FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

B.TECH. COMPUTER ENGINEERING

(SEMESTER: V - VIII)

(Under Credit Based Continuous Evaluation Grading System)

Session: 2016-17

GURU NANAK DEV UNIVERSITY AMRITSAR

B.TECH (COMPUTER ENGINEERING) SEMESTER SYSTEM
(Under Credit Based Continuous Evaluation Grading System)

SCHEME:

S. NO.	Course Code	Course	CREDITS		
		Semester – V			
1.	CSL330	System Analysis Design	3	1	0
2.	CSL331	Network Operating Systems	3	1	0
3.	CSL332	Relational Database Management Systems	3	1	0
4.	CSL333	Design & Analysis of Algorithm	3	1	0
5.	CSL334	Computer Graphics	3	1	0
6.	CSP335	Programming Lab–I (RDBMS & Computer N/W)	0	0	2
7.	CSP336	Programming Lab–II (Algorithm & Graphics)	0	0	2
8.		Interdisciplinary Course–I	4	0	0
		Sub Total:	19	5	4
		Grand Total:	28		

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSL–330: SYSTEM ANALYSIS AND DESIGN

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

System Planning and Analysis: Introduction to systems development and preliminary stage, Requirement analysis, Problem definition, Feasibility Study and its importance ,Identification and investigation of system, Information Gathering Tools, Cost Benefit Analysis, Role and Responsibilities of System Analyst.

UNIT–II

System Design: Input/Output Design , Modular and Structured Design , Tools for structured design and system design considerations.

System Implementation: System testing, Quality assurance, Documentation tools, Managing system implementation.

UNIT–III

System Security: Introduction, Threats to System, Control Measures, Disaster Recovery, Audit Trails.

Case study of the following systems.
Inventory Control.
University Management System.

References:

1. "Elements of System Analysis" – Marvin Gore and John W. Stubbe, 2003.
2. "System Analysis and Design" – Thapliyal M.P., 2002.
3. "Modern Systems Analysis & Design" – Hoffer, George and Valacich , 2001.
4. "SSAD: System Software Analysis and Design" – Mehta Subhash and Bangia Ramesh, 1998.
5. "Understanding Dynamic System : Approaches to Modelling, Analysis and Design" – Dorny C. Nelson, 1993.
6. "System Analysis and Design" – Perry Edwards, 1993.
7. "Systems Analysis and Design" – Elias M. Awad, 1993.
8. "Analysis and Design of Information Systems" – James A. Senn, 1989

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – V
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CSL–331: NETWORK OPERATING SYSTEMS

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Introduction of various Network Operating Systems: Windows 2000/2003/XP, Unix/Linux.

Overview of Network Operating System: Introduction, Architecture, Shell, Kernel, File System, Hardware requirements, Active Directory, Clustering & Load Balancing , Storage Management, Editors, Networking and Communication features, Licensing

UNIT–II

Disk Management: Terminology and Concepts, Managing Disks, Managing Basic and Dynamic Disks, Disk Quotas, Disk Fragmentation, Remote Storage, RAID and Mirroring.
Servers: Managing DHCP, IIS, WINS, DNS and Proxy servers.

User, Group and Computer Accounts: Creating and Managing user, Group and Computer Accounts, Managing Access Controls, Troubleshooting Accounts.

UNIT–III

Performance Monitoring and Security: Task Management, System Monitoring, Performance Logs and Alerts, Monitoring Memory, Network and Process Objects, Auditing Security Events, Audit Policy and Event Viewer.

Backup and Disaster Recovery: Backup & Recovery Concepts, Creating Backup Plan, Choosing and Managing Backup Media, Setting Backup Options, Scheduling Backup Jobs, Developing Disaster Recovery Plan, Assessing Threats, Incident Response Team, Restoring Data using Backups.

Special Topics: Introduction to E–Mail, Telnet and FTP, Distributed Systems.
Case and Comparative Studies of Windows 2003 server and Unix/Linux.

References:

1. MCSA/MCSE; Exam 70–291, Implementing , Managing and Maintaining a Windows Server 2003
2. Network Infrastructure by Shinder Deborah Littlejohn, Shroff Publishers, 7th Reprint, 2005..
3. Networking : The Complete Reference by Craig Zacker, Tata McGraw–Hill, Seventh Reprint, 2004.
4. Unix Concepts and Applications , Sumitabha Das,Third Edition, Tata McGraw Hill, First Reprint, 2003.
5. Unix and Shell Programming : A Text Book, Behrouz A. Forouzen, Second Reprint, PWS Publishers, 2005.
6. Linux: A Practical Approach, B.Mohamad Ibrahim, Second Reprint, Laxmi Publications, 2006.
7. Linux Security, Hontanon Ramon.J., BPB Publications, 2001.
8. The Internet: Douglas E. Comer, 3rd Edition, Prentice Hall, 2003.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – V
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CSL–332: RELATIONAL DATABASE MANAGEMENT SYSTEMS

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Introductory Concepts: Database, Database Management System (DBMS), Advantages and Disadvantages of DBMS, Database System Structure, DBA and responsibilities of DBA.
Three level ANSI–SPARC Architecture Schemas, Mapping, instances and Database Independence, Entity–Relationship Model, Relational Data Model, Keys, Integrity Constraints, Relational Algebra, Relational Calculus.

SQL: Introduction, Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) statements, Views, Sub–queries, Access Rights.

UNIT–II

PLSQL: Introduction, Comparison of SQL and PLSQL, Structure of PLSQL, Components of PLSQL, Variables and Constants, I/O Statements, Control Statements: Conditional, Iterative and Sequence, Cursor Management, Triggers and Exception Handling.

Normalization: Purpose of Normalization, 1NF, 2NF, 3NF, BCNF.

Query Optimization : Introduction of Query Processing, Heuristic Approach to Query Optimization, Cost Estimation, Pipelining.

UNIT–III

Transaction Management and Concurrency Control : Introduction to Transaction Processing, Properties of Transactions, Serializability and Recoverability, Need for Concurrency Control, , Locking Techniques, Time stamping Methods, Optimistic Techniques and Granularity of Data items.

Database Recovery of database: Introduction, Need for Recovery, Transactions and Recovery, Recovery Facilities, Recovery Techniques.

Database Security: Introduction, Threats, Counter Measures.

References:

1. S.K.Singh "Database Systems– Concepts, Design and Applications First Impression, 2006.
2. Ivan Bayross, "SQL/PLSQL: The Programming Language of Oracle, 3rd Revised Edition, 2006.
3. Prateek Bhatia & Gurvinder Singh, Simplified Approach to DBMS, 3rd Edition, 2006.
4. Elmarsi & Navathe, "Fundamentals of Database Systems" 4th Edition, 2004.
5. C.J.Date "Introduction to database system", 8th Edition, Galgotia Publications, 2004.
6. Connolly & Begg "Database Systems – A practical approach to design, Implementation and Management, 3rd Edition, Pearson Education India, 2003.
7. Silberschatz, Korth, Sudershan "Database System Concepts" 4th Edition, McGraw Hill Education, 2002.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – V
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CSL–333: DESIGN AND ANALYSIS OF ALGORITHM

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Introduction: Concept of Algorithm, Algorithm Specification, Performance Analysis (Time and space complexities), Asymptotic Notations.
Elementary Data Structures: Stacks, Queues, Trees and Graphs.
Divide and conquer: General Method, Binary Search, Finding the Maximum and Minimum, Quick Sort, Selection.
Greedy Method: General Method, Knapsack Problem, Minimum Cost Spanning Trees (Prim's Algorithm, Kruskal's Algorithm) and Single–Source Shortest Path.

UNIT–II

Dynamic Programming: General Method, Multistage Graphs, All Pairs Shortest Paths, Single–Source Shortest Paths, Optimal Binary Search Tress, 0/1 Knapsack and Travelling Salesmn Problem.
Backtracking: General Method, 8–Queens Problem, Graph Coloring and Hamiltonian Cycles.
Search and Traversal Technique: Techniques for Binary Trees, Techniques for Graphs,

UNIT–III

Alegebric Algorithms: General Method, Evaluation and Interpolation, Fast Fourier Transformation, Modular Arithmatic.
Hard Problems: Basic Concepts, Nondeterministic Algorithms, Classes NP–Hard and NP–Complete , NP–Hard Graph Problems (CNDP, DHC, TSP and AOG).
Approximation Algorithms: Introduction, Absolute Approximation (Planner Graph Coloring and NP–Hard Absolute Approximations), ε–Approximations (Scheduling Independent Tasks and Bin Packing).

References:

1. Aho , Hopcroft and Ullman "The Design and Analysis of Computer Algorithms", 2003.
2. Horowitz, S. Sahni, Sanguthevar Rajasekaran "Fundamentals of Computer Algorithms" , 2003.
3. R.G.Droomy, "How to Solve it by Computer" , Third Printing, 1989.
4. K. Mehlhorn, "Data Structures and Algorithms", Vols. 1 and 2, Springer Verlag, 1984.
5. Purdom, Jr. and C. A. Brown, The Analysis of Algorithms, Holt Rinechart and Winston, 1985.
6. D. E. Kunth, The Art of Computer Programming, Vols.I and 3, 1968, 1975.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – V
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CSL–334: COMPUTER GRAPHICS

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Overview of Computer Graphics: Applications of Computer Graphics, Raster–Scan displays, Random–Scan displays, Color CRT Monitors, Flat–Panel Displays; Video Controller, Display Processor, Common Graphic Input and Output devices, Graphic File Formats.
Output Primitives: DDA, Bresenham Line Algorithm; Bresenham and Midpoint Circle drawing algorithms; Midpoint Ellipse Algorithm; Flood and Boundary Filling;
Two Dimensional Geometric Transformation: Translation, Rotation, Scaling, Reflection; Matrix representations; Composite transformations;

UNIT–II

Two Dimensional Viewing: Viewing coordinate reference frame; Window to Viewport coordinate transformation, Point Clipping; Cohen–Sutherland and Liang–Barskey Algorithms for line clipping; Sutherland–Hodgeman algorithm for polygon clipping.
Three Dimensional Transformations: Translation, Rotation, Scaling, Reflection and composite transformations.

UNIT–III

Three Dimensional Viewing: Projections: Parallel and Perspective, Viewing Transformation: View Plan, View Volumes and Clipping.
Curves and Surfaces: Parametric representation, Bezier and B–Spline curves.
Color Models: Properties of Light, Intuitive Color Concepts, RGB Color Model, CMY Color Model, HLS and HSV Color Models, Conversion between RGB and CMY color Models, Conversion between HSV and RGB color models, Color Selection and Applications.

References:

1. D. Hearn and M.P. Baker, Computer Graphics: C version, 2nd Edition, PHI, 2004.
2. D.F. Rogers, Procedural Elements for Computer Graphics, 2nd Edition, Addison Wasley, 2004.
3. D.F. Rogers, Mathematical Elements for Graphics, 2nd Edition., McGraw Hill, 2004.
4. J.D. Foley et al, Computer Graphics, Principles and Practices, 2nd Edition, Addison Wasley, 2004.
5. Roy A. Plastock, Gordon Kalley, Computer Graphics, Schaum's Outline Series, 1986.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSP–335: PROGRAMMING LAB – I
(RDBMS & COMPUTER NETWORKS)

CREDITS		
L	**T**	**P**
0	0	2

RELATIONAL DATABASE MANAGEMENT SYSTEMS – LAB.

UNIT–I

SQL Commands : Data Definition Language (Create, Drop , Alter, Rename and Truncate), Data Manipulation Language (Select, Insert, Update and Delete), Transaction Control (Commit, Rollback and Savepoint) and Data Control Statements (Grant, Revoke) Statements, Querying Multiple Tables using joins, Using Subquery to solve the problem.
PLSQL : Exercises using Variables and Constants, I/O Statements, Control Statements: – Conditional, Iterative and Sequence, Cursor Management, Triggers and Exception Handling.

UNIT–II

Server Management

Installing and Configuring Windows 2003 and SCO UNIX/ LINUX servers.

Implementing LAN using Client Server Architecture.

Creating and Configuring Proxy, DNS and IIS servers

UNIT–III

Unix/Linux Administration

User Mmanagement : Creating groups, Creating Users , Assigning access rights, deleting users.

File Management : File Attributes, File Ownership, File Permissions, Directory Permissions, Managing File permissions and ownership using chmod, chown commands.

Space Management, Backup and Restore Strategies and Security Management.

Scheduling and Monitoring Performance of Server by using inbuilt utilities.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – V
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CSP–336: PROGRAMMING LAB–II (ALGORITHM & GRAPHICS)

CREDITS		
L	**T**	**P**
0	0	2

Experiments to plot growth of functions. Implementing heuristics and comparison with algorithms designed with asymptotic complexity in Comparison of various data structures for the same algorithm. Experiments with software packages like LEDA.

Computer Graphics Lab.

UNIT–I

A subset of the following List of Lab Experiments can be undergone.

Do two line segments intersect.
Compute the convex hull of a set of planar points.
Sean convert line segments.
Clip line segments against windows.

UNIT–II

Fill polygon with stipple patterns.
Use Phigs to show objects in various views. The truncated cube of Module 3 employed here.
Display the view volume.
Show a unit cube in perspective.
Implement the de Casteljau algorithm for curves.
Demonstrate the properties of the Bezier curves.

UNIT–III

Run a sample session on Microsoft Windows including the use of Paintbrush.
Run a simple X session including the use of the xfig package.
Run a sample session on the Macintosh.
Compile and link sample Motif program.
Write a simple file browser.
Above said Exercises can be implemented in C / C++ Programming Language.

B.TECH (COMPUTER ENGINEERING) SEMESTER SYSTEM
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SCHEME:

		Semester – VI	**L**	**T**	**P**
1.	CSL342	Object Oriented Analysis & Design	3	1	0
2.	CSL343	Software Engineering	3	1	0
3.	CSL344	Object Oriented Programming using JAVA	3	1	0
4.		Elective–I (for code see Dept. Elective–I list)	3	1	0
5.	CSP340	Programming Lab – VI (Advanced Database Management Systems)	0	0	4
6.		Interdisciplinary Course–II	4	0	0
7.		Interdisciplinary Course–III	4	0	0
		Sub Total:	**20**	**4**	**4**
		Grand Total:	**28**		
		Electives–I			
1.	CSL345	Natural Language Processing	3	1	0
2.	CSL346	System Hardware Design	3	1	0
3.	CSL347	Real Time Systems	3	1	0
4.	CSL348	Operation Research	3	1	0
5.	CSL349	Language Processor	3	1	0

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI
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CSL–342: OBJECT ORIENTED ANALYSIS AND DESIGN

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Introduction
Introduction to Object Oriented concepts, comparison of object oriented vs Procedural software development techniques. Advantages of Object Oriented Methodology.

Modeling
Modeling as a Design technique, Object modeling technique.

Object Modeling
Object & Classes, Links & Associations, Generalization & Inheritance, Aggregation, Abstract Classes, example of an Object Model.

UNIT–II

Dynamic Modeling
Events and States, Operations, Nested State Diagrams, Concurrency, example of the Dynamic Model.

Functional Modeling
Functional Models, Data Flow Diagrams, Specifying Operations & Constraints, example of a Functional Model.

UNIT–III

Analysis & Design
Overview of Analysis, Problem Statement, example of Analysis Process using Object, Dynamic & Functional Modeling on an example system. Overview of System Design, Object Design, Design Optimization.

Implementation
Implementation of the design using a Programming Language or a Database System.
Comparison of Object Oriented vs Non Object Oriented Languages.

References:

1. "Object Oriented Modeling & Design" by James Rambaugh, Michael Balaha (PHI , EEE)
2. "Object Oriented Software Construction" Hertfordshire PHI International 1988.
3. "Object Oriented Programming" Brad J.Cox Addison Wessley,1986.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI
(Under Credit Based Continuous Evaluation Grading System)

CSL–343: SOFTWARE ENGINEERING

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

1. Introduction to Software Engineering: Software Evolution, Software crisis, Principles of Software Engineering, Software Development Life Cycle.
2. Software Project Management: Management Activities, Project Planning, Project Scheduling, Risk Management.
3. Software Design: Principles, Methodologies, Design specifications, Verification and validation

UNIT–II

4. Coding: Structured programming, Coding styles.
5. Software Testing: Software Testing, Component Testing, Test case design.
6. Software Metrics: Design metrics, Coding metrics, Technical metrics, Testing metrics.

UNIT–III

7. Configuration Management: Configuration Management Planning, Change Management, Version Management and Release Management, System Building
8. CASE Tools
9. Exposure to Rational Rose Tools.

References:

1. Pressman : Software Engineering : A Practitioner's Approach, 3rd Ed., TMH 2004
2. Flecher and Hunt : Software Engineering and CASE : Bridging and Culture Gap, 2000.
3. Shepperd : Software Engineering, Metrics, Volume 1 (EN), McMillan, 1999
4. Robert S. Arnold : Software Re–engineering, IEEE Computer Society, 1994.
5. Pankaj Jalote : An Integrated Approach to Software Engineering, Narosa Publishers, 3rd Ed., 2006.
6. Ghezzi, Cario : Fundamentals of Software Engineering, 2nd ed., PHI, 2002.
7. Sommerville, Ian : Software Engineering, 7th edition, Pearson Education, 2004.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI
(Under Credit Based Continuous Evaluation Grading System)

CSL–344: OBJECT ORIENTED PROGRAMMING USING JAVA

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Evolution of Java
Importance of JAVA to Internet, Features of JAVA, Bytecode, Object Oriented Approach.

Data Types, Variables and Arrays
Data types, Declaration of Variable, Type Conversion and Casting, One Dimensional and Multidimensional arrays

Operators and Control Structures
Arithmetic, Bitwise, Relational, Boolean, Assignment Operators, Operator precedence, Selection Statements, Iteration Statements, Jump statements.

UNIT–II

Classes
Class Fundamentals, Declaring objects, introducing methods, constructors, this keyword, Overloading constructors, Recursion, Nested and Inner classes.

Inheritance
Basics, Creating Multilevel hierarchy, Method Overriding, Abstract Classes.

UNIT–III

Packages and Interface
Packages, Access Protection, Importing Packages, Interfaces, Defining, Implementing, Applying Interfaces, Extending Interfaces

Exception Handling
Fundamentals, Exception Types, uncaught exceptions, try and catch.

References:

1. Patrick Naughton & Herbert Schildt: The Complete Reference Java 2, Tata McGraw Hill Edition
2. Balagurusamy: Programming in JAVA, BPB Publications, 2005

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI
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CSP–340: PROGRAMMING LAB – VI
(ADVANCED DATA BASE MANAGEMENT SYSTEMS)

Credits		
L	**T**	**P**
0	0	4

Programming exercises on the courses of the semester.

Installation and Administration of ORACLE OR SQL Server.

Developing Application with Visual Basic.

Developing Application with JAVA/JDBC/ODBC

Practical based on Java's Introduction

Object Oriented Analysis and Design using Rational Rose/Case Tools

Object Oriented Programming using C++ or Java

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–345: NATURAL LANGUAGE PROCESSING (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Basic course on artificial intelligence, Data Structure & Algorithms.
Introduction to the methods and techniques of Natural Processing – semantics, pragmatics, Applications of Natural Language Processing.

COURSE CONTENTS:
Components of Natural Language Processing: Lexicography, syntax, Semantics, pragmatics: word level representation of natural languages prosoty & natural languages.

Formal Languages and Grammars: Shomsky Hierarchy; Left Associative Grammars. Ambiguous Grammars. Resolution of Ambiguities.

UNIT–II

Semantics Knowledge Representation: Semantic Network Logic and inference. Pragmatics, Graph Models and Optimization. Prolog for natural semantic.
Computation Linguistics: Recognition and parsing of natural language structures: ATN & RTN; General techniques of parsing: CKY, Earley & Tomita's Algorithm.

UNIT–III

Application of NLP: Intelligent Work Processors: Machine translation; User Interfaces;
Man–Machine Interfaces: Natural languages Querying Tutoring and Authoring Systems. Speech Recognition Commercial use of NLP.

References:
1) J. Allen, Natural Language understanding, Benjamin/Cunnings, 1987.

2) G. Gazder, Natural Language Processing in Prolog, Addison Wesley, 1989.

3) Mdij Arbib & Kfaury, Introduction to Formal Language Theory, Springer Verlag, 1988.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–346: SYSTEM HARDWARE DESIGN (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Basic Electrical Circuits (R.L.C. circuit analysis), Basic Electronic Devices and Circuits (B.J.I.s MOSFETs, basic logic gates).
To provide students an exposure to analysis and design techniques used in digital system hardware design.

Course Contents:

UNIT–I

CMOS Technology:
Logic levels.
Noise Margin.
Power dissipation, supply currents.
Speed delays. [10%]
Interconnect analysis.

UNIT–II

Power/Ground/ droop/bounce.
Coupling analysis.
Transmission line effects/cross talk. [40%]
Power/ground distribution.
Signal distribution.
Logic Design \ Random logic \ programmable logic.
Microcontrollers.

UNIT–III

Memory subsystem design.
Noise tolerant design.
Worst case timing.
Thermal issues in design. [40%]
Real life system design examples. [10%]

References:

1) James E. Buchanan, “BICMOS–CMOS System Design” McGraw Hill International Edition 1991.
2) James E. Buchanan, “CMOS–TTL System Design” McGraw Hill International Edition 1990.
3) John P. Hayes. “Digital System Design & Microprocessors” McGraw Hill International Edition 1985.
4) Darryl Lindsay, “Digital PCB Design and Drafting” Bishop Graphics 1986.
5) Howard W. Johnson & Martin Graham, High Speed Digital Design – A Handbook of Black Magic, Prentice Hall, PTR Englewood Cliffs, 1993.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI (ELECTIVES)
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CSL–347: REAL TIME SYSTEMS (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Computer Organization and Operating System.
To give an insight of concepts underlying, Real Time Systems and knowledge based real time systems, to give an understanding of its design and implementation.

COURSE CONTENTS:

UNIT–I

Introduction to Real–time systems: Issues of Real–time Systems, tasks & Task parameters, Real–time Systems components Soft and hard real time system, periodic and aperiodic tasks. Specification of time constraints. [10%]

Need for task scheduling: Issues and scheduling methodologies. Priority based scheduler, value based scheduler & Pre–emptive scheduling multiprocessor environment. Deterministic scheduling, Hardware Schedulers. [25%]

UNIT–II

Real time Operating Systems: A case study of generalized Executive for multiprocessors (GEM). Programming using Real time OS Constructors. Microprocessor based Real time scheduler. [20%]

Real Time Languages: Case study of a language having facilities for time and task management Euclid and Ada for real time programming. [10%]

UNIT–III

Architectural requirements of Real Time Systems: Tightly coupled systems, hierarchical systems, arbitration schemes, Reliability issues, HW/SW faults, diagnosis, functional testing etc. Fault tolerant architectures: TMR systems. [10%]

Real Time Knowledge based systems: Integration of real time and knowledge based systems. Neural networks and fuzzy logic in real time systems. [25%]

REFERENCES:

1) Levi S.T. and Aggarwal A.K. Real Time System Design, McGraw Hill International Edition, 1990.
2) Stankovic J.A. and Ramamritham K., Hard Real Time Systems, IEEE Press, 1988.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI (ELECTIVES)
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CSL–348: OPERATION RESEARCH (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Importance of need to take intelligent decisions is to be emphasized. How quantitative approach based on formal modeling concepts can be used has to be presented using OR. Major focus should be on how to model various situations in industries and solve them. Wherever possible attention should also be paid on computer softwares available for this purpose.

Course Contents:

UNIT–I

Introduction to OR modeling approach and various real life situations. [5%]

Linear programming problems & Applications, Various components of LP problem formulation. Solving Linear Programming problem using simultaneous equations and graphical Method Simplex method & extensions:

Sensitivity analysis.
Duality theory.
Revised Simplex.
Dual Simplex.
Transportation and Assignment Problems. [25%]

UNIT–II

Network Analysis including PERT–CPM.
Concepts of network.
The shortest path.
Minimum spanning tree problem.
Maximum flow problem.
Minimum cost flow problems.
The network simplex method.
Project planning & control with PERT & CPM. [20%]

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UNIT–III

Integer programming concepts, formulation solution and applications.	[10%]
Dynamic programming concepts, formulation, solution and application.	[05%]
Game Theory.	[05%]
Queuing Theory & Applications.	[10%]
Linear Goal Programming methods and applications.	[05%]
Simulation.	[15%]

References:

1) F.S. Hillier & G.J. Lieberman, Introduction to OR, McGraw Hill Int. Series 1995.
2) A Ravindran, Introduction to OR. John Wiley & Sons, 1993.
3) R. Kapoor, Computer Assisted Decision Models, Tata McGraw Hill 1991.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–349: LANGUAGE PROCESSORS (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Formal Language & Automata Theory, Systems Programming.

At the end of this course on Language processor, the student should be able to:
Understand the influence of Programming languages and architectures on the efficiency of language translation.
Understand the design of lexical analyzers.
Be proficient in writing grammars to specify syntax, understand parsing strategies and be able to use yacc to generate parsers.
Understand issues related to error detection.
Understand the issues in declaration processing, type checking, and intermediate code generation, and be able to perform these through the use of attribute grammars.
Understand the issues involved in allocation of memory to data objects.
Understand the key issue in the generation of efficient code for a given architecture.
Understand the role played by code optimization.

Course Contents:

UNIT–I

Overview of the translation process, **Lexical analysis:** hand coding and automatic generation of lexical analyzers. [08%]
Parsing theory: Top down and bottom up parsing algorithms. Automatic generation of parsers. [08%]
Error recovery: Error detection & recovery. Ad–hoc and systematic methods. [18%]

UNIT–II

Intermediate code generation: Different intermediate forms. Syntax directed translation mechanisms and attributed definition. [07%]
Run time memory management: Static memory allocation and stack based memory allocation schemes. [17%]
Symbol table management. [08%]

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VI (ELECTIVES)
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UNIT–III

Code generation: Machine model, order of evaluation, register allocation and code selection. [17%]

Code optimization: Global data flow analysis. A few selected optimizations like command sub expression removal, loop invariant code motion, strength reduction etc. [17%]

References:

1) Aho, Ravi Sethi, J.D. Ulliman, Compilers tools and techniques, Addison–Wesley, 1987.
2) Dhamdhere, Compiler Construction – Principles and Practice Macmillan, India 1981.
3) Tremblay J.P. and Sorenson, P.G., The Theory and Practice of Compiler Writing, McGraw Hill, 1984.
4) Waite W.N. and Goos G., Compiler Construction Springer Verlag, 1983.

B.TECH (COMPUTER ENGINEERING) SEMESTER SYSTEM
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SCHEME:

Sr.No.	Course Code	Course	CREDITS		
		Semester – VII:	**L**	**T**	**P**
1.	CSL470	Symbolic Logic & Logic Programming	3	1	0
2.	CSL471	Formal Languages & Automata Theory	3	1	0
3.	CSL472	Internet Protocol	3	1	0
4.		Departmental Elective-II	3	1	0
5.		Lab (DE II)	0	0	2
6.	CSP470	Software Lab VII (SL & LP)	0	0	2
7.		Interdisciplinary-IV	4	0	0
		Sub Total:	**16**	**4**	**4**
		Grand Total:	**24**		
		List of Departmental Electives–II:			
1.	CSL473	Advanced Microprocessors	3	1	0
2.	CSP473	Advanced Microprocessors	0	0	2
3.	CSL474	Cloud Computing	3	1	0
4.	CSP474	Cloud Computing	0	0	2
5.	CSL475	Expert Systems	3	1	0
6.	CSP475	Expert Systems	0	0	2
7.	CSL476	Robotics	3	1	0
8.	CSP476	Robotics	0	0	2

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CSL–470 SYMBOLIC LOGIC & LOGIC PROGRAMMING

CREDITS		
L	**T**	**P**
3	1	0

Course Contents:

UNIT–I

Prepositional Logic: Syntax and Semantics: Validity and consequence. Normal forms. Representing world knowledge using prepositional logic.

First Order Logic: World knowledge representation and the need for quantifiers. Syntax, semantics validity consequence clause normal form.

UNIT–II

Introduction to Prolog: Syntax of Prolog, Structured data representation. Execution model Introduction to Programming in Prolog, Illustrative examples.

The Connection between Logic and Logic Programming: Interpreting logic programs in terms of Horn clauses Deduction from clause form formulas resolution for prepositional logic Ground resolution. Unification and first order resolution SLD resolution; the computation and search rules. SLD trees and interpretation of non–declarative features of Prolog.

UNIT–III

Advanced Prolog Features: Programming Techniques: Structural Induction and Recursion, Extra Logical features: Cut and Negation Case Studies.
Introduction to Fuzzy logic and neural networks.

Texts / References:

1. Gries, The Science of Programming, Narosa Publishers, 1985.
2. Stoll, Set Theory and Logic, Dover Publishers, New York, 1963.
3. Clocksin, W.F. and Mellish, C.S., Programming in Prolog 2nd Edition, Springer – Verlag, 1984.
4. O'Keefe, R., The Craft of Prolog. The MIT Press, 1991.
5. Lloyd, J. W., Foundation of Logic Programming, Springer, 1984.

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CSP–470 SOFTWARE LAB VII
(SL & LP)

CREDITS		
L	**T**	**P**
0	0	2

SYMBOLIC LOGIC & LOGIC PROGRAMMING LAB

Experiments in Prolog Programming, Deductive databases, Recursion and Prolog list data structures.
Experiments to understand Prolog execution strategies, Cuts and Negation. Search Algorithms. Term Projects.

Texts / References:

Clocksin, W.F. and Mellish, C.S., Programming in Prolog 2nd Edition, Springer – Verlag, 1984.

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CSL–471 FORMAL LANGUAGES & AUTOMATA THEORY

CREDITS		
L	**T**	**P**
3	1	0

Course Contents:

Basic Definitions

UNIT–I

Operations on Languages: Closure properties of Language Classes. Context Free Languages: The Chomsky Griebach Normal Forms. Linear Grammars and regular Languages. Regular Expressions Context Sensitive Languages; The Kuroda Normal Form, One sided Context Sensitive Grammars.

UNIT–II

Unrestricted Languages: Normal form and Derivation Graph, Automata and their Languages: Finite Pushdown 2–push down Automata and Turing Machines, The Equivalence of the Automata and the appropriate grammars. The Dyck Language.

UNIT–III

Syntax Analysis: Ambiguity and the formal power Series, Formal Properties of LL(k) and L.R.(k) Grammars.

Derivation Languages: Rewriting Systems, Algebraic properties, Canonical Derivations, Context Sensitivity.

Cellular Automata : Formal Language aspects, Algebraic Properties Universality & Complexity Variants.

Texts / References:

1. G.E. Reevsz, Introduction to Formal Languages, McGraw Hill 1983.
2. M.H. Harrison, Formal Language Theory Wesley 1978.
3. Wolfman Theory and Applications of Cellular Automata, World Scientific, Singapore, 1986.

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CSL – 472 INTERNET PROTOCOLS

CREDITS		
L	**T**	**P**
3	1	0

Course Contents:

UNIT–I

Introduction & Overview: The need for Internet, The TCP/IP Internet, Internet services, history & scope, protocol standardization.

Review of underlying Technologies: LAN, WAN, MAN, Archnet & Ethernet topology, Token Ring, ARPANET, PROnet technology.

UNIT–II

Internet working concepts and architectural model, Application level Internet connection, Interconnection through IP Gateways, Users View.

Internet Address: Universal Identifiers, Three Primary classes of IP Addresses, network & Broadcasting Addresses, Address Conventions, Addressing Authority, Mapping Internet Addresses to physical Addresses, Determining Internet Address at startup (RARP).

UNIT–III

Internet as virtual Network, Detailed concept of Routers & Bridges. Protocols Layering, Difference between X.25 and Internet layering, gate to Gate Protocol (GGP), Exterior Gateway Protocol (EGP). Managing Internet, reliable transactions & Security on Internet.

Texts / References:

1. Internet working with TCP/IP Vol. – I
2. Principal Protocols & Architecture Comer & Stevens.

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CSL – 473 ADVANCED MICROPROCESSOR (ELECTIVE II)

CREDITS		
L	**T**	**P**
3	1	0

Course Contents:

UNIT–I

Review of 8 bit microprocessor and support components.
Selected Case Studies of 16/32/64 bit microprocessors and support Contents.
RISC Architectures and Case Studies: RISC Vs CISC.

UNIT–II

Power PC 601 Alpha 21064, Pentium super space, Transputer Architectures and Case Studies : High Performance Embedded Microcontrollers, Case Studies.

UNIT–III

403 GA Development Systems and support.
Selected Applications.

Texts / References:

1. J.T. Cain, Selected Reprints on Microprocessors and Microcomputers, IEEE Computer Society Press., 1984.
2. Rafiquzzaman, Microprocessors & Micro Computers Development Systems, Harper Row, 1984.
3. Rafiquzzaman, Microprocessors & Micro Computers – Based System Design, Universal Book Stall, New Delhi, 1990.
4. INMOS Ltd., Transputer Development System, Prentice Hall, 1988.
5. INMOS Ltd. Communicating Process Architecture, Prentice hall, 1988.
6. Wunnava V. Subbarao, 16/32 Bit Microprocessors 68000/68010/68020, Software, Hardware & Design Applications, Macmillan Publishing Company, 1991.
7. Kenneth Hintz, Daniel Tabak, Microcontrollers: Architecture, Implementation & Programming McGraw Hill Inc., 1992.
8. Data Books by Intel, Motorola, etc.
9. Daniel Tabak, Advanced Microprocessors, McGraw Hill Inc., 1995.
10. Andrew M. Veronis, Survey of Advanced Micro Processors, Van Nostrand Reinhold, 1991. McGraw Hill Inc., 1992.
11. Daniel Tabak, RISC Systems, John Willey & Sons, 1990.
12. The Power PC Architecture: A Specification for a New family of RISC Processors, Edited by Cathy May, Ed Silha, Rick Simpson, Hank Warren, Morgan Kaufmann Publishers, Inc., San Francisco, California, 2nd Edition (May 1994)
13. Charles M, Gilmore, Microprocessors Principles and Applications, McGraw Hill International Editions, 2nd Edtion, 1995.
14. PowerPC 403GA Embedded Controller User's Manual. PowerPC Tools – Development Tools for PowerPC Microprocessor (Nov. 1993). PowerPC 601 RISC Microprocessor User's Manual – 1993.

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CSP – 473 ADVANCED MICROPROCESSOR LAB.

CREDITS		
L	**T**	**P**
0	0	2

Students are expected to design and implement micro processor based systems for real life problem and evaluate the performance of various H/W plate forms.

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CSL474: CLOUD COMPUTING

CREDITS		
L	T	P
3	1	0

UNIT-I

Introduction: Definition, Vision, Reference Model, Benefits, Limitations, Terminology, Open Challenges.
Historical Development: Distributed Systems, Grid Computing, Utility Computing, Service-Oriented Computing, Web 2.0.

UNIT-II

Cloud Computing Architecture: Service Models, Deployment Models, Cloud Entities, Cloud Clients, Service Level Agreement (SLA) and Quality of Service (QoS) in Cloud Computing. Virtualization: Definition, Type of Virtualization, Benefits, Limitations, Virtualization and Cloud, Virtual Appliance.

UNIT-III

Programming Models in Cloud: Thread Programming, Task Programming and Map-Reduce Programming.
Advance Topic in Cloud: Energy Efficiency in cloud, Market Oriented Cloud Computing, Big-Data Analytics, Federated Cloud Computing.

Textbooks:

1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing: Foundation and Application Programming, Tata McGraw Hill, ISBN-13: 978-1-25-902995-0, New Delhi, India, Feb 2013.

Reference Books:

1. Barrie Sosinsky, Cloud Computing Bible, Wiley India Pvt. Ltd, ISBN-13: 978-8-12-6529803, New Delhi, India, 2011.
2. Dr. Saurabh Kumar, Cloud Computing: Insights Into New-Era Infrastructure, Wiley India Pvt. Ltd, ISBN-13: 978-8-12-6528837, New Delhi, India, 2011.
3. Fern Halper, Hurwitz, Robin Bloor, Marcia Kaufman, Cloud Computing for Dummies, Wiley India Pvt. Ltd, ISBN-13: 978-0-47-0597422, New Delhi, India, 2011.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VII
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CSP - 474 CLOUD COMPUTING

CREDITS		
L	**T**	**P**
0	0	2

Practical based on Programming model in cloud computing.

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VII
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CSL – 475 EXPERT SYSTEMS

CREDITS		
L	**T**	**P**
3	1	0

Course Contents:

UNIT–I

Expert Systems, Definitions types, components, Expert System Development Process.

Knowledge Representation Techniques – Logic Frames, Semantic Nets, etc.

UNIT–II

Domain Exploration – Knowledge elicitation. Conceptualization, bathering, Formaliztions

Methods of Knowledge Acquisition : interviewing Sensor Data Capturing.

UNIT–III

Learning, Planning and Explanation in Expert System: Neural Expert System, Fuzzy Expert System, Real Time Expert Systems.

Implementation Tools: Prolog, Expert System Shell Expersys, etc. Study of existing expert systems – TIERES, As Mycin & AM.

Texts / References:

1. Patterson, Introduction to AI Expert System, PHI, 1993.
2. Jackson, Building Expert System, John – Wiley, 1991.

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CSP – 475 EXPERT SYSTEMS LAB

CREDITS		
L	**T**	**P**
0	0	2

Students are required to develop expert system for various industrial / real life problems.

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CSL – 476 ROBOTICS (ELECTIVE – II)

CREDITS		
L	**T**	**P**
3	1	0

Course Contents:

UNIT–I

Introduction to Robotics, Introduction to Manipulators & Mobile Robots, Classification of Robots, Robot Applications. Industrial application environment and workcells, feeders and Orienting devices.

Robot Anatomy, Robot and Effectors, Transmission and actuators, with special reference to servomotors.

UNIT–II

Robot Arm Kinematics, World, Tool and Joint coordinators, DH transformation and Inverse Kinematics.

Fundamentals of Closed loop control, PWM amplifiers, PID control.

Robotics Sensors: Range, Proximity, Touch, Force & Torque Sensing, Uses of sensors in Robotics.

UNIT–III

Machine Vision: Introduction to machine Vision, The sensing and digitizing function in Machine Vision, Image Processing and analysis, Training and Vision system, Robotics Application. Low & High Level vision.

Robot Programming & Languages & Environment: Different methods, Features of various programming methods, Case study, Robot Task Planning: concept, Different Methods, Robots learning.

Mobile Robot: Introduction, Obstacle Representation, Motion Planning in fixed, Changing structured, Unstructured environment based on different requirements.

Texts / References:

1) M.P. Groover, M. Weins, R.N. Nagel, N.C. Odrey, Industrial Robotics, McGraw Hill, 1986.
2) Klafter D. Richard, Chmielewski T.A. and Negin Michael “Robotic Engineering”, Prentice Hall of India Ltd., 1993.
3) K.S. Fu, RC Gonzalez, CSG Lee, Robotics Control, Sensing, Vision and Intelligence, McGraw Hill, International Edition, 1987.
4) Andrew C. Straugard, Robotics & AI, Prentice Hall, Inc.
5) S. Sitharama Iyengar, Alberto Elefes, Autonomous Mobile Robots, Perception, Mapping & Navigation, IEEE Computer Society Press.
6) S. Sitharama Iyengar, Alberto Elefes, Autonomous Mobile Robots–Control, Planning and Architecture, IEEE Computer Society Press.
7) Various Research Papers in Area of Robotics.

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CSP – 476 ROBOTICS (ELECTIVE – II)

CREDITS		
L	**T**	**P**
0	0	2

Students are expected to implement the concept of Robot motion by interfacing the Robot with Computer System and remote operation of the Robot etc.

B.TECH (COMPUTER ENGINEERING) SEMESTER SYSTEM
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SCHEME:

S. NO.	Course Code	Course	CREDITS		
		Semester – VIII			
1.	CSD480	Industrial Training Cum Projects	22	0	0
		Sub Total:	**22**	**0**	**0**
		Grand Total:	**22**		

CSA1: B.TECH. (COMPUTER ENGINEERING) SEMESTER – VIII
(Under Credit Based Continuous Evaluation Grading System)

CSD – 480 Industrial Training Cum Projects

CREDITS		
L	**T**	**P**
0	0	22

Industrial attachment & projects work in the same industry.

A candidate should work on the project for 5 months and 6–8 hours on each working day.

Ist synopsis (containing mainly literature survey corresponding to the problem taken up for the project work and line of attack to solve the problem) within one month of joining the training is to be submitted and will be evaluated for 4 credits.

IInd synopsis (containing essentially the progress of work in comparative details) within three months of joining the training is to be evaluated will be evaluated for 6 credits.

Credits for Final Project Report & Viva Voce: 12

The evaluation shall be done as per the common ordinances for courses under Credit Based Continuous Evaluation Grading System.