BACHELOR OF SCIENCE IN COMPUTER SCIENCE (B.Sc CS)

PROGRAMME GUIDE

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INTRODUCTION

The B.Sc Computer Science degree provides teaching and experience in the practical design and development of a range of software and IT systems. Students will develop a broad range of knowledge and skills, equipping them for employment or further study in the computer industry. The course provides experience in practical design and development of a range of types of software and IT systems. It provides graduates with a broad range of knowledge and skills, equipping them for employment or further study in the computer industry, with a wide range of opportunities in programming, systems analysis, systems management, and the IT professions.

ACADEMIC OBJECTIVES

- communicate effectively, recognize and incorporate societal needs and constraints in their professional endeavors, and practice their profession with high regard to legal and ethical responsibilities
- engage in life-long learning, such as graduate study, to remain current in their profession and be leaders in our technological society

PROGRAMME CODE: **1122**

DURATION OF THE PROGRAMME:

Minimum Duration **3** years

Maximum Duration **6** years

MEDIUM OF INSTRUCTION/ EXAMINATION

Medium of instruction and Examination shall be **English**.

B.Sc. (CS) (Bachelor of Science in Computer Science) Scheme					
COURSE CODE	**COURSE TITLE**	**Cr.**	**CA**	**ETE(Th.)**	**ETE(Pr.)**
TERM 1					
DENG101	COMMUNICATION SKILLS - I	4	20	80	0
DCAP101	BASIC COMPUTER SKILLS	4	20	60	20
DCAP102	BASIC PROGRAMMING SKILLS	4	20	60	20
DCAP103	PRINCIPLES OF OPERATING SYSTEMS	4	20	80	0
DCAP104	EXPOSURE TO COMPUTER DISCPLINES	4	20	80	0
TERM 2					
DENG102	COMMUNICATION SKILLS - II	4	20	80	0
DCAP105	WORKSHOP ON COMPUTER HARDWARE AND NETWORK	4	20	0	80
DCAP107	OBJECT ORIENTED PROGRAMMING	4	20	60	20
DMGT106	MANAGING HUMAN ELEMENTS AT WORK	4	20	80	0
DCAP108	DIGITAL CIRCUITS AND LOGIC DESIGNS	4	20	80	0
TERM 3					
DMTH201	BASIC MATHEMATICS-I	4	20	80	0
DCAP201	FUNDAMENTALS OF DATA STRUCTURES	4	20	60	20
DCAP204	MANAGING DATABASE	4	20	60	20
DCAP208	MANAGEMENT SUPPORT SYSTEMS	4	20	80	0
DCAP210	INTRODUCTION TO MICROPROCESSORS	4	20	80	0
TERM 4					
DMTH202	BASIC MATHEMATICS- II	4	20	80	0
DCAP203	OPEN SOURCE TECHNOLOGIES	4	20	60	20
DCAP206	INTRODUCTION TO COMPUTER ORGANIZATION & ARCHITECTURE	4	20	80	0
DCAP207	NETWORKS	4	20	80	0
DCAP303	MULTIMEDIA SYSTEMS	4	20	60	20
TERM 5					
DCAP310	INTRODUCTION TO ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS	4	20	80	0
DCAP302	ENTERPRISE RESOURCE PLANNING	4	20	80	0
DCAP313	LAB ON COMPUTER GRAPHICS	4	20	0	80
DCAP311	WIRELESS NETWORKS	4	20	80	0
DCAP305	PRINCIPLES OF SOFTWARE ENGINEERING	4	20	60	20

TERM 6					
DCAP306	E-COMMERCE AND E-BUSINESS	4	20	80	0
DCAP304	SOFTWARE PROJECT MANAGEMENT	4	20	80	0
DCAP308	OBJECT ORIENTED ANALYSIS AND DESIGN	4	20	60	20
DCAP309	INFORMATION SECURITY & PRIVACY	4	20	80	0
DCAP801	MINOR PROJECT	4	0	0	100
TOTAL CREDITS				**120**	

Course Code:	D	E	N	G	1	0	1	Course Title:	**COMMUNICATION SKILLS-I**

WEIGHTAGE	
CA	**ETE (Th.)**
20	**80**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Speaking Skills ---**to enhance the basic speaking skills, one needs apt word and the correct pronunciation. • Simple rules of pronunciation and intonation • Theme based vocabulary building • Antonyms/ Synonyms/ Homonyms
2.	**Listening Skills –** to enhance correct understanding of the language being spoken and to give apt responses in return where required. • Types of listening and Traits of a good listener • Note taking • Exercises Practising Listening Skills-- talk shows , commentaries, etc., followed by identifying the theme, supporting ideas, or and digressions if any
3.	**Reading Skills---**to enhance independent reading, comprehension and quick reading of any given texts & aesthetic appreciation • Comprehension Passages • News / Magazine articles on stereotype topics **and / or** current topics • Poems – Abu Ben Adhem, The Tiger
4.	**Writing Skills –** to reinforce the grammatical structures • **Grammar** --Kinds of sentences**:** Positive, negative, statement, interrogative and exclamatory [learn the functional aspects of these sentences—when are they used, how are they structured etc.] • **Articles and Nouns**—Countable / uncountable , Names with and without THE • **Adjectives /Adverbs** – [describing things, adding information, circumstances] • **Prepositions** of time/ place/ reason: in , on, at , into , to , for , of, about, with, after etc.
5.	**Writing skills** ----- to enhance formally structured effective official writing • Basic cohesive paragraph writing • Note making • Resume writing • Job application writing/ acceptance letter

READINGS: SELF LEARNING MATERIAL.

Course Code:	D	C	A	P	1	0	1	Course Title:	**BASIC COMPUTER SKILLS**

WEIGHTAGE		
CA	**ETE (Pr.)**	**ETE (Th.)**
20	**20**	**60**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Computer Fundamentals.** Characteristics & Generation of Computers, Block diagram of Computer **Data Representation:** Binary Number System, Octal, Hexadecimal and their Conversion.
2.	**Memory:** Types, Units of memory, RAM, ROM, Secondary storage devices – HDD, Flash Drives, Optical Disks: DVD **I/O Devices** – Keyboard, Mouse, LCDs, Scanner, Plotter, Printer& Latest I/O devices in market
3.	**MS Windows**: Desktop, My Computer, Files and folders using windows explorer; Control Panel, Searching Files and folders.
4.	**MS Word:** Introduction, Environment, Help, Creating & Editing Word Document. Saving Document, Working with Text: Selecting, Formatting, Aligning & Indenting.
5.	**MS Word**: Finding Replacing Text, Bullets & Numbering, Header & Footer, Working with Tables, Properties Using spell checker, Grammar, AutoCorrect Feature, Synonyms and Thesaurus.
6.	**MS Word:** Graphics: Inserting Pictures, Clipart, Drawing Objects, Using Word Art. Setting page size and margins; Printing documents. Mail Merge Practical.
7.	**MS-Excel:** Environment, Creating, Opening, & Saving Workbook. Range of Cells. Formatting Cells, Functions: Mathematical, Logical, Date Time, Auto Sum
8.	**MS-Excel**: Formulas. Graphs: Charts. Types & Chart Tool Bar. Printing: Page Layout, Header and Footer Tab.
9.	**MS PowerPoint:** Environment, Creating and Editing presentation, Auto content wizard, using built-in templates **MS PowerPoint:** Types of Views: Normal, Outline, Slide, Slide Sorter, Slide Show, Creating customized templates; formatting presentations Graphics: AutoShapes, adding multimedia contents, printing slides
10.	**Internet:** Basic Internet terms: Web Page, Website, Home page, Browser, URL, Hypertext, ISP, Web Server Applications: WWW, e-mail, Instant Messaging, Internet Telephony, Videoconferencing, Web Browser & its environment

LABORATORY WORK:

1. Hardware familiarizing with various I/O Peripheral devices, storage devices.
2. Familiarity with DOS, Implementing various internal and external commands in DOS.

3. **MS Windows:** Familiarizing with windows operating system; using built-in accessories; managing files and folders using windows explorer; working with control panel; installing hardware and software.
4. MS-Office (or any other Office Suite), meaning and features , its components.
5. MS-Word (or any other word processor) : Creating Document Files, Saving, Closing Files, Page Settings and Formatting Text. Spell Checking, Thesaurus, Creating Tables, Adding rows, columns. Printing Documents, Setting Print Settings, creating labels and mail merge, taking Print outs
6. Ms-Excel-Working with worksheet, formulas & functions ,Inserting charts, Printing in Excel
7. MS Power Point-Views ,Designing, viewing, presenting & Printing of Slides.
8. Internet: Navigating with Internet Explorer; surfing the net, using search engines; using email facility.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. ITL Education Solutions Limited, "Introduction to Information Technology", Pearson Education, New Delhi
2. SAMS Teach Yourself Microsoft Office 2003 by Greg Perry
3. Peter Norton, "Introduction to Computers", Tata McGraw Hill Company, New Delhi.
4. Alexis Leon, Mathews Leon, "Fundamentals of Information Technology", Leon Techworld.

Course Code:	D	C	A	P	1	0	2	Course Title:	**BASIC PROGRAMMING SKILLS**

WEIGHTAGE		
CA	**ETE (Pr.)**	**ETE (Th.)**
20	**20**	**60**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction:** ANSI C standard, Overview of Compiler and Interpreters, Structure of C Program ,Programming rules, Execution
2.	**Basics-The C Declarations:** C Character Set, keywords, **:** Identifiers, data types, operators, constants and variables **Operators & Expressions**
3.	**Input/ Output in C:** Formatting input & output functions.
4.	**Decision making statements** – if, else if **Control Statements:** For, do while, while. Control transfer statements - break, continue.
5.	**Arrays and Strings**: Defining arrays; I/O of arrays, I/O of string data; built-in library functions to manipulate strings, array of strings
6.	**Pointer**: Introductions, Features, Declaration, Pointers and Arrays, pointers to pointers ,Pointers and strings, Void Pointers
7.	**Functions:** Defining and accessing a functions, passing arguments – call by value, function prototypes, recursive functions **Storage Classes:** Storage classes and their usage
8.	**Structures & Unions:** Defining and processing structures, array of structures, nested structures, Unions & difference from Structures
9.	**Files:** Opening, reading, writing & Closing file
10.	**Additional In C:** Dynamic memory allocation, Memory models, Linked List

LABORATORY WORK:

1. Implementation of C Programming Concepts (Operators, Data types, Control Statements, Functions, Arrays, Strings, Structures, Union, Pointers, File Handling)

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Ashok N. Kamthane, "Programming with ANSI & Turbo C", Pearson Education, Year of Publication:2008
2. E.Balagurusamy , "Programming in ANSI C ", Tata McGraw Hill Publishing Company Limited, New Delhi.
3. B.W. Kernighan and D.M. Ritchie, "The C Programming Language", Prentice Hall of India, New Delhi
4. Byron Gottfried , "Programming With C", Tata McGraw Hill Publishing Company Limited, New Delhi
5. Behrauz A.Foruzan & Richard F.Gilberg , " Computer science – A structure programming approach Using C ", Thomson Asia , 2001.

Course Code:	D	C	A	P	1	0	3	Course Title:	**PRINCIPLES OF OPERATING SYSTEMS**

WEIGHTAGE	
CA	**ETE (Th.)**
20	**80**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction:** Operating system Meaning, Supervisor & User mode, Meaning of System Calls & Kernel, Operating system operations & Functions, Types of OS: Single-processor system, multiprogramming, Multiprocessing, Multitasking, Parallel, Distributed, RTOS etc.
2.	**Process management**: Process Concept, PCB, Process Scheduling, Cooperating Processes, Overview of Inter process Communication.
3.	**Process Management:** Concept of Thread, Multithreading, Context Switching, scheduling criteria, Type of Scheduling: Long term, Short term & Medium term scheduling, scheduling algorithms, Overview of thread scheduling,
4.	**Process Management:** Concept of critical section, Ways to handle critical section problem, semaphores, Deadlock concept & handling
5.	**Memory Management**: Logical & Physical Address space, Swapping, Contiguous memory allocation, paging, segmentation, Virtual memory, demand paging, Overview of Page replacement, Thrashing
6.	**File Management:** File concepts, access methods, directory structure, file sharing, protection, Allocation methods, Free space Mgt., Directory Implementation.
7.	**Secondary Storage Structure:** disk structure, Disk Scheduling, disk management, swap-space management, Overview of RAID structure.
8.	**System Protection:** Goals of protection, Access matrix and its implementation, Access control and revocation of access rights, capability-based systems
9.	**System Security:** Security problem, program threats, system and network threats, cryptography as a security tools, user authentication, implementing security defenses, firewalling to protect systems and networks.
10.	Case study of Windows OS or Linux or any other OS

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Silberschatz, Gagne & Galvin, "Operating System Concepts", John Wiley & Sons, Seventh Edition or Latest.
2. A.S. Tanenbaum : Operating System : Design and Implementation, Prentice Hall of India.
3. Milankovic, Operating system, Tata Macgraw Hill, New Delhi.
4. Stalling, W., "Operating Systems", 2nd edition, Prentice Hall.
5. Deitel H. M., "Operating Systems, 2nd edition, Addison Wesley

Course Code:	D	C	A	P	1	0	4	Course Title:	EXPOSURE TO COMPUTER DISCIPLINES

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Processing Data:** Transforming data into information, How computers represent data, How computers process data, Machine cycles, Memory, Registers, The Bus, Cache Memory
2.	**Using Operating Systems:** operating system basics, Purpose of the operating system, types of operating system, Providing a user interface, Running Programs, Sharing Information, Managing Hardware, Enhancing an OS with utility software.
3.	**Networks:** Sharing data anytime anywhere, Uses of a network, Common types of a network, Hybrid Networks, How networks are structured, Network topologies and Protocols, Network Media, Network Hardware
4.	**Data Communication**: Local and Global reach of the network, Data communication with standard telephone lines and Modems, Using Digital Data Connections, Wireless networks
5.	**Graphics and Multimedia:** Understanding graphics File Formats, Getting Images into your Computer, Graphics Software, Multimedia Basics
6.	**Data Base Management Systems**: The Database, The DBMS, Working with a database, Databases at Work, Common Corporate Database Management Systems
7.	**Software Programming and Development:** What is computer Program, hardware/Software Interaction, Planning a Computer Program, How programs Solve Problems,
8.	**Programming Languages and Programming Process:** Categories of Programming Languages, Machine and Assembly Language, Higher Level Languages, WWW development languages, The SDLC of Programming
9.	**Understanding The Need of Security Measures:** Basic Security Concepts, Threats to Users, Threats to Hardware, Threat to Data, Cyber Terrorism.
10.	**Taking Protective Measures:** Keeping your System Safe, Protecting Yourself, Protecting your Privacy, Managing Cookies, Spyware and other BUGS, Keeping your data secure, Backing Up data, Safeguarding your hardware

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Title: Introduction to Computers, Author: Peter Norton, Publisher: McGraw Hill, Sixth Edition
2. Title: Maran Illustrated Computers Guided Tour, Author:Ruth Maran; Kelleigh Johnson, Publisher: Course Technology PTR
3. Title: Computing Fundamentals, Author: Peter Norton, Publisher: McGraw Hill, Sixth Edition.

Course Code:	D	E	N	G	1	0	2	Course Title:	COMMUNICATION SKILLS-II

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
A	**Speaking Skills--** to enhance the fluency/ efficiency and confidence of using a foreign language • Conversation building followed by • Dialogue writing based on formal / official situations, informal and regularly occurring situations. **Telephone skills--** [how to handle telephone calls, telephone etiquettes, making phone calls, taking incoming calls]
B	**Reading Skills ---**to enhance independent reading, comprehension and quick reading of any given texts & aesthetic appreciation Poems--- "Stopping by the Woods on a Snowy Evening" & " Ozymandias"
C	**Writing Skills --**to reinforce the grammatical structures and to enhance formally structured effective official writing • **Grammar** – Tenses: Present tenses – [simple & continuous] Past tenses [simple/continuous/ used to would to] Present Perfect and Past Perfect [simple/ continuous] Future [plans/ intentions/ predictions/ going to/ will present simple/ be/ about to / future continuous/ Future Perfect] • **Parts of Speech** – common errors in English • **Use of Capitals and Basic Punctuations**-- [comma, full stop, colon, semi colon, hyphen , inverted commas, apostrophe].
D	**Writing Skills --**to reinforce the grammatical structures and to enhance formally structured effective official writing • Basics of official correspondence-- principles of writing general and official correspondence • Format of Basic Formal letter-- placing order, cancellation, enquiry • Guidelines for writing & Planning effective Business letters • Kinds Of Business Letters-- Specimens + Exercises

sREADINGS: SELF LEARNING MATERIAL.

Course Code:	D	C	A	P	1	0	5	Course Title:	**WORKSHOP ON COMPUTER HARDWARE AND NETWORK**

WEIGHTAGE		
CA	**ETE (Pr.)**	**ETE (Th.)**
20	**80**	**00**

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction of Hardware and Software/components of computer.
2.	Mother boards, Chipsets & Microprocessor concept & latest available in market. Basics & types of Floppy drive/HDD/DVD/RAM /SMPS/ /BIOS etc
3.	Handling & Holding sensitive equipments, Installing Motherboards, Choosing Cabinet & Cooling considerations, Installing CPU.
4.	Assembling of different parts of computers.
5.	Knowing ports, wires attached in the pc. Knowing SATA slots, IDE Slots
6.	CMOS. Setting BIOS configurations.
7.	Installation of OS (Linux/Windows) and application/utility software, Handling Viruses
8.	Networking Basics: Different Wires, Hubs, Connectors. Punching/Crimping Tools. Switches, I/O Sockets
9.	Creation of Cross Wires and Direct Cables.
10.	IP & Setting up a computer on LAN

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: Robert Bruce Thompson & Barbara Fritchman Thompson, Title:P C Hardware in a nutshell, Publishers: O'REILLY, Year of Publication: 2004
2. Author: Steve Rackley ,Title:Networking in Easy Steps,Publishers: Wiley,Year of Publication: 2008
3. Author: Peterson: PC Assembling, TMG
4. Concentration shall not be to teach theoretical concepts; rather stress shall be on giving hands on practical exposure to computer H/W and Setting up small wired N/W.

Course Code:	D	C	A	P	1	0	7	Course Title:	OBJECT ORIENTED PROGRAMMING

WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	**Review:** Review of basic concepts of object-oriented programming & Introduction of OOP Languages, Comparison between procedural programming paradigm and object-oriented programming paradigm.
2.	**Beginning with OOP Language:** Review of Tokens, Expressions, and Operators & Control Structures. Scope Resolution operator , member dereferencing operator, Reference Variables Review of Functions, Function Overloading, Inline Functions, Default Arguments
3.	**Classes & Objects:** specifying a class, Defining member functions, creating class objects, accessing class members. Access specifiers – public, private, and protected Classes, its members, objects and memory allocation
4.	Static members, the const keyword and classes, the static objects. Friend Function & its usage Empty classes, nested classes, local classes
5.	**Constructors & Destructors:** Need for constructors and destructors, copy constructor, dynamic constructors, Destructors, constructors and destructors with static members
6.	**Operator Overloading & Type Conversion:** Defining operator overloading, rules for overloading operators, Overloading of unary operators and various binary operators with friend functions and member functions Type conversion – basic type to class type, class type to basic type, class type to another class type.
7.	**Inheritance:** Introduction, defining derived classes, forms of inheritance, Ambiguity in multiple and multipath inheritance, virtual base class, Overriding member functions, order of execution of constructors and destructors **Virtual functions & Polymorphism:** virtual functions, pure virtual functions, abstract classes, introduction to polymorphism
8.	**Pointers & Dynamic Memory Management:** understanding pointers, Accessing address of a variable, declaring & initializing pointers, Pointer to a pointer, pointer to a function, dynamic memory management - new and delete operators, this pointer
9.	**Console I/O:** concept of streams, hierarchy of console stream classes, Unformatted I/O Operations, Managing output with manipulators.
10.	**Working with Files**: Opening, Reading, Writing, Appending, Processing & Closing difference type of files, Command line Arguments

LABORATORY WORK:

Sr. No.	Topics
1.	Implementation of Concepts of OOP using C++ covered in the syllabus

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill
2. Author: Herbert Schildt,Title: Teach Yourself C++,Publishers: Tata Mc Graw Hill,Year of Publication: 2005
3. J Marget A. Ellis and Bjarne Stroustrup ,The Annotated C++ reference manual, Addison Wesley New York.
4. Waite Group Lafore R.,Object oriented programming in C++, Waite Group Lafore R.
5. Lippman F. B.C++ Primer, Addison Wesley

Course Code:	D	M	G	T	1	0	6	Course Title:	**MANAGING HUMAN ELEMENTS AT WORK**

WEIGHTAGE	
CA	**ETE (Th.)**
20	**80**

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction to human Resource Management: HRM Policies and their relationship with other fields. E – Human Recourse Management.
2.	Job designing, Recruitment, Selection, Induction and Placement
3.	Training and development: training process, methods and evaluating the training effort,
4.	Appraising and evaluating people in the organisation
5.	Compensation and Rewards,
6.	Industrial Relations,
7.	Improving Communication and Managing Conflict, The Dynamics of Change
8.	Importance of Small Groups and Informal Organizations.
9.	Individuals and Self Management, Handling Stress at workplace
10.	Motivating and Morale Boosting, Leading, Job Satisfaction and Quality of Work Life

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Dessler, Gary, *Human Resource Management*, Pearson Education, New Delhi, 2007
2. Robbins S P, Timothy A. Judge & Sanghi Seema, *Organizational Behaviour*, Pearson Education, New Delhi, 2009
3. Aswathappa, K. *Human Resource and Personnel Management, Text and Cases*. Tata McGraw – Hill, New Delhi, 2007.

Course Code:	D	C	A	P	1	0	8	Course Title:	**DIGITAL CIRCUITS AND LOGIC DESIGNS**

WEIGHTAGE	
CA	**ETE (Th.)**
20	**80**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Basic Concepts:** Number systems - Binary, Octal, Decimal, Hexadecimal, conversion from one to another.
2.	**Boolean Algebra:** Complement arithmetic, Boolean theorems of Boolean algebra.
3.	**Minimization of Boolean Algebra:** Sum of products and product of sums, Minterms and Maxterms, Karnaugh map, Tabulation and computer aided minimization procedures.
4.	**Logic Gates:** RTL, DTL, TTL, ECL, ICL, HTL, NMOS & CMOS logic gates, Circuit diagram and analysis characteristics and specifications, tri-state gates.
5.	**Combinational Circuits:** Problem formulation and design of combinational circuits, Adder / Subtractor, Encoder / decoder, Mux /Demux, Code-converters, Comparators, Implementation of combinational logic using standard ICs.
6.	**Memories:** ROM, EPROM, EEPROM, PAL, PLA and their use in combinational circuit design.
7.	**Sequential Circuits:** Flipflops - SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis of clocked sequential circuits - their design.
8.	State minimization, state assignment, Circuit implementation, Registers-Shift registers, Ripple counters, Synchronous counters, Timing signal, RAM, Memory decoding, Semiconductor memories.
9.	**A/D and D/A Converters:** Principle of analog to digital conversion, Weighted resistor and ladder networks, single slope, dual slope, successive approximation and flash converters.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Floyd Thomas L., Digital Fundamentals, Prentice-Hall, Ninth Edition.
2. *Tokheim R.L., " Digital Electronics - Principles and Applications ", Tata McGraw Hill, 1999.*
3. *Jain R.P., " Modern Digital Electronics ", Tata McGraw Hill, 1999.*

Course Code:	D	M	T	H	2	0	1	Course Title:	BASIC MATHEMATICS – I

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Trigonometric Functions of Sum and Difference of Two Angles
2.	Allied Angles. Transformation formulae, Inverse Trigonometric Functions.
3.	Matrix, Types of Matrices, Matrix Operations, Addition, Subtraction, Multiplication of Matrices, Transpose of Matrix, Symmetric and Skew Symmetric Matrix.
4.	Adjoint of Matrix, Inverse of a Matrix using Elementary operation and Determinants Method
5.	Minors and co-factors, Determinant , Solution of system of equations, Inverse of Matrix using determinants .
6.	Distance between two points, Slope of a line, Various forms of the equation of a line.
7.	Distance of a Point from a Line, Circle.
8.	Functions, Different types of functions, Limits and Continuity, Rules and Standard Procedures.
9.	Differentiability, Derivatives of Exponential, Logarithmic and Parametric Functions, Logarithmic Differentiation.
10.	Rate of Change, Tangents and Normal, Maxima and Minima.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. A text book in Mathematics for XI, XII of NCERT.

Course Code:	D	C	A	P	2	0	1	Course Title:	**FUNDAMENTALS OF DATA STRUCTURES**

WEIGHTAGE		
CA	**ETE (Pr.)**	**ETE (Th.)**
20	**20**	**60**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction & Overview**: Concept of data type, definition and brief description of various data structures
2.	Operations on data structures, algorithm complexity, Big O notation, recursion, some illustrative examples of recursive functions.
3.	**Arrays**: Linear and multi-dimensional arrays and their representation Pointers, Array Pointers, Records and Record Structures, Representation of Records in Memory; Parallel Arrays
4.	**Arrays:** operations on arrays, sparse matrices and their storage
5.	**Linked Lists**: Linear linked list, operations on linear linked list, double linked list
6.	**Stacks**: Sequential and linked representations, operations on stacks, multi stacks **Stacks:** application of stacks such as parenthesis checker, evaluation of postfix expressions,
7.	**Queues:** Sequential representation of queue, linear queue, circular queue, operations and applications, linked representation of a queue.
8.	**Introduction to Trees:** Binary Tree Representation, Traversal.
9.	**Sorting:** Insertion Sort, Selection Sort, Merge Sort, Radix Sort, Hashing.
10.	**Searching:** Linear and Binary Search.

LABORATORY WORK:

1. Implementation of Arrays, Linked Lists, Stacks, Queues, Sorting & Searching

READINDS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Seymour Lipschutz, "Schaum Outline Series", Tata McGraw Hill, New Delhi, Year of Publication: 2006
2. Kruse, Data Structures & Program design, Prentice Hall of India, New Delhi.
3. Tenenbaum, Augenstein, & Langsam, Data Structures using C and C++, Prentice Hall of India, New Delhi.
4. Sorenson and Tremblay : An Introduction to Data Structures with Algorithms.

Course Code:	D	C	A	P	2	0	4	Course Title:	MANAGING DATABASE

WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction to fundamentals of DBMS:** Database applications, Purpose of database systems, Views of data, Database languages, Relational Databases, Database Design, Transaction Management
2.	**Relational Databases:** Relational Model, Structure of Relational databases, fundamental, additional and extended relational algebra operations, Null Values, Modification of database
3.	**SQL:** Data Definition, datatypes, schema definition, Basic structure of SQL Queries, Creating tables, DML - SELECT, INSERT, DELETE and UPDATE operations, DDL commands
4.	**SQL:** Set Operations – UNION, INTERSECT, EXCEPT, Aggregate Functions, NULL values, Nested subqueries, Complex queries, Views, Joined relations **Advanced SQL:** Integrity constraints, Authorization: GRANT, REVOKE
5.	**Relational Languages:** Tuple Relational calculus, Domain relational calculus, Query by Example, Datalog
6.	**Database design and ER model:** Overview of Design process, Entity relationship model, constraints, ER Diagrams, ER Design issues, Weak entity sets, extended ER features
7.	**Relational Database Design:** Features, Atomic Domains and first normal form, Functional dependency theory decomposition using functional dependencies, decomposition using Multivalued dependencies, More normal forms, database design process
8.	**Transaction Management:** Concept of Transaction, Transaction State, Implementation of atomicity and durability, concurrent execution, Serializability, Recoverability, Implementation of Isolation, testing for Serializability
9.	**Concurrency Control**: Lock based protocols, Timestamp based protocols, Validation based protocols, Deadlock handling, Insert and Delete operations, Weak levels of consistency
10.	**Recovery system:** Failure classification, storage structure, recovery and atomicity, log-based recovery, recovery with concurrent transactions, buffer management, failure with loss of non-volatile storage

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: H. F. Korth & A. Silberschatz, Title: Database System Concepts, Publishers: Tata McGraw Hill, New Delhi, Year 2006
2. Ivan Bayross, SQL, PL/SQL The Programming Language of Oracle, BPB Publication.
3. Elmasri & Navathe, Fundamentals of Database systems, Addison & Weisely, New Delhi.
4. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
5. P. Bhatia & G. Singh, Simplified Approach to DBMS, Kalyani Publishers.
6. Martin Gruber, Understanding SQL, BPB Publication, New Delhi.
7. Val Occardi, Relational Database: Theory & Practice, BPB Publication, New Delhi.

Course Code:	D	C	A	P	2	0	8	Course Title:	**MANAGEMENT SUPPORT SYSTEMS**

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Support Systems: Changing** Business Environment, Managerial Decision Making. Computerised Support. Concept of Decision Support Systems. Major Tools and Techniques for Management Support System.
2.	**Decision Support:** Decision Making, Introductory and Definitions, Models, Phases of Decision Making
3.	**Decision Support Systems:** Definition, Configuration, Characteristics, And Components of DSS: Dialogue Management, Data Management and Model Management for DSS.
4.	**Modelling and Analysis**: Modelling for MSS, Static and dynamic models, Certainty, Uncertainty and Risk, MSS Modelling in Spreadsheets, Simulation, Optimization via Mathematical Programming
5.	**Data Warehousing** Data Warehousing definitions and concepts, Process Overview, architecture, development, administration and security issues
6.	**Business Analytics and Data Visualization:** Overview, Online Analytical Processing(OLAP), Data Visualization, GIS, Usage, Benefits and success
7.	**Data Mining:** Concepts and Applications, Tools and Techniques, Text Mining, Web Mining
8.	**Neural Networks:** Concept, ANN, Applications, development of Neural Network based system
9.	**Knowledge Management:** Introduction, activities, approaches, information technology, role of people, success
10.	**Knowledge-Based Decision Support:** Concepts and Definitions of Artificial Intelligence and Expert Systems, Benefits, Problems and limitations, Success factors

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Turban, Aronson, Liang, Sharda, "Decision Support Systems & Business Intelligence Systems", Pearson Education, Fifth Edition
2. Jean Paul Van Balle, Mike Eccles, Jane Nash, “Discovering Information Systems”, for Free Educational Use under “Creative Commons Attribution-NonCommercial-NoDerivs 2.5 Licence
3. Mallach E.G. “Decision Support and Data Warehouse Systems” Tata McGraw-Hill.
4. Gupta U.G. “ Management Information Systems: A Managerial Perspective” Galgotia Publications Pvt. Ltd.
5. Marakas G.M. “Decision Support Systems in 21st Century” Pearson Education

Course Code:	D	C	A	P	2	1	0	Course Title:	INTRODUCTION TO MICROPROCESSORS

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Microprocessors, Microcomputers, and Assembly Language:** Microprocessors, microprocessor Instruction Set and Computer Languages, Application
2.	**Introduction to 8085 Assembly Language Programming:** 8085 programming model, Instruction Classification, How to write a simple program
3.	**Microprocessor Architecture and Microcomputer Systems:** Microprocessor architecture and its operation, Memory, I/O devices, Example of Microcomputer system
4.	**8085 Microprocessor Architecture and Memory Interfacing:** 8085 MPU, Memory Interfacing, How does an 8085- Based Single board Microcomputer work?
5.	**Interfacing I/O Devices:** Basic interfacing Concepts, Interfacing output displays, Interfacing input devices, Memory Mapped I/O
6.	**Introduction to 8085 Instructions:** Data transfer operations, Arithmetic operations, Logic operations, branch operations,
7.	**Programming Techniques with Additional Instructions:** Programming techniques: Looping, Counting and Indexing, Additional Data transfer instructions
8.	**Counters and Time delays:** Counter and time delays, Illustrative program: Hexadecimal counter.
9.	**Stack and Subroutines:** Stack, Subroutine, Restart, Conditional call and Return Instruction
10.	**Interrupts:** 8085 interrupts

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Gaonkar Ramesh S, "Microprocessor Architecture, Programming and Applications" with 8085/8080A, Wiley Eastern Limited, New Delhi, 2006.
2. Hall Dougles V, "Microprocessors and Interfacing" Programming and Hardware, Tata McGraw-Hill, New Delhi, 2007

Course Code:	D	M	T	H	2	0	2	Course Title:	**BASIC MATHEMATICS-II**

WEIGHTAGE	
CA	**ETE (Th.)**
20	**80**

COURSE CONTENTS:

Sr. No.	Topics
1.	Integration as inverse process of differentiation ,Integration by substitution
2.	**I**ntegration by partial fraction and by parts
3.	Definite integral, evaluation of definite integrals by substitution
4.	Simple properties of definite integral
5.	Application in finding the area under simple curve and within two curves
6.	Formation of differential equation
7.	Solution of differential equation of first order and first degree by separation of variables
8.	Homogeneous equation and linear equation.
9.	Permutation, Combinations
10.	Random Experiments, Event, Axiomatic Approach to Probability.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. A text book in Mathematics for XI,XII of NCERT.
2. Teaching through course work assignment tests and term paper.

Course Code:	D	C	A	P	2	0	3	Course Title:	**OPEN SOURCE TECHNOLOGIES**

WEIGHTAGE		
CA	**ETE (Pr.)**	**ETE (Th.)**
20	**20**	**60**

COURSE CONTENTS:

Sr. No.	Topics
1.	**My SQL:** Current and Future Versions of MySQL, Installing MySQL. Basic Security Guidelines. Privilege System and Working with user privileges.
2.	**Apache Server:** Versions of Apache. Choosing Appropriate Installation Method. Installing on Windows. Apache Configuration File Structure. Apache Log File. Starting Apache for First Time.
3.	**PHP:** Versions of PHP. Installation of PHP. Php.ini basics. Testing Installation. **Building Blocks of PHP:** Variables, Data Types, Operators & Expressions, Constants. Switching Flow. Loops, Code Blocks and Browser Output.
4.	**Functions:** Meaning, Calling, Defining a function. Return value from user-defined function. Saving State with 'static' function. Testing for existence of function. **Arrays:** What are arrays, Creating Arrays, Array Related functions. **Objects:** Creating an Object. Object Inheritance.
5.	**Working with String, Dates & Time:** Formatting String with PHP. Using Date and Time Functions with PHP. Other String, Date/Time Functions.
6.	**Forms:** Creating Simple input Form. Accessing Form input with user defined arrays, HTML and PHP Code on a single Page. Using Hidden Fields to Save State. Redirecting User. Working with File Upload.
7.	**Cookies:** Introducing Cookies, Setting Cookies, Deleting Cookies with PHP, Session Function Overview, Starting Session, Working with Session Variables. Destroying Sessions and Unsetting variables.
8.	**Files and Directories:** Include Files with include(). Validating Files. Creating Files, Deleting Files, Opening a File for Reading, Writing, Appending.
9.	**Images:** Understanding Image Creation Process, Necessary Modifications to PHP, Drawing a New Image, Modifying Existing Images, Image Creation from User Input
10.	**Stored Procedures:** What are Transactions, What are Stored Procedures. **Connecting to MySQL with PHP. Working with MySQL Data.**

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Teach Yourself PHP, MySQL & Apache, By: Meloni, Pearson Education.
2. Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl & PHP By: James Lee, Pearson Education.
3. PHP: A Beginner's Guide By: Vaswani, Vikram, By: Tata Mc-Graw Hill

Course Code:	D	C	A	P	2	0	6	Course Title:	**INTRODUCTION TO COMPUTER ORGANIZATION & ARCHITECTURE**

WEIGHTAGE	
CA	**ETE (Th.)**
20	**80**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Tools for course understanding:** Awareness of ISA bus interface, a popular bus architecture used in IBM and compatible personal computer systems. **Digital Logic Circuits:** Digital computers, Logic gates, Boolean Algebra, Map Simplification, Half Adder, Full Adder, Flip flops – SR, JK, D, T, Edge triggered flipflops, Sequential Circuits
2.	**Digital Components:** Integrated circuits, Decoders – NAND gate decoder, Encoders, Multiplexers, Demultiplexers, Registers, Shift registers, Bidirectional Register with parallel load, Binary counters, Memory Unit – RAM, ROM, Types of ROMs
3.	**Data Representation:** Number systems – decimal, octal, hexadecimal, Complement – (r-1)'s complement, r's complement, Fixed point representation, floating point representation, Gray code, Decimal codes, alphanumeric codes, Error detection codes
4.	**Register Transfer and Micro-operations:** Register transfer language, Register transfer, Bus and memory transfers – three state bus buffers, Arithmetic micro-operations – binary adder, binary adder-subtractor, binary incrementer, arithmetic circuit
5.	Logic micro-operations and its hardware implementation, Shift micro-operations and hardware implementation, Arithmetic Logic Shift unit, Hardware description languages
6.	**Basic Computer Organization and Design:** Instruction Codes, Stored program organization, Computer registers, Common bus system, Computer instructions, Timing and Control, Instruction cycle, Memory reference instructions, Input output and interrupt, complete design of basic computer
7.	**Central Processing Unit:** General register organization, control word, Stack organization, register stack, memory stack, Instruction formats – three address, two address, one address, zero address instructions, Addressing modes, Data transfer and manipulation, arithmetic, logical, bit manipulation, Program control, Reduced Instruction Set Computer (RISC), CISC characteristics
8.	**Input-Output Organization:** Input output interface, I/O bus and interface modules, I/O vs memory bus, Isolated vs Memory mapped I/O
9.	Asynchronous data transfer, handshaking, Programmed I/O, Interrupt-initiated I/O, Priority Interrupt – Daisy chaining, parallel priority, priority encoder, interrupt cycle, DMA controller and transfer
10.	**Memory Organization:** Memory hierarchy, RAM, ROM chips, memory address map, Associative memory, Cache memory, Virtual memory, Memory management hardware

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: Morris Mano, Title: Computer System Architecture, Publishers: Prentice Hall, Year of Publication: 2007
2. Digital Principles and application, McGraw-Hill,1994
3. David A Patterson, Computer Architecture A Quantitative Approach, Pearson Education Asia.
4. J.P.Hayes, Computer System Architecture, Pearson Education Asia.

Course Code:	D	C	A	P	2	0	7	Course Title:	NETWORKS

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction to Computer Networks:** Uses of computer networks, Network Hardware: LAN, WAN, MAN, Wireless, Home networks, Internetworks. **Network topologies:** STAR, Ring, BUS etc.
2.	**Network Software:** Layers, Protocols, Reference models: OSI Model, TCP/IP model, comparison of OSI and TCI reference model.
3.	**Physical Layer:** Guided Transmission Media: Magnetic media, Twisted pair, Coaxial cables-base band, broadband, optical fiber transmission. **Wireless Transmission**, Satellites, PSTN
4.	**Networking Devices:** Hub, Router, Switch, Bridge, Gateway **Switching Techniques:** Circuit Switching, Message switching, packet switching
5.	**Multiplexing:** Frequency Division, Time Division Multiplexing **Modulation Techniques:** Amplitude, Frequency, Phase
6.	**Data Link Layer:** Design Issues - Services provided to the network layer, framing, error control, flow control, **Error Detection and Correction:** Error Correcting Codes, Error Detecting Codes
7.	**Data link protocols:** Elementary Data link protocols, Sliding Window protocols, HDLC, Data link layer in Internet
8.	**MAC Sublayer:** CSMA/CD, **Ethernet:** Ethernet Cabling, Fast Ethernet.
9.	**Network Layer:** Design Issues, Routing Algorithms: Optimality principled, shortest path routing, distance vector routing, link state routing **Congestion Control Algorithms:** General principles, congestion prevention policies
10.	**Network Security:** Cryptography – Introduction, Substitution ciphers, transposition ciphers

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: A.S. Tanenbaum, Title: Computer Networks, Publishers: Pearson Education, Delhi, Fourth Edition or latest:
2. Behnouz A. Forouzan, "Data Communication and networking", 2nd Ed. Update, Tata McGraw Hills 2003
3. Black U, "Computer Networks-Protocols, Standards and Interfaces", PHI 1996
4. Comer E. Doughlas, "Computer Networks and Internets", 2nd Ed., Pearson, 2000
5. W. Stallings, "Data and Computer Communications", 7th Ed., Pearson, 2002.
6. Laura Chappell (Ed), "Introduction to Cisco Router Configuration", Techmedia, 1999

Course Code:	D	C	A	P	3	0	3	Course Title:	MULTIMEDIA SYSTEMS

WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	**Multimedia:** Meaning and its usage, Stages of a Multimedia Project & Multimedia Skills required in a team
2.	**Text:** Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext.
3.	**Sound:** Multimedia System Sounds, Digital Audio, MIDI Audio, Audio File Formats, MIDI vs Digital Audio, Audio CD Playback. Audio Recording. Voice Recognition & Response.
4.	**Images:** Still Images – Bitmaps, Vector Drawing, 3D Drawing & rendering, Natural Light & Colors, Computerized Colors, Color Palletes, Image File Formats, Macintosh & Windows Formats, Cross – Platform format.
5.	**Animation:** Principle of Animations. Animation Techniques, Animation File Formats.
6.	**Video:** How Video Works, Broadcast Video Standards: NTSC, PAL, SECAM, ATSC DTV, Analog Video, Digital Video, Digital Video Standards – ATSC, DVB, ISDB, Video recording & Shooting Videos, Video Editing, Optimizing Video files for CD-ROM, Digital display standards.
7.	**Hardware:** Macintosh versus Windows**,** Connections: IDE, SCSI, UIDE, ATA, USB, Firewire etc. Storage devices, Input , Output devices for Multimedia Projects
8.	**Multimedia Software Tools:** Text Editing & Word processing tools, OCR S/W, Painting & Drawing Tools, 3D Modelling & Animation Tools, Image editing tools, Sound Editing tools, Animation, Video & Digital movie tools, Overview of various types of Multimedia Authoring tools.
9.	**Compression:** CODEC, Types of Compression & redundancies, GIF, JPEG & MPEG Standards Overview, Fractals
10.	**Multimedia tools for WWW & Designing for WWW**: Plug Ins, Text, Images, Sound & Animation for the Web.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Tay Vaughan, "Multimedia: Making it work", TMH, 1999
2. Ranjan Parekh, "Principles of Multimedia", Tata McGraw Hill Author:Vikas Gupta,Title:Coundex DTP Course KIT,Publishers: Wiley,Year of Publication: 2008
3. Keyes, "Multimedia Handbook", TMH, 2000.
4. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications", Pearson, 2001.
5. Steve Rimmer, "Advanced Multimedia Programming", MHI, 2000.
6. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI, PTR, 2000.

Course Code:	D	C	A	P	3	1	0	Course Title:	**INTRODUCTION TO ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS**

WEIGHTAGE	
CA	**ETE (Th.)**
20	**80**

COURSE CONTENTS:

Sr. No.	Topics
1.	**Overview of AI:** What is AI, Importance of AI, Early work in AI, AI and related Fields.
2.	**Knowledge:** General Concepts, Introduction, Definition and Importance of Knowledge, Knowledge-based systems, Representation of Knowledge, Knowledge Organization, Knowledge Manipulation, Acquisition of Knowledge
3.	**LISP and Other AI Programming Languages:** Introduction to LISP Syntax and Numeric Functions, Basic List Manipulation Functions in LISP, Functions, Predicates, and Conditionals, Input, outputs and Local variables, Iterations and recursion, property lists and arrays, PROLOG and Other AI Programming Languages
4.	**Formalized Symbolic Logics:** Introduction, Syntax and Semantics for Propositional Logic, Syntax and semantics for FOPL, Properties of Wffs, Conversion to Clausal Form, Inference Rules, The Resolution Principle, Nondeductive Inference Methods, Representations using Rules Dealing with Inconsistencies and Uncertainties: Truth Maintenance System, Predicated Completion and Circumscription, Modal and Temporal Logics, Fuzzy Logic and Natural Language Computation.
5.	**Probabilistic Reasoning:** Bayesian Probabilistic Inference, Possible World Representations, Dempster-Shafer Theory, Ad-Hoc Methods, Heuristic Reasoning Methods. Structured Knowledge: Associative Networks, Frame structures, Conceptual Dependencies and Scripts. Object Oriented Representation: Overview of Object-Oriented Systems, Object, Classes, Messages and Methods
6.	**Search and Control Strategies:** Preliminary Concepts, Examples of Search Problems, Uninformed or Blind Search, Informed Search, Searching And-Or Graph.
7.	**Matching Techniques:** Structures used in Matching, Measures for Matching, Matching like Patterns, Partial Matching, Fuzzy Matching Algorithms, The RETE Matching Algorithm. Knowledge Organization and Management: Indexing and Retrieval Techniques, Integrating Knowledge in Memory.
8.	**Natural Language Processing:** Overview of Linguistics, grammers and Languages, Basic Parsing Techniques, Semantic Analysis and Representation Structures, Natural Language generalization, Natural Language Systems, Recognition and Classification Process
9.	**Expert System Architecture:** Rule-Based Architecture, Nonproduction System Architectures, Dealing with Uncertainty, Knowledge Acquisition and Validation
10.	**Types of Learning, Knowledge Acquisition is Difficult, General Learning Model, Performance Measures, Knowledge System Building Tools, Learning by Induction :** Generalization and Specialization, Inductive Bias. Analogical Reasoning and Learning, Explanation based Learning.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Edition: 2010, Pearson Education, Inc.
2. Author: Rich Elian, Knight Kevin, Artificial Intelligence, Edition: 2010, Tata McGraw Hill Corp., New Delhi Author: Charriak Eugene, Introduction to Artificial Intelligence, Edition: 2009, Pearson Education , New Delhi
3. Author: Winston, Patrick Henry, Artificial Intelligence, Edition: 2009, Pearson Education , New Delhi.

Course Code:	D	C	A	P	3	0	2	Course Title:	ENTERPRISE RESOURCE PLANNING

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Tools to understand the course:** Awareness of ERP softwares SAP / CRM. **ERP overview:** Introduction, Business Function and Business Processes, Integrated Management Information, Business modelling ,Integrated Data Model, Common ERP Myths, History, Advantages, The Future of ERP packages
2.	**Risks and Benefits Of ERP:** Risks Factors of ERP implementation, Technological Issues ,Implementation Issues ,Benefits of ERP
3.	**ERP and Related Technologies:** Business Process Reengineering, Management Information system, Decision Support System, Executive Information System. **Databases:** Data Warehousing, Data Mining, On-Line Analytical Processing, Supply chain management, Customer Relationship Management
4.	**ERP Marketplace and Functional Modules:** The changing ERP market, Functional Modules of ERP software, Integration of ERP,SCM and CRM
5.	**ERP Implementation:** Basics, Technological, Operational, Business Reasons for ERP implementation, ERP Implementation Life Cycle, Objectives, Phases.
6.	**ERP Transition strategies:** Transition Strategies, Big Bang Strategy, Phased, Parallel Implementation, Process Line Transition strategy, Hybrid Transition strategy.
7.	**ERP Project Teams:** Organization of the Implementation team **ERP Vendors, Consultants & Users:** Pro & Cons of In-house Implementation ,vendors, consultants, Employees and Employ Resistance, Reasons for resistance, Contract with vendors, consultants and employees.
8.	**ERP Future Directions:** New Markets, New Channels, Faster Implementation Methodologies, Application Platforms, New Business Segments, Web Enabling & Snapshot.
9.	**ERP and eBusiness:** eBusiness-SCM, Process Model, ERP, Internet and WWW-ERP II
10.	**ERP-A Manufacturing Perspective:** ERP,CAD/CAM,MRP,BOM,MTO,MTS,ATO,ETO,CTO **Case Studies:** SAP at TATA Steel, J D Edwards At HP

READINGS: SELF LEARNING MATERIAL

ADDITIONAL READINGS:

1. Author: Alexis Leon Title: Enterprise Resource Planning ,Second Edition, Tata McGraw Hill Year:2008.
2. Author: Jyotindra Zaveri Title: Enterprise Resource Planning Publication: Himalaya Publishing House.
3. Author: Gestion D'Entreprise Title: ERP Open Resource Publication: Wiley.
4. Author:Jones, Gareth Title: Contemporart Management Publication: Tata McGraw Hill.

Course Code:	D	C	A	P	3	1	3	Course Title:	LAB ON COMPUTER GRAPHICS

WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	80	00

COURSE CONTENTS:

Sr. No.	Topics
1.	**Fundamentals Of Computer Graphics:** Applications of computer Graphics in various fields, Evolution of computer Graphics.
2.	**Graphics Systems:** Video Display Unit, Random scan displays, raster scan displays, Displaying Colours, Frame Buffer, Digitization, Persistence, Resolution
3.	Implementing Line Algorithm
4.	Implementing Circle Algorithm
5.	Implementing Ellipse Algorithm
6.	Implementing polygon filling algorithm
7.	Implementation of Hidden Surface in 2D.
8.	Implementing of Scaling in 2D Transformation.
9.	Translation
10.	Sharing, Rotation, Reflection.

LABORATORY WORK:

S. No.	Description
1.	Implementation of algorithms for drawing line, circle, ellipse
2.	Polygon filling algorithms
3.	Hidden surface algorithms
4.	Implementation of various transformations covered in syllabus

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Computer Graphics By: Becker, Publisher: Pearson Education.
2. Programming in C By: Yashwant Kanetkar, BPB Publications

Course Code	D	C	A	P	3	1	1	Course Title	**WIRELESS NETWORKS**

WEIGHTAGE	
CA	**ETE(Th.)**
20	**80**

COURSE CONTENTS:

S. No.	Topics
1.	**Introduction to Wireless Networks**. IEEE Standards for Wireless Networks. Wireless Networks Applications. Types of Wireless Networks. Benefits of Wireless Networks.
2.	**Wireless System Architecture**: Wireless System Components, Network Architecture. Information Signals. **Radio Frequency and Light Signal Fundamentals**: Wireless Transceivers, understanding RF Signals, Working of Light Signals
3.	**Types of Wireless Networks**: WPAN, WLAN, WMAN **Wireless PAN:** Components: User Devices, Radio NIC, USB Adapters, Wireless Routers, Bluetooth Dongles etc. **Wireless PAN Systems:** SOHO Equipments, Printing, Accessing Internet, Accessing PDA's, Mobile Phones **Wireless PAN Technologies**: IEEE 802.15. Bluetooth Version 1 and Version 2.
4.	**Wireless LAN:** Meaning, Components: User Devices, Radio NIC's, Access Points, Routers, Repeaters, And Antennae. **SOHO Applications**: Internet Access, Printing, Remote Accessing. Public Wireless LAN's, and AdHoc Wireless LAN's
5.	**Wireless MAN:** Meaning and Components: Bridges, Bridges Vs. Access Points, Ethernet to Wireless Bridges, Workgroup Bridges
6.	**Wireless MAN Systems:** Point to Point Systems, Point to Multi Point, Packet Radio Systems.
7.	**Wireless WAN:** WAN User Devices, Base Stations, Antennae. **Wireless WAN Systems:** Cellular-Based Wireless WANs, First-Generation Cellular**,** Second-Generation Cellular, Third-Generation Cellular.
8.	**Space-Based Wireless WANs:** Satellites, Meteor Burst Communications
9.	**Wireless Networks Security:** Security Threats, Unauthorized Access, Middle Attacks, DoS Attack (Denial of Service).

READINGS: SELF LEARNING MATERIAL

ADDITIONAL READINGS:

1. Wireless Networks First Step, By: Jim Geier, CISCO Press
2. Principles of Wireless Networks by Kaveh Pahlavan, Pearson Education
3. Wireless Communication & Networks by William Stallings, Pearson Education
4. 802.11 Wireless Networks: The definitive Guide by Mathew Gaust, o'Reilly
5. Building Wireless Community Network by Fringer, o'Reilly

Course Code:	D	C	A	P	3	0	5	Course Title:	PRINCIPLES OF SOFTWARE ENGINEERING

WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENT:

Sr. No.	Topics
1.	**Introduction:** Concept of Software Engineering. Software Engineering Challenges & Approach.
2.	**Software Processes & models**: Processes and Models, Characteristics of Software Model, Waterfall, Prototype, Iterative, Time Boxing. Comparison.
3.	**Software Requirements:** Problem Analysis, DataFlow, Object Oriented Modelling, Prototyping. **Software Requirement Specification Document: SRS,** Characteristics, Components, Specification Language, Structure of Document.
4.	**Introduction to Validation, Metrics**: Function Point & Quality Metrics. Software Architecture: Architecture Views, Architecture Styles:Client/Server, Shared Data.
5.	**Software Project Planning:** Process Planning, Effort Estimation, COCOMO Model, Project Scheduling and Staffing. Intro to Software Configuration Management: Quality Plan, Risk Management, Project Monitoring.
6.	**Functional Design:** Principles, Abstraction, Modularity, Top Down, Bottom Up Approach. Coupling, Cohesion. Structure Charts, Data Flow Diagrams, Design Heuristics.
7.	Intro to Verification: Meaning, Metrics: Network, Stability, Information Flow.
8.	Detailed Design: Process Design Language. Logic/Algorithm Design. Verification of Logic/Algorithm Design. Metrics: Cyclomatic Complexity, Data Bindings, Cohesion Metric.
9.	**Coding:** Common Errors, Structured Programming, Programming Practices, Coding standards. Coding Process: Incremental, Test Driven, Pair Programming. Refactoring: Meaning and Example. Verification, Metrics: Size & Complexity
10.	**Testing:** Fundamentals, Error, Fault, Failure, Test Oracles, Test Cases & Criteria. Black Box: Equivalence Class Partitioning, Boundary Value Analysis. White Box: Control Flow Based, Data Flow Based **Testing Process:** Levels of Testing, Test Plan, Test Case Specifications, Execution and Analysis. Logging and Tracking.Metrics: Failure Data and Parameter Estimation.

LABORATORY WORK:

Sr. No.	Topics
1.	Various Tools available for CASE (Computer Aided Software Engineering).
2.	Practical to show how to create an information gathering document.
3.	Finalizing the SRS Document based upon the information gathered and analysis of the same.
4.	How to Create Use Cases.
5.	How to Create ER Diagrams.
6.	Developing Test Cases and Test Plan.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.
2. R. Fairley, “Software Engineering Concepts”, Tata McGraw Hill, 1997.
3. Author: R.S. Pressman, Title: Software Engineering – A Practitioner’s Approach Publishers: McGraw Hill
4. Software Engineering by Ian Sommerville, Pearson Education.

Course Code:	D	C	A	P	3	0	6	Course Title:	E-COMMERCE AND E-BUSINESS

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction: E-Commerce, E-Business.** Meaning & Concept, E-Commerce vs. Traditional Commerce, Media Convergence Business applications & Need for E-Commerce, E-Business. Basics of E-Commerce: Network and electronic transactions today
2.	The internet environment for E- Commerce, B2B, B2C transactions, providers and vendors
3.	Electronic Data Interchange to E-Commerce: EDI, UN/EDIFACT Standard
4.	The internet & Extranet for E-Commerce, Identification & Tracking tools for E-Commerce, Overview of Internet Bandwidth & Technology Issues
5.	Security Concerns, Security Solutions – Symmetric & Asymmetric Cryptosystems, Digital Signatures, PKCS, Protocol for Secure messaging, key management, X.509 Certificates, SET protocols, E-Cash over the Internet.
6.	Business Process Reengineering: BPR Approach, Strategic Alignment Model, BPR methodology, Rapid Re Methodology & PRLC
7.	Legal issues – Paper Document vs. Electronic Document, technology for authenticating electronic document, Laws for E-Commerce, EDI interchange agreement, Legal issues for internet Commerce, Cyber Security, Cyber Crimes
8.	Management of Change, E-commerce in India
9.	**Case Study:** Designing and building E-Commerce web site. Managing Products, Database, Shopping cart applications, Integrating mobile E-Commerce, Payment Gateways, Tracking Orders. Eg**:** Amazon.com, eBay.com.
10.	Computer Emergency response team –CERT in objectives, functions, role , CERT –In Activities

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. K. Bajaj, "E-Commerce", Tata Mcgraw Hill, 1999
2. Sartaj Singh & Sandeep Kaur, E-Commerce E-Business: ABS
3. Jaynice Reynold & Roya Mofajali, "The Complete E-Commerce Book : Design, Build & Maintain a Successful Web-based Business"
4. Don Jones, Mark Scott & rick Villars, "E-Commerce for Dummies" Published by Hungry Minds
5. Ravi Kala Kota and Marcia Robinson : E-Business-Roadmap for Success; Pearson Education
6. Keneth C Laudon, Carol G Travor, "E-Commerce: business. technology. Society"

Course Code:	D	C	A	P	3	0	4	Course Title:	SOFTWARE PROJECT MANAGEMENT

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction to Software Project Management:-** What is project? Software Project Vs. Other Types. Activities by Software Project Mgt. Plans, Methods and Methodologies. Problems with Software Projects.
2.	**Step Wise Project Planning:** Project Scope, Objectives, Infrastructure, Characteristics, Effort Estimation, Risk Identification.
3.	**Programme Management & Project Evaluation:** Meaning, Managing Allocation of resources. Creating Programme. Individual Projects. Technical Assessment, Cost Benefit Analysis & Risk Evaluation.
4.	**Project Approach:** Intro. Technical Plan, Choice Of Process Models: Waterfall, V-Process, Spiral. Prototyping. Incremental Delivery.
5.	**Effort Estimation:** Meaning, Problems with Estimation, Basis, Estimation Techniques. Albrecht Function Point Analysis. Functions Mark II. COCOMO Model.
6.	**Activity Planning:** Objectives, Project Schedule, Network Planning Model. Time Dimension. Indentifying Critical Path.
7.	**Risk Management:** Categories of Risk. Identification. Assessment. Schedule Risk. Applying PERT Technique.
8.	**Resource Allocation:** Indentifying Resource Requirements. Scheduling Resources. Publishing the Resource Schedule & Cost Schedule. Scheduling Sequence.
9.	**Monitoring & Control:** Creating Frameworks. Data collection. Visualising Progress. Cost Monitoring. Change Control.
10.	**Software Quality:** Introduction, Defining Software Quality. ISO9126. Software Measures. Product Vs. Process Quality Management. External Standards. **Small Projects:-** Introduction, Problems with Student Projects, Content of project plan

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Bob Hughes and Mike Cotterell; Software Project Management, Fourth edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.
2. Software Project Management, by Walker Royce, published by Pearson Education.
3. S. Humphrey; Winning with Software - An Executive Strategy, Pearson Education Asia.
4. Software Project Management in Practice by Pankaj Jalote, Pearson Education.
5. A Discipline to Software Engineering by Watts S. Humphrey Pearson Education.
6. Software Project Management Readings and Cases by Chris Kemerer.

Course Code:	D	C	A	P	3	0	8	Course Title :	OBJECT ORIENTED ANALYSIS AND DESIGN

WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	**Introduction**: object orientation, OO development, OO themes, Evidence for usefulness of OO development
2.	**Modelling concepts**: Definition, Abstraction, Three models. **Class Modelling**: Object and class concepts, Link and association concepts, Generalization and inheritance, sample class model, Navigation of class models
3.	**Advance Class modelling**: Advance object and class concepts, Association Ends, N-ary associations, aggregation, Abstract classes, Constraints, Derived data, packages.
4.	**State Modelling**: Events, States, Transition and conditions, state diagrams, state diagram behaviour.
5.	**Interaction Modelling**: Use case models, Sequence models, Activity models.
6.	**Advance Interaction Modelling: Use** case Relationships, Procedural Sequence models, Special constructs for activity models
7.	**Analysis and design**: process overview, development life cycle **System conception**: devising, Elaboration, Preparing a problem statement
8.	**Doman Analysis:** Domain class model, Domain state model, domain interaction model.
9.	**System design**: overview, reuse plan, concurrency, allocation, software control strategy, boundary conditions
10.	**Class design**: Designing algorithms, Refactoring, design optimization, adjustment of inheritance, organizing class design.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: Michael Blaha, JamesRum baugh, Title:Object oriented Modelling and design with UML: Pearson Education, second edition. Delhi, Year of Publication: 2007
2. Meilir Page Jones, 'Fundamentals of Object Oriented Design in UML', Addison Wesley, 1999.
3. The Elements of UML(TM) 2.0 Style, Cambridge University Press (May 9, 2005)
4. UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design , &, Addison-Wesley Professional; 2 edition (June 27, 2005)
5. Real Time UML Workshop for Embedded Systems,Newnes; Pap/Cdr edition (September 20, 2006)
6. UML 2 Toolkit, by Wiley; Bk&CD-Rom edition (October 13, 2003)
7. Ian Summerville, 'Software Engineering Sixth Edition' 2003.

Course Code:	D	C	A	P	3	0	9	Course Title:	INFORMATION SECURITY & PRIVACY

WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	**Information Systems:** Meaning, importance, basics, changing nature and global information systems.
2.	**Threats:** New Technologies Open Door Threats, information Level Threats Vs Network Level Threats, information system security, Computer Viruses, Classifications of Threats and Assessing Damages and protecting information system security
3.	**Building Blocks of Information Security:** Basic Principles, Security related Terms, Three Pillars of Information Security. Information Classification, criteria for information and classification, data obfuscation
4.	**Information security Risk Analysis:** Introduction, Risk Management & Risk Analysis. Approaches and Considerations.
5.	**Physical Security:** Need, Meaning, Natural Disasters and control, basic tenets of physical security of information systems resources, physical entry controls.
6.	**Biometrics Controls for Security: Introduction,** Access Control, User Identification & Authentication. Meaning, Nature of Biometric identification/Authentication techniques, Biometric Techniques. Key Success factors and benefits.
7.	**Network security:** Need, Basic concepts, network security dimensions, establishing security perimeter for network protection. **Cryptography & Encryption:** Meaning, Applications of Cryptography, Digital Signature, Cryptographic Algorithms.
8.	**Databases Security:** Introduction, Need, federated databases, securing the contents of mobile databases, data integrity as a parameter for database security, database security policy.
9.	**Security Models & Frameworks:** Intro, Terminology. Methodologies for Information System Security
10.	**Privacy:** Meaning, direct marketing and impact on privacy, privacy invasion through data mining, privacy in outsourcing, privacy challenges in test environment. **Privacy Technological Impacts:** Implications of RFID. Use with Bio-Metrics. Smart Card Applications.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Information Systems Security By: Nina Godbole: Wiley Publications.
2. Information Security, 1/e: Principles and Practices By: Mark Merkow: Pearson Education.
3. Network Security: The Complete Reference By: Bragg, Roberta: TataMcgraw Hill.
4. Cryptography & Network Security By: Atul Kahate : TataMcgraw Hill.