SEMESTER V

U13ITT501 **OPERATING SYSTEMS**

L	T	P	C
3	1	0	4

Course Objectives

- To learn the fundamentals of Operating System Concepts with emphasis on foundations and design principles.
- To understand the services the operating system provides to the user.
- To understand the techniques for dealing with process synchronization
- To understand memory management techniques and deadlock handling methods.
- To understand file and disk management techniques.

Course Outcomes

After successful completion of this course, the studentsshould be able to

1. Illustrate the operating system concepts and its functionalities. [K2]
2. Compare various CPU scheduling algorithms. [K4]
3. Explain the need for process synchronization. [K2]
4. Compare file and disk management strategies. [K4]
5. Identify the issues in memory management.[K3]

Course Content

7 Hours

Introduction: Operating System Structure – Operating System Operations – Process Management – Memory Management – Storage Management – Protection and Security – Distributed Systems – Computing Environments – System Structures: Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs – **Process Concept**: Process Scheduling – Operations on Processes – Inter-process Communication.

10Hours

Multithreaded Programming: Overview – Multithreading Models – Threading Issues – **Process Scheduling**: Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Synchronization – The Critical-Section Problem – Peterson's Solution – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Monitors.

10Hours

Deadlocks: System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock – **Memory Management Strategies**: Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation.

9 Hours

Virtual Memory Management: Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing – **File System:** File Concept – Access Methods – Directory Structure – File Sharing – Protection.

9 Hours

Implementing File Systems: File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management
Secondary Storage Structure: Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. **Case Study**: Symbian Os.

Theory: 45 Hrs Tutorial: 15 Hrs **Total Hours:60**

REFERENCES

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", John Wiley & Sons (Asia) Pvt. Ltd, Seventh Edition, 2009.
2. Andrew S. Tanenbaum, "Modern Operating Systems", 3rd edition Prentice Hall of India Pvt. Ltd, 2010 (Case Study Topic).
3. Harvey M. Deitel, "Operating Systems", Pearson Education Pvt. Ltd, Second Edition, 2002.
4. William Stallings, "Operating System", Pearson Education, Sixth edition, 2012.

U13ITT502	SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

Course Objectives

- Apply the formal methods and techniques in the analysis, design, development, and testing of software components and systems.
- Identify the needs of society for IT in business and industry and explore the opportunities and resources for implementation
- Communicate effectively and conduct themselves in an ethical manner as software engineering professionals

Course Outcomes

After successful completion of this course, the students should be able to

1. Compare various software development model (K2)
2. Translate end-user requirements into system requirements.(K2)
3. Explain the importance of SQA, testing and cost estimation(K2)
4. Apply software project planning and management (K3)
5. Develop a simple automated system following software engineering principles(K3)

Course Content

9 Hours

Introduction to Software Engineering: Expanding roles for computers, the place of Software, Software Engineering Discipline, Computer Based Systems, Increasing size and scope of software, Generic vs. Custom-made software products-distinctive characteristics of software products.

Software Development Models: Life cycle, Development process, Life cycle models-Linear Sequential, Evolutionary, Unified models, Agile development approach.

9 Hours

Requirements Engineering: Classification of Requirements-System Requirements and Software Requirements, Functional and Non-Functional requirements, Priority Categories of Requirements. Requirement Engineering Tasks - Elicitation, Analysis, Specification, Validation and Management.

System Models: Domain Analysis and Modeling, Data Models, Functional Models-structured Analysis Model, Object Oriented Models- Cloud, State, Use Case Models, Sequence and activity diagrams, Relationship among the Object Oriented Models, Building Object Oriented Analysis Models

9 Hours

Software Design and Implementation: Architectural Design-Decomposition strategy, Partitions and Layers, Structured System Design-Use of Heuristics for Design Refinements, Object-Oriented Design-Handling Concurrency, Management of Global Resources

Detailed Design, User Interface Design-Human Factors, Evolution in HCI styles, HCI Design Issues, User Interface Standards and Guidelines, Evolution of User Interface Design through Prototypes. Reusable Components, Patterns, Frame works, Coding – Choice of Programming Language, Coding Standards

9 Hours

Software Testing: Conventional Testing and SDLC Testing, Organization for Testing, Non-Execution-Based Testing-Formal Technical Reviews, Walkthroughs, Inspections, Use of Static Analyzers. Execution-Based Testing- Black-Box vs. Glass-Box Testing, Testing during Code Integration, Product Testing System Testing, Testing Distributed Implementation, Testing of Real-Time systems, Acceptance Testing.
Software Quality Management: Quality Dimensions, Process Quality and Product Quality, Quality Assurance Planning, Quality Measurements, Software Configuration Management-Version management, Software Process Improvement-Capability Maturity Model, Other SPI models

9 Hours

Software Project Management: Software Projects, Project Feasibility Study, Project Planning, Project Organization, Estimation of Project Effort-Measuring Software Attributes and Productivity, COCOMO for Effort Estimation. Risk Management-Risk Identification, Risk Monitoring and Mitigation. Project Scheduling, Project Monitoring and Control-Assessment of Project Progress, Measurement during Software Projects.
Software Maintenance: Planning for Maintenance, maintenance Activities, Reengineering.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. S. Thangasamy, "Essentials of Software Engineering", Wiley India, First Edition, 2012
2. R.S. Pressman, 'Software Engineering – A Practitioner's Approach', Seventh edition, McGraw Hill International Edition, 2010.
3. Stephen Schach, 'Software Engineering', Seventh edition, TMH, New Delhi, 2007.
4. Pankaj Jalote, 'An Integrated Approach to Software Engineering', Third edition, Narosa Publishing House, 2005.
5. M. Blaha and J. Rumbaugh, 'Object Oriented Modeling and Design with UML', Second edition, Prentice-Hall India, 2006.
6. I Sommerville, 'Software Engineering', Seventh edition, Pearson Education, 2004

ANNEXURE-1

U13ITT503	COMPUTER NETWORKS	L	T	P	C
		3	1	0	4

Course Objectives

- To understand the concepts of data communications.
- To study the functions of different layers.
- To introduce IEEE standards employed in computer networking.
- To make the students to get familiarized with different protocols and network components.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the functionality of each layer of OSI reference model. [K2]
2. Explain the Data Link layer, Transport and Application layer protocols. [K2]
3. Describe IP routing concepts, distance vector and link state IP routing algorithms, and construction of routing tables.[K2]
4. Solve problems involving network bandwidth utilization. [K3]
5. Summarize the internet congestion control mechanism. [K2]

Course Content

DATA COMMUNICATIONS **6 Hours**

Data Communication- Networks-The OSI Model- Layers in the OSI Model – TCP/IP Protocol Suite – Addressing – Transmission Media.

DATA LINK LAYER **10Hours**

Link and Medium Access protocols – Framing – Error Detection – Reliable Transmission – IEEE 802 Standards – Ethernet – Token Rings – Wireless LANs.

NETWORK LAYER **10Hours**

Circuit Switching – Packet Switching – Switching and Forwarding – Bridges and LAN Switches – Cell Switching – Internetworking – Routing Techniques: Distance vector (RIP) – Link state (OSPF) – Subnetting – CIDR- BGP - IPv6.

TRANSPORT LAYER **10Hours**

UDP – TCP **–** Congestion Control and Resource Allocation –TCP Congestion Control – Congestion Avoidance Mechanisms – Quality of Service- Integrated Services – Differentiated Services.

APPLICATION LAYER **9Hours**

Domain Name System – Electronic Mail – File Transfer- WWW and HTTP-Network Management System – Simple Network Management Protocol.

Theory: 45 Hrs **Tutorial: 15 Hrs** **Total Hours:60Hrs**

REFERENCES

1. William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson Education, 2011.
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.
3. James F. Kurose, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Pearson Education, 2006.
4. Nader F. Mir, “Computer and Communication Networks”, First Edition, Pearson Education, 2007.
5. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach “, McGraw Hill Publisher, 2011.
6. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.

U13ITT504	JAVA PROGRAMMING	L	T	P	C
		3	0	0	3

Course Objectives

- Understand object-oriented programming concepts supported by Java.
- To learn the Java programming language fundamentals: its syntax, idioms, patterns, and styles.
- To learn the essentials of the Java class library

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain how Java provides support for principles of object oriented-programming, specifically abstraction, encapsulation, inheritance, and polymorphism (K2).
2. Explain the concepts of exception handling, life cycle of thread, Applet class (K2).
3. Build applications that include GUIs and event driven programming using swings (K3).
4. Explain the communication between client & server using sockets and database connectivity
5. Test a java program/application for errors & exceptions(K3)

Course Content

9 Hours

Java Fundamentals – Control Structures – Classes – Methods - Garbage Collection – Inheritance-Packages

9 Hours

Interfaces – Exception Handling - String Handling –Enumerations –Type Wrappers-Autoboxing- Generics

9 Hours

Multithreading: Thread model - Life Cycle – Synchronization - Inter-thread Communication – **I/O Package:** File class – Stream classes – Util package: Collection Interfaces – Collection classes.

9 Hours

Accessing databases with JDBC: Creating and Manipulating database-Row Set Interface-Prepared Statements-Stored Procedures-Transaction Processing.
Networking: Manipulating URLS-TCP/IP Sockets-Datagrams

9 Hours

GUI Components-Part I: Introduction-Swing Components: JButton-JTextField-JRadioButton-JcheckBox-JComboBox-JList-JPanel-JTextArea-Adapter classes-Event handling-Layout Managers Graphics and Java 2D- Applets.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Herbert Schildt, "The Complete Reference– Java", Tata McGraw Hill, Eighth edition,2011 (Unit I-III)
2. Deitel and Deitel, Java: How to Program, Ninth Edition, Prentice Hall, Ninth Edition,2011(UNIT IV,V)
3. Bruce Eckel , "Thinking in Java", Fourth Edition, Pearson Education, 2006
4. Cay S. Horstmann, Gary Cornell, "Core Java, Volume I—Fundamentals", Eighth Edition, Sun Microsystems,2011.
5. Cay S. Horstmann , "Core Java, Volume II—Advanced Features", Eighth Edition, Sun Microsystems
6. Ying Bai "Practical Database Programming with Java", Wiley Publication, 2011.
7. Marc Loy, Robert Eckstein, Dave Wood, James Elliott, Brian Cole," Java Swing", Second Edition,2012

		L	T	P	C
U13ECT511	**DIGITAL SIGNAL PROCESSING (Common to EEE / CSE / IT / EIE / MCE)**	**3**	**1**	**0**	**4**

Course Objectives

- Understand and analyze the characteristics of discrete signals and systems
- Apply mathematical tools for signal / system analysis
- Design digital filters.
- Learn the architecture and features of P-DSPs

Course Outcomes

After successful completion of this course, the studentsshould be able to

1. Understand the characteristics of discrete-time signals and discrete systems (K1)
2. Analyze signal / system properties using mathematical tools (K2)
3. Apply and develop algorithms for digital systems (K3)
4. Illustrate efficient computation of DFT (K3)
5. Discuss advanced features and architecture of generic P-DSP (K2)

Course Content

DISCRETE TIME SIGNALS AND SYSTEMS **12Hours**

Representation of a CT signal by samples – Sampling theorem – Reconstruction of a signal from its samples – Aliasing – DT Signals – Impulse, Step, Pulse, Sine, Exponential – Properties of DT signals - Transformation of independent variable – Shifting, scaling, folding - Discrete Time LTI systems – Properties – Impulse response – Convolution sum – Properties of Convolution

Z-TRANSFORM AND SYSTEM ANALYSIS **12Hours**

DTFT – Properties - Z transform – Forward Transform - Inverse Transform using Partial Fractions - Properties – Pole-Zero plot – Difference Equations - Transfer function - Analysis of Discrete Time systems using DTFT and Z Transform.

DISCRETE FOURIER TRANSFORM **12Hours**

Introduction to DFT– Properties of DFT – Efficient computation of DFT – FFT algorithms – Introduction to Radix-n algorithms - Radix-2 FFT – Decimation-in-Time and Decimation–in-Frequency algorithms – Butterfly diagram.

DESIGN OF DIGITAL FILTERS **12Hours**

FIR filter design: Linear phase characteristics - Windowing Technique –Rectangular, Hamming, Hanning, Blackmann windows – IIR filter design: Analog filter design - Butterworth and Chebyshev approximations – Impulse invariance and Bilinear transformations - FIR and IIR filter structures – Direct form I and II - cascade and parallel forms – Finite Precision effects.

ADVANCED TOPICS AND PROGRAMMABLE DSP CHIPS **12Hours**

Concepts of multi-rate signal processing – Decimation and interpolation by integer factor – Sampling rate conversion – Introduction to DSP architecture - Von Neumann, Harvard, Modified Harvard architectures - MAC unit – Multiple ALUs Modified Bus structures and memory access schemes in P-DSP – Multiple access memory – Multi-ported memory – VLIW architecture - Pipelining – Special addressing modes

Theory:45Hrs Tutorial:15 Hrs **Total Hours:60**

REFERENCES

1. Mrinal Mandel and Amir Asif, "Continuous and Discrete Time Signals and Systems", Cambridge International Student Edition, Cambridge University Press, 2007.
2. John G.Proakis and Dimitris G.Manolakis, "Digital Signal Processing, Principles, Algorithms and Applications", PHI, 3rd Edition. 2000.
3. B. Venkataramani, M. Bhaskar, "Digital Signal Processors, Architecture, Programming and Applications", Tata McGraw Hill, New Delhi, 2003. (Unit V)
4. Johny R.Johnson, "Introduction to Digital Signal Processing", PHI, 2009.
5. Won Y. Yang et. Al., "Signals and Systems with MATLAB", Springer International Edition, 2009
6. Steven W. Smith, "The Scientists and Engineer's Guide to Digital Signal Processing", California Technical Publishing, 1997.
7. James H. McClellan, Ronald W. Schafer, Mark A. Yoder, "Signal Processing First", 2nd Edition.

ANNEXURE-1

U13ITP501	SOFTWARE ENGINEERING LAB	L	T	P	C
		0	0	3	1

Course Objectives

- The goal is to teach practical software development methods and tools in the context of developing a software system
- Design and implement complex software solutions using state of the art software engineering techniques

Course Outcomes

After successful completion of this course, the students should be able to

1. Design a Software requirement specification for the application (S).
2. Identify classes, methods, data flow (designing) for the application (S).
3. Develop the code for the specific problem (S).
4. Develop test cases for the application(S).
5. Develop an automated system for the applications (S).

Course Content

SOFTWARE PROJECT DEVELOPMENT:

Develop a software development project using Rational Suite CASE Tool. The problem selected should consist of at least 10 Use cases.

1. Problem Analysis and Project Planning

Thorough study of the problem – Identification of project scope, objectives and preparation of S.R.S. (in IEEE format)

2. Software Requirement Analysis

Describe the individual phases / modules of the project, identify deliverables. Prepare test plan and test cases.

3. Modelling

Use relevant work products like data dictionary, use case diagram, sequence diagram, activity diagram, class diagram etc

4. Coding (using appropriate language)

5. Software Testing

Perform verification & validation at each stage and generate appropriate reports.

SUGGESTED LIST OF SAMPLE PROJECTS:

Develop the following using Software Engineering Methodology:

1. College Information System
2. Super Market Automation System
3. Restaurant Automation System
4. Judiciary Information System
5. Student Academic Record Management System
6. Medicine Shop Automation
7. Automobile Parts Shop Automation
8. Quiz System
9. ATM Systems

10. Development of Computer Games
11. Railway Ticket Reservation System
12. Payroll Processing System
13. Inventory System
14. Library Management System
15. Book Shop Automation System
16. Text Editor

SOFTWARE REQUIRED:

Rational Software, Languages: C/C++/JDK 1.3, JSDK, WEB BROWSER & UML, Any Front End Tools (like VB, VC++, Developer 2000) Any Back End Tools (like Oracle, MS-Access, SQL).

Total Hours:45

U13ITP502 JAVA PROGRAMMING LABORATORY

L	T	P	C
0	0	3	1

Course Objectives

- To gain practical knowledge in java
- To develop real time applications in java

Course Outcomes

After successful completion of this course, the students should be able to

1. Identify classes, objects, members of a class and the relationships among them for a specific problem (S).
2. Develop programs using appropriate packages for Inter –thread Communication and Synchronization (S).
3. Develop GUI applications to handle events (S).
4. Create client server based applications
5. Design, develop, test and debug Java programs using object-oriented principles in conjunction with development tools including integrated development environments (S).

Course Content

1. Simple Programs in java using classes and methods
2. Program for Method Overloading and Method Overriding
    a) Use the concept of Packages and Interfaces
3. Program for User Defined Exception Handling
4. Program using inbuilt methods of String class.
5. Thread Creation
    a) Using Thread Class and Runnable Interface
    b) Inter Thread Communication
6. Program using Input streams and Output streams
7. Programs using JDBC for developing real time applications(2 experiments)
8. Event handling in Swing (2 experiments)
    a) Usage of at least four different components in swing and different layouts

Total Hours:45

U13ITP503	OPERATING SYSTEMS LABORATORY	L	T	P	C
		0	0	3	1

Course Objectives

- To understand main components of OS and their working.
- To learn shell programming and OS commands
- To understand the principles of different memory management techniques.
- To study the operations performed by Operating System as a resource manager.

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate basic Linux commands [S,K1]
2. Develop shell scripts.[S,K3]
3. Analyze CPU Scheduling algorithms. [S,K4]
4. Demonstrate the Implementation of disk scheduling techniques. [S,K3]
5. Demonstrate the Implementation of memory management techniques. [S,K3]

Course Content

1. Study of UNIX commands
2. To write Simple shell programs
3. Simulate the following CPU scheduling algorithms
   a. FCFS b) Non-Preemptive SJF c) Round Robin
4. Write a C program to create a child process and allow the parent to display “Hello” and the child to display “Welcome” on the screen
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulation of First bit, Best fit, Worst fit memory allocation methods
7. Simulate Paging Technique
8. Simulation of First in First out and Least Recently Used page replacement algorithms
9. Simulate indexed file allocation strategy
10. Simulate Disk scheduling algorithms
    a) FCFS b) SSTF
11. Study of Symbian OS

Total Hours:45

		L	T	P	C
U13GHEP501	**HUMAN EXCELLENCE: SOCIAL VALUES-I** (Common to all branches of Engineering and Technology)	**0**	**0**	**2**	**1**

Course Objectives

- To produce responsible citizens to family and society
- To uplift society by pure politics and need education
- To realize the value of unity, service
- To immunize the body
- To get Divine peace through inward travel

Course Outcomes

After successful completion of this course, the students should be able to

1. Learn knowledge on the Duties and responsibilities
2. Demonstrate skills required for the Disparity among human being
3. Behave as a responsible Politics and Society & Education and Society
4. Analyze Impact of Science in Society

Course Content

RESPONSIBLE CITIZENS TO FAMILY AND SOCIETY — 5 Hours

Evolution of man - evolution of universe – creating theory – evolution theory – theory permanence theory – mithya – maya or illusion – evolution of living being –

POLITICS AND NEED EDUCATION — 5 Hours

Human being & group – unity of man in society – relationship between individual – society.

DEVELOPMENT OF SCIENCE, EDUCATION & ECONOMICS — 5 Hours

Duties and Responsibilities- Duty to self, family, society and world – politics & society – education & society – case study and live example – impact of science, economic & society.

DISPARITY AMONG HUMAN BEINGS — 5 Hours

Disparity among human beings – seven values – bodily structure – character of personality – advancement of knowledge or intellectual clarity – fame of service – physical strength –health – financial status. sixteen factors heredity – food – historical age – place of living – education – work – government – art – effort – physical age – friendship – opportunity – research – practice – accepted sentiments of society – morality.

SERVICE AND SACRIFICE — 3 Hours

Social welfare – need – pure & pure society.

YOGASANAS & MEDITATION — 7 Hours

Pancha bhootha navagraha meditation – Introduction – practice – benefits.

Sitting asanas: mahamudhra – ustrasana– gomukhasana– matsyasana – ArdhaMatsyendrasana.Upward lying asanas: setubhandasana–viparitakaranai – sarvangasana – halasana. Downward lying asanas: arthasarvangasana – adhomukhasvanasana–padmamayura

Total Hours:30

REFERENCES

1. World peace plane ---- Vethathiri Maharishi
2. Prosperous India ---- Swami Vivekananda
3. Samudhaya chikkalukkana nala Aaivugal ---- Vethathiri Maharishi
4. World Community Life ---- Vethathiriyam

ELECTIVE I

U13ITE101	THEORY OF COMPUTATION	L	T	P	C
		3	1	0	4

Course Objectives

- To demonstrate the ability to identify problems in various domains and provide solutions.
- To demonstrate the ability to design a computer based system that will fully meet the requirements of the end user.
- To identify which are the problems are unsolvable.
- To measure the complexity of a problem.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain automata theory as the basis of all computer science languages design. [K2]
2. Identify different types of grammars. [K3]
3. Build grammars for a given language and vice versa. [K3]
4. Develop Finite Automata, Push down Automata and Turing machines. [K3]
5. Classify decidable and undecidable problems, solvable and unsolvable problems. [K2]

Course Content

AUTOMATA **8 Hours**

Basic Machines Finite Automata (FA) - Deterministic Finite Automata (DFA) - Non-deterministic Finite Automata (NFA) - Finite Automata with Epsilon transitions.

REGULAR EXPRESSIONS AND LANGUAGES **9 Hours**

Finite State Automata and Regular Expressions – Converting regular expression to Finite Automata – Subset construction – Epsilon Closure – NFA to DFA - Applications of finite automata - Proving languages not to be regular -Equivalence and minimization of Automata - Decision algorithms.

CONTEXT-FREE GRAMMAR AND LANGUAGES **10Hours**

Context-Free Grammar (CFG) - Parse Trees - Ambiguity in grammars and languages - Definition of the Pushdown automata - Languages of a Pushdown Automata - Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata. Properties of context free languages - Normal forms for CFG – Chomsky Normal Form(CNF) – Greibach Normal Form(GNF)- Pumping Lemma for CFL - Closure Properties of CFL

TURING MACHINES **9 Hours**

Definitions of Turing machines – Models – Computable languages and functions –Techniques for Turing machine construction – Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine- Chomsky hierarchy of languages.

UNSOLVABLE PROBLEMS AND COMPUTABLE FUNCTIONS 9 Hours

Unsolvable Problems and Computable Functions – Primitive recursive functions – Recursive and recursively enumerable languages – Universal Turing machine

MEASURING AND CLASSIFYING COMPLEXITY:

Tractable and Intractable problems- Tractable and possibly intractable problems- P and NP completeness - Polynomial time reductions

Theory:45Hrs Tutorial:15 Hrs Total Hours:60

REFERENCES

1. John C.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, Tata McGraw Hill, 2003.
2. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2003.
3. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003
4. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.
5. Kavi Mahesh, "Theory of Computation, A Problem-solving Approach" Wiley India Pvt, Ltd, 2012.

U13ITE102	ADVANCED DATABASE TECHNOLOGIES	L	T	P	C
		3	0	0	3

Course Objectives

- To design high-quality relational databases and database applications.
- To develop skills in advanced visual & conceptual modeling and database design.
- To translate complex conceptual data models into logical and physical database designs.
- To learn about different databases.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the basics of distributed and object oriented databases (K2)
2. Compare different database systems (K4)
3. Explain the importance of backup and recovery techniques in distributed database systems (K3).
4. Design distributed database system to handle the real world problems (K3)
5. Explain different emerging data base technologies (K2)

Course Content

Distributed DBMS Concepts and Design Transparencies **9 Hours**

Introduction – Functions and Architecture of DDBMS – Distributed Relational Database Design – Transparency in DDBMS – Date's Twelve Rules for a DDBMS.

Distributed DBMSs - Advanced Concepts **9 Hours**

Distributed Transaction Management – Concurrency control – Deadlock Management – Database Recovery – The X/Open Distributed Transaction Processing Model –Replication Servers – Distribution and Replication in Oracle.

Object-Oriented DBMSs – Concepts and Design **9 Hours**

Introduction – Weakness of RDBMS – Object Oriented Concepts Storing Objects in Relational Databases – Object Oriented Data models – OODBMS Perspectives – Persistence – Issues in OODBMS – Advantages and Disadvantages of OODBMS.

Object-Oriented DBMSs - Standards and Systems **9 Hours**

OODBMS Standards and Systems – Object Management Group – Object Database Standard ODMG – Object Relational DBMS – Comparison of ORDBMS and OODBMS.

Emerging Database Technologies **9 Hours**

Active Database Concepts and Triggers – Temporal Database Concepts – Deductive Databases - Mobile Database – Multimedia Database – Spatial Databases.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Thomas M. Connolly and Carolyn E. Begg, "Database Systems - A Practical Approach to Design, Implementation, and Management", Third edition, Pearson Education, 2003.
2. Ramez Elmasri and Shamkant B.Navathe, "Fundamentals of Database Systems", Fourth edition, Pearson Education, 2004.
3. Tamer Ozsu .M and Patrick Ualduriel, "Principles of Distributed Database Systems", Second edition, Pearson Education, 2003.
4. Prabhu C.S.R., "Object Oriented Database Systems", PHI, 2003.
5. Peter Rob and Corlos Coronel, "Database Systems – Design, Implementation and Management", Fifth edition, Thompson Learning, Course Technology, 2003.

U13MAT501	PROBABILITY AND QUEUEING THEORY	L	T	P	C
		3	1	0	4

Course Outcomes

After successful completion of this course, the students should be able to

1. Analyze random or unpredictable experiments and investigate important features of random experiments
2. Construct probabilistic models for observed phenomena through distributions which play an important role in many engineering applications
3. Associate random variables by designing joint distributions and correlate the random variables.
4. Describe the random signals in terms of its average properties such as the average power in the random signal using random processes.
5. Construct Markov chain in which the future depends only upon the present are common among electrical engineering models.
6. Choose a class of models in which customers arrive in some random manner at a service facility

Course Content

PROBABILITY **9 Hours**

Probability – Axioms of Probability – Addition Theorem – Conditional Probability - Multiplication Theorem – Posterior Probability – Baye's Theorem

RANDOM VARIABLES **9 Hours**

Discrete and continuous random variables – Moments – Moment generating functions and their properties – Binomial – Poisson –Normal distributions. Joint distributions – Marginal and conditional distributions – Correlation and regression

MARKOV PROCESSES AND MARKOV CHAINS **9 Hours**

Classification – Stationary process – Markov process – Markov chains – Transition probabilities – Limiting distributions – Poisson process.

QUEUEING THEORY **9 Hours**

Markovian models – Birth and death queuing models – Steady state results – Single and Multiple server Queuing models – Queues with finite waiting rooms – Finite source models – Little's formula. (Derivations excluded)

NON–MARKOVIAN QUEUES AND QUEUE NETWORKS **9 Hours**

M/G/1 queue – Pollaczek – Khintchine formula – Series queues – Open and closed Networks.

Theory:45Hrs Tutorial:15Hrs **Total Hours:60**

REFERENCES

1. O.C. Ibe, "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007.
2. D. Gross and C.M. Harris, "Fundamentals of Queueing Theory", Wiley Student edition, 2004.
3. A.O. Allen, "Probability, Statistics and Queueing Theory with Computer Applications", Elsevier, 2nd edition, 2005.
4. H.A. Taha, "Operations Research", Pearson Education, Asia, 8th edition, 2007.
5. K.S. Trivedi, "Probability and Statistics with Reliability, Queueing and Computer Science Applications", John Wiley and Sons, 2nd edition, 2002.

U13ITE103	COMPUTER GRAPHICS	L	T	P	C
		3	0	0	3

Course Objectives

- To understand about input/output devices and graphics primitives.
- To understand 2D and 3D object modeling and transformations.
- To study the concepts of colour models and animation
- To add realism to the scenes by rendering and visible surface detection

Course Outcomes

After successful completion of this course, the students should be able to

1. Describe the working of graphics Input and Output devices (K2)
2. Describe the graphics primitives. (K2)
3. Explain and work with coordinate spaces, coordinate conversion, and transformations of graphics objects. (K3)
4. Explain the graphics modeling process. (K2)
5. Build virtual scenes, transform objects with animation. (K4)
6. Make use of the colour and transformation techniques for various gaming applications. (K3)

Course Content

9 Hours

Overview of Graphics Systems: Video Display devices – Raster Scan Systems –Random Display Systems – Hard Copy Devices.
Output Primitives: Points and Lines – Line drawing algorithms – Circle generating algorithms – Ellipse generating algorithms.

9 Hours

Two-Dimensional Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Reflection and Shearing Transformations-Affine Transformations.
Two-Dimensional Viewing: The Viewing pipeline – Viewing Coordinate Reference Frame – Window to View port Coordinate Transformation – Two Dimensional Viewing Functions – Clipping Operations –Point Clipping – Line clipping – Polygon Clipping – Curve Clipping.

9 Hours

Three-Dimensional Concepts: Three Dimensional Display Methods –Parallel Projection – Perspective Projection –Depth Cueing – Visible Line and Surface Identification –Surface Rendering – Exploded and Cutaway Views – Three Dimensional and Stereoscopic Views
Three-Dimensional Object representations: Polygon Surfaces – Curved lines and Surfaces – Quadric Surfaces – Blobby Objects – Spline representation – Bezier Curves and Surfaces – Fractal Geometry Methods - Visualization of data sets.

9 Hours

Three Dimensional Geometric and Modeling Transformations: Translation – Rotation – Scaling – Reflection and Shearing Transformations – Composite transformations – Three dimensional Transformation Functions Modeling and Coordinate transformations.
Three dimensional Viewing: Viewing Pipeline – Viewing Coordinates – Projections – View volumes - General Projection transformations –Clipping – Visible Surface Detection - Rendering.

9 Hours

Colour Models and colour Applications: Properties of Light – Standard Primaries and Chromaticity Diagram – Intuitive Colour Concepts – RGB Colour Model – YIQ Colour Model – CMY Colour Model – HSV Colour Model – Conversion between HSV and RGB Models - HLS Colour Model – Colour selection and Applications.
Computer Animation: Design of Animation Sequences – General Computer Animation Functions – Raster Animations – Computer Animation Languages – Key Frame Systems – Motion Specifications.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Donald Hearn M. Pauline Baker, "Computer Graphics - C Version", Second edition, Pearson Education, 2006.
2. Peter Shirley, "Fundamentals of Computer Graphics", Third Edition, A K Peters, 2009.
3. Amarendra N Sinha, Arun D Udai, "Computer Graphics", Tata McGraw Hill, 2012.
4. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd Edition, Pearson Education, 2003.

U13ITE104 INFORMATION CODING TECHNIQUES

L	T	P	C
3	0	0	3

Course Objectives

- To introduce the basic notions of information and channel capacity
- To compute the coding for text information
- To describe about compression techniques for audio and video
- To demonstrate how error control coding techniques are applied in communication systems

Course Outcomes

After successful completion of this course, the students should be able to

1. Describe about information, entropy and classify the coding schemes. [K2]
2. Demonstrate the coding schemes for text.[K3]
3. Describe and classify the compression schemes for video and image. [K2]
4. Utilize various types of error control codes. [K3]
5. Construct the code tree and state diagram for error control codes [K3]

Course Content

INFORMATION THEORY **9 Hours**

Information – Entropy - Information rate - classification of codes - Kraft McMillan inequality - Source coding theorem – Shannon - Fano coding - Huffman coding - Extended Huffman coding - Joint and conditional entropies - Mutual information - Discrete memoryless channels – BSC - BEC – Channel capacity - Shannon limit.

SOURCE CODING: TEXT, AUDIO AND SPEECH **9 Hours**

Text: Adaptive Huffman Coding - Arithmetic Coding - LZW algorithm – Audio: Perceptual coding - Masking techniques - Psychoacoustic model - MEG Audio layers I, II, III, Dolby AC3 - Speech: Channel Vocoder - Linear Predictive Coding.

SOURCE CODING: IMAGE AND VIDEO **9 Hours**

Image and Video Formats – GIF – TIFF- SIF – CIF - QCIF – Image compression: READ - JPEG – Video Compression: Principles-I, B, P frames - Motion estimation - Motion compensation - H.261 - MPEG standard.

ERROR CONTROL CODING: BLOCK CODES **9 Hours**

Definitions and Principles: Hamming weight - Hamming distance - Minimum distance decoding - Single parity codes - Hamming codes - Repetition codes - Linear block codes - Cyclic codes - Syndrome calculation - Encoder and decoder – Cyclic Redundancy check codes.

ERROR CONTROL CODING: CONVOLUTIONAL CODES **9 Hours**

Convolutional codes – code tree – trellis - state diagram - Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Bose.R, "Information Theory, Coding And Cryptography", TMH 2007
2. Fred Halsall, "Multimedia Communications: Applications, Networks, Protocols And Standards", Pearson Education Asia, 2002
3. Sayood. K, "Introduction To Data Compression", Third edition, Elsevier, 2006.
4. Gravano. S, "Introduction To Error Control Codes", Oxford University Press, 2007
5. Amitabha Bhattacharya, "Digital Communication", Tata Mcgraw Hilll, 2006
6. Reza, Fazlollah M "An Introduction To Information Theory", Dover publication, New York, 1994.

SEMESTER VI

U13ITT601 PRINCIPLES OF COMPILER DESIGN

L	T	P	C
3	1	0	4

Course Objectives

- To understand the functionality of the various phases of the compilation process.
- To understand about static and dynamic storage allocation.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the various phases of a compiler. [K2]
2. Construct DFA from a given regular expression [K3]
3. Apply Top-down and Bottom-up parsing Techniques [K4]
4. Translate given input to intermediate code [K3]
5. Identify various types of optimizations on intermediate code and generate assembly code. [K4]

Course Content

INTRODUCTION AND LEXICAL ANALYSIS **9 Hours**

Language Processors – The Structure of a Compiler – Applications of Compiler Technology – Programming Language Basics. Lexical Analysis – The Role of the Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – The Lexical-Analyzer Generator - LEX– Finite Automata – From Regular Expression to Automata – Design of a Lexical-Analyzer Generator – Optimization of DFA-Based Pattern Matchers.

SYNTAX ANALYSIS **9 Hours**

Introduction – Context-Free Grammars – Writing a Grammar – Top-Down Parsing – Recursive-Descent Parsing and Predictive Parsers - Bottom-up Parsing – Shift-Reduce Parsing and Operator Precedence Parsing - Introduction to LR Parsing: Simple LR – More Powerful LR Parsers – Canonical LR and LALR Parsers.

INTERMEDIATE CODE GENERATION **9 Hours**

Variants of Syntax Trees – Three-Address Code – Types and Declarations – Translation of Expressions – Type Checking – Control Flow – Back patching – Switch-Statements – Intermediate Code for Procedures.

CODE GENERATION **9 Hours**

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 – A Simple Code Generator – Peephole Optimization.

CODE OPTIMIZATION AND RUN-TIME ENVIRONMENT **9 Hours**

The Principal Sources of Optimization – Introduction of Data-Flow Analysis – Loops in Flow Graphs Run-Time Environments – Storage Organization – Stack Allocation of Space – Heap Management.

Theory:45Hrs Tutorial: 15 Hrs **Total Hours:60**

REFERENCES

1. Alfred V. Ahoet. al "Compilers Principles, Techniques and Tools", Second edition , Pearson Education,2007.
2. Allen I. Holub, "Compiler Design in C", Prentice Hall of India, 2003.
3. FischerC.N. and LeBlanc R.J. "Crafting a Compiler with C", Benjamin Cummings, 2003.
4. BennetJ.P., "Introduction to Compiler Techniques", Second edition, Tata McGraw-Hill, 2003.
5. HenkAlblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001.
6. Kenneth C. Louden, "Compiler Construction: Principles and Practice", Thompson Learning, 2003.

U13ITT602	DATA WAREHOUSING AND DATA MINING	L	T	P	C
		3	0	2	4

Course Objectives

- To acquire knowledge in data warehouse design and data mining techniques.
- To understand the fundamental concepts of classification, prediction, clustering and association in data mining.
- To develop skills to demonstrate the knowledge gained through problem solving using mining tools.

Course Outcomes

After successful completion of this course, the students should be able to

1. Identify the main characteristics of different data warehousing and data mining techniques through observation of their operations(K2)
2. Implement the main algorithms in data warehousing and data mining in a computationally efficient way (K3)
3. Extract knowledge using data mining techniques(K3)
4. Explore trends in data mining such as web mining, spatial-temporal mining(K3)
5. Explore the various data mining tools.(K3)

Course Content

DATA WAREHOUSING **9 Hours**

Data warehouse and OLAP technology – Types of Database – Multidimensional data model – Data warehouse architecture – Data cleaning.

DATA MINING PRIMITIVES AND CONCEPT DESCRIPTION **9 Hours**

Data mining primitives – Data mining query language - concept description – Data generalization and characterization – Analytical characterization – Mining Descriptive statistical measures in large databases.

CLASSIFICATION AND PREDICTION **9 Hours**

Introduction – Decision Tree Induction – Bayesian Classification – Back propagation – Lazy Learners – Other classification methods – Prediction – Evaluating the accuracy

CLUSTERING AND ASSOCIATION **9 Hours**

Similarity and Distance Measures – Hierarchical Algorithms – Partitional Algorithms – Outlier Analysis – Mining Frequent Patterns, Associations, and Correlations

ADVANCED TOPICS **9 Hours**

Web Mining – Web Content Mining – Structure and Usage Mining – Spatial Mining – Time Series and Sequence Mining – Graph Mining

List of Experiments

1. Exercise on Data warehouse Design for an enterprise
2. Exercise on Classification Algorithms
3. Exercise on Clustering Algorithms

4. Exercise on Discovering Association Rules
5. Exercises on Data mining tools

Theory:45Hrs Practical :15 Hrs **Total Hours:60**

REFERENCES

1. J. Han, M Kamber, "Data Mining: Concepts and Techniques", second edition, Elsevier, New Delhi, 2006.
2. Dunham M, "Data Mining: Introductory and Advanced Topics", Prentice Hall, New Delhi, 2002.
3. Trevor Hastie, Robert Tibshirani, Jerome Friedma," The Elements of Statistical Learning: Data Mining, Inference and Prediction", Prentice Hall, New Delhi, 2002.
4. Hand.D, Mannila H, Smyth.P, "Principles of Data Mining", MIT press, USA,2001.

U13ITT603 TCP/IP AND SOCKET PROGRAMMING

L	T	P	C
3	0	0	3

Course Objectives

- To learn socket programming concepts
- To understand the IP addressing schemes
- To study the internetworking protocol concepts
- To learn socket programming constructs and socket options

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate systematic and critical understanding of the theories, principles and practices of internetworking protocols.(k2)
2. Identify the issues that are driving the development of new protocols to broaden and enhance the operation of the internet.(k3)
3. Design a sub network for an organization based on its requirement.(k3)
4. Analyze mechanisms to improve the performance of network protocols. (k4)
5. Build client server applications using network programming constructs on unix platform.(k2)

Course Content

ELEMENTARY TCP SOCKETS **7 Hours**

Introduction to Sockets – Socket Address Structures – Byte Ordering Functions – Byte Manipulation Functions – Elementary TCP Sockets – Socket, Connect, Bind, Listen, Accept, Read, Write, Close Functions – Iterative Server – Concurrent Server.

APPLICATION DEVELOPMENT **10Hours**

TCP Echo Server – TCP Echo Client – UDP Echo Server – UDP Echo Client – Server with Multiple Clients – Boundary Conditions: Server Process Crashes - Server Host Crashes - Server Crashes and Reboots - Server Shutdown – I/O multiplexing – I/O Models – Select Function – Shutdown Function – Poll Function.

SOCKET OPTIONS, ELEMENTARY NAME & ADDRESS CONVERSIONS **10Hours**

Socket Options – getsocket and setsocket Functions – Generic Socket Options – IP Socket Options – ICMP Socket Options – TCP Socket Options – Elementary UDP Sockets –Domain Name System – gethostbyname Function – gethostbyaddr Function – getservbyname and getservbyport Functions.

INTERNET PROTOCOLS – I **9 Hours**

Internetworking Concept and Architectural Model – Classful Internet Addresses -Mapping Internet Addresses to Physical Addresses (ARP) - Determining an Internet Address at Startup (RARP) - Internet Protocol: Connectionless Datagram Delivery - Internet Protocol: Routing IP Datagrams - Internet Protocol: Error and Control messages (ICMP) – Classless Inter Domain Routing (CIDR) – Classless Addressing (Supernetting) – The Effect of Supernetting on Routing – CIDR Address Blocks and Bit Masks – Address Blocks and CIDR Notation.

INTERNET PROTOCOLS – II 9 Hours

Reliable Stream Transport Service (TCP) – Timeout and Retransmission – Accurate Measurement of Round Trip Samples - Karn's Algorithm and Timer Backoff – Establishing a TCP Connection – Closing a TCP Connection – TCP Connection Reset – TCP State Machine – Silly Window Syndrome and Small Packets – Avoiding Silly Window Syndrome - Internet Multicasting -Internet Group Management Protocol (IGMP) - IGMP Implementation - Group Membership State Transitions -IGMP Message Format - Auto configuration (DHCP) - IPv6 : Features of IPv6- General form of an IPv6 Datagram - IPv6 Base Header Format - IPv6 Extension Headers - Parsing an IPv6 Datagram - IPv6 Fragmentation and Reassembly -The Consequence of End to End Fragmentation - IPv6 Source Routing - IPv6 options

Theory: 45 Hrs Tutorial: 0 Hr Total Hours:45

REFERENCES

1. Richard Stevens W, "Unix Network Programming Vol-I", Second edition, PHI / Pearson Education, 1998. (Units I – III).
2. Comer D.E., "Internetworking with TCP/IP Vol-I (Principles, Protocols and Architectures)", Fourth edition, PHI, 2003. (Unit IV & V).
3. Comer D.E., Stevens D.L., "Internetworking with TCP/IP Volume II: Design, Implementation, and Internals", Third edition, PHI, 1999.
4. Comer D.E., "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), Second edition, PHI, 2003.
5. Behrouz A. Forouzan, "TCP / IP Protocol Suite", Third edition, Tata McGraw Hill, 2005.

U13GST008	PROFESSIONAL ETHICS	L	T	P	C
		3	0	0	3

Course Objectives

- To create an awareness on Engineering Ethics and its use in ones profession
- To instill moral values, social values and loyalty
- To provide an insight into ones professional rights and a view of professional ethics in the global context

Course Outcomes

After successful completion of this course, the students should be able to

1. Understand the ethical theories and concepts
2. Understanding an engineer's work in the context of its impact on society
3. Understand and analyze the concepts of safety and risk
4. Understand the professional responsibilities and rights of Engineers
5. Understand the concepts of ethics in the global context

Course Content

ENGINEERING ETHICS AND THEORIES **9 Hours**

Definition, Moral issues, Types of inquiry, Morality and issues of morality, Kohlberg and Gilligan's theories, consensus and controversy, Professional and professionalism, moral reasoning and ethical theories, virtues, professional responsibility, integrity, self respect, duty ethics, ethical rights, self interest, egos, moral obligations.

SOCIAL ETHICS AND ENGINEERING AS SOCIAL EXPERIMENTATION **9 Hours**

Engineering as social experimentation, codes of ethics, Legal aspects of social ethics, the challenger case study, Engineers duty to society and environment.

SAFETY **9 Hours**

Safety and risk – assessment of safety and risk – risk benefit analysis and reducing risk – the Three Mile Island and Chernobyl case studies. Bhopal gas tragedy.

RESPONSIBILITIES AND RIGHTS OF ENGINEERS **9 Hours**

Collegiality and loyalty – respect for authority – collective bargaining – confidentiality – conflicts of interest – occupational crime – professional rights – employee rights – Intellectual Property Rights (IPR) – discrimination.

GLOBAL ISSUES AND ENGINEERS AS MANAGERS, CONSULTANTS AND LEADERS **9 Hours**

Multinational Corporations – Environmental ethics – computer ethics – weapons development – engineers as managers – consulting engineers – engineers as expert witnesses and advisors – moral leadership – Engineers as trend setters for global values.

Theory: 45 Hrs Tutorial: 0 Hr Total Hours:45

REFERENCES

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering". (2005) McGraw-Hill, New York.
2. John R. Boatright, "Ethics and the Conduct of Business", (2003) Pearson Education, New Delhi.
3. Bhaskar S. "Professional Ethics and Human Values", (2005) Anuradha Agencies, Chennai.
4. Charles D. Fleddermann, "Engineering Ethics", 2004 (Indian Reprint) Pearson Education / Prentice Hall, New Jersey.
5. Charles E. Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and cases", 2000 (Indian Reprint now available) Wadsworth Thompson Learning, United States.

U13ITP601	SYSTEM SOFTWARE LABORATORY	L	T	P	C
		0	0	3	1

Course Objectives

- To understand main components of System Software and their working.
- Learn system software programming through simulation

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate the creation of a symbol table for a given high level language program (S,K2)
2. Demonstrate Pass1 & Pass 2 of a 2 pass assembler (S,K3)
3. Demonstrate single pass assembler and macro processor (S,K3)
4. Demonstrate absolute and relocating loader (S,K3)
5. Demonstrate Pass 1 & 2 of a direct linking loader (S,K3)

Course Content

List of experiments

1. Program to implement pass one of a two pass assembler
2. Program to implement pass two of a two pass assembler
3. Program to implement a single pass assembler
4. Program to implement a macro processor
5. Program to implement an absolute loader
6. Program to implement a relocating loader

Total Hours: 45

U13ITP602 COMPUTER NETWORKS LABORATORY

L	T	P	C
0	0	3	1

Course Objectives

- To develop client server based applications using unix sockets.
- To use network simulation tools.
- To analyze the performance of network protocols using simulation tools.

Course Outcomes

After successful completion of this course, the students should be able to

1. Develop knowledge to implement client server applications (K3)
2. Develop skills in unix socket programming. (K3)
3. Develop skills to use simulation tools. (K3)
4. Analyze the performance of network protocols.(K4)
5. Analyze the network traffic. (K4)

Course Content

LIST OF EXPERIMENTS

1. Develop client server based TCP applications using UNIX socket programming functions.
2. Develop client server based UDP applications using UNIX socket programming functions.
3. Implementation of HTTP\DNS\ARP\RARP protocols.
4. Implementation of sliding window and CRC protocols.
5. Implementation of Distance Vector and Link state routing protocols.
6. Study of network simulation tools such as NS2 \ QUALNET.
7. Performance analysis of TCP\UDP protocol using simulation tool
8. Performance analysis of routing protocols using simulation tool.
9. Demonstrate the working of network tools such as Ping, TCPDump, Traceroute, Netstat, IPconfig.
10. Analyze the network traffic using Wireshark tool.

Total Hours: 45

		L	T	P	C
U13GHP601	**HUMAN EXCELLENCE NATIONAL VALUES** (Common to all branches of Engineering and Technology)	**1**	**0**	**1**	**1**

Course Objectives

- To produce responsible citizens.
- To uphold our culture and spiritual life.
- To realize the value of unity, service.
- To immunize the body.
- To get Divine peace through inward travel.

Course Outcomes

After successful completion of this course, the students should be able to

1. Acquire knowledge on the Enlightened Citizenship.
2. Demonstrate skills required for the Indian Culture and it's greatness.
3. Behave as responsible Great spiritual Leaders.
4. Analyze National Values identification and practice.

Course Content

RIGHTS AND RESPONSIBLE CITIZENSHIP **5 Hours**

Citizenship- its significance-Enlightened citizenship - what are the rights to citizenship Emerging India-its glory today- Global perspective

GREATNESS OF INDIAN CULTURE **5 Hours**

Outsiders view about India – about yoga - culture – joint family – morality – service - food– behavior – attitude – work.
Indian culture and it's greatness – dress coding - festivals – food is medicine – games – traditional medicines

INDIA AND PEACE **5 Hours**

India and Peace – who are the person to participate world peace - India and Spirituality- Great spiritual leaders – Shankarar – Ramanujar – mathvar – budha – mahaveerar – vallalar – Ramakrishna paramahamsar –mathaamirthananthamaayi – ramanar – aravindhar – annai.

INDIA'S MESSAGE TO THE WORLD **5 Hours**

India's message to the world – thiruvalluvar – thirukural – manivasagar – tiruvasagam – aravindhar – B.K.S Iyengar – yoga asanas – Sir C.V.Raman – Physics –ramanujam – maths – rabinthranathtagore – literature – A.P.J Abdulkalam.

GLOBAL PEACE **3 Hours**

It's role in global peace - – vethathiri maharishi – world peace –Thiruvalluvar – vallalar - Service and sacrifice-Unity in diversity – case studies-live examples - National values identification and practice.

MEDITATION & YOGASANAS **7 Hours**

Nine Centre Meditations – Introduction – practice – benefits.
Yogasanas – II

Total Hours:30

REFERENCES

1. World peace plane ---- Vethathiri Maharishi
2. Prosperous India ---- Swami Vivekananda
3. Samudhaya chikkalukkana nala Aaivugal ---- Vethathiri Maharishi
4. World Community Life ---- Vethathiriyam

ELECTIVE II

U13ITE201	MULTIMEDIA SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives

- An introduction to Multimedia Representations and Compression
- An idea of Multimedia Authoring and Presentations
- An understanding of Multimedia Communication Systems and Groupware

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the architecture and issues for distributed multimedia systems.
2. Explain the representation of sound in digital form.
3. Apply various compression techniques for images and videos.
4. Describe a multimedia systems framework.
5. Outline a simple multimedia application.

Course Content

USES OF MULTIMEDIA INFORMATION **9 Hours**

Multimedia and Personalized Computing - Multimedia Systems: The Challenges. Architectures and Issues for Distributed Multimedia Systems: Distributed Multimedia Systems – Synchronization - Orchestration - and QOS Architecture – The Role of Standard - A Framework For Multimedia Systems.
Digital Representation of Sound – Transmission of Digital Sound - Digital Audio Signal Processing -Digital Music Making – Brief Survey of Speech Recognition and Regeneration – Digital Audio and the Computer – Video Technology.

DIGITAL VIDEO AND IMAGE COMPRESSION **9 Hours**

Evaluating a Compression System – Redundancy and Visibility – Video Compression Techniques –JPEG Image Compression Standard – The MPEG Motion Video Compression Standard – DVI Technology - Middleware System Services Architecture – Goals of Multimedia System Service Architecture – Media Stream Protocol - Multimedia Device Presentation Service and User Interface - Multimedia Services and the Window System - Client Control of Continuous Media - Device Control - Temporal Coordination and Composition - Tool Kits - Hyper Applications.

MULTIMEDIA FILE SYSTEMS AND INFORMATION MODELS **9 Hours**

The Case for Multimedia Information Systems – File System Support for Continuous Media – Data Models for Multimedia and Hypermedia Information - Multimedia Presentation and Authoring: Current State of the Industry – Design Paradigms and User Interface – Barriers to Widespread Use.

MULTIMEDIA COMMUNICATIONS SYSTEMS **9 Hours**

Multimedia Services over the Public Network: Requirements, Architecture and Protocols – Applications – Network services – Network Protocols- Multimedia Interchange: Quick Time Movie File (QMF) Format – MHEG (Multimedia and Hypermedia Information Encoding Expert Group) – Format Function and Representation Summary – Real-Time Interchange -

Multimedia Conferencing: Teleconferencing Systems – Requirements for Multimedia Communications – Shared Application Architectures and Embedded Distributed Objects – Multimedia Conferencing Architectures.

MULTIMEDIA GROUPWARE **9 Hours**

Seams and Design Approaches – Architecture of Team Workstation – Experimental use of Team WorkStation - Nomenclature – Video versus Computing – HDTV, ATV, EDTV, IDTV – Standardization Issues - Knowledge–based Multimedia Systems – Problems Facing Multimedia Systems – The Anatomy of an Intelligent Multimedia System – Virtual Reality: architecture - technology.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. John. F. Koegel Buford, "Multimedia Systems", Pearson Education, 2001.
2. Nigel Chapman and Jenny Chapman, "Digital Multimedia", John Wiley & Sons, 2000.
3. Prabhat K.Andleigh, Kiran Thakrar , "Multimedia Systems Design", PHI, 2007.
4. Tay Vaughan, "Multimedia: Making It Work", TMH, 2010.
5. Roy S Kalawsky, "The Science of Virtual Reality and Virtual Environments", Addison Wesley, 1993.

U13ITE202	C# AND .NET PROGRAMMING	L	T	P	C
		3	0	0	3

Course Objectives

- Display proficiency in C# by building stand-alone applications and web applications in the .NET framework using C#.
- Utilize XML in the .NET environment to create Web Service-based applications and components.

Course Outcomes

After successful completion of this course, the students should be able to

1. Compare and contrast the advantages of C# over Java and vice versa. (K4)
2. Explain how C# provides support for OOPS concepts and event handling support.(K2)
3. Summarize the basics of Asynchronous programming (K2)
4. Develop the windows /web based applications using ADO.NET in C#.(K3)
5. Apply XML in the .NET environment to create Web Service-based applications and components (K3).

Course Content

9 Hours

.NET architecture: CLR-Intermediate Language-Assemblies-Framework Classes-Namespaces-C# basics-Objects and Types-Inheritance-Arrays-Operators and casts

9 Hours

Delegates and Events-Strings-Regular Expressions-Language Integrated Query: Overview-Standard Query operators-Parallel LINQ

9 Hours

Asynchronous programming**:** Patterns-Foundation-Error Handling-Cancellation-Memory Management and pointers-Reflection—Assemblies

9 Hours

Parallel class-Threads and Synchronization-Windows Services Architecture**:** Creation, Monitoring and Controlling of Services
ADO.NET: Database Connections-Commands-Data Reader class-Managing data and relationships-Populating a dataset

9 Hours

XML:XML classes in .NET-Reading and writing streamed XML-DOM in .NET- XPath Navigator-XML and ADO.NET-Serializing objects in XML-Different XML objects
Core ASP.NET- web forms-Web Controls-State Management Techniques

Theory: 45Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner," Professional C# 2012 and .NET 4.5",Wiley Publications,2012
2. Ian Griffiths," Programming C# 5.0"Oreilly publications,First edition,2012
3. Andrew Troelsen, "Pro C# 5.0 and the .NET 4.5 Framework,"Apress,Sixth edition,2012
4. Karli Watson, Jacob Vibe Hammer..et .al, "Beginning Visual C# 2012 Programming", Wiley Publications,2012

U13ITE203	EMBEDDED SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives

- To acquire knowledge in embedded systems and RTOS concepts.
- To understand the PIC microcontroller programming and interfacing
- To develop skills related to designing of embedded systems.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the characteristics and components of Embedded systems, their design tools and applications.(K2,A1)
2. Apply the fundamentals of engineering design and programming skills to develop Microcontroller based embedded applications. (K3,A3)
3. Understand the design life cycle of embedded applications.(K2,A1)

Course Content

ARCHITECTURE OF EMBEDDED SYSTEMS **9 Hours**

Introduction to Embedded Systems – categories, specialties and recent trends – Embedded Processor, Microprocessors, Microcontrollers, DSP and ASICs, Comparative Assessment of Embedded processors. Memory Devices, ROM and RAM Family, Interfacing Memory

AN 8 BIT EMBEDDED PLATFORM **9 Hours**

PIC Microcontroller - Architecture of PIC Mid range series 16F – PIC16F877A – Memory organization – Special Function Registers(SFR) and General Purpose Registers(GPR) – Instruction set – FSR - Addressing modes – EEPROM – System peripherals - WDT

EMBEDDED I/O AND COMMUNICATION **9 Hours**

User peripherals - Input-Output Ports and Interfacing, Simple I/O Programming, Interrupts and their Servicing, Timing Devices and Interfacing, Analog I/O Techniques - Embedded Communication - Parallel Bus Standards, Serial Bus Standards, Networking Standards, Wireless Standards.

EMBEDDED SYSTEM SOFTWARE **9 Hours**

Real-Time Operating Systems **(RTOS):** Introduction, Real Time Issues – Modeling Timing Constraints – Scheduling - Memory Management, I/O Management and Device Drivers. Introduction to software design -Software Development life cycle, Software modeling. Tools for design, development and testing of embedded software.

DESIGN AND APPLICATIONS **9 Hours**

Field Programmable Devices and Applications, Introduction to Hardware Description Languages, Design of systems using Embedded Processors and Components, Design - Case Studies.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Raj Kamal, "Embedded Systems Architecture, Programming and Design", Second edition, Tata McGraw-Hill, 2008.(Unit I,II,IV,V)
2. Ajay V Deshmukh, "Microcontroller Theory and Applications", Tata McGraw-Hill, 2007.(Unit III).
3. Prasad K.V.K.K, "Embedded/Real-Time Systems: Concepts, Design and Programming",Dream Tech Press, Reprint, 2009.
4. David E.Simon, "An Embedded Software Primer", Pearson Education, 2003.
5. Daniel W Lewis, "Fundamentals of Embedded Software", Pearson Education Asia, 2001.
6. John B Peatman, "Designing with PIC Microcontroller", Pearson, 1998.

U13ITE204	MOBILE APPLICATIONS PROGRAMMING	L	T	P	C
		3	0	0	3

Course Objectives

- To explain the mobile application environment and user interface designing.
- To create mobile applications using database, graphics and animation.
- To understand testing and versioning of mobile applications.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the Mobility landscape and its importance. (K2)
2. Identify the aspects of Mobile applications development. (K3)
3. Design and develop mobile applications using Android as development platform, with key focus on user experience design, native data handling and background tasks and notifications. (K6).
4. Experiment with native hardware play, location awareness, graphics, and multimedia. (K3)
5. Make use of different methods for testing, signing, packaging and distribution of mobile applications. (K3)

Course Content

GETTING STARTED WITH MOBILITY **9 Hours**

Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development

App user interface designing – mobile UI resources (Layout, UI elements, Drawable, Menu), Activity- states and life cycle, interaction amongst activities.

BUILDING BLOCKS OF MOBILE APPS **10Hours**

App functionality beyond user interface - Threads, Asynchronous task, Services – states and lifecycle, Notifications, Broadcast receivers, Telephony and SMS APIs

Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)

SPRUCING UP MOBILE APPS **9 Hours**

Graphics and animation – custom views, canvas, animation APIs, multimedia – audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope)

TESTING MOBILE APPS **8 Hours**

Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk

TAKING APPS TO MARKET **9 Hours**

Web Services, HTTP Client, XML and JSON, Versioning, signing and packaging mobile apps,

distributing apps on mobile market place

Theory: 45 Hrs Tutorial: 0 Hr Total Hours:45

REFERENCES

1. Barry Burd "Android Application Development All-in-One For Dummies" Wiley publications, edition 1.
2. Lauren Darcey, Shane Conder "Sams Teach Yourself Android Application Development in 24 Hours" Publisher: Sams; 1 edition (10 June 2010).
3. Rick Rogers, John Lombardo, Zigurd Mednieks, Blake Meike "Android Application Development: Programming with Google SDK**"**, O'Reilly publication**.**
4. Reto Meier "Professional Android 4 Application Development" Publisher: Wrox; 3rd edition (May 1, 2012).
5. Mark L. Murphy **"**The Busy Coder's Guide to Advanced Android Development**",** Commons Ware, LLC. Jul 2009: Version 1.0

ELECTIVE-III

U13ITE301	COMPUTATIONAL INTELLIGENCE	L	T	P	C
		3	1	0	4

Course Objectives

- Acquire knowledge on designing neural networks for an application.
- Develop skills to design systems with genetic algorithms to seek global optimum.
- Develop an attitude to illustrate the intelligent behavior of programs.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the basics of evolutionary computation(K2)
2. Describe the theory and applications of Neural Networks(K2)
3. Illustrate the Genetic Algorithms and Programming(K3)
4. Explain about the particle swarm optimization technique(K2)
5. Explain about Fuzzy logic and the implementation of fuzzy systems(K2)
6. Explain the details of components of computational intelligence(K2)

Course Content

6 Hours

Biological Basis for Neural Networks - Evolutionary Computation – Behavioral Motivations for Fuzzy Logic – Application Areas – Computational Intelligence Development

11Hours

Neural Network Theory – Components and Terminology – Topologies – Learning – Recall – Taxonomy - Preprocessing & Post Processing – Implementation of Neural Network – Back Propagation – Learning Vector Quantizer – Radial Basis Function Networks – Kohonen Self Organizing Maps.

11Hours

Neural Network Theory – Components and Terminology – Topologies – Learning – Recall – Taxonomy - Preprocessing & Post Processing – Implementation of Neural Network – Back Propagation – Learning Vector Quantizer – Radial Basis Function Networks – Kohonen Self Organizing Maps.

11Hours

Fuzzy System Theory – Fuzzy Sets and Fuzzy Logic – Approximate Reasoning – Issues – Fuzzy Systems Implementation.

6 Hours

Computation Intelligence Theory - Definitions – Relationships among Components of Intelligent Systems Implementations – Metrics.

Theory:45Hrs Tutorial:15Hrs **Total Hours:60**

REFERENCES

1. Russ Eberhart, Pat Simpson and Roy Dobbins, "Computational Intelligence–PC tools", AP Professional, 1996.
2. S.N.Sivanandam and S.N.Deepa, "Principles of Soft Computing", Wiley India (P) Ltd, First edition, 2007.
3. Simon Haykin, "Neural Networks, A Comprehensive Foundation", Second edition, Addison Wesley Longman, 2001.
4. Timothy J.Ross, "Fuzzy Logic with Engineering Application ", McGraw Hill, 1977.
5. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
6. S.Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.

U13ITE302	SOFTWARE ARCHITECTURE	L	T	P	C
		3	0	0	3

Course Objectives

- Acquire basic for analysis of software systems' behavior before the system has been built.
- Facilitates communication with stakeholders, contributing to a system that better fulfills their needs.
- Develop skills in architectural design decision and re-use of elements and patterns

Course Outcomes

After successful completion of this course, the students should be able to

1. Identify the key elements of software architecture (K1)
2. Understand how software architecture aids the different stages of the software life cycle(K2)
3. Classify a variety of architectural styles and how they may be combined in a single system (K2)
4. Recognize major software architectural styles , design patterns, and frameworks (K2)
5. Describe a software architecture using various documentation approaches and architectural description languages(K2)

Course Content

8 Hours

Introduction – software design levels – software engineering discipline – architecture business cycle – architectural patterns – reference models – architectural structures, views

9 Hours

Architectural styles – pipes and filters – object-orientation – invocation – layered systems – repositories – interpreters – process control – heterogeneous architectures – case studies

10Hours

Architecture and functionality – architecture qualities – architecture in the lifecycle - Architectural design - Shared information systems – database integration – integration in software development environments – architectural structures for shared information systems

9 Hours

Architectural design guidance – design space – design rules – applying design space – quantified design space – formal models and specification – formalizing architectural style, design space - z – notation

9 Hours

Linguistic issues – requirements for architectural description languages – first class connectors – adding implicit invocation to traditional programming languages – tools for architectural design – universal connector language - Software architecture. Documentation – reconstruction

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Mary shaw and David Garlan, Software Architecture – Perspectives on an emerging discipline, Pearson education, 2008. (unit 1 to 5)
2. Len Bass, Paul Clements, Rick Kazman, Software Architecture in Practice, Addison-Wesley, 2003. (unit 1, 3, 5)
3. Christine Hofmeister, Robert Nord, Dilip Soni, Applied Software Architecture: A Practical Guide for Software Designers, Addison-Wesley, 1999
4. David M. Dikel, David Kane, James R. Wilson, Software Architecture: Organizational Principles and Patterns, Prentice Hall, 2001
5. Jan Bosch, Morven Gentleman, Christine Hofmeister, Juha Kuusela, Software Architecture: System Design, Development and Maintenance, Springer, 2002

U13MAT601	DISCRETE MATHEMATICS	L	T	P	C
		3	1	0	4

Course Objectives

- Be able to construct simple mathematical proofs and possess the ability to verify them.
- Be able to understand logical arguments and logical constructs.
- Have a better understanding of sets and relations.
- Acquire ability to describe computer programs in a formal mathematical manner.

Course Outcomes

After successful completion of this course, the students should be able to

1. Construct simple mathematical proofs and possess the ability to verify them.
2. Understand logical arguments and logical constructs.
3. Know various graphs and its algorithms in computer programs.
4. Understanding of sets and relations.
5. Describe computer programs in a formal mathematical manner.

Course Content

SET THEORY **9 Hours**

Introduction to the theory of sets, combination of sets, power sets, finite and infinite sets, principle of inclusion and exclusion, selected problems from each topic.

LOGIC **9 Hours**

Proposition, Predicate logic, Logic operators, Logic proposition and proof, methods of proofs

GRAPH THEORY **9 Hours**

Path, Cycles, Handshaking theorem, Bipartite graphs, Sub-graphs, Graph isomorphism, Operation on graphs, Eulerian graphs and Hamiltonian graphs, Planar graphs, Euler formula, traveling salesman problem, Shortest path algorithms.

RELATIONS **9 Hours**

Definitions and properties, Equivalence relations and equivalence classes, Representations of relations by binary matrices and diagraph, Operations on relations, Closure of a relations, Reflexive, Symmetric and transitive closures, Warshall's algorithm to compute transitive closure of a relation.

BOOLEAN ALGEBRA AND LATTICES **9 Hours**

Partial order relations, POSETS, lattices, Boolean Algebra and Boolean Functions, Introduction to Boolean algebra and Boolean functions. Different representations of Boolean functions. Application of Boolean functions to synthesis of circuits.

Theory:45Hrs Tutorial:15Hrs **Total Hours:60**

REFERENCES

1. Liu C.L, "Elements of Discrete Mathematics, Second Edition, Mc Graw Hill 1985.
2. Mott J.L, Kandel A. and Baker T.P., "Discrete Mathematics for Computer Scientists and Mathematicians, Second Edition, Prentice Hall India, 1986.
3. Harary F, Graph Theory, Narosa, 1969.
4. Thomas H.C., A Leiserson C.E., Rivest R.L, Stein C.A., "Introduction to a Algorithms(2^{nd} Edition),MIT press and McGraw-Hill.2001.

U13ITE303	CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
		3	0	0	3

Course Objectives

- To understand the security attacks and avoidance mechanisms.
- To learn about authentication and encryption techniques.
- To develop skill in building security systems.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain security issues and objectives in computer systems and networks. [K2]
2. Explain the workings of fundamental cryptographic, authentication, network security and system security algorithms. [K2]
3. Identify the appropriate cryptography scheme & security mechanism for different computing environment and information systems. [K3]
4. Develop security protocols and methods to solve real-life security problems. [K3]
5. Analyze security of network protocols and systems. [K4]

Course Content

INTRODUCTION **10Hours**

OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms – A model for Network Security – Classical Encryption Techniques – Block Cipher Principles – DES – Strength of DES – Block Cipher Operation – AES – Triple DES .

PUBLIC KEY CRYPTOGRAPHY **9 Hours**

Key Distribution – Pseudorandom Number Generation – Introduction to Number Theory – Public Key Cryptography and RSA – Key Management – Diffie-Hellman Key Exchange – Elliptic Curve Arithmetic and Cryptography .

AUTHENTICATION AND HASH FUNCTION **9 Hours**

Authentication Requirements – Authentication Functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – Secure Hash Algorithm – HMAC Digital Signatures – Digital Signature Standard.

NETWORK SECURITY **8 Hours**

Authentication Applications – Kerberos Version 4 – Electronic Mail Security – PGP – IP Security Overview – Web Security – Secure Electronic Transaction – Intrusion Detection – Firewall Design Principles.

WIRELESS NETWORK SECURITY **9 Hours**

Wireless Local Area Network(WLAN) – Securing WLANs – Countermeasures – The Infamous WEP – Physical Security – Wireless Application Protocol (WAP) – Comparison of the TCP/IP,OSI, and WAP models – WAP Security Architecture – Marginal Security – Wireless Transport Layer Security (WTLS) –Secure Socket Layer – WTLS and WAP

Theory: 45Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Fifth
   edition, Prentice Hall of India, 2008
2. Randall K.Nichols, Panos C.Lekkas, "Wireless Security- Models, Threats, and Solutions",McGraw Hill, 2001.
3. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2009.
4. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2008.
5. Charles B. Pfleeger and Shari Lawrence Pfleeger, "Security in Computing", Fourth edition, Pearson Education, 2006.

ELECTIVE-II
LABORATORY

U13ITEP201	COMPUTER GRAPHICS & MULTIMEDIA SYSTEMS LABORATORY	L	T	P	C
		0	0	3	1

Course Objectives

- Implement 2D and 3D object generations, transformations and viewing
- Introduction to image processing in MATLAB
- Experience on image editing software and authoring tools

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate graphics output primitive using various algorithms. (K3)
2. Use the mathematical concepts for 2D and 3D transformations. (K3)
3. Use the underlying algorithms for modeling and viewing coordinate transformations. (K3)
4. Prepare simple scenes using image editing and animation software. (K3)
5. Model a simple multimedia application. (K4)

Course Content

Implement the exercises from 1 to 4 using C/C++

1. Implementation of DDA and Bresenhams Line Algorithms for all slopes
2. Implementation of Midpoint Circle Algorithm
3. 2D Geometric Transformations – Translation, Rotation, Scaling, Reflection, Shearing
4. Cohen - Sutherland Line Clipping Algorithm

Implement the exercises from 5 to 7 using OpenGL

5. 3D Transformations - Translation, Rotation, Scaling
6. 3D Projections – Parallel, Perspective
7. Creating 3D Scenes

8. Image processing techniques using MATLAB
    a) 2D Fourier Transform
    b) Image enhancement

9. Image Editing and Manipulation - Basic Operations on image using any Image editing software, Creating gif animated images, Image optimization

10. 2D Animation – To create Interactive animation using any authoring tool

Total Hours: 45

U13ITEP202	C# AND .NET PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	1

Course Objectives

- Acquire practical knowledge in C# language and develop applications in it
- Gain proficiency in developing distributed data-driven applications using the .NET Framework, C#, SQL Server and ADO.NET, C#, ASP.NET, SQL Server and ADO.NET

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate good understanding in the basics of C# language .(K2)
2. Build a console based application using the object oriented principles , event handling and Asynchronous programming concepts in C#(K3)
3. Choose the basic controls in WPF and apply to develop the feature rich Windows application using C#(K3)
4. Make Use of the web control to develop web based application to access and manipulate data in a database using ADO.NET (K3)
5. Construct the web services to employ in the Web application. (K3)

Course Content

1. Simple programs using C# class
2. Program using Regular expressions
3. Program using events and delegation.
4. Program for operator overloading
5. Implementation of asynchronous programming
6. Study of basic controls in WPF.
7. Application development using windows controls and event handling
8. Application development for ADO.NET - connected architecture.
9. Application development for ADO.NET - disconnected architecture.
10. Developing a Web application ASP.NET using basic controls
11. Implementation of state management techniques for a Web Application development using ASP.NET Web Controls
12. Creation of simple web services in ASP.NET and using it for an application.

Total Hours: 45

U13ITEP203 EMBEDDED SYSTEM LABORATORY

L	T	P	C
0	0	3	1

Course Objectives

- To acquire practical knowledge in microcontroller and RTOS concepts.
- To understand the microcontroller programming and interfacing
- To develop skills related to design Embedded systems using simulation tools.

Course Outcomes

After successful completion of this course, the students should be able to

1. Understand the microcontroller programming and interfacing (K2)
2. Develop skills related to designing embedded systems applications. (K5)
3. Apply the various tools for designing Embedded Systems. (K3)

Course Content

1. Interfacing exercises using 8 bit Microcontrollers 8051/PIC Microcontrollers
   i) I/O Programming, Timers, Interrupts, Serial port programming
   ii) PWM Generation, Motor Control, ADC/DAC, LCD and RTC Interfacing, Sensor Interfacing
2. Programming exercises using 16 bit processors and 32 bit processors - I/O programming, Timers, Interrupts, Serial Communication, ADC,DAC
3. Study of one type of Real Time Operating Systems (RTOS).
4. Familiarity with Programmable Logic Devices using Xilinx/Altera FPGA and CPLD.
5. Simulation of simple applications of embedded processors in signal processing, real time control and consumer electronics using MATLAB/ LABVIEW.

Total Hours: 45

U13ITEP204	MOBILE APPLICATIONS PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	1

Course Objectives

- To develop mobile applications using various controls and activities.
- To create mobile applications using multimedia content programming.
- To develop mobile applications for data storage and retrieval using SqLite.

Course Outcomes

After successful completion of this course, the students should be able to

1. Build mobile applications using listeners. (K6)
2. Build applications based on various controls, Intents and using external resources. (K6)
3. Develop applications that communicate between activities. K(3)
4. Create Mobile applications using SqLite database and multimedia content programming. (K6)

Course Content

1. CREATING YOUR FIRST ANDROID APPLICATION
   The Hello World Application
   Working with the Emulator
   Strings
   Drawable
   Introducing the Manifest
   Understanding the Activity Lifecycle

2. CREATING LISTENERS
   Listeners Using an Inner Class
   Listeners Using an Interface
   Listeners By Variable Name
   Long Clicks
   Keyboard Listeners

3. UNDERSTANDING ANDROID VIEW CONTAINERS
   Linear Layout
   Relative Layout
   Table Layout
   List View

4. Create applications with Toast notifications.

5. ANDROID WIDGETS
   Custom Buttons
   Toggle Buttons
   Checkboxes and Radio Buttons

Spinners
Auto complete Text Box
Map View
Web Views
Time and Date Pickers

6. COMMUNICATING BETWEEN ACTIVITIES
   Switching Activities

7. AUDIO AND VIDEO
   Create android audio/video applications.

8. Create android application to Create, Modify and Query on SQLite database.
9. Create Location-Aware application that uses Proximity Alerts and Google Maps API
10. Create application with One-Time, Repeating Alarms, and Long-Running Background Task as Service

Total Hours: 45

SEMESTER VII

U13ITT701 MOBILE AND PERVASIVE COMPUTING

L	T	P	C
3	1	0	4

Course Objectives

- To acquire knowledge about wireless network architecture
- To study the wireless communication protocols
- To gain insight of pervasive devices and their applications.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the concepts and features of mobile computing and transmission technologies. (K2)
2. Explain the working of wireless communication protocols. (K2)
3. Compare the working of wireless routing protocols. (K2)
4. Compare wired and wireless protocols. (K4)
5. Outline the characteristics of pervasive computing applications including the major system components and architectures of the systems. (K2)

Course Content

MOBILE NETWORKS **9 Hours**

Cellular Wireless Networks – GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS.

WIRELESS NETWORKS **9 Hours**

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services –Network – HiperLAN – Blue Tooth- Wi-Fi – WiMAX

ROUTING **9 Hours**

Mobile IP – DHCP – AdHoc– Proactive and Reactive Routing Protocols – Multicast Routing.

TRANSPORT AND APPLICATION LAYERS **9 Hours**

Mobile TCP– WAP – Architecture – WWW Programming Model– WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WML Scripts.

PERVASIVE COMPUTING **9 Hours**

Pervasive computing infrastructure-applications- Device Technology - Hardware, Human-machine Interfaces, Biometrics, and Operating systems– Device Connectivity – Protocols, Security, and Device Management- Pervasive Web Application architecture- Access from PCs and PDAs - Access via WAP.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:60**

REFERENCES

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2003.
2. Jochen Burkhardt, Pervasive Computing: Technology and Architecture of Mobile Internet

Applications, Addison-Wesley Professional; 3rd edition, 2007
3. Frank Adelstein, Sandeep KS Gupta, Golden Richard, Fundamentals of Mobile and Pervasive Computing, McGraw-Hill 2005
4. Debashis Saha, Networking Infrastructure for Pervasive Computing: Enabling Technologies, Kluwer Academic Publisher, Springer; First edition, 2002
5. Introduction to Wireless and Mobile Systems by Agrawal and Zeng, Brooks/ Cole (Thomson Learning), First edition, 2002
6. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of Mobile Computing, Springer, New York, 2003.

U13GST003	PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3

Course Objectives

- To study the importance and functions of management in an organization
- To study the importance of planning and also the different types of plan
- To understand the different types of organization structure in management
- To understand the basis and importance of directing and controlling in management
- To understand to the importance of corporate governance and social responsibilities.

Course Outcomes

After successful completion of this course, the students should be able to

1. Understand the concepts of management, administration and the evolution of management thoughts.
2. Understand and apply the planning concepts.
3. Analyze the different organizational structures and understand the staffing process.
4. Analyze the various motivational and leadership theories and understand the communication and controlling processes.
5. Understand the various international approaches to management

Course Content

MANAGEMENT CONTEXT **9 Hours**

Management – Definition – Importance – Functions – Skills required for managers - Roles and functions of managers – Science and Art of Management –Management and Administration. Evolution of Classical, Behavioral and Contemporary management thoughts.

PLANNING **9 Hours**

Nature & Purpose – Steps involved in Planning – Forms of Planning – Types of plans – Plans at Individual, Department and Organization level - Managing by Objectives. Forecasting – Purpose – Steps and techniques. Decision-making – Steps in decision making.

ORGANISING **9 Hours**

Nature and Purpose of Organizing - Types of Business Organization - Formal and informal organization – Organization Chart – Structure and Process – Strategies of Departmentation– Line and Staff authority – Benefits and Limitations. Centralization Vs De-Centralization and Delegation of Authority. Staffing – Manpower Planning – Recruitment – Selection – Placement – Induction.

DIRECTING & CONTROLLING **9 Hours**

Nature & Purpose – Manager Vs. Leader - Motivation - Theories and Techniques of Motivation.
Leadership – Styles and theories of Leadership.
Communication – Process – Types – Barriers – Improving effectiveness in Communication.
Controlling – Nature – Significance – Tools and Techniques.

CONTEMPORARY ISSUES IN MANAGEMENT **9 Hours**

Corporate Governance Social responsibilities – Ethics in business – Recent issues.
American approach to Management, Japanese approach to Management, Chinese approach to Management and Indian approach to Management.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Tripathy PC And Reddy PN, "Principles of Management", Tata McGraw-Hill, 4th Edition, 2008.
2. Dinkar Pagare, "Principles of Management", Sultan Chand & Sons, 2000.
3. Kanagasapapathi. P (2008) Indian Models of Economy, Business and Management, Prentice Hall of India, New Delhi, ISBN: 978-81-203-3423-6.
4. G.K.Vijayaraghavan and M.Sivakumar, "Principles of Management", Lakshmi Publications, 5th Edition, 2009.
5. Harold Koontz & Heinz Weihrich, "Essentials of Management – An International perspective", 8th edition. Tata McGraw-Hill, 2009.
6. Charles W.L. Hill and Steven L McShane – Principles of Management, Tata Mc Graw-Hill, 2009.

U13ITT702	WEB TECHNOLOGY	L	T	P	C
		3	1	0	4

Course Objectives

- Develop skills in analyzing the significance of a web site.
- Learn the language of the web and the importance of web servers
- Be able to embed social media content into web pages.
- Implement and understand how to interpret basic web analytics

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the role of various web languages and HTTP in an web application [k2]
2. Apply the knowledge of web programming languages to design and manipulate the data in the website[k3]
3. Compare client side and server side technologies[k4]
4. Develop a professional and interactive web application.[k3]
5. Examine the need of web services in a web application .[k4]

Course Content

9 Hours

Web Essentials: Clients, Servers, and Communication. The Internet - Basic Internet Protocols - The World Wide Web - HTTP request message - response message - Web Clients - Web Servers - Markup Languages: XHTML. An Introduction to HTML – History –Versions -Basic XHTML Syntax and Semantics - Fundamentals of HTML
Style Sheets: CSS - Introduction to Cascading Style Sheets – Features - Core Syntax - Style Sheets and HTML - Cascading and Inheritance - Text Properties - Positioning

9 Hours

Client-Side Programming: Introduction to JavaScript – Functions – Objects – Arrays – Built - in Objects - JavaScript Debuggers. Browsers and the DOM - Introduction to the Document Object Model DOM History and Levels - Intrinsic Event Handling - Modifying Element Style - The Document Tree -DOM Event Handling

9 Hours

XML: Documents and Vocabularies - Versions and Declaration -Namespaces JavaScript and XML: Ajax-DOM based XML processing.
Selecting XML Data: XPATH - Template based Transformations: XSLT - Displaying XML Documents in Browsers.

9 Hours

JSF: Introduction – Java Web Technologies – Creating and running simple application- JSF components -Session Tracking.
Java Web Services: Basics- Creating, Publishing and Consuming Web Services - Session Tracking in Web Services

9 Hours

Web Servers (IIS and APACHE)-ASP.NET 2.0: Simple Web Form Creation – Web Controls-Session Tracking

Theory:45Hrs Tutorial:15Hrs **Total Hours:60**

REFERENCES

1. Jeffrey C.Jackson, "Web Technologies-A Computer Science Perspective", Pearson Education, 2006. (Unit 1,2,3)
2. H.M.Deitel, P.J. Deitel , et.al "Internet & World Wide Web - How To Program", Pearson Education, Fourth Edition, 2008. (Unit 4,5)
3. http://www.w3schools.com
4. Robert. W. Sebesta, "Programming the World Wide Web", Pearson Education, Fourth edition, 2007.

U13ITP701 WIRELESS NETWORKS LABORATORY

L	T	P	C
0	0	3	1

Course Objectives

- To acquire knowledge in wireless network concepts.
- To develop skills in building mobile application.
- To understand the use of simulation tools to study the behavior of wireless networks

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate knowledge in use of simulation tool (k2)
2. Develop skills to install and configure wireless devices (k3)
3. Evaluate the performance of wireless routing protocols (K5)
4. Examine the effect of MAC layer characteristics of a wireless network (k4)

Course Content

LIST OF EXPERIMENTS

1. Demonstrate installation of a WLAN adapter card in a desktop and laptop
2. Demonstrate configuration of an wireless access point
3. Develop a mobile application that turns on Bluetooth and communicate with another phone and transfer a picture file from one phone to other.
4. Develop a mobile application to enable a continuous chat between the two phones.
5. Analyze the behavior of wireless network in infrastructure and ad hoc mode.
6. Evaluate the performance of unicast routing protocol in ad hoc networks.
7. Evaluate the performance of multicast routing protocols in ad hoc networks.
8. Evaluate the performance of broadcasting in ad hoc networks.
9. Evaluate the performance of various queuing disciplines in ad hoc networks.
10. Examine the effect of physical and MAC layer characteristics of wireless links using signal strength, data rate, retransmission and delay measurement.

Total Hours: 45

U13ITP702	WEB TECHNOLOGY LABORATORY	L	T	P	C
		0	0	3	1

Course Objectives

- Understand the importance of the web as a medium of communication.
- Develop skills in analyzing the usability of a web site.
- Implement and understand how to interpret basic web analytics.
- Become familiar with graphic design principles that relate to web design.

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate the creation of web pages using HTML, DHTML and Cascading Styles sheets.(k6)
2. Analyze a web page and identify its elements and attributes(k4)
3. Build dynamic web pages using JavaScript(k3)
4. Develop XML documents and XML Schema.(k3)
5. Build interactive web applications using ASP.NET.(k3)

Course Content

LIST OF EXPERIMENTS

1. Create a web site using web development tool
2. Create a web page with all types of Cascading style sheets
3. Client Side Scripts for Validating Web Form Controls using JavaScript
4. Client side scripting for roll over image and random image display using JavaScript
5. Program using XML Schema (2 programs)
6. Program using XSLT/XSL
7. Program using JSF(2 programs)
8. Program to develop web services in java and consume it using an application(2 programs)
9. Program for ASP.NET using web controls

Total Hours: 45

		L	T	P	C
U13GHP701	**HUMAN EXCELLENCE GLOBAL VALUES-I** (Common to all branches of Engineering and Technology)	**1**	**0**	**0**	**1**

Course Objectives

- To realize global brotherhood and protect global.
- To know the youths participation in politics.
- To know importance of retain of our culture and Maintain
- To know impact of global terrorism.
- To know the current economic status among the youths.

Course Outcomes

After successful completion of this course, the students should be able to

1. Behave as responsible human beings respecting the global values.
2. Acquire knowledge on the complex patterns involved in maintaining world's peace and ecological balance.
3. Demonstrate skills required for the emergency of mono-culture at the global level.
4. To learn about Man is the cause and Man is the solution.

Course Content

GLOBAL BROTHERHOOD AND PROTECT GLOBE **5 Hours**

Global values – understanding and identification – its importance - Racial discrimination and solution

MAN IS THE CAUSE AND MAN IS THE SOLUTION **5 Hours**

Ecological imbalance – global warming – rain fall – status – acid rain – plastic usage – control - Political upheavals – nowadays political status – basic rights to citizen – corruption – youths participate in politics –e.g: M.K.Stalin – Kanimozhi – ragul Gandhi.

GREATNESS OF CULTURE **5 Hours**

Social inequality and solution– live case discussions and debate – black money – poverty people - Cultural degradation– live case discussions and debate – difference between Indian culture & western culture – impact of western culture in India – how to retain our culture and solution.

EMERGENCE OF MONOCULTURE **4 Hours**

Emergence of monoculture – solution - Global terrorism – it's cause and effect – solution

MARGINALIZATION OF GLOBAL ECONOMIC **4 Hours**

Economic marginalization and solution – it's impact in the globe – globalization in market – its effect in local market – merits – demerits of globalization - Man is the cause and man is the solution.

MEDITATION & YOGASANAS **7 Hours**

Nithyananda Meditation & Divine Meditation – Introduction – practice – benefits.
Yogasanas – III

Total Hours:30

REFERENCES

1. World peace plane ---- Vethathiri Maharishi
2. Prosperous India ---- Swami Vivekananda
3. Samudhaya chikkalukkana nala Aaivugal ---- Vethathiri Maharishi
4. World Community Life --- Vethathiri Maharishi

ENGINEERING SCIENCE ELECTIVES

U13ITES01	BUSINESS PROCESS MODELS	L	T	P	C
		3	0	0	3

Course Objectives

- Skill to develop basic business process model.
- Understand the Modeling of process

Course Outcomes

After successful completion of this course, the students should be able to

1. Summarize the principles of organizational strategy and process design. (K2)
2. Explain the role of IT in BPM. (K2)
3. Analyze the performance of existing processes and identify process improvement. (K4)
4. Predict business solutions in written and verbal forms for process innovation and redesign projects. (K3)
5. Create a BPM implementation strategy and implementation plan for an organization.(K5)

Course Content

UNDERSTANDING BUSINESS PROCESS **9 Hours**

Organizations as Systems - Effective Operations Management - Adding Value - Competing on Capabilities - Value Chain and Competitive Advantage

CUSTOMER AND MATERIAL PROCESSING **9 Hours**

Marketing in a Changing World - Relationship Marketing - Purchasing - Concept of a Manufacturing System - Logistics and Competitive Strategy - Reverse Logistics - The Triumph of Process

PROCESS MODELING **9 Hours**

Process Modeler's Needs - Basic Concepts in Process Modeling - Modeling with RADS - Animating a Process.

LARGE PROCESSES **9 Hours**

Micro-Modeling of Processes - Modeling Large Processes - Process Patterns

MANAGING THE MODEL **9 Hours**

Modeling the Materials in the Process – Analyzing a Process Model – Managing the Modeling.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Davis Barnes(Editor),"Understanding Business:Process", Routledge,USA,2000(Units I & II).
2. Martyn A Ould, "Business Processes: Modelling and Analysis for Re-Engineering and

Improvement", John Wiley & Sons, USA, 1995 (Units III- V).
3. Howard Smith and Peter Fingar, "Business Process Management (BPM): The Third Wave", Meghan-Kiffer Press, USA, 2003.
4. Roger Burlton, "Business Process Management: Profiting from Process", SAMS, USA, 2001.
5. Mike Jacka J, Paulette J Keller, "Business Process Mapping: Improving Customer Satisfaction", John Wiley & Sons, USA, 2001.
6. Faisal Haque, "e-Enterprise: Business Models, Architecture and Components", Cambridge University Press, UK, 2000.
7. Ulric J Gelinas et al. "Business Processes and Information Technology", Thompson Learning, India, 2004.

U13ITES02 BUILDING ENTERPRISE APPLICATIONS

L	T	P	C
3	0	0	3

Course Objectives

- Familiarize with the concept of Enterprise Analysis, Business Modeling and application architecture.
- Construct and develop different solution layers with an understanding of application framework
- Understand different testing involved with enterprise application

Course Outcomes

After successful completion of this course, the students should be able to

1. Describe the concept of Enterprise Analysis and Business Modeling (K2)
2. Explain requirements validation, planning and estimation (K2)
3. Demonstrate a simple application design in a framework (K3)
4. Explain the construction and development of different solution layers (K2)
5. Describe different testing levels and rolling out an enterprise application (K2)

Course Content

6 Hours

Overview of ERP and its Benefits- ERP and Related Technologies- Business Intelligence - Business Process Reengineering (BPR)
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

9 Hours

Inception of enterprise applications- enterprise analysis- business modeling- requirements elicitation- use case modeling- prototyping- non functional requirements- requirements validation- planning and estimation (Includes practice sessions)

12Hours

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

9 Hours

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

9 Hours

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 (Includes practice sessions)

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, Veerakumar Esakimuthu "Raising Enterprise Applications", John Wiley, April 2010.
2. Brett McLaughlin, "Building Java Enterprise Applications", O'Reilly Media, March 2002.
3. Alexis Leon, "ERP Demystified", Second Edition, Tata McGraw Hill, New Delhi, 2008.
4. Soren Lauesen, "Software Requirements: Styles & Techniques", Addison-Wesley Professional, 2002.
5. Inderjeet Singh, Mark Johnson, Beth Stearns, "Designing Enterprise Applications with the J2EE Platform", second edition, Pearson Education, 2002.

U13GST002	TOTAL QUALITY MANAGEMENT	L	T	P	C
		3	0	0	3

Course Objectives

- Acquire knowledge on TQM concepts
- Acquire knowledge on quality systems
- Develop skills to use TQM tools for domain specific applications

Course Outcomes

After successful completion of this course, the students should be able to

1. Understand quality concepts and philosophies of TQM
2. Apply TQM principles and concepts of continuous improvement
3. Apply and analyze the quality tools, management tools and statistical fundamentals to improve quality
4. Understand the TQM tools as a means to improve quality
5. Remember and understand the quality systems and procedures adopted

Course Content

INTRODUCTION **9 Hours**

Definition of Quality, Dimensions of Quality, Quality costs, Top Management Commitment, Quality Council, Quality Statements, Barriers to TQM Implementation, Contributions of Deming, Juran and Crosby, Team Balancing

TQM PRINCIPLES **9 Hours**

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Continuous Process Improvement,5S, Kaizen, Just-In-Time and TPS

STATISTICAL PROCESS CONTROL **9 Hours**

The seven tools of quality, New seven Management tools, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Concept of six sigma.

TQM TOOLS **9 Hours**

Quality Policy Deployment (QPD), Quality Function Deployment (QFD), Benchmarking, Taguchi Quality Loss Function, Total Productive Maintenance (TPM), FMEA

QUALITY SYSTEMS **9 Hours**

Need for ISO 9000 and Other Quality Systems, ISO 9001:2008 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 14001:2004

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1.Dale H.Besterfiled, “Total Quality Management”, Pearson Education
2.James R.Evans & William M.Lidsay, “The Management and Control of Quality”, South-Western (Thomson Learning), 2008.
3.Feigenbaum.A.V. “Total Quality Management”, McGraw Hill
4.Oakland.J.S. “Total Quality Management”, Butterworth – Hcinemann Ltd., Oxford
5.Narayana V. and Sreenivasan, N.S. “Quality Management – Concepts and Tasks”, New Age International 2007.
6.Zeiri. “Total Quality Management for Engineers”, Wood Head Publishers

		L	T	P	C
U13GST004	**OPERATIONS RESEARCH**	**3**	**1**	**0**	**4**

Course Objectives

- Apply knowledge of OR techniques to domain specific industrial situations to optimize the quality of decisions
- Conduct investigations by the use of OR techniques

Course Outcomes

After successful completion of this course, the students should be able to

1. Apply linear programming model and assignment model to domain specific situations
2. Analyze the various methods under transportation model and apply the model for testing the closeness of their results to optimal results
3. Apply the concepts of PERT and CPM for decision making and optimally managing projects
4. Analyze the various replacement and sequencing models and apply them for arriving at optimal decisions
5. Analyze the inventory and queuing theories and apply them in domain specific situations.

Course Content

LINEAR MODEL **9 Hours**

The phases of OR study – formation of an L.P model – graphical solution – simplex algorithm – artificial variables technique (Big M method, two phase method), duality in simplex

TRANSPORTATION AND ASSIGNMENT MODELS **9 Hours**

Transportation model – Initial solution by North West corner method – least cost method – VAM. Optimality test – MODI method and stepping stone method
Assignment model – formulation – balanced and unbalanced assignment problems

PROJECT MANAGEMENT BY PERT & CPM **9 Hours**

Basic terminologies – Constructing a project network – Scheduling computations – PERT - CPM – Resource smoothening, Resource leveling, PERT cost

REPLACEMENT AND SEQUENCING MODELS **9 Hours**

Replacement policies - Replacement of items that deteriorate with time (value of money not changing with time) – Replacement of items that deteriorate with time (Value of money changing with time) – Replacement of items that fail suddenly (individual and group replacement policies)
Sequencing models- n job on 2 machines – n jobs on 3 machines – n jobs on m machines, Traveling salesman problem

INVENTORY AND QUEUING THEORY **9 Hours**

Variables in inventory problems, EOQ, deterministic inventory models, order quantity with price break, techniques in inventory management

Queuing system and its structure – Kendall's notation – Common queuing models - M/M/1: FCFS/∞/∞ - M/M/1: FCFS/n/∞ - M/M/C: FCFS/∞/∞ -
M/M/1: FCFS/n/m

Theory: 45 Hrs Tutorial: 15 Hrs **Total Hours:60**

REFERENCES

1. Taha H.A., "Operation Research", Pearson Education
2. Hira and Gupta "Introduction to Operations Research", S.Chand and Co.2002
3. Hira and Gupta "Problems in Operations Research", S.Chand and Co.2008
4. Wagner, "Operations Research", Prentice Hall of India, 2000
5. S.Bhaskar, "Operations Research", Anuradha Agencies, Second Edition, 2004

U13GST005	ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT	L	T	P	C
		3	0	0	3

Course Objectives

- Acquire knowledge of economics to facilitate the process of economic decision making
- Acquire knowledge on basic financial management aspects
- Develop the skills to analyze financial statements

Course Outcomes

After successful completion of this course, the students should be able to

1. Evaluate the economic theories, cost concepts and pricing policies
2. Understand the market structures and integration concepts
3. Understand the measures of national income, the functions of banks and concepts of globalization
4. Apply the concepts of financial management for project appraisal
5. Understand accounting systems and analyze financial statements using ratio analysis

Course Content

ECONOMICS, COST AND PRICING CONCEPTS **9 Hours**

Economic theories – Demand analysis – Determinants of demand – Demand forecasting – Supply – Actual cost and opportunity cost – Incremental cost and sunk cost – Fixed and variable cost – Marginal costing – Total cost – Elements of cost – Cost curves – Breakeven point and breakeven chart – Limitations of break even chart – Interpretation of break even chart – Contribution – P/V-ratio, profit-volume ratio or relationship – Price fixation – Pricing policies – Pricing methods.

CONCEPTS ON FIRMS AND MANUFACTURING PRACTICES **9 Hours**

Firm – Industry – Market – Market structure – Diversification – Vertical integration – Merger – Horizontal integration

NATIONAL INCOME, MONEY AND BANKING, ECONOMIC ENVIRONMENT **9 Hours**

National income concepts – GNP – NNP – Methods of measuring national income – Inflation – Deflation – Kinds of money – Value of money – Functions of bank – Types of bank – Economic liberalization – Privatization – Globalization

CONCEPTS OF FINANCIAL MANAGEMENT **9 Hours**

Financial management – Scope – Objectives – Time value of money – Methods of appraising project profitability – Sources of finance – Working capital and management of working capital

ACCOUNTING SYSTEM, STATEMENT AND FINANCIAL ANALYSIS **9 Hours**

Accounting system – Systems of book-keeping – Journal – Ledger – Trail balance – Financial statements – Ratio analysis – Types of ratios – Significance – Limitations

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Prasanna Chandra, " Financial Management (Theory & Practice) TMH
2. Weston & Brigham, " Essentials of Managerial Finance"
3. Pandey, I. M., "Financial Management"
4. Fundamentals of Financial Management- James C. Van Horne.
5. Financial Management & Policy -*J*ames C. Van Horne
6. Management Accounting & Financial Management- M. Y. Khan & P. K. Jain
7. Management Accounting Principles & Practice -P. Saravanavel

	L	T	P	C
U13GST006 PRODUCT DESIGN AND DEVELOPMENT	**3**	**0**	**0**	**3**

Course Objectives

- Acquire knowledge on the various stages of a product development process
- Develop skills for using the various tools and techniques for developing products
- Acquire knowledge on project management techniques

Course Outcomes

After successful completion of this course, the students should be able to

1. Understand the process to plan and develop products
2. Understand the process of collecting information and developing product specifications
3. Understand the concept generation, selection and testing processes
4. Understand the concepts of product architecture, industrial design and design for manufacture
5. Understand the basics of prototyping, economic analysis and project planning and execution processes

Course Content

INTRODUCTION - DEVELOPMENT PROCESSES AND ORGANIZATIONS - PRODUCT PLANNING **9 Hours**

Characteristics of successful product development to Design and develop products, duration and cost of product development, the challenges of product development.

A generic development process, concept development: the front-end process, adapting the generic product development process, the AMF development process, product development organizations, the AMF organization.

The product planning process, identify opportunities. Evaluate and prioritize projects, allocate resources and plan timing, complete pre project planning, reflect all the results and the process

IDENTIFYING CUSTOMER NEEDS - PRODUCT SPECIFICATIONS **9 Hours**

Gathering raw data from customers, interpreting raw data in terms of customer needs, organizing the needs into a hierarchy, establishing the relative importance of the needs and reflecting on the results and the process.

Specifications, establish specifications, establishing target specifications setting the final specifications.

CONCEPT GENERATION - CONCEPT SELECTION - CONCEPT TESTING **9 Hours**

The activity of concept generation clarify the problem search externally, search internally, explore systematically, reflect on the results and the process

Overview of methodology, concept screening, concept scoring, caveats.

Purpose of concept test, choosing a survey population and a survey format, communicate the concept, measuring customer response, interpreting the result, reflecting on the results and the process.

PRODUCT ARCHITECTURE - INDUSTRIAL DESIGN - DESIGN FOR MANUFACTURING **9 Hours**

Meaning of product architecture, implications of the architecture, establishing the architecture, variety and supply chain considerations, platform planning, related system level design issues. Assessing the need for industrial design, the impact of industrial design, industrial design process, managing the industrial design process, is assessing the quality of industrial design.

Definition, estimation of manufacturing cost, reducing the cost of components, assembly, supporting production, impact of DFM on other factors.

PROTOTYPING - PRODUCT DEVELOPMENT ECONOMICS - MANAGING PROJECTS **9 Hours**

Prototyping basics, principles of prototyping, technologies, planning for prototypes.

Elements of economic analysis, base case financial mode,. Sensitive analysis, project trade-offs, influence of qualitative factors on project success, qualitative analysis.

Understanding and representing task, baseline project planning, accelerating projects, project execution, postmortem project evaluation.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Product Design and Development: Karl. T. Ulrich, Steven D Eppinger,. Irwin McGrawHill.
2. Product Design and Manufacturing: A C Chitale and R C Gupta, PHI
3. New Product Development: Timjones. Butterworth Heinmann,, Oxford. UCI.
4. Product Design for Manufacture and Assembly: Geoffery Boothroyd, Peter Dewhurst and Winston Knight.

ELECTIVE – IV

U13ITE401	HIGH SPEED NETWORKS	L	T	P	C
		3	0	0	3

Course Objectives

- To study the fundamentals high performance networks.
- To study the principles of queuing model and congestion management.
- To study about QoS and Protocols of QoS.

Course Outcomes

After successful completion of this course, the students should be able to

1. Summarize the mechanisms to provide high speed networking through case studies of ATM and frame relay networks.[K2]
2. Construct queuing system with different arrival and service rates. [K3]
3. Analyze the performance of various congestion control and admission control mechanisms. [K4]
4. Analyze various QoS parameters needed for real time traffic. [K4]
5. Explain the protocols needed for QoS support. [K2]

Course Content

HIGH PERFORMANCE NETWORKS **9 Hours**

Frame Relay Networks – Asynchronous Transfer Mode – Asynchronous Transfer Mode (ATM) Protocol Architecture - ATM Logical Connection - ATM Cell – ATM Service Categories – ATM Adaptation Layer (AAL) - High Speed LANs: Fast Ethernet - Gigabit Ethernet - Fiber Channel.

QUEUING MODELS AND CONGESTION MANAGEMENT **8 Hours**

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks

ATM CONGESTION CONTROL **12Hours**

Performance of TCP over ATM - Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame Work - Traffic Control – Available Bit Rate (ABR) Traffic Management – ABR Rate Control - Resource Management (RM) Cell Formats - ABR Capacity Allocations.

INTEGRATED AND DIFFERENTIATED SERVICES **8 Hours**

Integrated Services Architecture – Approach - Components - Services - Queuing Discipline - Fair Admission Control - Traffic Shaping - Resource Reservation Queuing (FQ) - Processor Sharing (PS) - Bit-Round Fair Queuing (BRFQ) - Generalized Processor Sharing (GPS) - Weighted Fair Queuing (WFQ) – Random Early Detection - Differentiated Services DS code points – Per Hop Behavior

PROTOCOLS FOR QOS SUPPORT **8 Hours**

Resource Reservation (RSVP) – Goals & Characteristics - Data Flow - RSVP operations - Protocol Mechanisms – Multiprotocol Label Switching – Operations - Label Stacking - Protocol

details – Real Time Protocol (RTP) – Protocol Architecture - Data Transfer Protocol - Real Time Control Protocol (RTCP).

Theory: 45 Hrs Tutorial: 0 Hr Total Hours:45

REFERENCES

1. William Stallings, "High Speed Networks and Internet", Second edition, Pearson Education, 2002.
2. Warland & Pravin Varaiya, "High Performance Communication Networks", Second edition, Jean Harcourt Asia Pvt. Ltd., 2001.
3. Irvan Pepelnjk, et al "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

U13ITE402	DISTRIBUTED SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives

- To outline foundations of Distributed Systems.
- To introduce the idea of middleware and related issues.
- To understand the issues involved in studying data and design of distributed algorithms.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the various types of architecture of distributed systems (K2)
2. Demonstrate the organization of client, server & implementation of naming system (k2)
3. Demonstrate various models for communication (K3)
4. Explain the various process synchronization methods & ways to achieve its consistency (k2)
5. Explain the architecture, communication, synchronization, fault tolerance & security in object based distributed system(k2)

Course Content

INTRODUCTION **9 Hours**

Introduction to Distributed systems-examples of distributed systems- resource sharing and the web- challenges-architectural models- fundamental models - Introduction to inter-process communications-external data representation and marshalling- client server communication-group communication.

DISTRIBUTED OBJECTS AND FILE SYSTEM **9 Hours**

Introduction - Communication between distributed objects - Remote procedure call - Events and notifications - Java RMI case Study - Introduction to Distributed File System - File service architecture - Sun network file system - Introduction to Name Services- Name services and DNS - Directory and directory services

DISTRIBUTED OPERATING SYSTEM SUPPORT **9 Hours**

The operating system layer – Protection - Process and threads - Communication and invocation - Operating system architecture - Introduction to time and global states - Clocks, Events and Process states - Synchronizing physical clocks - Logical time and logical clocks - Distributed debugging – Distributed mutual exclusion.

TRANSACTION AND CONCURRENCY CONTROL – DISTRIBUTED TRANSACTIONS **9 Hours**

Transactions – Nested transaction – Locks - Optimistic concurrency control - Timestamp ordering - Comparison of methods for concurrency control - Introduction to distributed transactions - Flat and nested distributed transactions - Concurrency control in distributed transactions - Distributed deadlocks - Transaction recovery

SECURITY AND REPLICATION **9 Hours**

Overview of security techniques - Cryptographic algorithms – Digital signatures - Cryptography pragmatics – Replication Introduction to Distributed Multimedia systems.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. . George Coulouris, Jean Dollimore, Tim Kindberg, , "Distributed Systems: Concepts and Design", 4th Edition, Pearson Education, 2005.
2. A. S. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2006.
3. MukeshSinghal and N. G. Shivaratri, “Advanced Concepts in Operating Systems”, McGraw-Hill, 2001

U13ITE403	INFORMATION SECURITY	L	T	P	C
		3	0	0	3

Course Objectives

- To understand the security model and threats for security.
- To acquire knowledge about the legal, ethical and professional issues in Information Security.
- To develop skill in analyzing and designing of security systems.

Course Outcomes

After successful completion of this course, the students should be able to

1. Describe threats to information security and security SDLC. (K2).
2. Identify the security threats and attacks. (K3)
3. Analyze the mechanism to assess and control risk. (K4)
4. Describe the types of security policies and standards. (K2)
5. Identify security issues related to personnel decisions, and qualifications of security personnel. (K2)

Course Content

INTRODUCTION **9 Hours**

History - What is Information Security? - Critical Characteristics of Information - NSTISSC Security Model - Components of an Information System - Securing the Components - Balancing Security and Access - The SDLC - The Security SDLC.

SECURITY INVESTIGATION **9 Hours**

Need for Security - Business Needs - Threats – Attacks – Legal - Ethical and Professional Issues.

SECURITY ANALYSIS **9 Hours**

Risk Management : Identifying and Assessing Risk - Assessing and Controlling Risk.

LOGICAL DESIGN **9 Hours**

Blueprint for Security - Information Security Policy - Standards and Practices - ISO 17799/BS 7799 – NIST Models - VISA International Security Model - Design of Security Architecture - Planning for Continuity.

PHYSICAL DESIGN **9 Hours**

Security Technology – IDS - Scanning and Analysis Tools –Access Control Devices - Physical Security - Security and Personnel.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Michael E Whitman and Herbert J Mattord, “Principles of Information Security”, Fourth Edition, Thomson Publishing, India Edition, 2011.
2. Micki Krause, Harold F. Tipton, “Handbook of Information Security Management”, Vol 1-3 CRC Press LLC, 2004.
3. Stuart Mc Clure, et al., “Hacking Exposed”, Tata McGraw- Hill, Sixth edition2009.
4. Matt Bishop, “Computer Security Art and Science”, Pearson/PHI, 2002.

U13ITE404	GRID COMPUTING	L	T	P	C
		3	0	0	3

Course Objectives

- Acquisition of knowledge of grid and cloud computing
- Solution of real life problems using cloud or grid

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain Grid computing model & its Application [K2]
2. Utilize Grid Toolkits and apply to solve the real life problems [K3]
3. Explain Grid management systems [K2]
4. Construct Grid services using Web services[K3]
5. Compare Grid and Cloud Computing[K2]

Course Content

GRID COMPUTING TECHNOLOGY – AN OVERVIEW **9 Hours**

Introduction – High-Performance Computing – Cluster Computing – Peer-to-Peer Computing – Internet Computing – Grid computing – Grid computing model – Grid Protocols – Types of Grids – Grid Networks – Grid Applications characteristics – Application Integration – Grid Computing and Public Policy

THE ANATOMY OF THE GRID **9 Hours**

The concept of virtual organizations – Grid architecture – Grid architecture and relationship to other Distributed Technologies – computational and data Grids, semantic grids

THE GRID MANAGEMENT SYSTEMS **9 Hours**

Grid Management systems, security, Grid Grid-Enabling software and Grid-enabling network services, Data Grid - Virtualization Services for Data Grids, Peer-to-Peer Grids - Peer-to-Peer Grid Databases for Web Service Discovery

THE OPEN GRID SERVICES INFRASTRUCTURE **9 Hours**

Technical details of OSGI specification, service data concepts, Naming and Change Management Recommendations – OGSA basic services

CLOUD COMPUTING **9 Hours**

Understanding Cloud Computing – Cloud Computing for Everyone: Cloud computing for the family, community and corporation.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Ahmar Abbas, "Grid Computing: A Practical Guide to technology and Applications", Firewall Media – 2008 Edition.
2. Joshy Joseph, Craig Fellenstein, "Grid Computing", Pearson Education, New Delhi, 2004.
3.Michael Miller, "Cloud Computing – Web-Based Applications that Change the way you work and collaborate Online", Pearson Education, 2009.
4. C S R Prabhu, " Grid and Cluster Computing, PHI Learning, New Delhi, 2008
5. Ian Foster, Carl Kesselman, "The Grid2: Blueprint for a New Computing Infrastructure". Morgan Kaufman, New Delhi, 2004

ELECTIVE – V

U13ITE501

	L	T	P	C
DIGITAL IMAGE PROCESSING	**3**	**0**	**0**	**3**

Course Objectives

- Acquire knowledge in image processing.
- Understand the filtering, restoration and segmentation concepts.
- Develop skills related to design a digital image processing based systems.

Course Outcomes

After successful completion of this course, the students should be able to

1. Apply spatial filtering methods in processing images (K3)
2. Describe the basics of filtering in the frequency domain (K2)
3. Create skills to restore degraded images (K3)
4. Explain the basics of color image processing (K2)
5. Apply pixel relationships to various images (K3)
6. Perform segmentation of images for better perception (K4)

Course Content

INTENSITY TRANSFORMATIONS AND SPATIAL FILTERING **9 Hours**

Basic Relationship between Pixels - Intensity Transformation Functions - Histogram Processing - Fundamentals of Spatial Filtering - Smoothing Spatial Filters - Sharpening Spatial Filters

FILTERING IN FREQUENCY DOMAIN **9 Hours**

Basics of Filtering in the Frequency Domain - Image Smoothing using Frequency Domain Filters - Image Sharpening using Frequency Domain Filters - Selective Filtering

IMAGE RESTORATION **9 Hours**

Model of the Image Degradation/Restoration Process - Noise Models - Restoration using Spatial Filtering - Noise Reduction by Frequency Domain Filtering – Inverse Filtering - Wiener Filtering – Constrained Least Mean Square Filtering - Geometric Mean Filter

COLOR IMAGE PROCESSING **9 Hours**

Pseudo Color Image Processing – Basics of Full-Color Image Processing – Color Transformations – Smoothing and Sharpening – Image Segmentation based on Color – Noise in Color Images.

IMAGE SEGMENTATION **9 Hours**

Fundamentals - Point, Line, and Edge Detection - Thresholding - Region-Based Segmentation

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. R.C. Gonzalez and R.E. Woods, "Digital Image Processing", Third edition, Prentice Hall, 2008
2. William K Pratt, "Digital Image Processing", John Willey, 2001.
3. A.K. Jain, "Fundamentals of Digital Image Processing", PHI, New Delhi, 2003.
4. Milan Sonka, et.al, "Image Processing, Analysis and Machine Vision", Second edition, PWS Publishing, 1999.
5. R.C. Gonzalez, R.E. Woods and S.Eddins," Digital Image Processing using MATLAB", Pearson Education, 2004.
6. Sid Ahmed, M.A., "Image Processing Theory, Algorithms and Architectures", McGraw Hill, 1995.

Annexure-1

U13ITE502	SOFTWARE QUALITY ASSURANCE & TESTING	L	T	P	C
		3	0	0	3

Course Objectives

- Acquire knowledge to use appropriate technological tools to analyze, test and automate the elements of software quality assurance
- Conduct independent research in software testing and quality assurance and apply that knowledge in their future research and practice
- Develop skills in critical thinking and problem solving, Evaluating software, finding program bugs and creating solutions

Course Outcomes

After successful completion of this course, the students should be able to

1. Appreciate the importance of software quality assurance (K2)
2. Apply software testing techniques for information systems development (K3)
3. Know the inputs and deliverables of testing process (K3)
4. Work together as a team in preparing a report(K3)
5. Interpret the importance of software quality assurance(K3)

Course Content

9 Hours

Introduction- Approaches to Testing -Testing during Development Life cycle - Requirement Traceability Matrix -Salient Features of good testing -Test policy -Test Strategy -Test Planning –Testing process & number of defects found in testing -Test Team Efficiency - Mutation Testing -Challenges in testing - Test Team Approach - Process Problems faced in testing – Defect - Error/Mistake and failures in software - People challenges in software Testing.

9 Hours

Introduction-Advantage & Disadvantages of automated Development system – Risk – Constraints - Project & Product risks - Risks faced due to software Development systems - Software implementation risks - Risk Assessment -Handling of risks -V test model - Defect Management.

9 Hours

Quality: Popular views - Professional views – software quality – total quality management – Software quality metrics – In-process quality metrics – Metrics for Software Maintenance – Applying the seven basic quality tools in software development.

9 Hours

Defect removal effectiveness – Rayleigh Model – Exponential distribution and reliability models – Quality Management models.

9 Hours

Availability metrics – Measuring and Analyzing customer satisfaction – conducting In- process quality assessments – Audit and assessment – software process maturity assessment – software

project assessment – Do's and Don'ts of software process improvement.

Theory:45 Hrs Tutorial: 0 Hr Total Hours:45

REFERENCES

1. Limaye M.G. "Software Testing – Principles, Techniques And Tools", Tata Mc Graw Hill, 2009 (Unit I & II).
2. Stephen H. Khan, "Metrics And Models In Software Quality Engineering", Second edition, Pearson Education, 2004 (Unit III – V).
3. Watts S. Humphrey, "Managing The Software Process", Addison Wesley, 1989.
4. William E. Perry, "Effective Methods For Software Testing", Second edition, John Wiley, 2000.

U13ITE503	REAL TIME SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives

- Acquire knowledge in real time system concepts, tasks and scheduling.
- Understand the design concepts of real time systems and multiprocessor systems.
- Develop skills related to design a real time based systems.

Course Outcomes

After successful completion of this course, the students should be able to

1. Apply the knowledge of operating system concepts to understand real time system concepts like tasks and scheduling. (K3)
2. Analyze the various parameters related to the different types of scheduling in single processor and multiprocessor environments.(K4)
3. Understand the various protocols for effective resource sharing.(K2)

Course Content

INTRODUCTION **9 Hours**

Concept of Real Time System – Jobs & Processors – Release Times, Deadlines, and Timing Constraints – Hard & Soft Timing Constraints – Hard Real Time Systems – Soft Real Time Systems – Issues in Real Time Computing – Structure of a Real Time System – Real Time Application.

MODEL OF REAL TIME SYSTEM **9 Hours**

Processors and Resources – Temporal Parameters – Periodic Task Model – Precedence Constraints and Data Dependency – Functional Parameters – Resource Parameters of Jobs and Parameters of Resources – Scheduling Hierarchy – Commonly used Approaches to Real Time Scheduling.

SCHEDULING **9 Hours**

Periodic Tasks: Assumptions – Fixed versus Dynamic Priority Algorithms – Schedulability Test for Fixed Priority Task with Arbitrary Response Times.

Aperiodic and Sporadic Tasks: Assumptions and Approaches – Deferrable Servers – Sporadic Servers – Slack Stealing in Deadline Driven and Fixed Priority Systems – Two Level Scheme for Integrated Scheduling.

RESOURCES AND RESOURCE ACCESS CONTROL **9 Hours**

Assumptions on Resources and Their Usage – Resource Contention and Resource Access Control – Priority Ceiling Protocol – Priority Inheritance Protocol – Stack Based Priority Ceiling Protocol – Preemption Ceiling Protocol.

MULTI PROCESSOR SCHEDULING & REAL TIME COMMUNICATION **9 Hours**

Model of Multiprocessor and Distributed Systems – Scheduling Algorithms for End to End Periodic Tasks – Schedulability of Fixed Priority End-to-End Periodic Tasks – End to-End Tasks in Heterogeneous Systems – Predictability and Validation of Dynamic Multiprocessor

Systems – Model of Real Time Communication – Priority Based Service for Switched Networks – Weighted Round - Robin Service – Medium Access Control Protocol – Real Time Protocol.

Theory: 45 Hrs Tutorial: 0 Hr Total Hours:45

REFERENCES

1. Jane .W. S. Liu, "Real Time Systems", Pearson Education 2000.
2. Krishna .C.M, "Real Time Systems", Mc-Graw Hill Publication, 1997.
3. Buhr (Raymond J A) ;Bailey (Donald L), "Introduction To Real Time Systems" Prentice Hall Of India, 1999.
4. Rajib Mall, "Real Time Systems: Theory And Practice", Dorling Kindersley Ltd, 2008.

ELECTIVE- VI

U13ITE601	CLOUD COMPUTING	L	T	P	C
		3	0	0	3

Course Objectives

- To introduce the broad perceptive of cloud architecture and model
- To understand the concept of Virtualization and design of cloud Services
- To be familiar with the lead players in cloud.
- To understand the features of cloud simulator
- To apply different cloud programming model as per need.
- To learn to design the trusted cloud Computing system

Course Outcomes

After successful completion of this course, the students should be able to

1. Compare the strengths and limitations of cloud computing(K3)
2. Identify the architecture, infrastructure and delivery models of cloud computing(K3)
3. Apply suitable virtualization concept(K3)
4. Choose the appropriate cloud player , Programming Models.(K1)
5. Summarize the core issues of cloud computing such as security, privacy and interoperability(K2)

Course Content

CLOUD ARCHITECTURE AND MODEL **9 Hours**

Technologies for Network-Based System – System Models for Distributed and Cloud Computing –NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public Vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

VIRTUALIZATION **9 Hours**

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices -Virtual Clusters and Resource management – Virtualization for Data-center Automation.

CLOUD INFRASTRUCTURE **9 Hours**

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development –Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

PROGRAMMING MODEL **9 Hours**

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce –Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

SECURITY IN THE CLOUD 9 Hours

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Theory: 45 Hrs Tutorial: 0 Hr Total Hours:45

REFERENCES

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management and Security", CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India, 2011.
5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
6. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
7. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, "Grid and Cloud Computing – A Business Perspective on Technology and Applications", Springer.
8. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.
9. Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, 'Mastering Cloud Computing", TMGH, 2013.
10. Gautam Shroff,Enterprise Cloud Computing, Cambridge University Press,2011
11. Michael Miller, Cloud Computing, Que Publishing, 2008
12. Nick Antonopoulos, Cloud computing, Springer Publications, 2010

U13ITE602 AD HOC AND SENSOR NETWORKS

L	T	P	C
3	0	0	3

Course Objectives

- To acquire knowledge about the ad hoc networks and its protocols.
- To understand the importance of energy and security management in an ad hoc network.
- To gain an insight of wireless sensor networks

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the concept of ad-hoc and sensor networks, their applications and typical node and network architectures.(k2)
2. Compare wireless routing protocols function and their implications on network performance.(k2)
3. Explain various security threats to ad hoc networks and describe proposed solutions. (k2)
4. Analyze the protocol designs in terms of their energy-efficiency.(k4)
5. Explain the sensor network characteristics, query processing and sensor databases.(k2)

Course Content

INTRODUCTION **11Hours**

Characteristics of wireless channel - Wireless local loop - IEEE 802.16 standard – HIPERACCESS -Ad hoc Wireless Networks: Introduction and Issues - MAC Protocols: Design issues - Goals and classification -MACAW: A Media Access Protocol for Wireless LANs- Distributed Packet Reservation Multiple Access Protocol-Distributed Priority Scheduling and Medium Access in Ad Hoc Networks- MAC Protocol using Directional Antennas

ROUTING PROTOCOLS **11Hours**

Design issues – Classification – Location Aided Routing- Zone Routing Protocol - Hierarchical State Routing Protocol - Power Aware Routing Protocol – Operation of multicast Routing Protocols - Classification of Multicast Routing Protocols-– Application-Dependent Multicast Routing

SECURITY IN ADHOC NETWORKS **9 Hours**

Security in ad hoc wireless networks – Network Security requirements - Issues and challenges in security provisioning – Network security attacks – key management – secure routing in Adhoc networks.

ENERGY MANAGEMENT **7 Hours**

Need - Classification of battery management Schemes - Transmission power management Schemes - System power management schemes.

WIRELESS SENSOR NETWORKS **7 Hours**

Architecture - Data dissemination - Date gathering - MAC protocols - Location discovery - Quality of sensor networks.

Theory: 45 Hrs Tutorial:0 Hr **Total Hours:45**

REFERENCES

1. Siva Ram Murthy. C and Manoj B.S, "Ad hoc Wireless Networks: Architectures And Protocols ", Prentice Hall PTR,2004
2. Toh C.K.**, "**Ad hoc Mobile Wireless Networks: Protocols And Systems", Prentice Hall PTR, First edition 2001
3. Mohammad Ilyas, "The Handbook Of Ad hoc Wireless Networks", CRC press, 2002
4. Charles E. Perkins, "Ad hoc Networking", Addison –Wesley,2000
5. Stefano Basagni , et al " Mobile Ad hoc Networking", Wiley –IEEE press,2004
6. Zhao, Guibas "Wireless Sensor Networks" ,Morgan Kaufmann Publications,2004

U13ITE603 MANAGEMENT INFORMATION SYSTEM

L	T	P	C
3	0	0	3

Course Objectives

- Development of technical and managerial skills in information technology
- Application of appropriate system analysis and design methodologies to enhance existing information systems and business processes
- Experience real-world learning and application of skills to recognize, value, and appreciate management and ethical issues in emerging information technologies

Course Outcomes

After successful completion of this course, the students should be able to

1. Relate the value of information systems to various firms.
2. Describe key information technologies used in today's businesses, such as databases and business intelligence tools.
3. Analyze issues related to information systems acquisition, development, operations, and management.
4. Identify the ethical, social, and security issues of information systems;
5. Apply the skills and techniques necessary to use a computer for information management in a business environment

Course Content

9 Hours

What is IS? Why IS? Business Perspective - Contemporary Approaches - New Role of IS in Organizations - E Commerce - E Business - New Opportunities - Types of Systems – Functional Perspective - Enterprise Applications – ES, SCM, CRM, KM.

9 Hours

Organizations and IS - Changing Role of IS - Decision Making - Business Strategy – E Business and E Commerce.

9 Hours

Computer Hardware - Computer Categories - Software- Management. Data in Files - Database Environment - Database Management - Trends - New IT Infrastructure – Internet – WWW – Support Technology – Management Issues and Decisions.

9 Hours

KM in Organizations – KWS – AI - Intelligent Techniques - Decision Support Systems – GDSS - Executive Support Systems - Organizational Change – BPR - Systems Development – Approaches - Application Development

9 Hours

System Vulnerability and Abuse - Control Environment - System Quality. International IS - Growth – Organizing - Managing - Issues and Opportunities.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Kenneth C. Laudon and Jane Price Laudon, "Management Information Systems - Managing The Digital Firm", Eighth Edition, Pearson Education Asia, 2004.
2. Gordon B.Davis, "Management Information System: Conceptual Foundations, Structure And Development", McGraw Hill, 1974.
3. Steven Alter, "Information System – A Management Perspective" – Addison Wesley, 1999.
4. James O' Brein, "Management Information Systems", Tata McGraw Hill, New Delhi, 1999.
5. Ralph M.Stair and George W.Reynolds, "Principles Of Information Systems – A Managerial Approach", Thomson Asia Pvt. Ltd., 2001.

ELECTIVE-VII

U13ITE701 **OPEN SOURCE SOFTWARE**

L	T	P	C
3	1	0	4

Course Objectives

- Acquire knowledge of open source programming languages, servers and databases
- Ability to install and run open-source operating systems.
- Ability to build and modify one or more Free and Open Source Software packages.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain the use of various open source software available in the industry.(K1)
2. Summarize the difference between open source and proprietary software.(K2)
3. Compare the technical difference between PHP, Python and Perl.(K4)
4. Build an open source platform to develop a project/application for solving real world problem.(K3)
5. Demonstrate the interoperability among various open source tools and it s applications (K3).

Course Content

INTRODUCTION **9 Hours**

Introduction to Open Sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources - Open Source Operating Systems: LINUX: Introduction – General Overview – Kernel architecture-Kernel Mode and User Mode – Process Management – Scheduling – Personalities – Cloning – Signals

OPEN SOURCE DATABASE **9 Hours**

MySQL: Introduction – Setting up Account – Starting, Terminating and Writing your own SQL Programs – Record Selection Technology – Working with Strings – Date and Time– Sorting Query Results – Generating Summary – Working with Metadata – Using Sequences – MySQL and Web.

OPEN SOURCE PROGRAMMING LANGUAGES: PHP **9 Hours**

PHP: Introduction – Programming in Web Environment – Variables – Constants –Data; Types – Operators – Statements – Functions – Arrays – OOP – String Manipulation and Regular Expression – File Handling and Data Storage – PHP and SQL Database – PHP and LDAP – PHP Connectivity – Sending and Receiving E-mails

PYTHON **9 Hours**

Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP

PERL **9 Hours**

PERL Backgrounder – PERL Overview –Variables and Data – Statements and Control

Structures – Subroutines - Packages and Modules - Working with Files – Data Manipulation-Perl Process Management.

Theory: 45 Hrs Tutorial: 15 Hrs **Total Hours:45**

REFERENCES

1. Robert Love, "Linux Kernel Development", Third edition, Pearson Publications, 2011
2. Vikram Vaswani, "MySQL-THE Complete Reference", Tata McGraw Hill Edition, Reprint, 2011
3. Rasmus Lerdorf ,Levin Tatroe& Peter McIntyre, "Programming PHP", O'Reilly, 2006
4. Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2006
5. Martin C. Brown, "Perl: The Complete Reference", Second edition, Tata McGraw-Hill, Indian Reprint, 2009.

U13ITE702 SERVICE ORIENTED ARCHITECTURE

L	T	P	C
3	1	0	4

Course Objectives

- Acquire knowledge about primary concepts of SOA
- Know the integration of SOA technological points with Web Services.
- Implement of SOA in development cycle of Web Services

Course Outcomes

After successful completion of this course, the students should be able to

1. Demonstrate an understanding of architectural principles, architecture evolution processes, development methods with SOA, strengths and difficulties of service-oriented system development (K2)
2. Organise the services to perform the service composition (K3)
3. Model and design a service-oriented system using architectural principles, development methods with SOA and service-related technologies systematically and effectively (K3)
4. Critically evaluate and apply development methods with SOA and service-related technologies in service-oriented system development (K5)
5. Demonstrate ability to work as a member of a software development project team (A)

Course Content

SOA and Web Services Fundamentals **9 Hours**

The Evolution of SOA –Characteristics of SOA – Introducing SOA

Web Services, Primitive SOA and Contemporary SOA **9 Hours**

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

Building SOA **9 Hours**

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task centric business service design

SOA Platforms **9 Hours**

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

Fundamental WS Extensions **9 Hours**

WS-BPEL basics – WS-Coordination overview - WS-Policy- WS-Security

Theory: 45 Hrs Tutorial: 15 Hrs **Total Hours:45**

REFERENCES

1. Thomas Erl**, "**Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.
2.Thomas Erl, "SOA Principles of Service Design "(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.
3.. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson Education, 2005.
5. Dan Woods and Thomas Mattern, "Enterprise SOA Designing IT for Business Innovation" O'REILLY, First Edition, 2006.

U13ITE703	SEMANTIC WEB	L	T	P	C
		3	1	0	4

Course Objectives

- Acquire knowledge in semantic web languages, ontology learning and management.
- Understand the fundamentals of ontology management and tools used for Ontology annotation.
- Develop skills related to semantic web services and current trends.

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain ontological categories and semantic web [K2]
2. Develop domain specific ontologies using ontology languages [K3]
3. Classify ontology learning algorithms based on application domain [K3]
4. Summarize different ontology development tools. [K3]
5. Design and build ontologies in OWL using the de facto standard editor, Protege, justify their design [K5]

Course Content

INTRODUCTION **9 Hours**

Components – Types – Ontological Commitments – Ontological Categories – Philosophical Background - Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need – Foundation – Layers – Architecture.

LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES **10Hours**

Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics – Pragmatics - Traditional Ontology Languages – LOOM- OKBC – OCML - Flogic Ontology Markup Languages – SHOE – OIL - DAML + OIL- OWL.

ONTOLOGY LEARNING FOR SEMANTIC WEB **10Hours**

Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning – Importing and Processing Ontologies and Documents – Ontology Learning Algorithms - Evaluation

ONTOLOGY MANAGEMENT AND TOOLS **9 Hours**

Overview – need for management – development process – target ontology – ontology mapping – skills management system – ontological class – constraints – issues. Evolution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools.

APPLICATIONS **7 Hours**

Web Services – Semantic Web Services - Case Study for specific domain – Security issues –currenttrends.

Theory:45 Hrs Tutorial: 15 Hrs **Total Hours:45**

REFERENCES

1. Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez, "Ontological Engineering: with examples from the areas of Knowledge Management, e-Commerce and the Semantic Web" Springer, 2004
2. Grigoris Antoniou, Frank van Harmelen, "A Semantic Web Primer (Cooperative Information Systems)", The MIT Press, 2004
3. Alexander Maedche, "Ontology Learning for the Semantic Web", Springer; 1 edition, 2002 John Davies, Dieter Fensel, Frank Van Harmelen, "Towards the Semantic Web: Ontology – Driven Knowledge Management", John Wiley & Sons Ltd., 2003.
4. Dieter Fensel (Editor), Wolfgang Wahlster, Henry Lieberman, James Hendler, "Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential", The MIT Press, 2002
5. Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, "The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management", Wiley, 2003
6. Steffen Staab (Editor), Rudi Studer, "Handbook on Ontologies (International Handbooks on Information Systems)", Springer 1st edition, 2004

ELECTIVE – VIII

U13ITE801	KNOWLEDGE BASED DECISION SUPPORT SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives

- Learn about DSS concepts and Business Intelligence
- Learn how to develop a good DSS using the latest methods

Course Outcomes

After successful completion of this course, the students should be able to

1. Explain about decision making, models and Modeling process, Data mining Processes(K2)
2. Describe the development of Decision support system, Tools and Platform(K1)
3. Explain about Business Intelligence and Artificial neural networks management(K2)
4. Explain about Knowledge representation methods(K2)
5. Illustrate the Inference Techniques, Management support systems(K3)

Course Content

9 Hours

Decision Support Systems and Business Intelligence – Decision Making, Systems, Modeling and Support.

9 Hours

Decision Support Systems Concepts, Methodologies and Technologies – Modeling and Analysis.

9 Hours

Data Mining for Business Intelligence-Artificial Neural Networks for Data Mining –Business Performance Management.

9 Hours

Collaborative Computer-Supported Technologies and Group Support Systems - Knowledge Management.

9 Hours

Artificial Intelligence and Expert Systems-Management Support Systems: Emerging Trends and Impacts.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Efraim Turban, Ramesh Sharda, Dursun Delen ,"Decision Support and Business Intelligence Systems", Ninth Edition, Pearson Education, 2011.
2. V.S.Janakiraman and K.Sarukesi, "Decision Support Systems", Prentice Hall of India, 2004.
3. Efrem G Mallach ,"Decision Support Systems and Data Warehouse Systems ", Mc Graw Hill, 2000.
4. George M Marakas ,"Decision Support Systems", II edition, - Pearson/Prentice Hall, 2002.

U13ITE802 SOFTWARE PROJECT MANAGEMENT

L	T	P	C
3	0	0	3

Course Objectives

- Create and manage project plans that address real-world management challenges at each stage of the SDLC
- Develop the skills for tracking and controlling software deliverables
- Assess business, do feasibility studies, time and resource management, risk analysis and project evaluation

Course Outcomes

After successful completion of this course, the students should be able to

1. Understand software project planning and management.(K2)
2. Select appropriate project approach for problem at hand.(K3)
3. Categorize risk and analyze resources. (K4)
4. Evaluate cost and contract management (K5)
5. Measure and enhance Software Quality(K5)

Course Content

INTRODUCTION **5 Hours**

Software Project Management - An Overview of Project Planning - Programme Management and Project Evaluation.

COST ESTIMATION **6 Hours**

Selection of an Appropriate Project Approach – Software Effort Estimation - Activity Planning.

RISK MANAGEMENT AND RESOURCE ALLOCATION **13Hours**

Risk Management: Risk – Categories of Risk – A Framework for Dealing with Risk – Risk Identification – Risk Assessment – Risk Planning – Risk Management – Evaluating Risks to the Schedule –Monte Carlo Simulation – Critical Chain Concepts.

Resource Allocation: The Nature of Resources – Identifying Resource Requirements – Scheduling Resources – Creating Critical Paths - Publishing the Resource Schedule – Cost Schedules – The Scheduling Sequence.

MONITORING, MANAGING AND CONTROL **12Hours**

Monitoring and Control: Creating the Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value Analysis – Prioritizing Monitoring – Change Control

Managing Contracts: The Supply Process – Types of Contract – Stages in Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance.

MANAGING PEOPLE AND ORGANIZING TEAMS **9 Hours**

Managing People and Organizing Teams - Software Quality– Practical Software Quality Measures – Product versus Process Quality Management – External Standards – Techniques to Help Enhance Software Quality – Quality Plans.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. Bob Hughes, Mike Cotterell, "Software Project Management", Fifth Edition, Tata McGraw Hill, 2010.
2. Walker Royce, "Software Project Management– A Unified Framework ", Pearson Education, 2004.
3. Humphrey and Watts, "Managing the software process ", Addison Wesley, 1989.

U13ITE803	BUSINESS INTELLIGENCE AND ITS APPLICATION	L	T	P	C
		3	0	0	3

Course Objectives

- To give an exposure to Business **I**ntelligence domain.
- To know the basics of BI terminologies, framework and its data integration
- To introduce the basics of multi-dimensional data modeling, enterprise reporting and application of the concepts using open source /Microsoft tools

Course Outcomes

After successful completion of this course, the students should be able to

1. Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence
2. Demonstrate understanding of technology and processes associated with Business Intelligence framework
3. Demonstrate understanding of Data Warehouse implementation methodology and project life cycle
4. Identify the metrics, indicators and make recommendations to achieve the business goal for a given scenario
5. Design an enterprise dashboard that depicts the key performance indicators which helps in decision making

Course Content

Introduction to Business Intelligence **6 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

Basics of Data Integration (Extraction Transformation Loading) **15Hours**

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

Introduction to Multi-Dimensional Data Modeling **9 Hours**

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, 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 **15Hours**

Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS Architecture, enterprise reporting using SSRS.

Theory: 45 Hrs Tutorial: 0 Hr **Total Hours:45**

REFERENCES

1. David Loshin, Business Intelligence ,Second Edition, Morgan Kaufmann Series,2012
2. Mike Bierre, Business Intelligence for the Enterprise, IBM Press,2003
3. Larissa T. Moss, Shaku Atre, Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-Support Applications,Addison-Wesley,2003
4. Cindi Howson, Successful Business Intelligence: Secrets to Making BI a Killer App, McGraw-Hill,2008
5. Brain, Larson, Delivering business intelligence with Microsoft SQL server 2008 , McGraw-Hill,2009

DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

The department of Information Technology aspires to transform individuals in pursuit of lifetime learning and service into highly motivated professionals through educational, cultural and professional opportunities.

MISSION

- To provide academic programs that engage, enlighten and empower the students to learn technology through practice, service and outreach
- To educate the students about social responsibilities and entrepreneurship
- To encourage research through continuous improvement in infrastructure, curriculum and faculty development in collaboration with industry and institutions