WITH EFFECT FROM THE ACADEMIC YEAR 2016-2017

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. III-YEAR (REGULAR)

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 & Accountancy	4	-	3	75	25
2.	BIT 301	Design and Analysis of Algorithms	4	-	3	75	25
3.	BIT 302	Software Engineering	4	-	3	75	25
4.	BIT 303	Database Management Systems	4	-	3	75	25
5.	BIT 304	Operating Systems	4	-	3	75	25
6.	BIT 305	Theory of Computation	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

CM371 W*ith effect from the Academic Year 2016-2017*

MANAGERIAL ECONOMICS AND ACCOUNTANCY

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

COURSE OBJECTIVES:

- To differentiate & distinguish price and output decisions in different market structures.
- To know the objectives behind financial, economic, taxation, industrial & licensing policies.
- To know the meaning, importance, sources,& uses of capital in an enterprise and to estimate the working capital requirements

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).

UNITIII

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

UNIT IV

Book-keeping: Principles and significance of double entry book keeping, Journal, Subsidiary books, Ledger accounts Trial Balance, concept and preparation of Final Accounts with simple adjustments, Analysis and interpretation of Financial Statements through Ratios.(Theory questions and numerical problems).

UNIT V

Financial 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 and numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities).

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.
4. Shashi K Sharma and Gupta. "Financial Management", Kalyani Publishers.
5. Khan and Jain, "Financial Management", Sultan Chand Publications
6. SP Jain and KL Narang, "Financial Accounting",Kalyani Publishers.

BIT 301 *With effect from the Academic Year 2016-2017*

DESIGN AND ANALYSIS OF ALGORITHMS

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

COURSE OBJECTIVES:

- To analyze the asymptotic performance of algorithms.
- To demonstrate a familiarity with major algorithms and data structures.
- To apply important algorithmic design paradigms and methods of analysis.

UNIT-I

Introduction: Space and Time Complexity, Amortized Complexity, Asymptotic Notation, Randomized Algorithms. Elementary DataStructures:Heaps and Heap sort. Sets representation, UNION, FIND Operations,and Graphs.

UNIT-II

Divide and Conquer: The general method, binary search, finding maximum and minimum. Merge sort, quick sort, selection, Strassen's Matrix .

Greedy Method: Knapsack problem, Optimal Storage on Tapes, Job sequencing with Deadlines, Optimal Merge Pattern, Minimum Cost Spanning Trees and Single Source shortest Paths.

UNIT-III

Dynamic Programming: Multistage Graphs, All pairs shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, Reliability Design,Travelling Salesman Problem, BFS and Traversal, DFS and Traversal, Biconnected Components and Depth FirstSearch.

UNIT-IV

Backtracking and Branch and Bound:8-Queens Problem, Graph Colouring, Hamiltonian cycles, Knapsack Problem. Introduction to LC Search, FIFO Branch and Bound, LC Branch and Bound, 0/I Knapsack Problem, Travelling Salesperson problem.

UNIT-V

NP-hard and NP-Completeness: Basic concepts, Non Deterministic Algorithms, Significance of Cook's theorem, NP hard graph problems-hard code generation problems. Decision Problem,Node covering problem.

Suggested Reading:

1.Horowitz E. Sahni *S.*Rajasekaran *S: "Fundamentals of ComputerAlgorithms"*,2nd edition, Universities Press, 2007.
2.AnanyLevitin,*"Introduction to the Design & Analysis of Algorithms*",2003.
2.Aho, Hopcroft,Ullman, "*The Design and Analysis of ComputerAlgorithms",*Pearson Education,2000.
3.Parag H.Dave,HimanshuB. Dave "*Design acid Analysis of Algorithms*",Pearson Education,2008.
4.Udit Agarwal,*"Algorithms Design and Analysis*",Phanpati Rai& Co., 2007.

BIT 302 *With effect from the Academic Year 2016-2017*

SOFTWARE ENGINEERING

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

COURSE OBJECTIVES:

- To make students to understand the basic principles of Software Engineering, the process models which are employed in the development of software
- To make students to understand the basic testing techniques which are employed during the development of the software.

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 - Box Testing, 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, WitoldPedrycz, Software Engineering-An enginnering Approach, John Wiley Inc., 2000.

BIT 303 W*ith effect from the Academic Year 2016-2017*

DATABASE MANAGEMENT SYSTEMS

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

COURSE OBJECTIVES:

- Making students understand basic concepts related to data base systems and also allows to develop an intuition about database design

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 Non-volatile 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 304*With effect from the Academic Year 2016-2017*

OPERATING SYSTEMS

Instruction	4 Periods per week
Duration	4 Hours
University Examination	50 Marks
Sessional	25 Marks

COURSE OBJECTIVE

- To understand the working of computer system in terms of the different operations performed and services provided by it.
- To understand the functions and management of different resources of the system (Processor, I/O, and Memory etc)
- To understand issues of protection and security.

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, Interprocesscommunication, Examples of IPC Systems, Communication in Client/Server Systems.

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

UNIT II

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

Process Coordination and Synchronization: Background, The Critical-Section Problem, Peterson'sSolution, Synchronization, Monitors, Synchronization Examples.

Deadlocks: System Model, Deadlock characterization, Methods for Handling Deadlocks, DeadlockPrevention, 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,

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

UNIT IV

Implementing File Systems: File System-Structure, File-System Implementation, Directory**I**mplementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, Log-Structured File Systems, NFS.

Secondary –Storage Structure: Overview of Mass-Storage Structure, Disk Structure, DiskAttachment, 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, AccessMatrix, 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 Defences, Firewalling to protect Systems and Networks, Computer Security Classification, Case Studies- Linux System.

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 Stallings-Operating Systems, Fifth Edition, Pearson Education, 2005.

Ida M.Flynn, Understanding Operating Systems, Sixth Edition, Cengage, 2011

BIT 305 *With effect from the Academic Year 2016-2017*

THEORY OF COMPUTATION

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

COURSE OBJECTIVES:

- Provides basic properties of formal languages and formal grammars, deterministic and nondeterministic finite automata, relation between types of languages and types of finite automata.
- Provides basic properties of Pushdown Automata and Turing machines and computing with Turing machines and PDA.
- Understand the challenges for Theoretical Computer Science and its contribution to other sciences

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, Algebraic Laws for Regular Expression.

UNIT-Il

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.ContextFreeGrammars and Languages: Context-Free Grammar s, 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, Propertiesof ContextFree Languages :Normal Forms for Context-Free Grammars, Pumping Lemma, closure properties, Decision Properties of CFL's.

UNIT-IV

Introduction to TurningMachines: Problems that Computer Cannot Solve, The Turning, Machine, Programming Techniques for Turning Machines, Extensions to the Turning*4*Machines, Restricted Turning Machines, Turning Machine and Computers.

UNIT-V

Undecidability:

A language that is not Recursively Enumerable. An undecidableProblemthatisRE,Undecidableproblems aboutTuring Machines, Post's Correspondence Problem, OtherUndecidable Problems.

Intractable Problems: The Classes P and NP ,PNP Complete Problem, A RestrictedsatisfiabilityProblem.

SuggestedReading:

1.John E.HopcroftRajeevMotwani,JeffeiyDUlman, I*ntroductionto Automata Theory Languages and Computation*,Second edition, Pearson Education, 2007.

2. John C.Martin,*Introduction toLanguages and the Theory ofComputation*,3rd edition,TataMcGrawHill,2003.

3.Cohen DanielI.E.*"Introduction to Computer Theory"*2nd edition, Wiley India, 2007.

4.BernardMoret,*TheTheory of Computation*,Pearson Education, 2002.

With effect from the Academic Year 2016-2017

BIT 331

OPERATING SYSTEMS LAB

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

COURSE OBJECTIVES:

- To understand and use different systems calls related to process, file, IPC etc.
- To understand thread management.
- To understand the different processor scheduling and page replacement algorithms
- To provide understanding of and solution for different IPC classical synchronization problems.

1. Familiarity and usage of System calls of LINUX:
   process management: fork(), exec(), wait(), sleep() ...,
   file management: open(), read(), write(), seek(), close()...,
2. Familiarity andusage of IPC constructs (Basic operations):
   pipes, shared memory, messages, semaphores..
3. Creating thread under LINUX platform using appropriate thread API
4. Program to get the attributes of a file/Directory on Linux using related system calls.
5. Program to get and set the environment variables.
6. Implement inter-process communication using IPC constructs.
7. Implementing Producer Consumer Problem solution.
8. Implementing Reader-writers problem solution using semaphores.
9. Implementing Dining Philosophers problem solution using semaphores.
10. Implement Process Scheduling Algorithms: FCFS, SJF (Pre-emptive), Round Robin.
11. Implement Page Replacement Algorithms: FIFO, LRU, OPTIMAL.

BIT 332 *With effect from the Academic Year 2016-2017*

DBMSLAB

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

COURSE OBJECTIVES:

- To educate students with fundamental concepts of Database Design, Data Models, Different Data Base Languages (SQL/Oracle

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.
11. Experiment on Database Connectivity.

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

Suggested Reading:

1. NileshShah , 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 *With effect from the Academic Year 2016-2017*

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.