Values –Espoused and Applied Values – Value judgement based on Culture – Value judgement based on Tradition – Interdependence of Values

Need for value education – Findings of Commissions and Committees - Corruption and illegal practices – Science and Technology without values- Exploitation of nature – Increasing use of violence and intoxicants – Lack of education in values – Implications of education in values – Vision for a better India

Challenges for Value adoption – Cultural, Social, Religious, Intellectual and Personal challenges

UNIT – 2: Personal Development and Values in Life

Personal Development: Enlightened self-interest – Accountability and responsibility – Desires and weaknesses – Character development – Good relationships, self-restraint, Spirituality and Purity – The quest for Character – Tests of Character – The key to good character

Values in Life: Building an ethical policy – Integrating values in everyday life – Archaic Social Values – Parenting practices – Critical Thinking - Analyzing and Prioritizing values – Practicing Yoga and Meditation

UNIT – 3: Practicing Values for the development of Society

Resentment Management and Self-analysis – Positive Thinking and Emotional Maturity – The importance of Women , Children and Taking care of them – Helping the poor and needy – Fighting against addictions and atrocities – Environmental awareness – Working for the Sustainable development of the society

Values in Education system: Present Scenario- Engineering education –Current trends- Need for quality improvement- Adoption of value education – Principles of Integrity- Institutional Development.

UNIT – 4: Basic Concepts of Professional Ethics

Ethics, Morals and Human life , Types of Ethics, Personal Ethics, Professional ethics, Ethical dilemmas, Indian and Global thoughts on ethics, Profession, Professional and Professionalism, Ethical role of a professional Basic ethical principles, Some basic ethical theories, use of ethical theories.

Science, Religion Ethics, Genders and ethics, Media and ethics, Computer Ethics, Case Studies on Professional Ethics, Exemplary life sketches of prominent Indian personalities

UNIT-5: Ethics in engineering profession

Engineering profession-Technology and Society-Engineering as Social Experimentation-Engineering ethics-Ethical obligations of Engineering Professionals-Role of Engineers-Engineers as Managers-Professional responsibilities of Engineers- Engineers Responsibility for Safety- A few Case Studies on Risk management

Conflicts of Interest- Occupational Crimes- Plagiarism-Self plagiarism-Ethics Audit-Consideration for ethics audit-Ethics Standards and Bench Marking

Text Books:

1. Subramanian R., " Professional Ethics " , Oxford University Press , 2013
2. Nagarajan R.S., " A Text Book on Human Values and Professional Ethics " New Age Publications , 2007

3. Dinesh Babu S., " Professional Ethics and Human Values", Laxmi Publications, 2007

Reference Books:

4. SantoshAjmera and Nanda Kishore Reddy " Ethics, Integrity and Aptitude",McGrawhill Education Private Limited , 2014
5. GovindaRajan M., Natarajan S., Senthil Kumar V.S." Professional Ethics and Human Values " Prentice Hall India Private Limited ,2012
6. Course Material for Post Graduate Diploma In "Value Education & Spirituality" Prepared by Annamalai University in Collaboration with Brahma Kumaris , 2010

With effect from the Academic Year 2015-16

IT 316

OPERATING SYSTEMS LAB

Instruction per week	3 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objectives:
1. To familiarize with various system calls of LINUX.
2. To implement processes synchronization and scheduling algorithms.
3. To develop a simulator of process set.

Course Outcomes:
Students who complete the course should be able to
1. Use system calls for managing inter-process communication.
2. Capable of simulating different processes sets.

Prerequisites:
Knowledge of C Programming, Basic commands of UNIX, Data Structures.

List of Programs

1. a. Create 2-processes using fork() system call of LINUX.
   b. Create processes hierarchy using fork() system call of LINUX.
2. a. Demonstrate execvp() system call for executing another inbuilt function.
   b. Demonstrate execvp() system call for executing user defined function.
3. Use system calls to get the attributes of a file/Directory.
4. Use system calls to get and set the environment variables.
5. a. Implement Echo server using pipes.
   b. Implement full duplex communication using pipes.
6. a. Implement Echo server using shared memory.
   b. Implement Client-Server model using shared memory.
7. a. Implement Echo server using Message queues.
   b. Implementprivate communication between a server and multiple clients via a single message queue.
8. a. Simulate FCFS CPU Scheduling Algorithm.
   b. Simulate SJF CPU Scheduling Algorithm.
9. Implement Banker's algorithm for Deadlock Avoidance.
10. Implement Producer-Consumer Problem using Message passing.
11. Implement Dining philosophers problem using semaphores.
12. Implement Producer-Consumer Problem using semaphores.
13. Implement Reader-writers problem using Semaphores.

Suggested Reading:
1. W. Richard Stevens, "Unix Network Programming", Volume 1, Addison-Wesley Professional, 2004.

With effect from the academic year 2015-16

IT 317

DATABASE LAB

Instructionper week	3 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	50 Marks
Sessional	25 Marks
Credits	2

Course objectives:

1. To present the concepts and techniques relating to query processing.
2. To design and develop database for an application.
3. To understand various methods of securing the database.

Course outcomes:

Students who complete this course should be able to

1. Design and implement a database schema by enforcing integrity constraints for a given problem-domain.
2. Populate and query a database using SQL DML/DDL commands.
3. Do PL/SQL programming.

Prerequisites:

Familiarity with variables and data types is required.

List of Programs

1. Creation of database (exercising the commands for creation).
2. Exercising Simple to complex queries.
3. Demonstration of PL/SQL Blocks, Procedures and Functions.
4. Usage of Triggers and Cursors.
5. Demonstrate Exception Handling by PL/SQL procedures for data validation.
6. Creation of Forms for student Information, library information etc.
7. Generation using SQL reports.
8. Creating Password and Security features for applications.
9. Usage of File locking table locking, facilities in applications.
10. Creation of small full pledged database application spreading over to 3 sessions.

Note:-The creation of sample database for the purpose of the experiments is to be pre-decided by the instructor.

Suggested Reading:

1. Rick F Vander Lans, "Introduction to SQL", Fourth edition, Pearson Education,2007.
2. Benjamin Rosenzweig, Elena Silvestrova, "Oracle PL/SQL by Example", Third Edition, Pearson Education, 2004.
3. Albert Lulushi, "Oracle Forms Developer's Handbook", Pearson Education, 2006.

With effect from the academic year 2015-16

IT 318

MINI PROJECT – III

Instruction per week	3 Periods
Sessional	25
MarksCredits	1

The Students are required to carry out Mini Project in any of the areas such as DatabaseSystems, Operating Systems,Compiler Design and Object Oriented System Development.

Students are required to submit a report on the Mini Project at the end of the Semester.

With effect from the academic year 2015-16

EG 221

SOFT SKILLS AND EMPLOYABILITY ENHANCEMENT

Instructionper week	2 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	50 Marks
Sessional	25 Marks
Credits	1

Course Objectives: To help the students

1. Participate in group discussions with confidence and to make effective presentations. Also to learn the art of communication.
2. With- resume packaging, preparing and facing interviews.
3. Build an impressive personality through effective time management & goal setting, self-confidence and assertiveness.
4. Understand what constitutes proper grooming and etiquette in a professional environment. Also to understand academic ethics and value systems.

Course Outcomes: The students will be able to

1. Be effective communicators and participate in group discussions with confidence. Also be able to make presentations in a professional context.
2. Write resumes, prepare and face interviews confidently.
3. Be assertive and set short term and long term goals. Also learn to mange time effectively and deal with stress.
4. Make the transition smoothly from campus to corporate. Also use media with etiquette and know what academic ethics are.

List of Experiments

Exercise 1

Communicative Competence – The Art of Communication, basic grammar, Indianisms, Effective listening skills, using English in different situations

Exercise 2

Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence

Elements of effective presentation – Structure of presentation – Presentation tools – Body language

Creating an effective PPT

Exercise 3

Interview Skills – Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets

Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews

Exercise 4

Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Exercise 5

Corporate Culture – Grooming and etiquette, communication media etiquette
Academic ethics and integrity

Suggested Reading:

1. Madhavi Apte , "A Course in English communication", Prentice-Hall of India, 2007
2. Leena Sen , "Communication Skills", Prentice-Hall of India, 2005
3. Dr. Shalini Verma, "Body Language- Your Success Mantra", S Chand, 2006
4. Edgar Thorpe and Showick Thorpe , "Objective English", 2nd edition, Pearson Education, 2007
5. Ramesh, Gopalswamy, and Mahadevan Ramesh, "The ACE of Soft Skills", New Delhi: Pearson, 2010
6. Gulati and Sarvesh, " Corporate Soft Skills", New Delhi: Rupa and Co. , 2006
7. Van Emden, Joan, and Lucinda Becker, "Presentation Skills for Students", New York: Palgrave Macmillan, 2004
8. Covey and Stephen R, "The Habits of Highly Effective People", New York: Free Press, 1989

With effect from Academic Year 2015-16

SCHEME OF INSTRUCTION & EXAMINATION
B.E. III YEAR
INFORMATION TECHNOLOGY

Semester - II

S.No	Syllabus Ref.No	SUBJECT	Scheme of Instruction		Scheme of Examination			Credits
			Periods per Week		Duration in Hrs.	Maximum Marks		
			L/T	D/P		Semester-End Examination	Sessional	
		THEORY						
1	IT 321	Computer Networks and Socket Programming	4	-	3	75	25	3
2	IT 322	Data Warehousing and Data Mining	4	-	3	75	25	3
3	IT 323	Web Programming	4	-	3	75	25	3
4	IT 324	Computational Intelligence	4	-	3	75	25	3
5	IT 325	Digital Image Processing and Analysis	4	-	3	75	25	3
6		Elective-I	4	-	3	75	25	3
		PRACTICAL						
7	IT 326	Network Programming Lab	-	3	3	50	25	2
8	IT 327	Data Mining Lab	-	3	3	50	25	2
9	IT 328	Mini Project – IV	-	3	3	-	25	1
10	-	Industrial Visit	-	-	-	-	-	-
		TOTAL	**24**	**9**	**-**	**550**	**225**	**23**

Elective-I

IT 351 Computer Graphics
IT 352 Software Testing
IT 353 Software Project Management
IT 354 Natural Language Processing
IT 355 Advanced Computer Architecture

IT 356 Human Computer Interaction

With effect from the academic year 2015-16

IT 321

COMPUTER NETWORKS AND SOCKET PROGRAMMING

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To understand the fundamental concepts of computer networks and Socket programming.
2. To know the role of various layers and protocols for computer networks.
3. To introduce internet services and security policies.

Course Outcomes:

Students who complete this course should be able to

1. Identify the different types of network topologies and protocols, networking devices and their functions within the network.
2. Enumerate the layers of the OSI model and TCP/IP and describe the function(s) of each layer.
3. Develop solutions for networking and security problems, balancing business concerns, technical issues and security.

Prerequisites:

Structured Programming, Data Communications.

UNI T-I

Introduction: Uses of Computer Networks, Network Hardware, Network Software: Reference Models (ISO -OSI, TCP/IP).

Network Programming: Socket Interface: Sockets, Socket Address, Elementary Sockets, Advanced Sockets, Socket Options, Out of Band Data, Daemon process and Internet Super Server.

Remote Procedure Calls: Introduction, Transparency Issues and Sun RPC.

UNI T-II

Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service.

Internetworking: Concatenated virtual circuits, Connectionless Internetworking, Tunneling,Internetworkrouting, Fragmentation.

UNIT-III

Network layer in the Internet: Internet Protocol, IPv4, IPv6, Interoperability of IPv4 and IPv6, IP addresses, Internet Control protocols, OSPF, BGP, Internet Multicasting, Mobile IP.

Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet **Transport Protocols:** UDP, Internet Transport Protocols - TCP.

UNIT-IV

Application Layer: Domain Name System:DNS Name Space, Resource Records, Name Servers.

Electronic Mail: Architecture and Services, UserAgent, Message Formats, Message transfer and Final Delivery.

World Wide Web: Architectural Overview, Static Web Documents, Dynamic Web Documents, HTTP, Wireless Web.

Multimedia: Digital Audio, Streaming Audio, Voice over IP, Video on Demand.

UNIT-V

Network Security: Cryptography, Symmetric Key Algorithms, Public Key Algorithms, Digital Signatures, Management of Public Keys, Communication Security, Authentication Protocols, E-mail Security, Web Security.

Text Book:

1. Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, Pearson Education.
2. W. Richard Stevens, "Unix Network Programming" Prentice Hall/Pearson Education,2009.

Suggested Reading:

1. James F. Kurose, Keith W, Ross, "Computer Networking, ATop-Down Approach Featuring the Internet", Third Edition, Pearson Education, 2005.
2. William Stallings, "Computer Networking with Internet Protocols and Technology", Pearson Education, 2004.

With effect from the academic year 2015-16

IT 322

DATA WAREHOUSING AND DATA MINING

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 MarksCredits
	3

Course Objectives:

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. Examine the types of the data to be mined and apply preprocessing methods on raw data.
3. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

Course Outcomes:

Students who complete this course should be able to

1. Process raw data to make it suitable for various data mining algorithms.
2. Discover and measure interesting patterns from different kinds of databases.
3. Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data.

Prerequisites:

Basic Programming, Mathematics-Statistics, Database Concepts

UNIT-I

Introduction: Introduction to Data Mining, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

Getting to know your data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Measuring Data Similarity and Dissimilarity.

Data Preprocessing: An Overview, DataCleaning, DataIntegration, DataReduction, Data Transformation and Data Discretization.

UNIT-II

DataWarehousing and Online Analytical Processing

DataWarehouse: Basic Concepts, DataWarehouseModeling: Data Cube and OLAP, DataWarehouse Design and Usage: A Business Analysis Framework for Data Warehouse Design, Data Warehouse Design Process, Data Warehouse Usage for Information Processing, DataWarehouse Implementation.

Mining Frequent Patterns,Associations and correlations: Basic Concepts, Frequent Item Set Mining Methods, Interesting patterns, Pattern Evaluation Methods, Pattern Mining in Multilevel and multidimensional space.

UNIT-III

Classification: Basic Concepts**,** Decision Tree Induction,Bayes Classification Methods,Rule-Based Classification,Model Evaluation and Selection,Techniques to Improve Classification Accuracy: Introducing Ensemble Methods, Bagging, Boosting and AdaBoost.

Classification: Advanced Methods

Bayesian Belief Networks, Classification by Back propagation, Support Vector Machines, Lazy Learners (or Learning from Your Neighbors), Other Classification Methods.

UNIT-IV

Cluster Analysis: Basic Concepts and Methods, Overview of Basic Clustering Methods,Partitioning Methods, Hierarchical Methods: Agglomerative versus Divisive Hierarchical Clustering, Distance Measures in Algorithmic Methods, BIRCH: Multiphase Hierarchical Clustering Using Clustering Feature Trees.

Density-Based Methods: DBSCAN: Density-Based Clustering Based on Connected Regions with High Density, OPTICS: Ordering Points to Identify the Clustering Structure, Grid-Based Methods.

Evaluation of Clustering: Assessing Clustering Tendency, Determining the Number of Clusters, Measuring Clustering Quality.

UNIT-V

Outlier Detection: Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches, Proximity-Based Approaches

Data Mining Trends and Research Frontiers:

Mining Complex Data Types: Mining Sequence Data: Time-Series, Symbolic Sequences and Biological Sequences, Mining Other Kinds of Data, Data Mining Applications, Data Mining and Society, Data Mining Trends.

Text Book:

1. Han J &Kamber M, “Data Mining: Concepts and Techniques”, Third Edition, Elsevier, 2011.

Suggested Reading:

1. Pang-Ning Tan, Michael Steinback, Vipin Kumar, “Introduction to Data Mining”, Pearson Education, 2008.
2. M.Humphires, M.Hawkins, M.Dy,“Data Warehousing: Architecture andImplementation”, Pearson Education, 2009.
3. Anahory, Murray, “Data Warehousing in the Real World”, Pearson Education, 2008.
4. Kargupta, Joshi,etc., “Data Mining: Next Generation Challenges and Future Directions”, Prentice Hall of India Pvt Ltd, 2007.

With effect from the academic year 2015-16

IT 323

WEB PROGRAMMING

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To design and develop web pages using html5, CSS positioning, servlets and JDBC.
2. Understanding and writing a well-formed XML schemas and documents.
3. Using JSP as view component in MVC based web applications.
4. Understanding .NET architecture and writing applications with ADO.NET

Course Outcomes:

Students who complete this course should be able to

1. Design and develop various web based applications using JavaScript and servlets
2. Use JDBC in JSP pages, Create web forms with JQuery.
3. Design web site using HTML, CSS and ASP.NET with Ajax based requests.

UNIT-I

Introduction: Web Fundamentals, **HTML 5.0:** basic tags, Form elements and attributes.
Introduction to Cascading Style Sheets: CSS selectors, CSS BOX Model, CSS Positioning, and CSS floating.
JQuery: Introduction to JavaScript, Selecting elements in the documents, Event handling, working with styles, The Event object, Using and creating plugins, JSON Fundamentals.
Web-Based and REST Style Services:

UNIT-II

Introduction to XML: The Syntax of XML, XML Document Structure, Document Type Definitions, Name Space, XML Schemas, Displaying raw XML Documents, Displaying XML Documents with CSS, XSLT Style Sheets and XML Processors.

UNIT-III

Java Servlets: Servlet Life Cycle,Basic Servlet Structure, request methods, passing initialization parameters from web.xml, Handling the client request form data, Generating HTTP Response, Request dispatching and State Management techniques.
Java Server Pages: Expressions, Scripting elements, Page Directives, Actions, JSP Objects, Handling Exceptions, MVC Flow of Control, Accessing MsAccess, MySQL and Oracle databases using servlets and JSP.

UNIT-IV

Web Services: Definition, Web services Architecture, Simple Object Access Protocol

(SOAP) - goals, structure and contents of a SOAP Message, processing a SOAP message, Web Services Description language (WSDL) - Structure of WSDL interface, Implications of WSDL Model, Universal description discovery and integration (UDDI) - Goals, Information in a UDDI registry, UDDI data structures, UDDI Registry API.

UNIT-V

ASP.NET: Web Form fundamentals, Web Controls, State management, Building better web form - Validation, rich controls, user controls and graphics, Data Management with ADO.NET, ASP.NET with Ajax.

Text Book:

1. Robert W.Sebesta, "Programming with World Wide Web", Eighth Edition, Pearson Education, 2008.
2. John Pollak, "JQuery - A Beginners Guide", McGraw-Hill Education, 2014.
3. Phil Hanna, "The Complete Reference JSP", First Edition, Tata McGraw-Hill, 2003.
4. Gustavo Alonso ,"Web Services: Concepts, Architectures and Applications" Springer Science & Business Media, 2004
5. Matthew MacDonald, "Beginning ASP.NET 4.5 in C#", Illustrated, Apress, 2012.

Suggested Reading:

1. James Webber, SavasParastatidis, Ivan Robinson,"Rest in Practice:HyperMedid and System Architecture", First Edition,O'REILLY,2010.

With effect from the academic year 2015-16

IT 324

COMPUTATIONAL INTELLIGENCE

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To understand knowledge representation and logical reasoning techniques used in Artificial Intelligence.
2. To learn problem solving techniques, natural language processing and build expert systems.
3. To design machine learning and neural network systems.

Course Outcomes:

Students who complete this course should be able to

1. Design an Expert System to solve real world problems.
2. Develop self-learning system that can compensate for partial knowledge base.

Prerequisites:

Discrete Mathematics, Probability and Random Theory.

UNIT-I

Introduction: History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications.

Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction.

Game Playing: Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning.

UNIT-II

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT-III

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

UNIT-IV

Machine-Learning Paradigms: Introduction, Machine Learning Systems, Supervised and Unsupervised Learning, Inductive Learning, Learning Decision Trees, Deductive Learning. Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

UNIT-V

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web.

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

Text books:

1. SarojKaushik, "Artificial Intelligence", Cengage Learning, 2011.
2. Tom M. Mitchell, "Machine Learning", McGraw Hill, 1997.
3. Kulkarni, Parag, Joshi, Prachi ,"Artificial Intelligence : Building Intelligent Systems",PHI,2015

Suggested Reading:

1. Russell, Norvig, "Artificial intelligence - A Modern Approach", Pearson Education, Second Edition. 2004.
2. Rich, Knight, Nair: "Artificial intelligence", Tata McGraw Hill, Third Edition 2009.
3. Nilsson, N., "Artificial Intelligence: A New Synthesis", San Francisco, Morgan Kaufmann, 1998.
4. Peter Jackson, "Introduction to Expert Systems", Third Edition, Pearson Addison Wesley,1998

With effect from the academic year 2015-16

IT 325

DIGITAL IMAGE PROCESSING AND ANALYSIS

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To learn the fundamental concepts and applications of digital image processing.
2. To learn the image processing concepts: Intensity transformations, spatial filtering, smoothing and sharpening in both spatial and frequency domains, Image restoration and reconstruction, Color image processing, Image compression.
3. To learn the image analysis concepts: morphological image processing, image segmentation, image representation and description, and object recognition.

Course Outcomes:

Students who complete this course should be able to

1. Implement Pre and Post process for the given image using image enhancement techniques.
2. Design and Implement digital image processing related problems as part of mini projects.
3. Implement Color image processing and Image compression methods.

Prerequisites:

Knowledge of linear algebra, basic probability and statistics.

UNIT-I

Basics: Introduction, Fundamental steps, Components, Elements of visual perception, image sampling and quantization, some basic relationships between pixels.

Intensity Transformations: Some Basic Intensity Transformation Functions, Histogram Processing.

UNIT- II

Spatial Filtering: Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

Filtering in the Frequency Domain: Preliminary Concepts, Image Smoothing using Frequency Domain Filters, Image Sharpening Using Frequency Domain Filters.

UNIT- III

Image Restoration and Reconstruction: A Model of the Image degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only - Spatial Filtering, Minimum Mean Square Error (Wiener) Filtering.

Morphological Image Processing: Preliminaries, Erosion and Dilation, Opening and Closing.

UNIT- IV

Image Segmentation: Fundamentals, Point, Line, and Edge Detection, Segmentation by Thresholding, Region-Based Segmentation, Segmentation Using Watershed Algorithm.

Representation and Description: Representation, Some Simple Descriptors, Shape Numbers, Fourier Descriptors.

Object Recognition: Patterns and Pattern Classes, Matching: Minimum distance classifier, correlation.

UNIT-V

Color Image Processing: Color Fundamentals, Color Models, Pseudo color Image Processing.

Image Compression: Fundamentals, Compression Techniques, Lossless Compression, Lossy Compression, Measuring Information, Huffman Encoding, Arithmetic Coding, LZW, Run Length, Predictive Coding.

Text Book:

1. Rafael C Gonzalez and Richard E Woods, "Digital Image Processing", Pearson Education, Third Edition.

Suggested Reading:

1. Vipula Singh, "Digital Image Processing with MatLab and lab View", Elsevier.
2. Thomas B. Moeslund, "Introduction to Video and Image Processing: Building Real Systems and Applications", Springer, 2012.
3. Milan Sonka, Vaclav Halvac and Roger Boyle, "Image Processing, Analysis, and Machine Vision", Second Edition, Thomson Learning Publishers.
4. Kenneth R.Castleman, "Digital Image Processing", Pearson Education, 2006.

With effect from the academic year 2015-16

IT 351

COMPUTER GRAPHICS

(ELECTIVE – I)

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. Acquire knowledge about device level algorithms for displaying two dimensional output primitives for raster graphics system.
2. Acquire knowledge about the basic concepts of representing 3D objects in 2D.
3. To introduce computer graphics techniques transformations, clipping, curves and surfaces.

Course Outcomes:

Students who complete this course should be able to

1. Understand the core concepts of computer graphics.
2. Understand graphics techniques for rasterization, clipping, curve generation etc.
3. Represent pictures using various algorithms.

Prerequisites:

Knowledge of Linear Algebra (vectors and matrices), Good programming skills.

UNIT-I

Computer Graphics: Introduction, Application areas, Overview of graphics systems: Video-display devices, Raster-scan systems, Random scan systems, Graphics monitors and Work stations and input devices, Graphics software.

Output primitives: Points and lines, line drawing algorithms: DDA and Bresenham's line generation, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms, Fill-Area Functions, Cell Array, Character generation.

UNIT-II

Attributes of Output Primitives: Line Attributes, Curve Attributes, color and gray scale levels, Area Fill Attributes, Character Attributes, Bundled Attributes, Inquiry Functions.

Structures and Hierarchical Modeling: Structure concepts, Editing Structures, Hierarchical modeling with structures. Graphical User Interfaces and Interactive Input Methods: The User Dialogue, Logical Classification of Input Devices, Input Functions, Interactive Picture Construction Techniques.

UNIT-III

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Liang-Barsky line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT-IV

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, CSG, Octrees, BSP Trees.

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms.

UNIT-V

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

Text Book:

1. Donald Hearn and M.Pauline Baker, “Computer Graphics C version”, Second Edition, Pearson Education.

Suggested Reading:

1. Foley, VanDam, Feiner and Hughes, “Computer Graphics Principles & Practice in C”, Second edition, Pearson Education.
2. David F Rogers, “Procedural elements for Computer Graphics”, Tata McGraw Hill, Second Edition.
3. Neuman and Sproul, “Principles of Interactive Computer Graphics”, Tata McGraw Hill.
4. Shalini, Govil-pai, “Principles of computer Graphics”, Springer.

With effect from the academic year 2015-16

IT 352

SOFTWARE TESTING
(ELECTIVE – I)

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To learn various software testing techniques through case studies.
2. To understand the essential characteristics of various automation tools used for testing.

Course Outcomes:

Students who complete this course should be able to

1. Apply various test processes and use various testing tools.
2. Implement methods of test generation from requirements.

Prerequisites

Object Oriented Analysis and Design with UML, Software Engineering.

UNIT-I

Introduction: SoftwareTesting, Goals of Software Testing, Software Testing Definitions, Effective Software Testing Vs Exhaustive Software Testing, Software Testing Life Cycle, Software Testing Methodology, Verification and Validation – Verification of Requirements, High Level design, Low level design.

UNIT-II

Dynamic Testing: Black Box Testing Techniques-Functional Testing, Equivalence partitioning, BVA.White Box Testing Techniques-Structural Testing, Static Testing, Validation Activities, Regression Testing. .

UNIT-III

Test Management, Testing Metrics-Base Metrics, Calculated metrics, Manual vs Automated testing, Efficient Test Suite Management.

UNIT-IV

Testing Object Oriented Software – OOT Basics, Object Oriented testing, Testing Web based systems,- Web based system, Web Technology Evolution, Challenges in testing for web bases software, Quality Aspects, Web Engineering (Webe), Testing of Web based systems.

UNIT-V

Overview of Testing Tools, Testing an Application using WinRunner, Test Script Language, Selenium software testing tool, Use of LoadRunner and Rational functional tester, Junit, Source Code Testing Utilities in Unix / Unix Environment.

Text Book:

1. NareshChauhan, "Software Testing Principles and Practices", Oxford University Press, 2010.
2. Dr.K.V.K.K.Prasad, "Software Testing Tools", Dreamtech press, 2008.

Suggested Reading:

1. William E. Perry, "Effective Methods for Software Testing",Third Edition, Wiley & Sons, 2006.
2. SrinivasanDesikan, Gopalaswamy Ramesh, "Software Testing: Principles and Practices", Pearson Education, 2006.

With effect from the academic year 2015-16

IT 353

SOFTWARE PROJECT MANAGEMENT
(ELECTIVE-I)

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To plan and manage projects at each stage of SDLC.
2. To understand the basic concepts and issues of Software Project Management.
3. To discuss the notion of Process Improvement and Process Management.

Course Outcomes:

Students who complete this course should be able to

1. Choose most effective software development model to suit organizational needs.
2. Plan and implement the software projects.
3. Improve process and manage project profiles.

Prerequisites:

Software engineering

UNIT - I

Conventional Software Management, Evolution of Software Economics, Improving SoftwareEconomics, Old Way & New.

UNIT - II

Life - Cycle Phases, Artifacts of the Process, Model Based Software Architectures, Workflows of the Process, Checkpoints of the process.

UNIT - III

Iterative Process Planning, Project Organization & Responsibilities, Process Automation, Project Control and Process Instrumentation, Tailoring the Process.

UNIT - IV

Modern Project Profiles, Next Generation Software Economics, Modern Process Transitions, Managing Contacts, Managing People & Organizing Terms.

UNIT - V

Process Improvement & Managing to the CMM, ISO 12207- an Overview, Programme Management.

Text Book:

1. Walker Royce, "Software Project Management - A Unified frame work", Pearson Education, Addision Wesley.

Suggested Reading:

1. Bob Hughes, MilkeCotterell- "Software Project Management", Tata McGraw Hill, Third Edition.
2. Watt S. Humphery, "Managing Software Process", Addison Wesley, 1998.

With effect from the academic year 2015-16

IT 354

NATURAL LANGUAGE PROCESSING
(ELECTIVE-I)

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To understand the applications of NLP and different levels of language analysis.
2. To understand syntax and semantics of the language and knowledge representations.
3. To understand the basic concepts of NLP including PoS tagging, Word senses and Ambiguity and to encode ambiguity in logical form.
4. Understand machine learning techniques used in NLP including statistical methods and probabilistic context-free grammars.

Course Outcomes:

Students who complete this course should be able to

1. Understand and apply relevant linguistic concepts and Machine Learning techniques.
2. Choose appropriate solutions for solving typical NLP sub problems (tokenizing, tagging, parsing).
3. Formulate NLP tasks as learning and inference tasks, and address the computational challenges involved.

UNIT- I

Introduction to Natural Language Processing: The study of Language, Applications of NLP, EvaluatingLanguage Understanding Systems, Different levels of Language Analysis,Representations and Understanding, Organization of Natural language, Understanding Systems.

UNIT-II

Linguistic Background: An outline of English syntax,Spoken Language input and output Technologies, Written language Input - Mathematical Methods - statistical Modelling and classification Finite StateMethods.Grammar for Natural Language Processing - Parsing - Introduction to semantics and knowledge representation, Some applicationslike Machine translation, database interface.

UNIT-III

Grammars and Parsing: Grammars and sentence Structure, Top-Down andBottom-Up Parsers, Transition Network Grammars, Top-Down ChartParsing.

Feature Systems and Augmented Grammars: Basic Feature systemfor English, Morphological Analysis and the Lexicon, Parsing with Features,Augmented Transition Networks.

UNIT-IV

Semantic Interpretation: Semantics and Logical Form,word senses and ambiguity, The Basic logical formlanguage, Encoding ambiguity in logical form, Thematic roles, Linking syntaxand semantics, Recent trends in NLP.

UNIT-V

Ambiguity Resolution: Statistical Methods, Probabilistic LanguageProcessing, Estimating Probabilities, Part-of-Speech tagging, ObtainingLexical Probabilities, Probabilistic Context-Free Grammars, Best FirstParsing.

Text Book:

1. James Allen, "Natural Language Understanding", Pearson Education, Second Edition

Suggested Reading:

1. Christopher D Manning and HinrichSchutze, "Foundations of Statistical Natural Language Processing", MIT Press, 1999.
2. AksharBharti, VineetChaitanya and Rajeev Sangal, "NLP: A Paninian Perspective", Prentice Hall, New Delhi.
3. D. Jurafsky, J. H. Martin, "Speech and Language Processing", Pearson Education.

With effect from the academic year 2015-16

IT 355

ADVANCED COMPUTER ARCHITECTURE
(ELECTIVE-I)

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To understand the concepts of Modern processor design.
2. To understand the concepts of Pipelining and Instruction level parallelism.
3. To understand the concepts of Vector Processors and Array Processors.

Course Outcomes:

Students who complete this course should be able to

1. Analyze, evaluate CPU and memory performance.
2. Understand trade-offs in modern CPU design including issues affecting superscalar architectures.
3. Analyze hardware design of multiprocessors including cache coherence and synchronization.

Prerequisites:

Computer organization

UNIT- I

Measuring Performance and Cost: Performance Measurement, Enhancement to Uniprocessor, Models, Benchmarks, Basic Model of Advanced Computer Architectures.

UNIT- II

Pipelining and Superscalar Techniques: Basic Pipelining, Data and Control Hazards, Dynamic Instruction Scheduling, Branch Prediction Techniques, Performance Evaluation, Case Study-Sun Microsystems – Microprocessor.

UNIT- III

Vector Processors: Vector Processor Models, Vector Architecture and Design, Performance Evaluation, Programming Vector Processors.

UNIT- IV

Array Processors: Parallel Array Processor Model, Memory Organization,
Interconnection Networks: Performance Measures, Static and Dynamic Topologies.

UNIT-V

Multiprocessors and Multi Computers: Multiprocessor Models, Shared –Memory and Distributed Memory Architectures, Memory Organization, Cache Coherence and Synchronization Mechanisms, Parallel Computer, Performance Models.

Text Book:

1. John. L. Hennessey and David A Patterson, "Computer Architecture - A Quantitative Approach", Fourth Edition, Elsevier, 2007.

Suggested Reading:

1. Sajjan G. Shiva, Taylor Series, "Advanced Computer Architecture", CRC Press, 2006.
2. Kai Hwang, "Advanced Computer Architecture", McGraw Hill, 1999.

With effect from Academic Year 2015-16

IT 356

HUMAN COMPUTER INTERACTION
(ELECTIVE-I)

Instruction per week	4 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:

1. To understand the need for optimizing the user's interactions with a system, environment or product, so that they match the users' activities that are being supported and extended.
2. To learn the characteristics of graphical and web user interface, the design and evaluation processes.
3. To develop knowledge of the structure and the representational dynamics of the cognitive system interacting with the computer.

Course Outcomes:

Students who complete this course should be able to

1. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
2. Recognize how a computer system may be modified to cater to the diversity and cognition levels of people.
3. Carry out the steps of design, usability, experimental testing, and evaluation of human computer interaction systems.

Prerequisites:

Moderate experience using computers and GUI-based applications.

UNIT - I

The Importance of the User Interface: Defining the User Interface, the Importance of Good Design, **Characteristics of Graphical and Web User Interfaces:** The Graphical User Interface, **The Web User Interface:** Characteristics of a Web Interface,Principles of User Interface Design: General Principles.

The User Interface Design Process: Obstacles and Pitfalls in the Development Path, Usability, the Design Team, **Know Your User or Client:** Understanding How People Interact with Computers, Important Human Characteristics in Design, Human Considerations in Design, Human Interaction Speeds, Methods for Gaining an Understanding of Users, **Understand the Principles of Good Screen Design:** Human Considerations in Screen Design, **Develop System Menus and Navigation Schemes:** Structures of Menus, Functions of Menus, Content of Menus, Formatting of Menus, Phrasing the Menu, Selecting Menu Choices, Kinds of Graphical Menus

UNIT – II

Select the Proper Kinds of Windows: Window Characteristics, Components of a Window, Window Presentation Styles, Types of Windows, Window Management, Organizing Window Functions, Window Operations, **Select the Proper Device-Based Controls:** Characteristics of Device-Based Controls, **Choose the Proper Screen-Based Controls:** Operable Controls, Text Entry/Read-Only Controls, Combination Entry/Selection Controls, Other Operable Controls, Presentation Controls, Selecting the Proper Controls, **Write Clear Text and Messages.**

UNIT – III

Provide Effective Feedback and Guidance and Assistance, Provide Effective Internationalization and Accessibility, Create Meaningful Graphics, Icons and Images, Choose the Proper Colors, Organize and Layout Windows and Pages.

UNIT – IV

Interaction Design – Introduction, Goals of Interaction Design, Heuristics and Usability principles, **Conceptualizing interaction:** Problem Space, conceptual models, interface metaphors, paradigms. **Understanding Users**: cognition, Conceptual frame works for cognition, **Collaboration and Communication:** Social mechanisms, Conceptual frameworks.

UNIT – V

Understanding how interfaces affect users: Affective aspects, Expressive interfaces, User frustration, Agents, **Process of Interaction Design:** What is interaction design about? Life cycle models, **Design, prototyping and Construction:** Prototyping and construction, Conceptual Design, Physical Design, **Introducing Evaluation:** Introduction, What, Why and when to evaluate, **Evaluation Framework, Testing and modelling users.**

Text Book:

1. Wilbert O. Galitz, "The essential guide to User Interface Design", Wiley Dreamtech, 2002.

Suggested Reading:

1. Sharp, Rogers, Preece, "Interaction Design", Second Edition, John Wiley, 2008.
2. Steven Hein, "The Resonant Interface : HCI Foundations for Interaction Design", Addison-Wesley,2007
3. J.Preece, Y.Rogers, and H.Sharp, "Interaction Design: Beyond Human-Computer Interaction",Wiley& sons ,Second edition, 2007.

With effect from the academic year 2015-16

IT 326

NETWORK PROGRAMMING LAB

Instruction per week	3 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objectives:

1. To understand the use of client/server architecture in application development.
2. To understand and use elementary socket system calls, advanced socket system calls and Java Socket API.
3. To understand how to use TCP and UDP based sockets.
4. To implement network routing algorithms, application layer protocols and encryption algorithms.

Course Outcomes:

Students who complete this course should be able to

1. Use network programming concepts to develop and implement distributed applications.
2. Develop and implement next generation protocols required for emerging applications.
3. Model and evaluate performance of networking systems.

Prerequisites:

Knowledge of C Programming, Basic commands of UNIX.

List of Programs

1. Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whoisetc. Usage of elementary socket system calls (socket(), bind(), listen(), accept(),connect(),send(),recv(),sendto(),recvfrom()).
2. Implementation of Connection oriented concurrent service (TCP).
3. Implementation of Connectionless Iterative time service (UDP).
4. Implementation of Select system call.
5. Implementation of gesockopt(),setsockopt() system calls.
6. Implementation of getpeername() system call.
7. Implementation of remote command execution using socket system calls.
8. Implementation of Distance Vector Routing Algorithm.
9. Implementation of SMTP.
10. Implementation of FTP.
11. Implementation of HTTP.
12. Implementation of RSA algorithm.

Note: Implement programs 2 to 7 in C and 8 to 12 in JAVA.

Suggested Reading:

1. W. Richard Stevens, "Unix Network Programming", Prentice Hall, Pearson Education,2009.
2. Douglas E.Comer,"Hands-on Networking with Internet Technologies", Pearson Education.

With effect from the academic year 2015-16

IT 327

DATA MINING LAB

Instruction per week	3 Periods
Duration of End - Semester Examination	3 Hours
End - Semester Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objectives:

1. Acquaintance to WEKA tool.
2. Prepare the data for mining and apply various mining techniques to analyse the data.
3. Design and develop datamining application on sample/realistic data sets.

Course Outcomes:

Students who complete this course should be

1. Competent to preprocess the data for mining.
2. Proficient in generating association rules.
3. Able to build various classification modelsand Realise clusters from the available data.

Prerequisites:

Database systems.

List of Programs

1. BasicsofWEKA tool
   a. Investigate the Application interfaces. b. Explore the default datasets.
2. Pre-process agiven dataset based on the following:
   a. Attribute Selection b.Handling Missing Values
   c. Discretization d. Eliminating Outliers
3. Create a dataset in ARFF (Attribute-Relation File Format) for any given dataset and perform Market-Basket Analysis.
4. Generate Association Rules using the Apriori algorithm.
5. Generate Association Rules using the FP-Growth algorithm.
6. Build a classifier using K-NN algorithm.
7. Build a Decision Tree by using J48 algorithm.
8. Cluster the IRIS dataset by using the k-Means Clustering algorithm and visualize the cluster mean values and standard deviation of dataset attributes.
9. Build various Regression models.
10. Explore various other data mining tools.

(Note: Wherever necessary interpret the results and measure the performance)

SuggestedReading

1. Ian H.Witten, Eibe Fank, Mark A Hall, "Data Mining Practical Machine Learning Tools and Techniques", Third edition, 2011.
2. Han and Kamber,"Data Mining Concepts and Techniques", Third Edition, Elsevier.

With effect from the academic year 2015-16

IT 328

MINI PROJECT – IV

Instruction per week	3 Periods
Sessional	25 Marks
Credits	1

The Students are required to carry out Mini Project in any of the areas such as Computer Networks, Computational Intelligence, Digital Image Processing, Data Mining and Web Development.

Students are required to submit a report on the Mini Project at the end of the Semester.