Date: 30-03-2016

WITH EFFECT FROM THE ACADEMIC YEAR 2016 - 2017

SCHEME OF INSTRUCTION & EXAMINATION

B.E. IIIrd YEAR
(COMPUTER SCIENCE & ENGINEERING)

SEMESTER - I

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration	Maximum Marks	
			L	D/P	In Hours	Univ. Exam	Sessionals
		THEORY					
1.	CS 301	Database Management Systems	4	-	3	75	25
2.	CS 302	Operating Systems	4	-	3	75	25
3.	CS 303	Automata, Languages and Computation	4	-	3	75	25
4.	CS 304	Software Engineering	4	-	3	75	25
5.	CM 371	Managerial Economics and Accountancy	4	-	3	75	25
6.	CS 306	Data Communications	4	-	3	75	25
		PRACTICALS					
1.	CS 331	DBMS Lab	-	3	3	50	25
2.	CS 332	OS Lab	-	3	3	50	25
3.	CS 333	Mini Project	-	3	-	-	25
		Total	**24**	**9**	**24**	**550**	**225**

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CS 301

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, Database 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 Entity-Relationship Model, Constraints, Entity-Relationship Diagrams, Entity – Relationship 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, Multi-version 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, McGraw-Hill International Edition, 5th Edition, 2006
2. Ramakrishnan, Gehrke, Database Management Systems, McGraw-Hill International Edition, 3rd Edition, 2003
3.Elmasri, Navathe, Somayajulu, Fundamentals of Database Systems, Pearson Education, 4th Edition, 2004

WITH EFFECT FROM THE ACADEMIC YEAR 2016 - 2017

CS 302

OPERATING SYSTEMS

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

UNIT-I

Introduction to operating systems: OS structure and strategies, Process concept, Interprocess communication, Threads, Multithreaded programming.

Process scheduling: Scheduling criteria, Scheduling Algorithms, Multi Process scheduling, Thread Scheduling.

UNIT-II

Memory Management, swapping, contiguous allocation, paging, static and dynamic partition, demand paging, page replacement algorithms, thrashing, segmentation with paging, Virtual memory.

File System Interface: File Concept, Access Methods, Directory Structure, File System Mounting, File sharing, protection.

File System implementation: File system structure, File system implementations, Directory implementation, Allocation Methods, Free space management, Efficiency and performance, recovery.

Case Studies: UNIX file system, Windows file system

UNIT-III

Process Synchronization: Critical section problem, semaphore, monitors**.**

Deadlocks: Necessary conditions, resource allocation graph, methods for handling deadlocks, preventions, avoidance, detection and recovery, protection, goals of protection, domain of protection, access matrix .

UNIT-IV

Device Management: Disk structure, Disk Attachment, Disk Scheduling, Disk Management, RAID Structure, Stable storage implementation.

I/O System: I/O hardware, Application I/O interface, Kernel I/O Subsystem, Transforming I/O request to hardware operation, STREAMS.

UNIT-V

Case Studies:

LINUX System: Design Principles, Kernel Modules, Process Management, Scheduling Memory Management, File Systems, Input and Output, Interprocess communication, Network Structure, Security.

Windows XP: Design Principles, Architecture, Environmental subsystem, File Subsystem, Networking, Programming interface, Android OS

Suggested Reading:

1. Abraham Silberchatz, Peter B.Galvin, Greg Gagne, *Operating System-Concepts*, Wiley India, 2006.
2. Andrew S.Tanenbaum, *Modern Operating Systems*, Third Edition, Pearson education, Asia-2008.
3. Naresh Chauhan, *Principles of Operating Systems*, first edition, Oxford University Press, 2014.
4. DhananjayM.Dhamdhere, *Operating System-concept based approach*, third edition, Tata McGraw Hill, Asia-2009.
5. Robert Love: *Linux kernel Development*, Pearson Education, 2004.

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CS 303

AUTOMATA LANGUAGES AND COMPUTATION

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, Non-deterministic Finite Automata, An application, Finite Automata with Epsilon Transitions.

Regular expressions & Languages: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic 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, Decision Properties of Regular Language, Equivalence and Minimization of Automata.

Context Free Grammars and Languages: Context free grammars, Parses Trees, Applications, Ambiguity in Grammars and Languages.

UNIT-III

Pushdown Automata: Definition, Languages 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 Computers cannot Solve, The Turing machines, Programming Techniques for Turing Machines, Extensions to the Turing 4 Machines Restricted Turing Machines, Turing machines and Computers.

UNIT-V

Un-decidability: 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. **Intactable 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,* 3nd edition, Pearson Education-2007.
2. John C.Martin, *Introduction to Languages and the Theory of Computation,* 3rd edition Tata McGraw Hill, 2003.
3. Chander Kumar Nagpal, *Formal Lnaguages and Automata Theory*, first edition, Oxford University Press, 2011
4. Bernard M.Moret, *The Theory of Computation,* Pearson Education, 2002.

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CS 304

SOFTWARE ENGINEERING

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

UNIT -I

Introduction to Software Engineering:

Generic view of Process: Software Engineering, Process Framework, CMM, Process Patterns, Process Assessment, Personal and Team Process, Process Technology, Product and process.

Process Models: Perspective Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process.

An Agile View of Process: What is Agility, Agile Process, and Agile Process Models.

UNIT-II

Planning and Managing the Project: Tracking Progress, Project Personnel, Effort Estimation, Risk Management, the Project Plan, Process Models and Project Management, Information Systems Example, Real-time Example.

Requirement Engineering: A bridge to design and construction, Requirement Engineering tasks, Initiating Requirement Engineering Process, Eliciting Requirement, Developing Uses cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

UNIT-III

Building the Analysis Model: Requirements Analysis Modeling approaches, Data modeling concepts, Object oriented analysis , Scenario based modeling, Flow oriented modeling, Class-based modeling, Creating a Behavioral Modeling.

Design Engineering: Design with in the context of SE, Design Process and Design quality, Design concepts, The Design Model, Pattern-based Software Design.

UNIT-IV

Creating Architectural Design: Software architecture, Data design, Architectural Styles and Patterns, Architectural Design, Assessing alternative Architectural Designs, Mapping data flow into software Architecture.

Modeling Component-Level Design: What is a Component, Designing Class-Based components, Conducting Component–level Design, Object Constraint Language, Designing Conventional Components.

Performing User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation**.**

UNIT-V

Testing Strategies: A Strategic approach to software testing, strategic issues, test strategies for O-O software, validation testing, system testing, art of debugging.

Testing Tactics: Software Testing Fundamentals, Black-Box and white box Testing, basis path testing, Control Structure Testing, O-O Testing methods, Testing Methods applicable on the class level, inter class Test case design, Testing for Specialized environments, architectures and applications, Testing Patterns.

Product Metrics: Software quality, A framework for product metrics, Metrics for the analysis model, metrics for the Design model, metrics for source code, Metrics for Testing, Metrics for maintenance.

Suggested Reading:

1. Roger S. Pressman, *"Software Engineering –A Practitioners Approach"*, 6th Edition, Pearson Education, India, 2005.
2. Shari Lawrence Pfleeger, *"Software Engineering Theory and Practices"* 4th Edition - Pearson Education, India, 2011.
3. Ali Behforooz and Frederick J. Hudson, *Software Engineering Fundamentals*, Oxford University Press, 2012
4. Pankaj Jalote, *"An Integrated Approach to Software Engineering"*, 3rd Edition, Springer Link Edition, India, 2005.

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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

preparation of Final Accounts with simple adjustments, Analysis and interpretation of Financial Statements through Ratios.

(Theory questions and numerical problems on preparation of final accounts, cash book, petty cash book, bank reconciliation statement, calculation of some 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.

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CM 306

DATA COMMUNICATIONS

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

UNIT-I

Introduction: Communication model, Data Communication networking, Protocols and Architecture, Standards.

Data Transmission: Concepts and terminology, Analog and Digital Transmission, Transmission Impairments, Transmission media.

Data Encoding: Digital Data Digital Signals, Digital Data-Analog Signals, Analog Data-Digital Signals, Analog Data-Analog Signals.

UNIT-II

Data Communication Interface: Asynchronous and Synchronous Transmission, Line

Configuration, Interfacing.
Data Link Controls: Flow Control, Error Detection, Error Control, HDLC, other Data link Control protocols, performance issues.

UNIT-III

Multiplexing: Frequency Division Multiplexing, Synchronous time - Division Multiplexing, Statistical Time – Division Multiplexing. Asymmetric Digital Subscriber line, xDSL. Circuit Switching, Packet Switching & Frame Relay. ATM Architecture, Logical Connection, ATM Cells, Transmission of ATM cells.

UNIT-IV

Traditional Ethernet: Topologies and Transmission Media, LAN protocol architecture, MAC sub layer, - CSMA/CD, Physical Layer, Implementation, Bridged, switched and full duplex Ethernets, Layer 2 and Layer 3 Switches. Fast Ethernet: MAC sublayer, Physical sublayer, Implementation.

Gigabit Ethernet: MAC sublayer, Physical Layer, Implementation.

UNIT -V

Cellular Wireless Networks: Principles of Cellular Networks, First Generation Analog Second Generation CDMA, Third Generation Systems.

Wireless LANs: Overview, Wireless LAN Technology, IEEE 802.11. Architecture and services, IEEE 802.11 Medium Access Control, IEEE 802.11 Physical Layer.

Bluetooth: Architecture, Layers.

Suggested Reading:

1. William Stallings, *Data and Computer communication,* 7th edition. Pearson Education, Asia-2004.
2. Behrouz A. Forouzan, *Data Communications and Networking,* 4th Edition, Tata McGraw Hill, 2006.
3. Bhushan Trivedi, *Data Communication and Networks*, first edition, Oxford University Press, 2016
4. Fred Halsall, *Data Communications, Computer Networks and Open Systems,* 4th Edition, Pearson Education, 2000.

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CS - 331

DATABASE MANAGEMENT SYSTEMS LAB

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

1. SQL

a. Creating Database (Exercising commands like DDL,DML,DCL and TCL)
b. Exercising all types of Joins
c. Creating tables in I Normal, II Normal, III Normal and BCNF Form.
d. Creating table using combination of constraints.
e. Exercising Simple to Complex Queries
f. Usage of Stored Functions.
g. Creating Password and Security features for an Application.
h. Usage of File locking, Table locking facilities in an Applications

2. PL/SQL

a) Demonstration of Blocks, Cursors, Procedures, Functions and Packages.
b) Demonstrate Exception Handling .
c) Usage of Triggers to perform operation on Single and Multiple Tables.
d) PL/SQL Procedures for data validation

3. Report Generation Using SQL Reports

4. Creation of Small Full pledged Database Application

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 Systems Using Oracle"*, PHI,2007.
2. Rick F Van der 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.

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CS 332

OPERATING SYSTEMS LAB

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

1. Printing file flags for specified descriptor.
2. Print type of file for each command line arguments
3. Recursively descend a directory hierarchy counting file types
4. Program using process related system calls
5. Program s to create threads
6. Implement CPU scheduling algorithms (a) Round Robin (b) SJF (c) FCFS
5. Implement page replacement algorithms (a) FiFo (b) LRU
6. Echo server using pipes
7. Echo server using messages
8. Producer- Consumer problem using shared memory.
9. Readers – Writers problem using message passing
10. Dinning philosopher problem using semaphore
11. Bankers algorithm for Deadlock detection and avoidance
12. Program using file locking
13. Programs using LINUX shell scripts.
14. Case study of android OS

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CS 333

MINI PROJECT

Instruction	3 Periods per week
Sessional	25 Marks

The students are required to carry out mini projects in any of the areas such as Data Structures, Microprocessors and Interfacing, Database Management Systems, Operating Systems, Design and Analysis of Algorithms, and Software Engineering.

Students are required to submit a report on the mini project at the end of the semester.