SCHEME OF INSTRUCTION & EXAMINATION
B.E. III YEAR (COMPUTER SCIENCE & ENGINEERING)

With effect from the Academic year 2013-2014

SEMESTER - I

S. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination			
			Periods per Week		Duration in Hours	Maximum Marks		
			L/T	D/P		Univ. Exam	Sessionals	Credits
	THEORY							
1	CS301 UE	Database Management Systems	4	-	3	75	25	4
2	CS310 UE	Data Communications	4	-	3	75	25	4
3	CS303 UE	Computer Graphics	4	-	3	75	25	4
4	CS304 UE	Operating Systems	4	-	3	75	25	4
5	CS305 UE	Automata, Languages & Computation	4	-	3	75	25	4
	PRACTICALS							
1	CS331 UE	DBMS Lab	-	3	3	50	25	2
2	CS332 UE	Computer Graphics Lab	-	3	3	50	25	2
3	CS333 UE	Operating Systems Lab	-	3	3	50	25	2
		TOTAL	20	9		525	200	26

CS 301 UE

DATABASE MANAGEMENT SYSTEMS

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

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

CS 310 UE

DATA COMMUNICATIONS

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

Objectives:
- To learn about Data Communications in this introductory course in networking technology.
- To gain a practical understanding of relevant terminology, concepts and other information necessary to be knowledgeable in Data Communications.

Outcomes: This course enables the student to develop and demonstrate the following:
- Ability to understand the fundamentals and the framework necessary to keep pace with changes in networking technologies.
- Ability to make intelligent decisions about the appropriate design, integration and use of Data Communications equipment and systems.

UNIT-I

Data Communication and Networking Overview, Protocol Architectures: OSI, TCP/IP and ATM. Data transmission, Guided and Wireless transmission.
Data Encoding: digital data-digital signals, digital data-analog signals, analog data-digital signals, analog data-analog signals.

UNIT–II

Multiplexing, Circuit switching and Packet switching, Digital Data Communication Techniques, Asynchronous and Synchronous transmission, DSL and ADSL.

UNIT-III

Data Link Control: Error detection techniques, Interfacing.
Line configurations, Flow control, Error control, Data link control protocols, Protocol verification.

UNIT-IV

Local Area Networks, LAN Technologies, MAC sub layer, CSMA/CD, Token Ring, Fibre channel, IEEE Standards, High Speed LAN: Switched, Fast, Gigabit Ethernets.

UNIT-V

Wireless LANs, 802.11 Broadband wireless, 802.16 Bluetooth, Bridge, Spanning Tree Bridge, Source Routing Bridge, Repeaters, Hubs, Switches, Routers and Gateways, Virtual LANs.

Suggested Reading:
1. William Stallings, Data and Computer Communications, 8th Edition, Prentice Hall of India, 2012
2. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition, Pearson, 2012

CS 303 UE

COMPUTER GRAPHICS

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

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, OpenGL API, Primitives and attributes, Color, Viewing and Control functions.

UNIT-II

Input and Interaction: Input devices, Clients and Servers, Display lists, Display lists and modeling, Programming event-driven input, Picking, Building interactive models, Animating interactive programs, Logic operations. Geometric Objects: Three-dimensional primitives, Coordinate systems and frames, Frames in OpenGL, Modeling colored cube.

UNIT-III

Transformations: Affine transformations, Transformations in homogeneous 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

Modeling & 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 & 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, Pearson Education, 5th edition, 2009
2. Francis S Hill Jr., Stephen M Kelley, Computer Graphics using OpenGL, Prentice-Hall Inc., 3rd edition, 2007
3. Jim X. Chen, Foundations of 3D Graphics Programming using JOGL and Java3D, Springer Verlag, 2006
4. Hearn Donald, Pauline M Baker, Computer Graphics, 2nd edition, 1995

CS 304 UE

OPERATING SYSTEMS

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

UNIT-I

Introduction to Operating Systems: OS structure and strategies, Process concepts, Threads, Inter process communication. CPU scheduling algorithms, Process synchronization, Critical section problem, Semaphores, Monitors.

UNIT-II

Memory management, Swapping, Contiguous allocation, Paging, Static and Dynamic partitions, Demand paging, Page replacement algorithms, Thrashing, Segmentation, Segmentation with paging. File system interface: File concepts, Access methods and protection. File system implementation: File system structure, Allocation methods, Directory implementation.

UNIT-III

Deadlocks: Necessary conditions, Resource allocation graph, Methods for handling deadlocks, Prevention, Avoidance, Detection and Recovery. Protection: Goals, Domain of protection, Access matrix. Security: Authentication, Threat monitoring, Encryption.

UNIT-IV

Device Management: Disk scheduling methods, Disk management, Device drivers and interfaces, CPU- Device interactions, I/O optimization.

UNIT-V

Case Studies: The Linux System–Design principles, Kernel modules, Process management, Scheduling, Memory management, File systems, Input and Output, Inter process communication. Windows XP–Design principles, System components, Environmental subsystems, File systems, Networking, Programmer interface.

Suggested Reading:
1. Abraham Silberschatz, Peter B Galvin, Operating System Concepts, Addison Wesley, 2006
2. William Stallings, Operating Systems-Internals and Design Principles, 5th edition, PHI, 2005
3. Andrew S Tanenbaum, Modern Operating Systems, PHI, 1996

CS 305 UE

AUTOMATA, LANGUAGES AND COMPUTATION

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

UNIT-I

Introduction, Finite state automata, Non-deterministic finite state automata, FA with ε-transitions, Regular expressions, FA with outputs, Applications of FA. Properties of regular sets-Pumping Lemma, Closure properties, Myhill-Nerode Theorem, Minimisation of FA, Decision Algorithms.

UNIT-II

Context Free Grammars and Languages–Derivations, Parse-trees, Ambiguity in Grammars and Languages. Pushdown Automata–Definitions, The languages of PDA, Equivalence of PDAs and CFGs, Deterministic Pushdown Automata(DPDA).

UNIT-III

Properties of CFLs–Normal forms for CFGs, Pumping Lemma, Closure properties, Decision algorithms, Deterministic Context Free Languages, Predicting machines, Decision properties, LR(0) grammars, LR(0) and DPDA, LR(k) grammars.

UNIT-IV

Turing Machines–Introduction, Computational Languages and Functions, Techniques for construction of Turing machines. Modifications of TM, TM as enumerator, Restricted TM.

UNIT-V

Undecidability: Recursive and Recursively enumerable languages, UTM and undecidable problem, Rice Theorem, Post's correspondence problem. Chomsky's Hierarchy – Regular grammars, Unrestricted grammar, CSL, Relationship between classes of languages.

Suggested Reading:

1. John E. Hopcroft, Jeffrey D. Ullman, Introduction to Automata Theory, Languages and Computation, Narosa, 1979
2. Zvi Kohavi, Switching and Finite Automata Theory, TMH, 1976

CS 331UE

DBMS LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks
Credits	2

1. Creation of database (exercising the commands for creation).
2. Simple to Complex condition query creation using SQL Plus.
3. Usage of Triggers and Stored Procedures.
4. Creation of Forms for Student information, Library information, Pay roll etc.
5. Writing PL/SQL procedures for data validation.
6. Report generation using SQL reports.
7. Creating password and security features for applications.
8. Usage of File locking, Table locking facilities in applications.
9. Creation of small full- fledged database application spreading over 3 sessions.

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

CS 332 UE

COMPUTER GRAPHICS LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks
Credits	2

1. Program to draw simple 2-D images using basic OpenGL functions.

2. Program to draw simple 3-D shapes using polygonal approximations.

3. Program to demonstrate the usage of display lists.

4. Create a simple game with interactive graphics programming.

5. Program to demonstrate animation effect using transformations and double buffering.

6. Create a simple walk through program.

7. Program using projections in OpenGL.

8. Program with light sources and shading.

9. Program that defines and renders a scene graph using Open Scene Graph API.

10. Program using OpenGL Bezier curves and B-Splines.

CS 333 UE

OPERATING   SYSTEMS   LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks
Credits	2

1-3. Memory Management Algorithms

4-5 . Examples of Multithreading

6. Producer & Consumer problem using Semaphores and Shared memory

7-8 . Processor Scheduling algorithms

9. Dining Philosophers problem using Semaphores

10. Readers and Writers problem using Semaphores

11. Shell-programming exercises