FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

MCA (SOFTWARE SYSTEMS)
(Three Years Course)

(Under Credit Based Continuous Evaluation Grading System)

(Semester: I – VI)

Examination: 2015-16

GURU NANAK DEV UNIVERSITY
AMRITSAR

CSB3: Master of Computer Applications (Software Systems) Semester System
(Under Credit Based Continuous Evaluation Grading System)

SCHEME

Semester-I					
			Credits		
Sr. No.	***Sub Code***	***Subject***	**L**	**T**	**P**
1.	CSL430	Programming Languages	4	0	0
2.	CSL431	Emerging Trends in Computer Technology	4	0	0
3.	CSL432	Operating Systems	4	0	0
4.	CSL433	Computer Organization & Architecture	4	0	0
5.	CSP430	Programming Lab – I	0	0	2
6.	CSP431	Minor Project-I	0	0	4
		Sub Total:	**16**	**0**	**6**
		Grand Total:	**22**		

CSB3: Master of Computer Applications (Software Systems) Semester – I
(Under Credit Based Continuous Evaluation Grading System)

CSL430: PROGRAMMING LANGUAGES

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

UNIT-I

Programming Languages, Generation of Languages, Introduction to C and C++ programming, difference between C ,C++ and VC++, Standard C and C++ data types, Storage classes, Operators of C and C++, Standard C Library, I/O statements of C, writing & using functions in C, Arrays ,String Handling, Pointers and dynamic memory allocation in C.

UNIT-II

Structures & Unions in C, File Handling in C, Advanced preprocessor statements, Object oriented terminology, Features of C++, Streams, Standard Library of C++, Classes and Objects, I/O in C++, Function Overloading, Friend Function and classes, Constructors & Destructors.

UNIT-III

Inheritance, Types Of Inheritance, Ambiguity in Inheritance, Polymorphism, Operator Overloading, Virtual Functions , Pure virtual Functions , Pointers & Dynamic memory allocation in C++, File handling in C++, Templates , Exception Handling.

BOOKS:
Let us C – Yashwant Kanethkar
Programming with ANSI & Turbo C – Kamthane
Programming with ANSI & Turbo C++ – Kamthane
Thinking in C++ - P. B. Mahapatra

PROGRAMMING LANGUAGES LAB:
Students should be asked to write programs in C & C++ using different statements, Libraries and Functions, Designing Unique Manipulators

CSB3: Master of Computer Applications (Software Systems) Semester – I
(Under Credit Based Continuous Evaluation Grading System)

CSL431: EMERGING TRENDS IN COMPUTER TECHNOLOGY

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

UNIT-I

Introduction to Information Technology: Latest development in Computer hardware : RISC V/S CISC architecture, Intel V/S Motorola chips, Computer peripherals.

Latest Developments in Software: Programming Paradigms, Software Agents, Interoperable objects.

UNIT-II

Data Management Technologies: Data Ware Housing and Data Mining, Data Marts and Conceptual Foundation of ERP.

UNIT-III

Networking Technologies: Computer Networks, LAN, WAN, MAN, topologies, Internet, ISDN, PSDN, Wireless Networks, Internet Telephony, Virtual learning environment, Mobile communications, IP Addressing.

Audio and Video Conferencing: Technology & Applications, Application to information technology to various function areas such as education, Banking, Communication etc.

References:

1. W.H. Inmon: Building and Data Warehouse, John Wilay & Sons, 2004.
2. Fayyad and Vsama M: Advances in Knowledge Discovery & Data Mining, et.al., MIT, 2003

CSB3: Master of Computer Applications (Software Systems) Semester – I
(Under Credit Based Continuous Evaluation Grading System)

CSL432: OPERATING SYSTEMS

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

UNIT-I

Basic Concepts: History & Evolution of Operating System, OS as resource manager, Various views of OS.

Memory Management: Basic Memory management Schemes, Partition memory management, demand paged memory management, segmented memory management, swapping, hierarchy of memory.

UNIT-II

Process Management: States of Processes, process scheduling, race conditions, deadlocks, banker's algorithm, precedence graphs, semaphores, monitors.

Device Management: Dedicated devices, shared devices, virtual devices, channels, I/O traffic controller, I/O scheduler, I/O device handlers.

UNIT-III

Information Management: Simple file system, Symbolic file system, logical file systems, physical file systems, security of file systems.

Case Studies: Networks Operating systems, Windows NT, Windows 95, UNIX to be discussed briefly.

References :

Madnick and Donovan: Operating System, McGraw Hill, 1973.
P.B. Henson: Operating System Principles, Prentice Hall, 1973.
P.B. Henson: Architecture of Concurrent Programs, Prentice Hall, 1977.
J.L. Peterson, A. Silberchatz: Operating System Concepts, Addison Wesley, 1983.
A.C. Shaw: Logic Design of Operating System, Prentice Hall, 1974.
M.J. Bach: Design of UNIX Operating System, PHI, 1986.
A.S. Tenenbaum: Operating System: Design and Implementation PHI, 1989.

CSB3: Master of Computer Applications (Software Systems) Semester – I
(Under Credit Based Continuous Evaluation Grading System)

CSL433: COMPUTER ORGANIZATION AND ARCHITECTURE

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

UNIT-I

Basic computer Organisation and design: Register Transfer language & operations, various Arithmetic, Logic & Shift microoperations instructions, codes, computer registers, instructions, timing & control, instruction cycle, design of a complete basic computer & it's working.

Programming & controlling the basic computer: Machine & Assembly Language, hardwired & Microprogrammed control, Design of a control unit.

UNIT-II

CPU Architecture: General register & stack organization, instruction formats and addressing modes, ALU & Control unit architecture.

Memory Organisation: Memory hierarchy, main, auxiliary, cache memory, virtual memory paging and segmentation.

UNIT-III

I/O Organization: Peripheral Devices, input-output interface, Modes of data transfer programmed & interrupt initiated I/O, DMA, I/O Processors.

Parallel & Multiprocessing Environment: Introduction to parallel processing, pipelining, RISC Architecture, vector & array processing, Multiprocessing concepts, memory & resource sharing, interprocessor communication & synchronisation.

References : Morris Mano: Computer System Architecture, PHI.
Hayes J.P.: Computer Architecture & Organisation, McGraw Hill.
Stone: Introduction to Computer Architecture: Galgotia.
Tanenbaum: Structured Computer Organisation, PHI.

CSB3: Master of Computer Applications (Software Systems) Semester – I
(Under Credit Based Continuous Evaluation Grading System)

CSP430: PROGRAMMING LAB-I

Credits		
L	**T**	**P**
0	0	2

Programming exercises on the courses of the semester.

CSB3: Master of Computer Applications (Software Systems) Semester – I
(Under Credit Based Continuous Evaluation Grading System)

CSP431: MINOR PROJECT-I

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

The continuous evaluation is to be done by subject teacher.

CSB3: Master of Computer Applications (Software Systems) Semester System
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SCHEME

Semester-II					
1.	CSL440	Data Structures	4	0	0
2.	CSL441	Microprocessors	4	0	0
3.	MTL408	Mathematical Elements of Computer Science	4	0	0
4.	CBL496	Accounting and Financial Management	4	0	0
5.	CSP440	Programming Lab – II	0	0	2
6.	CSP441	Minor Project-II	0	0	4
		Sub Total:	**16**	**0**	**6**
		Grand Total:	**22**		

CSB3: Master of Computer Applications (Software Systems) Semester – II
(Under Credit Based Continuous Evaluation Grading System)

CSL440: DATA STRUCTURES

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

UNIT-I

Preliminaries: Various data structures, common operations on data structures, algorithm complexity, big O notation, time-space tradeoff between algorithms.

Arrays: Arrays defined, representing arrays in memory, various operations on linear arrays.

Linked Lists: Types of linked lists, representing linked lists in memory, advantage of using linked lists over arrays, various operation on linked lists.

Stacks: Description of stack structure, implementation of stack using arrays and linked lists. Applications of stacks - converting arithmetic expression from infix notation to polish and their subsequent evaluation, quicksort technique to sort an array, parenthesis checker.

UNIT-II

Queues: Description of queue structure, implementation of queue using arrays and linked lists, description of priorities queues. Applications of queues - Operating system simulations.
Trees: Description of tree structure and its terminology, binary search tree, implementing binary search tree using linked lists, various operations on binary search trees.
Heaps: Description of heap structure, implementing heaps using arrays, various operations on heaps, Applications of heaps – heapsort technique to sort an array, implementation of priorities queues.

UNIT-III

Graphs: Description of graph structure, implementing graphs in memory using adjacency matrix or adjacency lists, various graphs transversing algorithms, finding shortest path between two nodes, finding biconnected component, strongly connected component and finding cycles in the graphs.
Hash Tables: Direct address tables, hash tables, collision resolution by chaining, hash functions, open addressing – linear probing, quadratic probing, double hashing.
Files: Operations on files, multi tape sorting algorithms, important characteristics of sequential files, indexed sequential file, Directed files and multi-key files, File performance criteria and terms.

References:

1. Yashavant Kanetkar: Let Us C, BPB Publications, New Delhi.
2. Seymour Lipschutz: Theory and Problems of Data Structures, Schaum Outline Series, McGraw-Hill Book Company.
3. Jeffery Esakov: Data Structures - An Advanced Approach Using C, Tom Weiss, Prentice-Hall International, Inc.
4. Trembley and Sorenson: An Introduction to Data Structures with Application, Tata-McGraw Hill Company, Delhi.
5. Tenenbaum: Data Structures and C.
6. Gotterfried: Programming in C, Schaum Outline Series, McGraw-Hill Book Company.

CSB3: Master of Computer Applications (Software Systems) Semester – II
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CSL441: MICROPROCESSORS

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

UNIT-I

Introduction: Introduction to Microprocessor, Microcontroller and Microcomputer.
Architecture of a Microcomputer: General Architecture of a microcomputer system. Microprocessor unit, input unit, output unit, memory unit and auxiliary storage unit.
Architecture of 8086/ 8088 Microprocessor: Description of various pins, configuring the 8086/8088 microprocessor for minimum and maximum mode systems description of maximum system mode interfaces, internal architecture of the 8086 / 8088 microprocessor, system clock, Bus cycle, instruction execution sequence.

UNIT-II

Memory Interface of the 8086 / 8088 microprocessor: Address space and Date organization, generating memory addresses, hardware organization of the memory address space, memory bus status codes, memory control signals, read/write bus cycles, the role of stack in intrrupts and subroutine cells; demultiplexing the address data bus, program and data storage memory, dynamic RAM system.
Input /Output Interface of the 8086 / 8088 microprocessor: I/O Interface, I/O address space and data transfers, I/O instructions, I/O bus cycles, Output ports, 8255A programmable peripherals interface (PPI), memory- mapped, I/O, serial communication interface (USART and UART) - the RS-232 C interface, 8251A programmable communication interface, special purpose interface controllers.

UNIT-III

Interrupt Interface of 8086/8088 microprocessor: What is interrupt? Types of interrupt, interrupt vector table (IVT)
8086/8088 assembly language programming: General structure of an assembly language program, steps in the development of an assembly language program, Assembly language V/S machine language, addressing modes, Instruction set : data movement instructions, arithmetic instructions, logical instructions, shift and rotate instructions, jumping and looping instructions, string processing, interrupt instructions, stack operations, subroutines, handling instructions, defining and using macros.
Programming exercises must be design to show how the input/output is performed. How decisions are made and how loops can be set in an assembly language programs.

References:

1. Walter Triebel : The 8086 Microprocessor - Architecture, Software and Interfacing techniques, PHI, Delhi.
2. Walter Triebel : The 8088 Microprocessor - Architecture, Software and Interfacing techniques, PHI, Delhi.
3. Douglas V. Hall : Microprocessors and Interfacing - Programming and Hardware, Tata McGraw Hill Publishing Company Ltd. , New Delhi.
4. Peter Abel : IBM PC Assembly Language and Programming, PHI, Delhi.

CSB3: Master of Computer Applications (Software Systems) Semester – II
(Under Credit Based Continuous Evaluation Grading System)

MTL408: MATHEMATICAL ELEMENTS OF COMPUTER SCIENCE

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

UNIT-I

Logic and Propositional Calculus: Proposition and Compound Propositions, basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions, Logical Equivalence, Duality law, Algebra of propositions, Conditional and Biconditional Statements, Arguments, Logical Implication, Propositional Functions, Predicates and Quantifiers, Negation of Quantified Statements, Inference theory of the predicates calculus. (05 Lectures)

Algebraic Systems: Operations, Semigroups, Groups, Subgroups, Normal Subgroups and Homomorphisms, Rings, Fields, Polynomials over a field. (04 Lectures)

Graph Theory: Graphs and Multigraphs, Subgraphs, Isomorphic and Homeomorphic Graphs, Paths, Connectivity, Bridges of Konigsberg, Transversable Multigraphs, Labeled and Weighted Graphs, Complete, regular and Bipartite Graphs, Tree graphs, Planar Graphs, Graph Colorings, Representing Graphs in Computer Memory. (05 Lectures)

UNIT-II

Directed Graphs: Directed Graphs, Basic Definitions, Rooted Trees, Sequential Representation of Directed Graphs, Warshall's Algorithm, Shortest Paths, Linked Representation of Directed Graphs, Graph Algorithms, Depth-first and Breadth-first searchers, Directed Cycle-Free Graphs, Topological Sort, Pruning Algorithm for Shortest Path. (05 Lectures)

Binary Trees: Binary Trees, Complete and Extended Binary Trees, Representing Binary Trees in Memory, Transversing Binary Trees, Binary Search Trees, Priority Queues, Heaps, path Lengths, Huffman's Algorithm, General (Ordered Rooted) Trees Revisited. (04 Lectures)

Properties of the Integers: Order and Inequalities, Absolute Value, Mathematical Induction, Division Algorithm, Greatest Common Divisor, Euclidean Algorithm, Fundamental Theorem of Arithmetic, Congruence Relation, Congruence Equations. (03 Lectures)

CSB3: Master of Computer Applications (Software Systems) Semester – II
(Under Credit Based Continuous Evaluation Grading System)

UNIT-III

Recurrence Relations and Generating Functions: Polynomial expressions, telescopic form, recursion theorem, closed form expression, generating function, solution of recurrence relation using generating function. (10 Lectures)

Ordered Sets and Lattices: Ordered Sets, Hasse Diagrams of Partially Ordered Sets, Consistent Enumeration, Supremum and Infimum Isomorphic (similar) Ordered Sets, Well-ordered sets, Lattices, Bounded Lattices, Distributive Lattices, Complements, Complemented Lattices. (04 Lectures)

Boolean Algebra: Boolean algebra and its duality**,** Duality, Boolean Algebra as Lattices, Boolean identities, sub-algebra, Representation Theorem, Sum-of-Products Form for Sets, Sum-of-Products Form for Boolean Algebra, Minimal Boolean Expressions, Prime Implicants, Logic Gates and Circuits, Boolean Functions, Karnaugh Maps. (05 Lectures)

Books Recommended:

1. Trambley, J.P. and Manohar,R: Discrete Mathematical Structures with Applications to Computer Science.
2. Liu C.L.: Elements of Discrete Mathematics.
3. Alan Doerr and Kenneth Levasseur: Applied Discrete Structures for Computer Science.
4. Narsingh Deo: Graph Theory.
5. Lipschutz, S. and Lipson, M.: Discrete Mathematics (Schaum's out lines series).

CSB3: Master of Computer Applications (Software Systems) Semester – II
(Under Credit Based Continuous Evaluation Grading System)

CBL496: ACCOUNTING AND FINANCIAL MANAGEMENT

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

UNIT-I

Accounting Principles: Concepts and conventions, Double entry system of accounting, Accounting cycle, Preparation of Trial Balance.

Final Accounts: Trading, Profit and Loss A/cs and balance sheet of role proprietary concern. Interpretation of final accounts of companies, recent trends in presentation of financial statements.

Budgeting: Importance of Preparation of functional and master budgets.

UNIT-II

Marginal Costing: Importance of break even analysis, Applications of break even analysis & limitations.

Standard Costing: Analysis of variances with reference to material, labour and sales-Elementary treatment.

Financial Analysis: Techniques of financial analysis - common size, comparative, trend Analysis, Ratio Analysis : Types, advantages and limitations.

UNIT-III

Fund Flow & Cash Flow statements: Meaning & Importance, preparation and interpretation of these statements.

Introduction to Computerized Accounting System: Computer Applications in Financial, Material, Production, Marketing & Planning management, Sales/Order Transaction Processing Inventory, Billing & Sales, Accounts Receivable / Payable, Payroll, Labour, General Accounting System.

References :

1. Rockely, L.E.: Finance for the Non-accountant, 2nd Edn, Basic Books, 2001.
2. Levy, and Sarnat: Principles of Financial Management, Prentice Hall, 1999.
3. Arnold: Financial Accounting, PHI, 2004.

CSB3: Master of Computer Applications (Software Systems) Semester – II
(Under Credit Based Continuous Evaluation Grading System)

CSP440: PROGRAMMING LAB-II

Credits		
L	**T**	**P**
0	0	2

Programming exercises on the courses of the semester.

CSB3: Master of Computer Applications (Software Systems) Semester – II
(Under Credit Based Continuous Evaluation Grading System)

CSP441: MINOR PROJECT-II

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

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CSB3: Master of Computer Applications (Software Systems) Semester System
(Under Credit Based Continuous Evaluation Grading System)

Semester–III:					
1.	CSL516	Computer Oriented Numerical & Statistical Methods	4	0	0
2.	CSL517	Computer Networks	4	0	0
3.	CSL518	Information Systems	4	0	0
4.	CSL519	Linux Administration	4	0	0
5.	CSP516	Programming Lab–III	0	0	2
6.	CSP517	Minor Project–III	0	0	4
		Sub Total:	**16**	**0**	**6**
		Grand Total:	**22**		

CSB3: Master of Computer Applications (Software Systems) Semester – III
(Under Credit Based Continuous Evaluation Grading System)

CSL516: COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS

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

UNIT-I

Errors and Sources of Propagation for errors: Errors, Representation of fixed and floating point numbers, consequences due to fixed format representation, error estimation and types of errors.

Solution of algebraic and transcendental equations: The bisection methods, iteration methods, method of false position, Newton Raphson method, rate of convergence of secant method, Newton Raphson methods.

Linear Systems of Equations: Direct Methods, Gausian Elimination Method, Lu Factorization, Solution of Tridiagonal Systems, Iterative Method, Gauss Seider and Gauss Jacobi Method.

UNIT-II

Interpolation Curve Fitting and Cubic Splines: Finite Differences, Backward, Forward, Lagrange's interpolation, Inverse Interpolations, Least square, curve fitting procedures, fitting a straight line, nonlinear curve fitting, Data fitting with cubic splines.

Numeric Differentiation and Integration: Numerical differentiation using interpolation method, numerical
integration, Trapezoidal rule, Simpson's 1/8 rule, Simpson 3/8 rule.

Numerical Solution of Ordinary Differential equations: Euler method, Runge-Kutta method, Predictor corrector method.

UNIT-III

Average: Requisites of a good average, Various method of central tendency, selection and limitations of an average.

Dispersion: Meaning, Characteristics for an ideal measure of dispersion. Measures of dispersion (Mean deviation, Standard Deviation and variance.)

Skewness & Kurtosis Correlation: Types of correlation, Causation, Methods of studying correlation (only Karl-Pearson's method in detail), Correlation in Bivariate frequency table.

Linear regression analysis: Standard error of an eliminate, Correlation vs Regression analysis.

References:

1. Rajaraman, V.: Computer Oriented Numerical Methods, PHI, 1993.
2. Jain, MK et. al.: Numerical Methods for Scientists & Engineers, Wiley Eastern Limited, New Delhi, 1993.
3. Sharma J.N.: Numerical Methods for Engineers and Scientists, New Delhi, Narosa Publishing House, 2004.
4. R.S. Salaria: Numerical Methods, A Computer Oriented Approach, BPB Publications, 2005.
5. S.C. Gupta: Fundamental of Statistics, Himalayas Publication House, 2004.
6. Gupta & Kapoor: Applied Statistics, Sultan Chand & Sons, 2003.

CSB3: Master of Computer Applications (Software Systems) Semester – III
(Under Credit Based Continuous Evaluation Grading System)

CSL517: COMPUTER NETWORKS

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

UNIT-I

Network definition, network hardware and software, Network topologies, uses of computer networks, Transmission media, OSI Reference models, TCP/IP Reference model, Comparison of OSI and TCP Reference models.

Fourier Analysis, Analog and Digital Transmission, Switching, ISDN services, Transmission in ATM networks.

UNIT-II

Framing, Error Detection and Correction, Elementary Data Link and Sliding Window Protocols, Channel allocation in LANs and WANs, Multiple Access Protocols and IEEE standards 802, High speed LANs.

Design Issues of Network Layer, Routing algorithms, Congestion control algorithms, Internetworking, Repeaters, Routers.

UNIT-III

Services and Elements of Transport Protocols, RPC.

Network Security and Privacy - Data Representation, Fundamentals of Data Compression Techniques and Cryptography.

Network Services - File Transfer, Access and Management, Electronic mail, Remote Login.

References :

1. Tannanbaum, A.S.: Computer Networks, Pearson Education, 4th Ed. Delhi, 2004.
2. Forouzon Behrouz: Data Communications, Tata McGraw Hill, 2005.
3. Stallings, William : Local Networks : An introduction Macmillan Publishing Co., 2002
4. Stallings, William : Data & Computer Communication Macmillan Publishing Co., 2003

CSB3: Master of Computer Applications (Software Systems) Semester – III
(Under Credit Based Continuous Evaluation Grading System)

CSL518: INFORMATION SYSTEMS

Credits		
L	T	P
4	0	0

UNIT–I

Basic Concepts:
Systems concepts; system components and relationships; cost/value and quality of information; competitive advantage of information; Evolution and Classification of Information Systems, Management Information Systems, ethical issues such as information privacy, accessibility, property, and accuracy.

UNIT–II

Building and Maintaining Information Systems:
Systems development methodologies including life cycle and iterative design models; development phases including systems selection and planning, analysis, logical design, physical design, implementation and operation, maintenance
Systems development approaches: Classical Approach, object–oriented analysis and design; Rapid Application Development (RAD); eXtreme programming; prototyping;Unified Modelling Language.

UNIT–III

Enterprise Models:
Enterprise application integration, Enterprise Resource Planning (ERP), Workflow management systems, Collaborative technologies, Extranets. Telecommuting and Virtual Organizations.
Knowledge Management Systems, Decision Support Systems.

Recommended Books:

1. Laudon, K.C. and Laudon, J.P. *Management Information Systems: Managing The Digital Firm*, Pearson, 2013, thirteenth edition.
2. Curtis, G. and D. Cobham *Business Information Systems: Analysis, Design and Practice*. Prentice Hall, 2008.
3. Avison, D. and G. Fitzgerald *Information Systems Development: Methodologies ,Techniques and Tools*, McGraw–Hill, 2006, Fourth Edition.
4. Pressman, R. *Software Engineering: a Practitioner's Approach*, McGrawHill, 2009, Seventh Edition.
5. Jawadekar, *Management Information Systems*, Tata McGraw Hill Publications
6. Efraim Turban, *Decision Support and Business Intelligence Systems*, Pearson Education, 2014
7. Elias M. Awad, *Knowledge Management*, Pearson Education, 2004.

CSB3: Master of Computer Applications (Software Systems) Semester – III
(Under Credit Based Continuous Evaluation Grading System)

CSL519: LINUX ADMINISTRATION

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

UNIT-I

Introduction : Introduction to LINUX, Installing LINUX, Partitions, LILO, Installing software packages. Updating with Gnome, Updating with KDE, Command line installing.

File Structure : LINUX files, File structure, File & Directory permission, Operations on a file.

Administering Linux : Creating a user A/C, modifying a user A/C, Deleting a user A/C, Checking Disk Quotas, System Initialization, System start-up & shutdown, Installing & managing H/W devices.

UNIT-II

Setting Up A LAN : Understanding LAN, Setting up Wireless LAN, Understanding IP address, Troubleshooting LAN.

Setting Up Print Server : Choosing CUPS, Working with CUPS Pointing, Managing Pointing, Configuring Point Server.

Setting Up File Server : Setting up an NFS, SAMBA, Installing & Running send mail.

UNIT-III

Setting Up Web Server : Configuring the Apache Server, Starting & stopping the server, Monitoring Server Activities.

Setting Up DHCP & NIS : Setting up DHCP Server, Setting up DHCP Client, Setting up Network Information Service.

Troubleshooting : Troubleshooting LINUX in GRUB mode.

References :

1. Christopher Negus: Redhat Linux(10) Bible, 2003.
2. Tim Parker: Linux Unleashed, 2006.
3. Charles Fisher: Linux Administration Tools, 2007.

CSB3: Master of Computer Applications (Software Systems) Semester – III
(Under Credit Based Continuous Evaluation Grading System)

CSP516: PROGRAMMING LAB-III

Credits		
L	**T**	**P**
0	0	2

Programming exercises on the courses of the semester.

CSB3: Master of Computer Applications (Software Systems) Semester – III
(Under Credit Based Continuous Evaluation Grading System)

CSP517: MINOR PROJECT-III

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

The continuous evaluation is to be done by subject teacher.

CSB3: Master of Computer Applications (Software Systems) Semester System
(Under Credit Based Continuous Evaluation Grading System)

SCHEME

Semester–IV:					
1.	CSL526	Relational Data Base Management Systems	4	0	0
2.	CSL527	Computer Graphics	4	0	0
3.	CSL528	Computer Programming with MATLAB	4	0	0
4.		Interdisciplinary Course–I	4	0	0
5.	CSP526	Programming Lab–IV	0	0	2
6.	CSP527	Minor Project–IV	0	0	4
		Sub Total:	**16**	**0**	**6**
		Grand Total:	**22**		

CSB3: Master of Computer Applications (Software Systems) Semester – IV
(Under Credit Based Continuous Evaluation Grading System)

CSL 526: RELATIONAL DATA BASE MANAGEMENT SYSTEMS

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

UNIT-I

Basic Concepts: An overview of Database Management (Database, Database System, why database, Data independence) An architecture for a database system (levels of the architecture, mappings, DBA, client/server architecture) Introduction to Relational db systems.

The Relational Model: Relational Data Objects: Domains and relations, Relational Data Integrity, Relational Algebra, Relational Calculus and SQL Language.

UNIT-II

Database Design: Concepts of functional dependencies, Multivalued dependencies, 1NF, 2NF, 3NF, BCNF, Higher Normal Forms, An overview of the E/R Model, E/R diagrams, Database design with E/R model.

UNIT-III

Data Protection: Recovery, Concurrence, Security, Integrity.

Overview of optimization process and distributed database and client/server systems.

Object Oriented Systems: Basic concepts, OO/Relational rapprochement, Knowledge base system, expert systems (10 lectures)

References:

1. C.J. Date, “An Introduction of Database System”, The Systems Programming Series, 6/Ed, Addison-Wesley Publishing Company, Inc., 1995.
2. Silberscatz, Korth and Sudarshan, “Database System Concepts”, Third Ed., McGraw Hill International Editions, Computer Science Series-1997.
3. Parteek Bhatia and Gurvinder Singh, “Simplified Approach to DBMS”, Kalyani Publishers.
4. Desai, Bipin C, “An Introduction to Database Systems”, West Publishing Company, St. Paul, Minnesota, USA-1993.

CSB3: Master of Computer Applications (Software Systems) Semester – IV
(Under Credit Based Continuous Evaluation Grading System)

CSL527: COMPUTER GRAPHICS

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

UNIT-I

Elements of Computer Graphics: Introduction to computer graphics; graphics display devices; interactive control devices; output devices; display processors.

2D Graphics

Elementary Drawing Algorithms: Line drawing using direct method, simple DDA, integer DDA, incremental method, and Bresenham's algorithm; Circle drawing using incremental method and Bresenham's algorithm, drawing arcs, sectors, etc.

Geometric Transformations: Translation, rotation, scaling, reflection and shear; concept of homogenous coordinates, Building composite transformations.

Viewing Transformations: Concept of windows & viewport, window-to-viewport mapping, clipping operations - point clipping, line clipping algorithms (Cohen - Sutherland, mid-point subdivision, Cyrus - Beck), Sutherland - Hodgman polygon clipping algorithm.

UNIT-II

3D Graphics

Drawing 3D Shapes: Coordinate systems, representation of 3D shapes, designing curves and surfaces (Hermite, Bezier, and B-Spline).

Geometric Transformations: Translation, rotation, scaling and reflection.

Projective Transformations: Parallel projections - orthographic, axonometric (isometric, diametric and trimetric), oblique projectios; and perspective projections (one, two and three vanishing points).

Viewing Transformations: Viewing a 3D object, 3D clipping (extension of specified 2D algorithms to handle 3D objects).

UNIT-III

Hidden line / surface Removal: back face removal, z-buffer algorithm, Painters (depth sort) algorithm, subdivision algorithms - Warnock's algorithm, scan line algorithms - scan line z-buffer algorithm.

Rendering: Introduction, a simple illumination model, shading - Gouraud shading & Phong shading, ray tracing, shadows, textures.

References:

1. David F. Rogers: *Procedural Elements for Computer Graphics,* McGraw Hill Book Company.
2. Adams & David F. Rogers: *Mathematical Elements of Computer Graphics,* McGraw Hill Book Company.
3. Roy A. Plastock, Gordon Kalley: *Computer Graphics,* McGraw Hill Book Company.
4. Donald Hearn & M. Pauline Baker: *Computer Graphics,* Prentice Hall of India Private Limited.

CSB3: Master of Computer Applications (Software Systems) Semester – IV
(Under Credit Based Continuous Evaluation Grading System)

CSL–528: COMPUTER PROGRAMMING WITH MATLAB

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

UNIT–I

Constants, variables, vectors, matrices; arithmetic and vector/matrix operations, operator precedence. Input and display of data; writing programs in MATLAB environment.

Selection structures: IF and SWITCH.

Loops: FOR and WHILE structures. Multiple (nested) loops. Flags. BREAK and CONTINUE statements.

UNIT–II

Arrays, cell arrays, structures, string manipulation, Debugging programs.

User–defined functions, Passing arguments, returning values; NARGIN, NARGOUT, GLOBAL variables, Formatted output.

UNIT–III

Files: Saving/loading data from files. Opening/closing files, handling file errors. Selecting files through dialog boxes. Repeating operations until end–of–file.

Plotting: Preparing data to be plotted; formatting plots; 2D chart types. Preparing data for 3D plotting; 3D chart types. Wortking with chart handles. Simple curve fitting.

References:

1. Essential MATLAB for Engineers and Scientists, Fourth Edition; Brian H. Hahn, Daniel T. Valentine.
2. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudra Pratap, Oxford University Press.

CSB3: Master of Computer Applications (Software Systems) Semester – IV
(Under Credit Based Continuous Evaluation Grading System)

CSP526: PROGRAMMING LAB-IV

Credits		
L	**T**	**P**
0	0	2

Practical Based on Exchange Server

CSB3: Master of Computer Applications (Software Systems) Semester – IV
(Under Credit Based Continuous Evaluation Grading System)

CSP527: MINOR PROJECT-IV

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

The continuous evaluation is to be done by the subject teacher

CSB3: Master of Computer Applications (Software Systems) Semester System
(Under Credit Based Continuous Evaluation Grading System)

Semester-V					
1.	CSL630	Theory of Computation	4	0	0
2.	CSL631	System Simulation	4	0	0
3.		Interdisciplinary course-II	4	0	0
4.		Interdisciplinary course-III	4	0	0
5.	CSP630	Programming Lab-V	0	0	2
6.	CSP631	Minor Project-V	0	0	4
		Sub Total:	**16**	**0**	**6**
		Grand Total:	**22**		

CSB3: Master of Computer Applications (Software Systems) Semester – V
(Under Credit Based Continuous Evaluation Grading System)

CSL630: THEORY OF COMPUTATION

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

UNIT-I

Non Deterministic Finite Automata, Deterministic Finite Automata, ε - moves, regular expressions, crossing sequence. Moore and Mealy machines.

Pumping lemma for regular sets, Minimisation algorithm.

UNIT-II

Context free grammar, derivation Trees, Chomesky & Greibach normal forms.

Pushdown automata, pumping lemma for CFL's ogden's lemma, Turing machines.

UNIT-III

Undecidability, Recursive and recursively enumerable languages, Rice theorem, Post's correspondence problem.

Introduction to regular grammars, unrestricted grammars context sensitive languages, LR(k) grammar and trios.

References :

1. A.V. Aho, J.E. Hopcroft and J.D. Ullman, 'Introduction to Automata, Languages and Computations', Addison Wesley, 1980.
2. H.R. Lewis and C.H. Papdimitrou, ' Elements of the Theory of Computation', Prentice Hall Inc., 1981.
3. V.J. Rayward Smith, 'A First Course on Computability', Blackwell Scientific Publications, Oxford, 1986.
4. M.Davis and E.J. Weyuker 'Computability, Complexity and Languages' Academic Press, 1982.
5. D. Gries, 'Science of Programming', Springer Verlag, New York, 1981.
6. Dewire, Dawna Tranis : Client Server Computing, McGraw Hill, 1994.

CSB3: Master of Computer Applications (Software Systems) Semester – V
(Under Credit Based Continuous Evaluation Grading System)

CSL631: SYSTEM SIMULATION

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

UNIT-I

Introduction : Concept of a system, stochastic activities, continue and discrete system, system modeling, mathematical modeling, principle used in modeling.

Simulation of Systems : Concepts of simulation of continuous systems with the help of two examples; use of integration formulas; concepts of discrete system simulation with the help of two examples, Generation of random numbers, Generation of non-uniformly distributed numbers.

UNIT-II

Simulation of Queuing Systems : Rudiments of queuing theory, Simulation of Single-Server queue, two-server queue, general queues.

Simulation in Inventory Control and Forecasting : Elements of inventory theory, inventory models, Generation of Poisson and Erlang variats, forecasting and regression analysis.

UNIT-III

Design and Evaluation of Simulation Experiments : Experimental layout and validation.

Simulation Languages : Continuous and discrete simulation languages, Block-Structured continuous simulation languages, expression based languages, discrete system simulation languages, simscript, GPSS, SIMULA, Simpack, GASP IV, CSIM, factors in selection of a discrete system simulation languages.

Case Studies: Analytic Vs Simulation Models, Applications to Operating Systems, Databases, Computer Networks Architectures.

References:

1. Narsingh Deo, “System Simulation with Digital Computer”, Prentice-Hall of India Pvt. Ltd. - 1993.
2. Gordon, “System Simulation”, Prentice Hall of India Pvt. Ltd. - 1993

CSB3: Master of Computer Applications (Software Systems) Semester – V
(Under Credit Based Continuous Evaluation Grading System)

CSP630: PROGRAMMING LAB-V

Credits		
L	**T**	**P**
0	0	2

Programming Exercises based on the courses of the semester.

CSB3: Master of Computer Applications (Software Systems) Semester – V
(Under Credit Based Continuous Evaluation Grading System)

CSP631: MINOR PROJECT-V

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

The continuous evaluation is to be done by subject teacher.

CSB3: Master of Computer Applications (Software Systems) Semester System
(Under Credit Based Continuous Evaluation Grading System)

Semester-VI					
1.	CSP640	**Major Project**	0	0	26
		Sub Total:	**0**	**0**	**26**
		Grand Total:	**26**		

CSB3: Master of Computer Applications (Software Systems) Semester – VI
(Under Credit Based Continuous Evaluation Grading System)

CSP640: MAJOR PROJECT

Credits		
L	**T**	**P**
0	0	26

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 7 credits.

Credits for Final Project Report & Viva Voce: 15