SCHEME OF INSTRUCTION & EXAMINATION

B.E. IIIrd YEAR
(INFORMATION TECHNOLOGY)

SEMESTER - I

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration In Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	CM 371	Managerial Economics and Accountancy	4	-	3	75	25
2.	BIT 302	Software Engineering	4	-	3	75	25
3.	BIT 303	Digital Signal Processing	4	-	3	75	25
4.	BIT 304	Database Management Systems	4	-	3	75	25
5.	BIT 305	Operating Systems	4	-	3	75	25
6.	BIT 306	Theory of Automata	4	-	3	75	25
		PRACTICALS					
1.	BIT 331	Operating Systems Lab	-	3	3	50	25
2.	BIT 332	DBMS - Lab	-	3	3	50	25
3.	BIT 333	Mini Project - III	-	3	-	-	25
		Total	**24**	**9**	**--**	**550**	**225**

CM 371

MANAGERIAL ECONOMICS AND ACCOUNTANCY

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Meaning and Nature of Managerial Economics: Managerial Economics its usefulness to Engineers, Fundamental Concepts of Managerial Economics, Scarcity, Marginalism, Equi-marginalism, Opportunity costs, Discounting, Time Perspective, Risk and Uncertainty, Profits, Case study method.

UNIT-II

Consumer Behaviour: Law of Demand, Determinants, Kinds; Elasticity of Demand (Price, Income and Cross-Elasticity); Demand Forecasting, Law of Supply, Concept of Equilibrium. (Theory questions and small numerical problems can be asked).

UNIT-III

Theory of Production and Markets: Production Function, Law of Variable Proportion, ISO quants, Economics of Scale, Cost of Production (Types and their measurement), Concept of Opportunity Cost, Concept of Revenue, Cost-Output relationship, Break-Even Analysis, Price – Output determination under Perfect Competition and Monopoly (theory and problems can be asked).

UNIT-IV

Capital Management: Its significance, determination and estimation of fixed and working capital requirements, sources of capital, Introduction to capital budgeting, methods of payback and discounted cash flow methods with problems. (Theory questions are numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities can be asked).

UNIT-V

Book-keeping: Principles and significance of double entry book keeping, Journal, Subsidiary books, Ledger accounts Trial Balance, concept and

tion of Final Accounts with simple adjustments, Analysis and **pretation** of Financial Statements through Ratios.

Theory questions and numerical problems on preparation of final accounts, **h book**, petty cash book, bank reconciliation statement, calculation of **me ratios**).

Suggested Reading:

1. Mehta P.L., "*Managerial Economics – Analysis, Problems and Cases*", Sulthan Chand & Son's Educational publishers, 2011.
2. Maheswari S.N. "*Introduction to Accountancy*", Vikas Publishing House, 2005.
3. Panday I.M. "*Financial Management*", Vikas Publishing House, 2009.

BIT 302

SOFTWARE ENGINEERING

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Software and Software Engineering: The Nature of Software, The Unique Nature of Web Apps, Software Engineering. The Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement Prescriptive Process Models, Specialized Process Models, The Unified Process Personal and Team Process Models, Process Technology, Product and Process.

Understanding requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirement Model, Negotiating Requirements, Validating Requirements.

UNIT-II

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling.

Design Concepts: Design within the Context of Software Engineering, The Design Process, Design Concepts.

Architectural Design: Software Architecture, Architecture Genres, Architecture Styles, Architecture Design, Assessing Alternative Architecture Designs, Architecture Mapping Using Data Flow.

Component level Design: Designing Class-Based Components, Conducting Component-Level Design, Designing Traditional Components, Component-Based Development.

UNIT-III

Quality Concepts: Software Quality, Achieving Software Quality.

Review Techniques: Cost Impact of Software Defects.

Software Quality Assurance: Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, The ISO 9000 Quality Standards, The SQA Plan.

Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging.

UNIT-IV

Testing Conventional Applications: Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black - BoxTesting, Model-Based Testing.

Software Configuration Management: Software Configuration Management.

Product Metrics: A Framework for Product Metrics, Metrics for the Requirements Model, Metrics for the Design Model, Metrics for Testing, Metrics for Maintenance.

UNIT-V

Estimation: Observations on Estimation, The Project Planning Process, Software Scope and Feasibility, Resources, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Specialized Estimation Techniques, The Make/Buy Decision.

Risk Management: Reactive versus Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring, and Management, The RMMM Plan.

Software Process Improvement: The SPI Process, The CMMI, The people CMM, Other SPI Frameworks, SPI Return on Investment, SPI Trends.

Suggested Reading:

1. Roger S.Pressman, *"Software Enigneering: A Practitioners Approach"*, Seventh Edition, McGraHill, 2009.
2. Ali Behforoz and Frederic J.Hadson, *"Software Engineering Fundamentals"*, Oxford University Press, 1996.
3. Pankaj Jalote *"An Integrated Approach to Software Engineering,* Third Edition, Narosa Publishing house, 2008.
4. James F.Peters, Witold Pedrycz, Software Engineering-An enginnering Approach, John Wiley Inc., 2000.

BIT 303

DIGITAL SIGNAL PROCESSING

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Basic Elements and advantages of DSP, Discrete time signals and systems, Analysis of discrete time LTI systems, Discrete time system described by difference equation. Review of Z-transforms, Frequency domain sampling, Properties of DFT, Overlap-save method, overlap-add method, Efficient computation of DFT: FFT Algorithm, Direct computation of DFT, Radix-2 FFT Algorithm, MATLAB program for FFT Calculation.

UNIT-II

Design of FIR filters, characteristics of practical frequency selective filters, symmetric and anti symmetric FIR filters. Design of linear face FIR filters using windows. Design of optimum equi-ripple linear face FIR filters. Structure for the realization of discrete time systems: structure for FIR systems, direct form and cascade form structures.

UNIT-III

Design of IIR filters from analog filters. IIR filter design by impulse invariance, bilinear transformation. Butterworth filters, Chebyshev filters. Frequency transformation in analog and digital domains.

Structures for IIR systems, direct form, cascade form, parallel form. Representation of numbers, Round off effect in digital filters.

UNIT-IV

Architectures for Programmable DSP devices: Introduction, basic architectural features, DSP computational Building Blocks (Multiplier, Shifter, MAC Unit & ALU). Bus Architecture & Memory: On-chip memory, organization of on-chip memory, Data Addressing capabilities: Immediate addressing mode, register addressing mode, direct addressing mode, indirect addressing mode and Special addressing modes. Address generation Unit, Programmability & Program execution: Program Control,

Program Sequence. Speed issues: Hardware architecture, parallelism, pipelining. Introduction to TMS320C54xx DSP processor, Bus structure, CPU, Data Addressing modes, Memory space.

UNIT-V

Applications of Programmable DSP devices, DSP based Bio-telemetry receiver, A speech Processing System and its implementation of TMS320C54xx processor, An Image Processing System: JPEG Algorithm, Encoding & Decoding Using TMS320C54xx.

Suggested Reading:

1. Proakis John G, Dimitris G. Manolakis, *Digital Signal Processing,* Third Edition, PHI 2005. (Units 1,2 &3).
2. Avtar Singh, S.Srinivasan, *Digital Signal Processing Implementations Using DSP Microprocessors with Examples from TMS320C54xx,* Thomson Brooks/Cole, 2004. (Units 4 & 5)
3. Jonathan (Y) Stein, *Digital Signal Processing A Computer Science Perspective,* Wiley-India, 2000.
4. Vinay K. Ingle, John G. Proakis, *Digital Signal Processing using Mat Lab,* Thomson Brooks/Cole, 2004.
5. Phil Lapsley, Jeff Bier, Amit Shoham, Edward Lee, *DSP Processor Fundamentals: Architectures & Features,* Wiley-India, 1996.

BIT 304

DATABASE MANAGEMENT SYSTEMS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Databases Design, Object – Based and Semi-structured Databases, Data Storage and Querying, Transaction Management, Data Mining and Analysis, Database Architecture, Database Users and Administrators.

Database Design and the E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E–R Design Issues, Weak Entity Sets, Extended E-R Features, Database Design for Banking Enterprise, Reduction to Relational Schemas, Other Aspects of Database Design.

UNIT-II

Relational Model: Structure of Relational Databases, Fundamental Relational-Algebra Operations, Additional Relational – Algebra Operations, Extended Relational - Algebra Operations, Null Values, Modification of the Databases.

Structured Query Language: Data Definition, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Complex Queries, Views, Modification of the Database, Joined Relations.

UNIT-III

Advanced SQL: SQL Data Types and Schemas, Integrity Constraints, Authorization, Embedded SQL, Dynamic SQL, Functions and Procedural Constructs, Recursive Queries, Advanced SQL Features.

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

UNIT - IV

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

Transactions: Transaction Concepts, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability.

UNIT-V

Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Insert and Delete Operations, Weak Levels of Consistency, Concurrency of Index Structures.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Nonvolatile Storage, Advanced Recovery Techniques, Remote Backup Systems.

Suggested Reading :

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, *Database System Concepts,* Sixth Edition, McGrah-Hill International Edition, 2010.
2. Ramakrishnan, Gehrke, *Database Management Systems,* Third Edition, McGrah-Hill International Edition, 2003.
3. Elmasri Navathe, Somayajulu, *Fundamentals of Database System, Fourth Edition,* Pearson Education, 2006.
4. Patric O'Neil, Elizabeth O'Neil, *Database—Principles, Programming, and Performance,* Morgan Kaufmann Publishers, 2001.

BIT 305

OPERATING SYSTEMS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction: Computer system organization & Architecture, Operating System Structure & Operations, Process, Memory and Storage Managements, Protection and Security, Distributed and Special-Purpose Systems, Computing Environments.

System Structures: Operating-System Services, User Operating System Interface, System calls, Types of System Calls, System Programs, Operating-System Structure, Virtual Machines, Operating –System Generation, System Boot.

Process Concept: Overview, Process Scheduling, Operations on Processes, Interprocess communication, Examples of IPC Systems, Communication in Client/Server Systems.

Multithreaded Programming: Overview, Multithreading Models, Thread Libraries, Threading Issues, Operating-System Examples.

UNIT II

Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multi-Processor Scheduling, Thread Scheduling, Operating System Examples, Algorithm Evaluation.

Process Coordination and Synchronization: Background, The Critical-Section Problem, Peterson's Solution, Synchronization, Monitors, Synchronization Examples, Atomic Transactions.

Deadlocks: System Model, Deadlock characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock.

UNIT-III

Memory-Management Strategies: Background, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Example: The Intel Pentium.

Virtual Memory Management: Background, Demand paging, Copy-on-write, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory, Other Considerations, Operating-System Examples.

Storage Management: File System, File Concept, Access Methods, Directory Structure, File-System Mounting, File sharing, Protection.

UNIT-IV

Implementing File Systems: File System-Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, Log-Structured File Systems, NFS, Example: The WAFL File System.

Secondary –Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure.

I/O Systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystems, Transforming I/O Request to Hardware Operations, STREAMS, Performance.

UNIT-V

Protection and Security: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of access rights, Capability- based Systems, Language-based protection.

System Security: The security problem, program Threats, System and System Network Threats, Cryptography as a Security tool, User Authentication, Implementing Security Defenses, Firewalling to protect Systems and Networks, Computer Security Classification, An Example: Windows XP.

Suggested Reading:

1. Abraham Silberschatz, Peter Galvin, Greg Gagne, *Operating System Principles,* Seventh edition, John wiley & sons publication, 2006 .
2. A.Tanenbaum, *Modern Operation Systems.* Third edition, Pearson Education, 2008.
3. William Stalling, *Operating Systems,* Fifth Edition, Pearson Education, 2005.
4. Ida M.Flynn, *Understanding Operating Systems,* Sixth Edition, Cengage, 2011 .

BIT 306

THEORY OF AUTOMATA

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Automata: Introduction to finite Automata, Central concepts of Automata Theory.

Finite Automata: An informal picture of finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, An Application, Finite Automata with Epsilon Transitions.

Regular Expression And languages: Regular Expressions, Finite Automata and Regular Expression, Applications of Regular Expressions, Algebric Laws for Regular Expressions.

UNIT-II

Properties of Regular Languages: Proving Languages not to be Regular, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

Context Free Grammars and Languages: Context-Free Grammars, Parse Trees, Applications, Ambiguity in Grammars and Languages.

UNIT-III

Pushdown Automata: Definition, Language of PDA, Equivalence of PDA's and; CFG's. Deterministic pushdown Automata.

Properties of Context Free Languages: Normal Forms for Context-Free Grammars, Pumping Lemma, Closure Properties, Decision Properties of CFL's.

UNIT-IV

Introduction to Turing Machines: Problems that Computer Cannot Solve, The Turing Machine, Programming Techniques for Turing Machines, Extensions to the Turing Machines, Restricted Turing Machines, Turing Machine and Computers.

UNIT -V

Undecidability: A language that is not Recursively Enumerable. An undecidable problem that is RE, undecidable problems about Turing Machines, Post's Correspondence Problem, Other Undecidable Problems.
Intractable Problems: The classes P and NP, An NP complete Problem, A Restricted Satisfiability problem.

Suggested Reading:

1. John E.Hopcroft,Rajeev Motwani,Jeffery D Ulman, *Introduction to Automata Theory Languages And Computation,* Second edition, Pearson Education, 2007.
2. John C.Martin, *Introduction to Languages and The Theory of computation,* Third edition, Tata McGraw Hill, 2003.
3. Cohen Daniel I.E, *Introduction to Computer Theory,* Second edition, 2007.
4. Bernard Moret, *The Theory of Computation,* Pearson Education, 2002.

BIT 331

OPERATING SYSTEMS LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

1. Familarity and usage of system calls of LINUX/WINDOWS NT on process management fork(), exec() etc.,IPC & Synchoronization-pipes, shared memory, messages, semaphores etc., File management-read, write etc.
2. Creating Threads and Manipulating under Windows-NT platform.
3. Implementing a program to get the attributes of a file/Directory on Linux using related system calls.
4. Implementing a program to get and set the environment variables using system calls.
5. Implementation of Echo server using pipes.
6. Implementation of Echo server using shared memory.
7. Implementation of Echo server using Messages.
8. Implementing Producer Consumer Problem using semaphores.
9. Implementing Producer Consumer Problem using Message passing.
10. Implementing Reader-writers problem using Semaphores.
11. Implementing Dining philosophers problem using semaphores.
12. Implementing Dinning philosophers problem using Windows-NT threads.
13. Implementation of Limited shell on Linux platform.

Suggested Reading:

1. W. Richard Stevens, *Unix Network Programming,* Prentice Hall/ Pearson Education, 2009.

BIT 332

DBMS - LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

1. Creation of database (exercising the commands for creation)
2. Simple condition query creation using SQL Plus
3. Complex condition query creation using SQL Plus
4. Usage of Triggers and Stored Procedures.
5. Creation of Forms for student Information, library information, Pay roll etc.
6. Writing PL/SQL procedures for data validation
7. Generation using SQL reports
8. Creating Password and Security features for applications.
9. Usage of File locking table locking, facilities in applications.
10. Creation of small full pledged database application spreading over to 3 sessions.

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

Suggested Reading:

1. Nilesh Shah, *Database System Using Oracle,* PHI, 2007.
2. Rick F Vander Lans, *Introduction to SQL,* Fourth edition, Pearson Education,2007.
3. Benjamin Rosenzweig, Elena Silvestrova, *Oracle PL/SQL by Example,* Third edition, Pearson Education, 2004.
4. Albert Lulushi, *Oracle Forms Developer's Handbook,* Pearson Education, 2006.

BIT 333

MINI PROJECT – III

Instruction 3 Periods per week
Sessional 25 Marks

The Students are required to carry out Mini Project in any of the areas such as Database Management Systems, Operating Systems.

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

SCHEME OF INSTRUCTION & EXAMINATION

B.E. IIIrd YEAR
(INFORMATION TECHNOLOGY)

SEMESTER - II

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration In Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	BIT 351	Computer Networks	4	-	3	75	25
2.	BIT 352	Compiler Construction	4	-	3	75	25
3.	BIT 353	Object Oriented System Development	4	-	3	75	25
4.	BIT 354	Artificial Intelligence	4	-	3	75	25
5.	BIT 355	Design & Analysis of Algorithms	4	-	3	75	25
6.		ELECTIVE - I	4	-	3	75	25
		PRACTICALS					
1.	BIT 381	OOSD & Compiler Construction Lab	-	3	3	50	25
2.	BIT 382	Network Programming Lab	-	3	3	50	25
3.	BIT 333	Mini Project - IV	-	3	-	-	25
		Total	**24**	**9**	**–**	**550**	**225**

Elective - I

1. BIT 356 Computer Graphics
2. BIT 357 Data Warehousing & Data Mining
3. BIT 358 Software Testing
4. BIT 359 Digital Instrumentation & Control

BIT 351

COMPUTER NETWORKS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

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

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

UNIT-II

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

Network layer in the Internet: IP protocol, IP addressees, Internet control protocols, OSPF, BGP, Internet Multicasting, Mobile IP, IPv6.

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

UNIT-III

Network Programming:

Socket Interface: Sockets, Socket Address, Elementary Sockets, Advanced Sockets, Socket

Options, Out of Band Data, Daemon process and Internet Super Server,IPv4 and IPv6 interoperability.

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

UNIT-IV

Application Layer:

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

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

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

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

UNIT-V

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

Suggested Reading:

1. Andrew S. Tanenbaurn, *Computer Nerworks,* Fourth Edition, Pearson Education.
2. W. Richard stevens, *Unix Network Programming,* Prentice Hall/ Pearson Education,2009.
3. James F. Kurose, Keith W, Ross, *Computer Networking, Atop-Down Approach Featuring the Internet,* Third Edition, Pearson Education , 2005.
4. William Stallings, *Computer Networking with Internet Protocols and Technology,* Pearson Education, 2004.

BIT 352

COMPILER CONSTRUCTION

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

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

Lexical analysis – The role of Lexical Analyzer. Input Buffering, Specification of Tokens. Rccognition of Tokens, The Lexical-Analyzer Generator Lex.

UNIT-II

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

UNIT-III

Syntax Directed Translation – Syntax Directed Definitions. Evaluation Orders for SDDs. Applications of Syntax Directed Translation.

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

UNIT-IV

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

Code Generation : Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Peephole Optimization, Register Allocation and Assignment, Machine Independent Optimizations – The Principal Sources of Optimizations, Introduction to data flow analysis, Foundation of data flow analysis.

UNIT-V

Optimizing for Parallelism and Locality - Basic Concepts, Matrix Multiply: An In-Depth Example, Data Reuse, Synchronization between Parallel Loops.

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

Suggested Reading:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman – *Compilers: Principles, Techniques &Tools* – Pearson Education, Second Edition, 2007
2. Leland L Bech, *System Software: An Introduction to Systems Programming,* Pearson Education Asia, 1997.
3. Kenneth C Louden, *Compiler Construction: Principles and Practice, Cengage Learning,* 1997.

BIT 353

OBJECT ORIENTED SYSTEM DEVELOPMENT

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

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

UNIT-II

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

UNIT-III

UML Introduction: Why we Model, Introducing the UML, Elements of UML.

Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams, Class Diagrams.

Advanced Structural Modeling: Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages, Instances, Object Diagrams, Components.

UNIT-IV

Basic Behavioral Modeling: Interactions, Use Cases, Use Case Diagrams, Interaction diagrams, Activity diagrams.

Advanced Behavioral Modeling: Events and Signals, State Machines, Processes and Threads, Time and space, State Chart Diagrams.

UNIT-V

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

Suggested Reading:

1. Ivor Jacobson, Grady Booch, James Rumbaugh, *The Unified Software Development Process,* Pearson Education, India, 2008.
2. Grady Booch, James Rumbaugh, Ivor Jacobson, *The Unified Modeling Language-User Guide(Covering UML 2.0),* Second Edition, Pearson Education, India, 2007.

BIT 354

ARTIFICIAL INTELLIGENCE

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

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

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

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

UNIT-II

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

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

UNIT-III

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

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

UNIT-IV

Machine-Learning Paradigms: Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Suggested Reading 2), Deductive Learning. Clustering, Support Vector Machines.

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

UNIT-V

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web

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

Suggested Reading:

1. Saroj Kaushik, *Artificial Intelligence,* Cengage Learning, 2011.
2. Russell, Norvig, *Artificial intelligence, A Modern Approach,* Pearson Education, Second Edition. 2004
3. Rich, Knight, *Nair: Artificial intelligence,* Tata McGraw Hill, Third Edition 2009.

BIT 355

DESIGN & ANALYSIS OF ALGORITHMS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction: Algorithm Specification, Performance analysis, Space Complexity, Time Complexity, Asymptotic Notation(O,Omega,Theta), Practical Complexities, Performance Measurement, Review of elementary data structures, Heap and Heap Sort, Hashing, Set representation, UNION, FIND.

UNIT-II

Divide- and Conquer: The general method, finding maximum minimum. Merge sort quick sort and selection.

Greedy Method: Knapsack problem, Optimal Storage on tapes, Job sequencing with deadlines, Optimal merge patterns, Minimum Spanning Trees.

UNIT-III

Dynamic Programming And Traversal Technique: Multistage graph, All Pair Shortest Path, Optimal Binary Search trees,0/1 Knapsack, Reliability Traveling Salesman Problem, Bi connected Components and Depth First Search.

UNIT-IV

Backtracking and Branch and Bounds: 8-Queens Problem, Graph Coloring Hamilton cycle, Knapsack Problem, 0/1 Knapsack Problem, Traveling salesperson problem, Lower-Bound Theory.

UNIT-V

NP-Hard and NP-Completeness: Basic concepts, cook's theorem, NP-hard graph problems and scheduling problem, NP-hard generation problems, Decision problem, Node covering problem.

Suggested Reading:

1. Horowitz E. Sahani S., *Fundamentals of Computer Algorithm,* Second editon, University Press, 2007.
2. Anany Levitin, *Introduction to the Design & Analysis, of Algorithms,* Pearson Education, 2003.
3. Aho, Hopcroft, Ulman, *The Design and Analusis of Computer Algorithm,* Pearson Education, 2000.
4. Parag H.Dave, Himanshu B. Dave, *Design and Analysis of Algorithms,* Pearson Education, 2008.

BIT 356

COMPUTER GRAPHICS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Graphics Systems and Models: Graphics system; Images; Physical and synthetic; Imaging system; synthetic camera model; programming interface; graphics architectures programmable pipelines; performance characteristics.

Graphics Programming: Programming two-dimensional applications; OpenGLAPI; Primitives and attributes; color; viewing, control functions.

UNIT-II

Input and Interaction: Input device; clients and servers; displays lists; display lists and modeling; programming event driven input; picking ; building interactive models; animating Interactive programs; logic operations.

Geometric Objects: Three - dimensional primitives; coordinates systems and frames; frames in OpenGL; Modeling colored cube.

UNIT-III

Transformations: Affine Transformations; Transformations in homogenous coordinates; concatenation of Transformations; OpenGL transformation matrices.

Viewing: Classical and Computer views; Viewing with a computer; Positioning of camera; Simple projections; Projections in OpenGL; Hidden surface removal; Parallel-projection matrices; Perspective projection matrices.

UNIT-IV

Lighting and Shading: Light sources; The Phong lighting model; Computational vectors; Polygonal shading; Light sources in OpenGL; Specification of matrices in OpenGL; Global illumination.

From Vertices To Frames: Basic implementation strategies; line-segment clipping; polygon clipping; clipping of other primitives; clipping in three dimensions; Rasterization ; Bresenham's algorithm; Polygon Rasterization; Hidden surface removal; anti-aliasing; display considerations.

UNIT-V

Modelling & Hierarchy: Hierarchal models; trees and traversal; use of tree data structure; animation; Graphical objects; Scene graphs; Simple scene graph API; Open Scene graph; other tree structures.

Curves and Surfaces: Representation of curves and surfaces; design criteria; Bezier curves and surfaces; Cubic B-splines; General B-splines; rendering curves and surfaces; curves and surfaces in OpenGL.

Suggested Reading:

1. Edward Angel, *Interactive Computer Graphics A Top-Down Approach Using OpenGL,* Peasrson Education, Fifth Edition -2009.
2. Fransis S Hill Jr., Stephen M Kelley, *Computer Graphics Using Open GL,* Prentice-Hall, Inc., Third Edition , 2007.
3. Jim X. Chen, *Foundation of 3D Graphics Programming Using JOGL and Java3D,* Springer Verlag, 2006.

BIT 357

DATA WAREHOUSING & DATA MINING

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

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

Data Preprocessing: Preprocessing, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT-II

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture and Implementation, from Data Warehousing to Data Mining.

Mining Frequent Patterns, Associations Rules: Basic Concepts, Efficient and Scalable Frequent Item Set Mining Methods, Mining Various kinds of Association Rules.

UNIT-III

Classification and Prediction: Introduction, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule based Classification, Classification by Back Propagation, Support Vector Machines, Associative classification, Other classification Methods, Prediction, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor.

UNIT-IV

Cluster Analysis: Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model Based Clustering Methods, Clustering High Dimensional Data, Outlier Analysis.

Mining Streams, Time-Series, and Sequence Data: Mining Data Streams, Mining Time-Series Data, and Mining Sequence Patterns in Transactional Databases and Biological Data:

UNIT-V

Mining Object, Spatial, Multimedia, Text, and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Suggested Reading:

1. Han J & Kamber M, *Data Mining: Concepts and Techniques,* Third Edition, Elsiver, 2011.
2. Pang-Ning Tan, Michael Steinback, Vipin Kumar, *Introduction to Data Mining,* Pearson Education, 2008.
3. Arun K Pujari, *Data mining Techniques,* Second Edition, University Press,2001.
4. Margaret H Dunham, S.Sridhar, *Data mining: Introductory and Advanced Topics,* Pearson Education, 2008.
5. Humphires, Hawkins, Dy, *Data Warehousing: Architecture and Implementation,* Pearson Education, 2009.
6. Anahory, Murray, *Data Warehousing in the Real World, Pearson Education,* 2008.
7. Kargupta, Joshi,etc., *Data Mining: Next Generation Challenges and Future Directions,* Prentice Hall of India Pvt Ltd, 2007.

BIT 358

SOFTWARE TESTING

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction: Software-Testing, Terminology and Methodology, Verification and Validation.

UNIT-II

Dynamic Testing: Black Box Testing Techniques, White Box Testing Techniques, Static Testing, Validation Activities, Regression Testing.

UNIT-III

Test Management, Software Metrics, Testing Metrics for Monitoring and Controlling the Testing Process, Efficient Test Suite Management.

UNIT-IV

Testing Object Oriented Software, Testing Web Based Systems, Debugging.

UNIT-V

Overview of Testing Tools, Testing an Application using WinRunner, Test Script Language, Architecture and use of Silk Test, Use of LoadRunner and JMeter, Source Code Testing Utilities in Unix / Unix Environment.

Suggested Reading:

1. Naresh Chauhan, *Software Testing Principles and Practices,* Oxford University Press, 2010.
2. Dr.K.V.K.K.Prasad, *Software Testing Tools,* Dreamtech Press, 2008.
3. William E. Perry, *Effective Methods for Software Testing* Edition, Wiley & Sons, 2006.
4. Srinivasan Desikan, Gopalaswamy Ramesh, *Software Principles and Practices,* Pearson Education, 2006.

BIT 359

DIGITAL INSTRUMENTATION & CONTROL

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction to process control Introduction, control systems, process control block diagram, control system evaluation, time response, significance and statistics. Analog signal conditioning. principles of analog signal conditioning, passive circuits, op amps, op-amps in instrumentation, Industrial Electronics.

Digital Signal Conditioning: Review of digital fundamentals, comparators, DACs ADCs Data Acquisition Systems (DAS).

UNIT-II

Thermal Sensors: Metal resistance Vs temperature devices, thermistors, thermocouples, bimetal strips, Gas thermometer, vapor pressure thermometer, liquid expansion thermometer, solid state temperature sensors. Mechanical Sensors displacement, location or position sensors, strain sensors, motion sensors, pressure sensors, flow sensors.

UNIT-III

Optical Sensors : Fundamentals of EM radiation, photo detectors, pyrometry, optical sources, applications.

Final control : Final Control operation, signal conversions, actuators, control elements.

UNIT-IV

Discrete–state process control : Definition , characteristics of the system, ladder diagram, Programmable logic controllers.

Controller principles : Process characteristics, control system parameters, discontinuous, continuous and composite controller modes.

UNIT-V

Analog controllers: Electronic controllers, pneumatic controllers, design considerations. Digital Controllers Digital electronics methods, computers in process control, characteristics of digital data, controller software.

Control loop characteristics: Control system configurations, multivariable control systems, control system quality, stability, process loop tuning.

Suggested Reading:

1. Curtis Johnson, *Process Control Instrumentation Technology,* Eighth Edition, PHI-2006.
2. W Bolton, *Mechatronics, Electronic Control Systems in Mechanical and Electrical Engineering,* Second Edition, Pearson Education, Asia, 2001.
3. CS Rangan, G.R. Sarma, V.S.V Mani, *Instrumentatin Devices & Systems,* Second Edition, Tata McGraw Hill, 2002.

BIT 381

OOSD & COMPILER CONSTRUCTION LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

COMPILER CONSTRUCTION LAB: Exercises must be taken from 1 to 6

OBJECT – ORIENTED ANALYSIS & DESIGN LAB: Exercises must be taken from 7 to 12

1. Scanner programs using LEX
2. SLR Parser table generation
3. LR Parser table generation
4. Parser Generation using YACC

5-6 Program on Code generation & Code Optimization

7. System Definition
   a) Requirements Management (b) Data Modeling
8. Software Development
   a) Application & Web modeling (b) Configuration Management
   c) Unit Testing
9. Content Management
10. System Testing
    a) Functional Testing (b) Reliability Testing
    c) Performance Testing
11. Change Management
    a) Configuration Management (b) Requirement Management
    c) System Documentation
12. Project Management

BIT 382

NETWORK PROGRAMMING LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. Understanding and using of commands like ifconfig, netstst, ping, arp, telnet, ftp, finger, traceroute, whois etc.
2. Implementation of concurrent and iterative echo server using both connection and connectionless socket system calls.
3. Implementation of time and day time services using connection oriented socket system calls.
4. Implementation of ping service
5. Build a web server using sockets.
6. Implementation of remote command execution using socket system calls.
7. Demonstrate the use of advanced socket system calls.
8. Demonstrate the non blocking I/O.
9. Implementation of concurrent chart server that allows current logged in users to communicate one with other.
10. Implementation of file access using RPC.
11. Build a concurrent multithreaded file transfer server using threads.
12. Implementation of DNS.

Suggested Reading:

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

BIT 383

MINI PROJECT - IV

Instruction	3 Periods per week
Sessional	25 Marks

The Students are required to carry out Mini Project in any of the areas such as Computer Networks, Object Oriented System Development, and Compiler construction.

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

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