

MAHAMAYA TECHNICAL UNIVERSITY
NOIDA



Syllabus

for

MASTER OF COMPUTER APPLICATIONS

(Semesters-I,II: Year-1)

(Effective from the Session: 2012-13)

Evaluation Scheme for Session: 2012-13

MCA –I Year (FIRST SEMESTER)

S N	Code	Subjects	Periods			Evaluation Scheme						Total	Credit
			L	T	P	Sessional				End Semester			
						CT	TA	TOT	P	Th	P		
1	CA-101	Problem Solving and Computer Programming with C	3	1	3	30	20	50	25	100	50	225	6
2	CA-102	Mathematical Foundation of Computer Science	3	1	0	30	20	50	-	100	-	150	4
3	CA-103	Principles of Management	3	1	0	30	20	50	-	100	-	150	4
4	CA-104	Computer System Design	3	1	3	30	20	50	25	100	50	225	6
5	CA-105	Energy, Environment and Ecology	3	1	0	30	20	50	-	100	-	150	4
6	CA-106	Professional Communication	0	1	2	15	10	25	-	-	25	50	2
7	CA-107	Seminar	0	0	2	-	-	-	50	-	-	50	1
Total Marks:			15	6	10							1000	27

Evaluation Scheme for Session: 2012-13

MCA –I Year (SECOND SEMESTER)

S N	Code	Subjects	Periods			Evaluation Scheme						Total	Credit
			L	T	P	Sessional				End Semester			
						CT	TA	TOT	P	Th	P		
1	CA-201	Computer Based Numerical and Statistical Techniques	3	1	2	30	20	50	25	100	25	200	5
2	CA-202	Computer networks	3	1	0	30	20	50	-	100	-	150	4
3	CA-203	Fundamentals of E-Commerce	3	1	0	30	20	50	-	100	-	150	4
4	CA-204	Data Structures and File Handling	3	1	3	30	20	50	25	100	50	225	6
5	CA-205	Object Oriented Systems and Programming with C++	3	1	3	30	20	50	25	100	50	225	6
6	CA-206	Technical Writing	2	0	0	-	-	-	-	50	-	50	2
Total Marks:			17	5	8							1000	27

Objective:

- Understand the significance of an implementation of a programming language in a *compiler*
- Increase the ability to learn new programming languages
- Increase the capacity to express programming concepts and choose among alternative ways to express things in a programming language

UNIT 1:

Introduction to Computer System: Hardware, Software-system software & application software; Introduction to Computing Environment; Introduction to Problem solving and notion of algorithm: Flow charting, Pseudo code, corresponding sample C-program, Testing the code; Number Systems and their conversion: Decimal, Binary and Hexadecimal representations, bit, byte; Character representation: ASCII, sorting order; System software re-visited: machine language, symbolic language, higher level languages, what is a compiler, what is an operating system, what is a linker, what is an editor, error handling; Introduction to program development.

UNIT 2:

Structure of a C-program, comments, identifiers; Fundamental Data Types: Character types, Integer, short, long, unsigned, single and double-precision floating point, complex, boolean, constants; Basic Input/Output: printf, formatting, scanf, eof errors; Operators and Expressions: Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associativity, Functions in C: standard function, defining a function, inter-function communication- passing arguments by value, scope rules and global variables; Top-down program development.

UNIT 3:

Conditional Program Execution: Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch; Program Loops and Iteration: Uses of while-do and for loops, multiple loop variables, assignment operators, using break and continue; Arrays: Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size

UNIT 4:

Sequential search, Sorting arrays; Strings, Recursion; Text files, file Input/Output - fopen, fread, etc Structures: Purpose and usage of structures, declaring structures, assigning of structures, Pointers to Objects: Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments

UNIT 5:

Familiarization with Linux OS environment: basic OS commands, directory creation, editing, storing and protecting access to files; Text files in Indian languages: keyboarding, editing, searching; The Standard C Preprocessor: Defining and calling macros, utilizing conditional compilation, passing values to the compiler, string handling functions.

Lecture-wise Break-UP

Week	Lecture 1	Chapter	Lecture 2	Chapter	Lecture 3	Chapter	Lab Meeting
Week-1	Introduction to Computer System: Hardware, Software-system software, & application software; Introduction to Computing Environment;	Ch-1 TB1	Introduction to Problem solving and notion of algorithm: Flow charting, Pseudo code,	App C TB1	corresponding sample C-programme, Testing the code;	Ch-1 TB1	Get familiar with OS and C compiler Implement and Test Small Routine in C
Week-2	Number Systems and their conversion: Decimal, Binary and Hexadecimal representations, bit, byte;	App D TB1	Number Systems and their conversion: Decimal, Binary and Hexadecimal representations, bit, byte;	App D TB1	Character representation: ASCII, sorting order	App A TB1	Implement and Test Small Routine in C
Week-3	System software revisited: machine language, symbolic language, higher lever languages, what is a compiler, what is an operating system, what is a linker, what is an editor, error handling	Ch-1 TB1	Introduction to programme development; Structure of a C-program, comments, identifiers	Ch-2 TB1	Fundamental Data Types: Character types, Integer, short, long, unsigned,	Ch-2 TB1	Implement and Test a moderate size Routine in C
Week-4	Data Types and Variable single and double-precision floating point, complex, boolean, constants;	Ch-2 TB1	Basic Input/Output: printf, formatting, scanf, eof errors;	Ch-2 TB1	Operators and Expressions: Using numeric and relational operators, mixed operands and type conversion,	Ch-3 TB1	Evaluation of Expression Basic I/O
Week-5	Logical operators, Bit operations, Operator precedence and associatively,.	Ch-3 TB1	Functions in C: standard function, defining a function,	Ch-3 TB1	Inter-function communication-passing arguments by value, scope rules and global variables; Top-down program development	Ch-3 TB1	Evaluation of Expression Function
Week-6	if and switch statements,	Ch-5 TB1	nesting if and else, restrictions on switch values,	Ch-5 TB1	use of break and default with switch;	Ch-5 TB1	Iteration
Week-	Repetition	Ch-6	Repetition	Ch-6	Repetition	Ch-6	Iteration,

7	structure in C: while-do	TB1	structure in C: for loops	TB1	structure in C: multiple loop variables, assignment operators, using break and continue;	TB1	Function
Week-8	Arrays: Array notation and representation, manipulating array elements,	Ch-8 TB1	using multidimensional arrays, arrays of unknown or varying size	Ch-8 TB1	Sequential search, Sorting arrays;	Ch-8 TB1	Arrays
Week-9	Sorting arrays	Ch-8 TB1	Strings,	Ch-11 TB1	recursion	Ch-8 TB1	Sorting & searching
Week-10	Recursion	Ch-6 TB1	Text files, file Input/Output - fopen, fread, etc	Ch-7 TB1	Structures: Purpose and usage of structures, declaring structures, assigning of structures,	Ch-12 TB1	Strings, Recursion
Week-11	Pointers to Objects: Pointer and address arithmetic,	Ch-9 TB1	pointer operations and declarations,	Ch-9 TB1	using pointers as function arguments	Ch-9 TB1	Pointers
Week-12	Linux OS environment: basic OS commands,	Ch-1 TB4 / Ch-2 TB3	directory creation, storing and protecting access to files	Ch-2 TB4 / Ch-5 TB3	editing,	Ch-3 TB4 / Ch-6 TB3	Use of Unix platform (making directory, copy edit and store file, running a program already developed)
Week-13	Text files in Indian languages: keyboarding,		Text files in Indian languages: editing, searching		The Standard C Preprocessor: Defining and calling macros,	App G TB1	Hindi text document processing
Week-14	utilizing conditional compilation, passing values to the compiler, string handling functions,	App G TB1	Std C Library	App E TB1	Std C Library	App F TB1	Macros, Library

Text Books :

1. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition [India Edition], 2007. [TB1]

For Linux:

2. UNIX Concepts and Applications, Das , TMH [TB2]

3.. LINUX, unleashed , Techmedia [**TB3**]

3. LINUX : LEARNING THE ESSENTIALS by K. L. JAMES, published by PHI
4. Guide to UNIX and LINUX by Harley Hahn published by TMH

A few web-links for tutorials/resources:

<http://www.cprogramming.com/tutorial.html>

http://www.pixel2life.com/publish/tutorials/760/_c_beginner_examples_tutorial/

<http://www.loirak.com/prog/ctutor.php>

<http://www.ee.surrey.ac.uk/Teaching/Unix/>

<http://fclose.com/b/linux/3423/tutorials-for-linux-beginners/>

<http://www.linux-tutorial.info/>

<http://www.roseindia.net/linux/tutorial/>

<http://www.tdil.mit.gov.in/>

PREREQUISITES

There are no prerequisites in terms of courses to attend.
Students should be familiar with notions of mathematics

OBJECTIVES:

The objective of this course are :

- To Introduce Mathematical Logic, especially First Order Logic.
- To introduce proof techniques such as Mathematical Induction and Contradiction.
- Develop an understanding of counting, functions and relations.
- To introduce and study abstract, mathematical models of computation (such as Turing machines, formal grammars, recursive functions), and to use the abstract computation models to study the ability to solve computational problems.

LEARNING OUTCOME

Techniques introduced in this course will come in handy for courses such as Analysis of Algorithms, Compiler design and NLP

UNIT-I:

8 Hrs

Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets

Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation.

Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions.

Mathematical Induction: Piano's axioms, Mathematical Induction Discrete Numeric Functions and Generating functions Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients.

(Text Book 1: Chapters 2, Pages 104 to 258)

UNIT-II:

8 Hrs

Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups

(Text Book 1: Chapters 3 Pages: 270)

Propositional Logic: Proposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers,

(Text Book 1: Chapters 1, Pages 1 to 102)

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices. (Text Book 1: Chapters 4 , Page 278 to 390)

UNIT-III

8 Hrs

Graphs: Simple graph, multi graph, representation of graphs, Bipartite, Regular, Planar and connected graphs, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal.

(Text Book 1: Chapters 5, Pages 468 to 509)

UNIT-IV

8 Hrs

Theory of computation: Introduction, Alphabets, Strings and Languages, Kleene Closure, NFA, DFA, , Conversion of NFA to DFA, Optimizing DFA FA with output: Moore machine, Mealy machine, Conversions. Regular expression (RE) , Definition, Regular expression to FA, Arden Theorem, DFA to Regular expression, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages.

(Text Book 2: Part II, All Chapters)

UNIT-V

8 Hrs

Chomsky Hierarchy of language, Context-free grammar (CFG) , Pushdown Automata (PDA), equivalence of PDA's and CFG's, Introduction Turing Machine(TM), construction of TM for simple problems. TM as Computer of Integer functions, Universal TM, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs.

(Text Book 2: Part III and Part IV)

Text Books:

- 1) John C Martin “ Introduction to Languages and The Theory of Computation”, Third edition,, TMH
- 2) Trembley, J.P & R. Manohar, “Discrete Mathematical Structure with Application to Computer Science”, TMH

Reference Books :

- 3) Hopcroft, Ullman, “Introduction to Automata Theory, Languages and Computation”, Pearson Education
- 4) Chowdhary, K. R. “ Fundamentals of discrete Mathematical Structures’, Second Edition, PHI Learning
- 5) Liptschutz, Seymour, “Discrete Mathematics”, TMH
- 6) Kenneth H. Rosen, ” Discrete Mathematics and its applications”, TMH
- 7) Peter Linz, ” An Introduction to Formal languages and Automata”, ” Jones & Bartlett Learning

Web-links for tutorials/resources: to be added

<http://dipqa.com/view/dips/170/automata-theory-questions-tutorials/>

http://oqls10.typepad.com/blog/2011/12/automata_theory_tutorials-83399.html

http://math.about.com/od/discretemath/Discrete_Math.htm

Lecture-wise Break-UP

Week	Lecture 1	Lecture 2	Lecture 3	Assignments
Week-1	Definition of sets, countable and uncountable sets, Venn Diagrams	proofs of some general identities on sets ,	Definition, types of relation, composition of relations	Pictorial representation of relation
Week-2	equivalence relation, partial ordering relation.	Definition, type of functions, one to one, into and onto function, inverse function,	composition of functions, recursively defined functions	Piano's axioms, Mathematical Induction Discrete Numeric Functions
Week-3	Generating functions Simple Recurrence relation with constant coefficients	Properties, Semi group, Monoid, Group, Abelian group,	properties of group, Subgroup, Cyclic group, Cosets,	Permutation groups, Homomorphism, Isomorphism and Automorphism of groups
Week-4	Preposition, First order logic, Basic logical operations	Tautologies, Contradictions,	Algebra of Proposition	Logical implication, Logical equivalence, Normal form
Week-5	Inference Theory, Predicates and quantifiers	Lattices, and complemented lattices.	ordered set, Hasse diagram of partially, ordered set,	isomorphic ordered set, well ordered set
Week-6	properties of Lattices, and complemented lattices.	Simple graph, multi graph, representation of graphs	Regular, Planar and connected graphs	Euler graphs, Hamiltonian path and circuits
Week-7	Graph coloring, chromatic number,	isomorphism and Homomorphism of graphs.	Definition, Rooted tree, properties of trees	binary search tree, tree traversal
Week-8	Introduction, Alphabets, Strings	Introduction to Languages	Kleene Closure,	NFA
Week-9	DFA	Conversion of NFA to DFA	Optimizing DFA	Mealy and More Machines
Week-10	Mealy to More Conversion	Moore machine to Mealy machine, Conversions	Regular expression	Regular expression to FA, Arden Theorem
Week-11	DFA to Regular expression	Non Regular Languages	Pumping Lemma for regular Languages. Application of Pumping Lemma	Closure properties of Regular Languages
Week-12	Chomsky Hierarchy of language	Context-free grammar (CFG)	Context-free grammar (CFG)	Pushdown Automata (PDA)
Week-13	Pushdown Automata (PDA)	equivalence of PDA's and CFG's	Introduction Turing	construction of TM for simple problems

			Machine(TM	
Week-14	TM as Computer of Integer functions, Universal TM	Recursive and recursively enumerable languages	Halting problem, Introduction to Undecidability	Undecidable problems about TMs

CA-103: PRINCIPLES OF MANAGEMENT

L T P
3 1 0

OBJECTIVE:

Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge on international aspect of management.

UNIT 1. HISTORICAL DEVELOPMENT

8 Hours

Definition of Management – Science or Art – Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organization.
(Text Book 1: Chapters 1 and 2, Pages 3 to 24)

UNIT 2. PLANNING

8 Hours

Nature & Purpose – Steps involved in Planning – Objectives – Setting Objectives – Process of Managing by Objectives – Strategies, Policies & Planning Premises- Forecasting – Forecasting.
(Text Book 1: Chapters 3, 4 and 5, Pages 45 to 102)

UNIT 3. ORGANISING

8 Hours

Nature and Purpose – Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and Limitations – De-Centralization and Delegation of Authority – Staffing – Selection Process - Techniques – HRD – Managerial Effectiveness.

(Text Book 1: Chapters 7,8,9 and 11, Pages 133 to 190, 217 to 244)

UNIT 4. DIRECTING

8 Hours

Scope – Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication – Process of Communication – Barriers and Breakdown – Effective Communication – Electronic media in Communication.

(Text Book 1: Chapters 14, 15, 16 and 17, Pages 299 to 384)

UNIT 5. CONTROLLING

8 Hours

System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology in Controlling – Use of computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.

(Text Book 1: Chapters 18, 19, 20, 21 and 22, Pages 393 to 506)

TEXT BOOKS

1. Harold Koontz & Heinz Weihrich “Essentials of Management”, Fifth edition, Tata McGraw-Hill, 1998

REFERENCES

- 1 Tripathy PC And Reddy PN, “Principles of Management”, Tata McGraw-Hill, 1999.
2. Decenzo David, Robbin Stephen A, “Personnel and Human Reasons Management”, Prentice Hall of India, 1996
3. JAF Stomer, Freeman R. E and Daniel R Gilbert, “Management”, Pearson Education, Sixth

Edition, 2004.

4. Fraidoon Mazda, “Engineering Management”, Addison Wesley, 2000.

5. Joseph L Massie “Essentials of Management”, Prentice Hall of India, (Pearson) Fourth Edition, 2003.

Web Links

<http://www.wiziq.com/tutorials/principles-of-management>

<http://nova.campusguides.com/content.php?pid=132346&sid=1493625>

Week wise Lecture Schedule

Week	Lecture 1	Lecture 2	Lecture 3	Assignment
Week-1	Definition of Management -Science or Art	Management and Administration	Development of Management Thought –	Development of Management Thought –
Week-2	Contribution of Taylor and Fayol	Functions of Management	Functions of Management	Types of Business Organization.
Week-3	Nature and Purpose of Planning	Steps involved in Planning	Objectives – Setting Objectives	Process of Managing by Objectives
Week-4	Strategies of Planning	Policies & Planning Premises	Forecasting	Forecasting
Week-5	Formal and informal organization	Organization Chart	Structure and Process – Departmentation by difference strategies	Line and Staff authority
Week-6	Benefits and Limitations	De-Centralization and Delegation of Authority	– Staffing – Selection Process - Techniques	HRD – Managerial Effectiveness.
Week-7	Human Factors – Creativity and Innovation	Harmonizing Objectives	Leadership – Types of Leadership Motivation	Hierarchy of needs
Week-8	Motivation theories – Motivational Techniques	Job Enrichment – Communication	Process of Communication – Barriers and Breakdown	Effective Communication – Electronic media in Communication.
Week 9	System and process of Controlling – Requirements for effective control	The Budget as Control Technique	Information Technology in Controlling	Use of computers in handling the information – Productivity
Week-10	Problems and Management	Control of Overall Performance – Direct and Preventive Control – Reporting	The Global Environment – Globalization and Liberalization	International Management and Global theory of Management.

Learning Objective:

1. Students will learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
2. Students will be able to identify where, when and how enhancements of computer performance can be accomplished.
3. Students will learn the sufficient background necessary to read more advance texts as well as journal articles on the field.
4. Student will see how to use concepts of computer organization in real-life settings using various PC performance improvements.
5. Students will also be introduced to more recent applications of computer organization in advanced digital systems.

Learning Outcome:

1. Student will learn the concepts of computer organization for several engineering applications.
2. Student will develop the ability and confidence to use the fundamentals of computer organization as a tool in the engineering of digital systems.

UNIT-1**9 Hrs****Data Representation in Computer Systems**

Introduction, Positional Numbering Systems, Converting Between Bases, Signed Integer Representation, Floating-Point Representation

(Textbook 1, Chapter 2, Page no 54 – 120)

Arithmetic:

Overview, Fixed Point Addition and Subtraction, Fixed Point Multiplication and Division, Floating Point Arithmetic, High Performance Arithmetic

(Textbook 2, Chapter 3, 61- 86)

Boolean algebra and Digital Logic:

Introduction, Boolean algebra, Boolean Expressions, Boolean Identities, Logic Gates, Digital Components, Combinational Circuits, Sequential Circuits, Karnaugh Maps

(Textbook 1, Chapter 3, Page no 121 – 192)

UNIT 2**9 Hrs****Register and Register transfer :**

Part1- Registers, Micro-operations and Implementations, Part 2 - Counters, Register Cells, Buses, & Serial Operations, Part 3 - Control of Register Transfers

(Textbook 4, Chapter 7)

Processor Organization and Performance:

Introduction, Number of Addresses, Flow of Control, Instruction Set Design Issues, Micro-programmed Control, Performance

Computer Design Basics:

Part 1 – Data-paths, Part 2 – A Simple Computer

(Textbook 4, chapter 9)

UNIT-3

Memory:

7 Hrs

Overview, The Memory Hierarchy, Random Access Memory, Memory Chip Organization, Case Study: Rambus Memory, Cache Memory, Virtual Memory, Advanced Topics, Case Study: The Intel Pentium 4 Memory System. (Textbook 2, Chapter 7, 249 - 302)

UNIT-4

6 Hrs

Buses and Peripherals

Parallel Bus Architectures, Bridge-Based Bus Architectures, Internal Communication Methodologies, Case Study: Communication on the Intel Pentium Architecture, Serial Bus Architectures, Mass Storage, RAID - Redundant Arrays of Inexpensive Disks, Input Devices, Output Devices, Case Study: Graphics Processing Unit, Case Study: How a Virus Infects a Machine. (Textbook 2, Chapter 8, 303 - 352)

UNIT- 5

9 Hrs

Languages and the Machine:

The Compilation Process, The Assembly Process, Linking and Loading, Macros, Quantitative Analyses of Program Execution, From CISC to RISC, Pipelining the Datapath, Overlapping Register Windows, Low Power Coding. (Textbook 2, Chapter 6, 197 - 248)

Performance Measurement and Analysis:

Introduction, Computer Performance Equations, Mathematical Preliminaries, Benchmarking, CPU Performance Optimization, Disk Performance. (Textbook 1, Chapter 11, Page no 585 – 620)

Text-Books:

1. The Essentials of Computer Organization and Architecture,
Linda Null and Julia Lobur, 3rd Ed, Jones & Bartlett Learning
2. **Computer Architecture and Organization: An Integrated Approach**
Miles J. Murdocca and Vincent P. Heuring, John Wiley & Sons, 2007
3. **Fundamentals of Computer Organization and Design,**
S. P. Dandamudi, Springer, New York, 2003.
4. **Logic and Computer Design Fundamentals**
Morris mano and Kimi charels 4th Edition, Prentice Hall.

Reference Books:

1. **Structured Computer Organization,**

Andrew S. Tanenbaum 5/E, Pearson

2. Digital Logic Design

Brian Holdsworth and Clive Woods, 4th Ed, Newnes

Web-links

1. <http://freevideolectures.com/Course/2315/Digital-Computer-Organization/>
2. <http://freevideolectures.com/Course/2277/Computer-Organization>
3. http://www.mywbut.com/syllabus.php?mode=VT&paper_id=54&dept_id=6
4. <http://www.jblearning.com/catalog/9781449600068/>
5. http://writphotec.com/mano4/PowerPoint_Handouts/
6. http://www.scs.carleton.ca/sivarama/org_book/

Lecture-wise Break-UP

Ut	Wk	Lecture 1	Lecture 2	Lecture 3	Tutorial
1	1	Positional Numbering Systems, Converting Between Bases	Signed Integer Representation,	Floating-Point Representation,	Data Representation in Computer Systems
	2	Fixed Point Addition and Subtraction, Fixed Point Multiplication and Division,	Floating Point Arithmetic,	High Performance Arithmetic	Arithmetic
	3	Boolean algebra, Boolean Expressions, Boolean Identities, Logic Gates, Digital Components,	Combinational Circuits, Sequential Circuits,	Karnaugh Maps	Boolean algebra and Digital Logic

Ut	Wk	Lecture 1	Lecture 2	Lecture 3	Tutorial
2	4	Part 1 - Registers, Microoperations and Implementations, <ul style="list-style-type: none"> • Registers and load enable • Register transfer operations • Microoperations - arithmetic, logic, and shift • Microoperations on a single register Multiplexer-based transfers Shift registers	Part 2 - Counters, Register Cells, Buses, & Serial Operations	Part 3 – Control of Register Transfers	Register and Register transfer
	5	Number of Addresses 3-Address Machines 2-Address Machines 1-Address Machines 0-Address Machines The Load/Store Architecture Processor Registers	Flow of Control Branching Procedure Calls Instruction Set Design - Issues Operand Types Addressing Modes Instruction Types Instruction Formats	Microprogrammed Control H/w Implementation S/w Implementation Performance Performance Metrics Execution Time - Calculation Means of - Performance The SPEC	Processor Organization and Performance

				Benchmarks	
	6	Part 1 – Datapaths <ul style="list-style-type: none"> • Introduction • Datapath Example • Arithmetic Logic Unit (ALU) • Shifter • Datapath Representation and Control Word 	Part 2 – A Simple Computer <ul style="list-style-type: none"> • Instruction Set Architecture (ISA) • Single-Cycle 	Hardwired Control PC Function Instruction Decoder Example Instruction Execution	Computer Design Basics

Ut	Wk	Lecture 1	Lecture 2	Lecture 3	Tutorial
3	7	The Memory Hierarchy,	Random Access Memory	Memory Chip Organization	Memory
	8	Case Study: Rambus Memory,	Cache Memory,	Virtual Memory, Advanced Topics	
	9	Case Study: The Intel Pentium 4 Memory System			

Ut	Wk	Lecture 1	Lecture 2	Lecture 3	Tutorial
4	9		Parallel Bus Architectures Bridge-Based Bus Architectures,,	Internal Communication Methodologies,	Buses and Peripherals
	10	Case Study: Communication on the Intel Pentium Architecture,	Serial Bus Architectures, Mass Storage, RAID - Redundant Arrays of Inexpensive Disks,	Input Devices, Output Devices, Case Study: Graphics Processing Unit,	
	11	Case Study: How a Virus Infects a Machine			

Ut	Wk	Lecture 1	Lecture 2	Lecture 3	Tutorial
5	11		The Compilation Process,	The Assembly Process,	Languages and the Machine
	12	Quantitative Analyses of Program Execution,	Linking and Loading, Macros	From CISC to RISC, Pipelining the Datapath	
	13	Overlapping Register Windows, Low Power Coding			
	13		Computer Performance Equations,	Mathematical Preliminaries,	Performance Measurement and Analysis
	14	Benchmarking,	CPU Performance Optimization,	Disk Performance	

CA-104P: COMPUTER SYSTEM DESIGN LAB

Lecture/ Session -wise Lab Plan

Week	Lab Session (Duration: 3 Hours)
Week1	TTL Characteristics and TTL IC Gates
Week2	Multiplexers & Decoders
Week3	Flip-Flops: SR-ff, JK-ff, T-ff, D-ff
Week4	Counters
Week5	Shift Registers
Week6	Binary Adders & Subtractors
Week7	A L U
Week8 (8086 Assembly Language Programming(ALP))	<p>Write an ALP to evaluate the expressions:</p> <p>(i) $a = b + c - d * e$</p> <p>(ii) $z = x * y + w - v + u / k$</p> <p>a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e. b. Considering 2 digit, 4digit and 8 digit BCD numbers. Take the input in consecutive memory locations and results also. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.</p>
Week9	Write an ALP of 8086 to add two exponential numbers which are in IEEE 754 notation. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
Week10	<p>Write an ALP of 8086 to take N numbers as input. And do the following operations on them.</p> <p>a) Arrange in ascending and descending order. b) Find max and minimum c) Find average</p> <p>Consider 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.</p>
Week11	<p>Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it.</p> <p>a) Find the length b) Find it is Palindrome or not c) Find whether given string substring or not. d) Reverse a string e) Concatenate by taking another sting</p> <p>Display the results by using "int xx" of 8086.</p>
Week 12	<p>Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result</p> <p>Write a procedure to locate a character in a given string. When the first occurrence of the character is located, its position is returned to main. If no match is found, a negative value is returned. The main procedure requests a character string and a character to be located and displays the result.</p>
Week13	<p>Write an assembly language program to encrypt digits as shown below:</p> <p>Input digit: 0 1 2 3 4 5 6 7 8 9</p> <p>Encrypted digit: 4 6 9 5 0 3 1 8 7 2</p>

	Your program should accept a string consisting of digits. The encrypted string should be displayed using “int xx” of 8086.
Week14	<p>Write an assembly language program to read a string of characters from the user and that prints the vowel count . Display the results by using “int xx” of 8086.</p> <p>For example: Input: Advanced Programming in UNIX</p> <p style="padding-left: 100px;">Out put:</p> <p style="padding-left: 100px;">Vowel count</p> <p style="padding-left: 100px;">a or A 3</p> <p style="padding-left: 100px;">e or E 1</p> <p style="padding-left: 100px;">i or I 3</p> <p style="padding-left: 100px;">o or O 1</p> <p style="padding-left: 100px;">u or U 1</p>

REFERENCE BOOKS:

1. IBM PC Assembly Language and Programming, P. Abel, 5th Edition, PHI/Pearson Education.
2. Introduction To Assembly Language Programming, Sivarama P.Dandamudi, Springer Int. Edition,2003.
3. The 8088 and 8086 Microprocessors: Programming , Interfacing,Software,Hardware and Application,4th edition,W.A.Triebel,A.Singh,N.K.Srinath,Pearson Education

Web Resources :

1. <http://etienne.ece.jhu.edu/etienne/teaching/ECE491/current/Lectures/chap5.pdf>
2. http://www.eng.auburn.edu/~nelson/courses/elec3040_3050/ELEC3050%20HCS12%20Lab1.pdf

CA-105: ENERGY, ENVIRONMENT AND ECOLOGY

1. Work load per week

a. **Lecture (L):** 3 hrs/week **Total Lecture Hours per Semester:** 42

b. **Tutorials (T):** 1 **Total Tutorial Hours per Semester:** 14

c. **Practicals (P):** 0 **Total Lab Hours per Semester:** 0

d. **Total Credits:** L+T+P 04

e. One credit is defined as one lecture load per week and two hours of self-study to be connected with tutorial, practical work book and assignments.

2. Prerequisites of the course

- (a) Relation between human and nature
- (b) Effect of human activities on environment
- (c) Calculate the intensity of pollutants
- (d) Interaction between nature and human being
- (e) Chemistry of soil, air and water
- (f) Government legislation to control environmental pollution problem

3. Prerequisites of which next course: This course is prerequisite for :

- Environment Engineering-I & II.
- Environmental Management for Industries.
- Environmental Geo-technology.
- Industrial pollution control & Environmental Audit

4. Objectives of the course

- (a) Develop ability to understand interrelationship between human beings and nature.
- (b) Recognizing basic component of environment i.e. air, water and soil and ecology i.e. energy, producers and decomposers.
- (c) Identify problem of pollution along its solution
- (d) Evaluate quantity and quality of natured resources and how natural resource can be available for a long time.
- (e) Teach students how their activities support environment instead of degradation of environment by anthropogenic activities.
- (f) Introduce students to upcoming environmental pollution control techniques.

5. Learning outcomes from this course

- (a) To be able to plan and prepare suitable methods for the conservation of environmental segments.
- (b) To be able to plan importance of sustainable developments i.e. appropriate use of natural resources.
- (c) To be able to plan and prepare new techniques of development by reducing low rate consumption of natural resources through Environment Impact Assessment (EIA) process.

- (d) To be able to understand role of individual NGO and Government for environment protection activities.

6. Details of the syllabi:

Unit	Topic	Text Book1 Page. No.	Lectures
I	Introduction: <ul style="list-style-type: none"> • Definition of environment. • Need of public awareness. • Segments of environment. • Importance of Environment. • Ecosystem- definition, classification and components. • Function of ecosystem. • Nitrogen and sulphur cycle. 	(Text book-1 Chapter-1) (Text book-2, 1.3) (Text book-1, Chapter-2) (Text book-2, 1.4.4,1.4.5)	6
II	Sustainable Development: <ul style="list-style-type: none"> • Definition, principle, parameter and its challenges. • Biodiversity: classification, measurement and conservation. • Natural resources: availability & problems. • Minerals & Energy Resources • Seed suicide and sustainable agriculture. 	Text book-1,chapter-5 (T.Book-2, Chapter-9) (T.Book-1,Chapter-7) (Text book-1, Chapter-8)	6
III	Energy: <ul style="list-style-type: none"> • Classification of energy resources. • Fossil fuels, nuclear and hydroelectric energy. • Solar, wind, biomass, biogas and hydrogen fuel energy. 	Text book-1,chapter-8	4
IV	Pollution: <ul style="list-style-type: none"> • Environment pollution. • Water pollution, • Solid waste management & hazards waste management. • Current environmental issues • Problem with urbanization and automobile pollution and their control. • Adverse effects of Pollution: Climate change; Green house effect, Global warming, Acid rain and ozone layer depletion. 	T.Book-1,Chapter-11 (T.Book-1,Chapter-12),T.Book-2,Ch.-7 T.book-1,Ch.-13 T.book-1,Ch.-18 T.BOOK-2,ch.-2	8

V	Environmental protection & Control Measures: <ul style="list-style-type: none"> • Government initiatives i.e. air, water and environmental protection act. • Role of NGOs. • Environment Impact Assessment (EIA): definition, methodology and process. • Environmental education: its principle and objectives. • Case Studies – Bhopal Gas Tragedy, London Smog. • Water Borne and water induce disease, arsenic problem in drinking water 	T.book-1,Ch.-20	6
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Text Books

1. Environment Studies - R Rajagopalan, Oxford Publications.
2. Environmental Chemistry – A K De, New Age Publications.

Reference Books

1. Environment and Ecology – Smriti Srivastava, S K Kataria & Sons.
2. Environmental Science – G T Miller, Publisher – Thomson Asia, Singapore.
3. Environmental Change and Globalization: Double Exposures – Robin Leichenko and Karen O'Brien, Oxford University Press.
4. Essential Environmental Studies – S P Mishra & S N Pandey, Ane Book Publications.
5. Principles of Environmental Science and Engineering by P Venugoplan Rao, Prentice Hall of India.
6. Environmental Science and Engineering by Meenakshi, Prentice Hall of India.
7. Introduction to Environmental Science – Y Anjaneyulu, B S Publication.
8. Environmental Science – D B Botkin, E A Keller, Wiley, India.
9. Fundamentals of Ecology – E P Odum, Publisher – Thomson Asia, Singapore.
10. Basics of Environment & Ecology – Anubhava Kushik, New Age International Publications.
11. Environmental Studies – Benny Joseph – Tata Mcgraw Hill.
12. Text book of Environment Science & Technology - M Anji Reddy, B S Publication.
13. Environmental Studies – S N Chary, Macmillan Publishers, India, Ltd.
14. Environmental Studies – B S Chauhan, University Science Press.

Internet Link:- (i) www.epa.gov
(ii) www.unfcce.int
(iii) www.unep.org
(iv) www.cpcb.nic.in
(v) www.environmental.ksc.nasa.gov

CA-106: PROFESSIONAL COMMUNICATION

1. Title of the course:	PROFESSIONAL COMMUNICATION
2. Work load per week	
a. Tutorial(T): 1 hrs/week	Total Tutorial Hours per Semester: 14
b. Practicals (P): 2 hrs/week	Total Lab Hours per Semester: 28
c. Total Credits: T+P	2

Objectives of the course: To impart basic Communication skills to the first year UG students in the English language through rigorous practice and use of various category of common words and how their application in sentences; to enable them to achieve effective language proficiency for their social, professional & inter personal communication both in speaking & writing.

Desired Outcome of the Course: The student must be able to:

- i) Understand and use about 1200 to 1500 General Purpose words of English language,
- ii) Express his /her ideas and thoughts in speech or writing,
- iii) Be able to comprehend, converse, interact and participate in any day-to-day events and situation
- iv) Write grammatically correct sentences for various forms of written communication to express oneself.

Key Concepts:

Context of Communication, as means of sharing, Speaker- Listener and Writer – Reader relationship, medium of communication, barriers to communication, accuracy, brevity, clarity and appropriateness in communication.

Writing Skills: Words for general purpose use. Sentence formation and using given set of words. Transforming word usage for different tenses, using words for narrative in first, second & third person. Semantics of connectives, modifiers and models, sentence variety and paragraphs, Cohesion and coupling, structure of basic letters, reports & document preparation – introduction to conclusion. Referencing & listing of references.

Speaking Skills: Speech and verbal communication, articulation, paralinguistic's, Pause and its use, formal and informal speaking, debate, extempore and discussion. Task oriented, personal and inter-personal communication.

Reading Comprehension: Kinds and types of texts, abstracting, précis writing and summarizing.

Listening Comprehension: Fluency & speed, impact of pronunciation on comprehension, Intelligent listening,

Teaching methodology:

- 1.The Professional Communication course needs to equip the student for oral & written communication in English language and meeting the requirements of situational communication ability.
2. The teacher must teach the course through examples, practice sessions and even the lectures must be conducted in the tutorial mode.

3. The teacher must function as a mentor, guide and facilitator for the student to understand the words that have been identified for practice and their use in different situations be given as the assignment for the student to write and speak with one another.
4. The course has to be taught in small batches of 20 to 25 and in the language lab so that continuous and intense practice is recorded, and the track of the student's progress is maintained on per lecture basis.
5. The Books suggested are as base texts and may be expanded upon for giving larger scope of practice to the students. It is important to promote self learning by asking the students to use the internet for finding language training material and content, which can then be used a classroom tasks.

Text Books & references:

1. Dorothy Adams, Michele Crawford, et et "Everyday English- A course on Communicative English" Level 1 & 2, Cengage India 2009. (with practice CD)
2. Bhaskar W. W. S. and Prabhu, N. S. "English Through Reading". Vol I & II MacMillan, 1978.
3. D'Souza Eunice and Shaham, G. "Communication Skills in English". Noble Publishing House 1977.
4. Fiske , John " Introduction to Communication Studies" Rotledge, London, 1990.

Performance Evaluation & Examination:

The student will have to perform on per lecture basis and the peer to peer learning and evaluation method is to be used. However, since the students will be given class tests and assignments hence these will have to be corrected and marked by the teachers and the marks made public with formative feedback to the student explaining where the mistake is and what the correct ways to answer the questions are.

Assignments are to be given to reinforce the concepts and extend the practice of words and their usage by the student in different situations, tenses and accounts in first, second or third person.

The Course examination will be practical based and the student will have to be proficient to demonstrate the language capability as will be tested on the basis of question paper sent from the university.

SEMESTER-II

CA-201: COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES

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3 1 2

Objectives: With the current deployment of computer technology and tools, it is very important to develop efficient algorithms for solving problems in science, engineering, technology, insurance and banking. Thus, the objective of this course is to enable students to obtain an intuitive and working understanding of numerical methods for the basic problems of numerical analysis and gain experience in the implementation of numerical methods using a computer. They would also gain an appreciation of the concept of error in these methods and the need to analyze and predict it.

Knowledge of C/C++ and basic Mathematics

Unit-I

8 Hours

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation. Errors in numerical computation.

Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration Method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

Unit-II

8 Hours

Finite differences and Interpolation: Finite Differences, Difference tables. Polynomial Interpolation: Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Sterling's, Bessel's, Everett's formula. Lagrange's Interpolation, Newton Divided difference formula, Hermit's Interpolation for unequal intervals.

Unit-III

8 Hours

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's rules, Boole's Rule, Weddle's Rule Euler- Maclaurin Formula.

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, Ill Conditioned system of equations, Refinement of solution. Gauss Jacobi and Gauss Seidel iterative methods, Rate of Convergence.

Solution of differential equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods, Predictor-corrector methods.

Unit-IV

8 Hours

Curve fitting, Approximations and Regression Analysis: Method of least squares, fitting of straight lines, polynomials, exponential curves etc. Approximation of functions by Chebyshev polynomials. Linear, Non-linear and Multiple regressions.

Time series and forecasting: Moving averages, smoothing of curves, forecasting models and methods.

Unit-V

8 Hours

Statistical methods: Sample distributions, Test of Significance: Chi-Square Test, t and F test.

Analysis of Variance: Definition, Assumptions, One-way classification, ANOVA Table, Two-way classification.

Text Books:

1. Rajaraman V., "Computer Oriented Numerical Methods", PHI
2. Gerald & Wheatley, "Applied Numerical Analyses", AW

References:

1. Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons.
3. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical Statistics, Sultan Chand and Sons.

CA-201P: COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES LAB

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Write programs in C++

- To find out the roots of algebraic and transcendental equations using (1) Bisection (2) Newton Raphson (3) Iterative (4) Regula Falsie and (5) Secant methods. (Week 1 to Week 5)
- To implement Gauss elimination method for a system of linear equations. (Week 6)
- To implement Newton's forward and backward interpolation formula. (Week 7 and Week 8)
- To implement Lagrange's interpolation formula. (Week 9)
- To implement method of least square curve fitting. (Week 10)
- To implement linear regression. (Week 11)
- Implement numerical integration using Simpson's 1/3 and 3/8 rules, Trapezoidal rule, Boole's and Weddle's Rule. (Week 12 to Week 14)

Learning Objective:

- Develop practical networking knowledge and skills in a professional environment.
- Understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.

UNIT 1: Introduction**8 Hrs**

Goals and Applications of Networks, Network structure and architecture, the historical *background of computer networks*, type of networks and their classification on the basis of transmission technology (Broadcast, Point-to-point and Internet) and Scale (LAN, MAN, WAN), concepts of layering, an introduction of OSI layered architecture (Open System Interconnection Reference Model), concept of service access points and information exchange between two peer layers, transmission media

TB1-Ch2-3, TB2- Chapter 1

UNIT 2: Data Communication Fundamentals (Physical Layer)**8 Hrs**

Basic elements of communication such as data, signal and channel characteristics, Signal Representation (Time & frequency), Channel characteristics (Bandwidth, Bit interval, Bit rate etc), various sources of impairments (attenuation, distortion and noise), concept of channel capacity, transmission of digital signals-Encoding of digital data (uni polar, polar, and bipolar and block coding techniques), encoding of analog data (PCM, delta Modulation), Transmission of analog signal- Analog/digital data to analog signal conversion(amplitude, pulse and frequency modulation),multiplexing techniques.

TB3- Ch3-5, TB1- 4-5, TB3-Ch8

UNIT 3: Data Link control, Switched /Broadcast Communication Networks 8 Hrs

Framing and synchronization, Error control technique(detection and error correction), flow control, Medium Access Control Techniques, IEEE LAN standards, HDLC, switching techniques- circuit switching(PSTN as special case), switching techniques- circuit switching(PSTN as special case)message switching, packet switching (X.25 and Frame Relay) and virtual circuit switching- ATM

TB1 – Ch 9,10, TB3-Ch 6,7

Unit 4: Network Layer, Transport Layer and Internetworking

8 Hrs

Internetworking devices such as repeater/hub, bridge, router and gateway, TCP/IP protocol suite, IP addressing and subnetting, various protocols at the IP layer- ARP, RARP, ICMP, IGMP, Routing and congestion control, Transport Layer –Design Issues , Connection management, Unreliable Connectionless Transfer: UDP, reliable Connectionless Transfer: TCP

TB1-Ch 21-22,24, TB2-Ch6

Unit 5 : Network Security and Application layer

8 Hrs

Application layer protocols such as HTTP, Electronic mail, File transfer, DNS, WWW and Remote login, cryptography –introduction and basic principles, Substitution cipher, transposition cipher , symmetric- Key Algorithms – DES, AES, Public key Algorithms- RSA, digital Signature, Communication security- IPsec, Firewall, VPN

TB2-Ch7 , 8

**Lecture-wise
Break-up**

Week	Lecture 1	Chapter	Lecture 2	Chapte	Lecture 3	Chapte	Tutorial
Week-1	Goals and Applications of Networks	TB1- Ch2-3, TB2- Chapter 1	Network structure and architecture	TB1- Ch2-3, TB2- Chapter 1	The historical <i>background of computer networks</i>	TB1- Ch2-3, TB2- Chapter	
Week-2	Type of networks and their classification on the basis of transmission technology (Broadcast,	TB1- Ch2-3, TB2- Chapter 1	Scale (LAN, MAN, WAN)	TB1- Ch2-3, TB2- Chapter 1	Concepts of layering, an introduction of OSI layered architecture (Open System Interconnection Reference Model)	TB1- Ch2-3, TB2- Chapter 1	
Week-3	Concept of service access points and information exchange between two peer	TB1- Ch2-3, TB2- Chapter 1	Transmission media	TB1- Ch2-3, TB2- Chapter 1	Basic elements of communication such as data, signal and channel characteristics	TB3- Ch3-5, TB1- 4-5, TB3- Ch8	

Week-4	Signal Representation (Time & frequency)	TB3-Ch3-5, TB1- 4-5, TB3-Ch8	Channel characteristics (Bandwidth, Bit interval, Bit rate etc)	TB3-Ch3-5, TB1- 4-5, TB3-Ch8	Various sources of impairments (attenuation, distortion and noise)	TB3-Ch3-5, TB1- 4-5, TB3-Ch8	
Week-5	Concept of channel capacity,	TB3-Ch3-5, TB1- 4-5, TB3-Ch8	Transmission of digital signals- Encoding of digital data (uni polar, polar, and	TB3-Ch3-5, TB1- 4-5, TB3-Ch8	Transmission of analog signal- Analog/ digital data to analog signal conversion(am	TB3-Ch3-5, TB1- 4-5, TB3-Ch8	
Week-6	Multiplexing techniques	TB3-Ch3-5, TB1- 4-5, TB3-Ch8	Framing and synchronization	TB1 – Ch 9,10, TB3-Ch 6,7	Error Control techniques (detection and error correction)	TB1 – Ch 9,10, TB3-Ch 6,7	
Week-7	Flow control	TB1 – Ch 9,10, TB3-Ch 6,7	Medium Access Control Techniques	TB1 – Ch 9,10, TB3-Ch 6,7	IEEE LAN standards	TB1 – Ch 9,10, TB3-Ch 6,7	
Week-8	HDLC	TB1 – Ch 9,10, TB3-Ch 6,7	Switching techniques- circuit switching(PSTN as special case)	TB1 – Ch 9,10, TB3-Ch 6,7	Message switching, packet switching (X.25 and Frame Relay)	TB1 – Ch 9,10, TB3-Ch 6,7	
Week-9	Virtual circuit switching- ATM	TB1 – Ch 9,10, TB3-Ch 6,7	Internetworking devices such as repeater/hub, bridge,		Internetworking devices such as router and gateway		

Week-10	TCP/IP protocol suite	TB 1-Ch 21-22,24, TB2-Ch6	IP addressing and subnetting	T B1-Ch 21-22,24, TB2-Ch6	Various protocols at the IP layer- ARP, RARP, ICMP, IGMP	T B1-Ch 21-22,24, TB2-Ch6	
Week-11	Routing and congestion control	TB1-Ch 21-22,24, TB2-Ch6	Transport Layer – Design Issues	TB1-Ch 21-22,24, TB2-Ch6	Connection management	T B1-Ch 21-22,24, TB2-Ch6	
Week-12	Unreliable Connectionless Transfer: UDP	TB1-Ch 21-22,24, TB2-Ch6	Reliable Connectionless Transfer: TCP	TB1-Ch 21-22,24, TB2-Ch6	Application layer protocols such as HTTP, Electronic mail	TB2-Ch7, 8	
Week-13	File transfer, DNS WWW and Remote login	TB2-Ch7, 8	Cryptography –introduction and basic principles	TB2-Ch7, 8	Substitution cipher, transposition cipher	TB2-Ch7, 8	
Week-14	Symmetric-Key Algorithms – DES, AES	TB2-Ch7, 8	Public key Algorithms- RSA, digital Signature	TB2-Ch7, 8	Communication security- IPsec, Firewall, VPN	TB2-Ch7, 8	

Text Books :

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education
3. W. Stallings, Data and Computer Communication, Macmillan Press

Reference Books:

1. [ISRD Group](#), , “data communication and computer networks”, TMH
2. S. Kashav, “ An Engineering Approach To Computer Networking”, Pearson Education

Web-links for tutorials/resources: to be added

http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/New_index1.html

http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/osi_prot.htm

<http://www.wildpackets.com/compendium/IP/L1-IP.html>

PREREQUISITES

There are no prerequisites in terms of courses to attend.

Students should be familiar with notions of traditional business and usages of Internet

OBJECTIVES:

- The objective of this course are:
- This course aims to give students an in-depth understanding of ecommerce.
- It is hoped that the knowledge would enhance the expertise of students in e-commerce and the various concepts associated with it.
- Students will be equipped with definitions of common terms, characteristics and applications of e-commerce systems.
- Students will also learn about scope of traditional business over Web using ecommerce.
- Students will aware about the security concerns in implementing E-commerce.

LEARNING OUTCOME

Theories, Techniques, Case Studies introduced in this course will come in handy for courses Online Business Methodology, Information security, Web Technologies.

Unit 1

Introduction: Electronic Commerce - Technology and Prospects, Definition of E-Commerce, Category of E-Commerce applications(Electronic Market, Electronic Data Interchange, (EDI), Internet Commerce), Electronic Commerce and Trade Cycle, Economic potential of electronic commerce, Incentives for engaging in electronic commerce, forces behind E-Commerce, Advantages and Disadvantages of EC, Limitations of Electronic Commerce, E-Business, Architectural framework of EC, Impact of E-commerce on business, E-Commerce Business model.

[TB1, TB2, TB5]

Unit II

Network Infrastructure for E- Commerce: Internet and Intranet based E-commerce-Issues, problems and prospects, Components of I-way, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

Internet and World Wide Web: An overview of basic network architecture of Internet, layered architecture (Link, Network, Transport, Application layer), Next generation Internet features (IPV6).

Web: Brief history of Web, Web system Architecture, URL, Overview of HTTP.

Mobile Commerce: Introduction of M-Commerce, Mobile Computing Devices, Mobile Computing Software, Wireless Application Protocol, WAP technology.

[TB1, TB3, TB5]

Unit III

Web Security: Security Issues on web, Categories of Internet Data and Transaction (public, copyright, confidential, secret data), WWW based security schemes (Secure HTTP, SSL), Firewall, Importance of Firewall, Different Types of Firewall (Packet filtering, Application / proxy gateway, Circuit level gateway), Limitations of Firewall, Security concerns in E-

Commerce (Client-Server, Data and Transaction security), Difference security threats, attacks and security schemes.

[TB1, TB4, TB3]

Unit IV

Cryptography: Introduction to Cryptography and its need in EC, Simplified model of conventional Encryption, Encryption techniques: Symmetric Encryption- Data Encryption Standard, Triple DES, Asymmetric Encryption- Secret key encryption, public and private pair key encryption, Digital Signatures, Certificate Authority, Digital Certificate, Message Digest.

[TB1, TB4, TB5]

Unit V

Electronic Payments: Overview, The SET protocol, SET network architecture, categories of EPS, Digital token based EPS, e-cash, e-check, Smart Card, Credit / Debit Card based EPS, Online banking and impact of EC over CRM, SCM, Virtual Private Network.

[TB3, TB4]

Text Books:

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addis
2. David Whiteley, "e-commerce, Strategy, Technology and Application", TMH
3. Henry Chan, Raymond Lee, "E-commerce fundamentals and application", Wiley student edition
4. Bharat Bhaskar, "Electronic commerce framework, Technologies and Application", TMH
5. Efraim Turban, JaeLee, "Electronic Commerce A Managerial Perspective", Pearson

Web-links for tutorials/resources: to be added

<http://www.ias.ac.in/resonance/Oct2000/pdf/Oct2000p13-23.pdf>

<http://www.sts.tu-harburg.de/~r.f.moeller/lectures/ec-ws-05-06/ECommerce01.pdf>

<http://www2.sta.uwi.edu/~anikov/comp6350/questions.pdf>

http://www.sagepub.com/upm-data/9598_019964Ch1.pdf

<http://www.gurukpo.com/admin/bookpdf/195.pdf>

<http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc->

[BANG/System%20Analysis%20and%20Design/pdf/ Lecture_Notes/LNm13.pdf](http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/System%20Analysis%20and%20Design/pdf/Lecture_Notes/LNm13.pdf)

<http://cs.wellesley.edu/~ecom/notes.html>

<http://www.cybermanagement.com/>

<http://swat.cse.lehigh.edu/pubs/yang09a.pdf>

<http://www.robabdul.com/case-study.asp>

Lecture wise Break –UP

Week	Lecture 1	Lecture 2	Lecture3	Tutorial
Week 1	Electronic Commerce - Technology and Prospects, Definition of E-Commerce,	Category of E-Commerce applications(Electronic Market,	Electronic Data Interchange, (EDI), Internet Commerce), Electronic Commerce and Trade Cycle.	Case Study: 1. Traditional Trade Cycle 2. Embedded System: Mother Dairy Milk Scheme Automated Teller Machine
Week 2	Economic potential of electronic commerce, Incentives for engaging in electronic commerce,	forces behind E-Commerce, Advantages and Disadvantages of EC, Limitations of Electronic Commerce	E-Business, Architectural framework of EC, Impact of E-commerce on business, E-Commerce Business model,	Case Study: 1. Current Indian Economy 2. Business model based on Amazon.com / ebay.com
Week 3	Network Infrastructure for E-Commerce: Internet and Intranet based E-commerce- Issues, problems and prospects,	Components of I-way, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).	Internet and World Wide Web: An overview of basic network architecture of Internet,	Case Study: 1. Wi-Fi connectivity 2. Optical Fiber 3. Set-Top Box
Week 4	Layered architecture (Link, Network, Transport, Application layer), Next generation Internet features (IPV6).	Web: Brief history of Web, Web system Architecture, URL, Overview of HTTP.	Mobile Commerce: Introduction of M-Commerce, Mobile Computing Devices, Mobile Computing Software,	Case Study: 1. Understanding WWW consortium 2. Mobile communication architecture.
Week 5	Wireless Application Protocol, WAP technology.	Web Security: Security Issues on web, Categories of Internet Data and Transaction (public, copyright, confidential, secret data),	WWW based security schemes (Secure HTTP, SSL), Firewall, Importance of Firewall,	Case Study: 1. Understanding CISCO Firewall 2. Understanding Proxy Servers
Week 6	Different Types of	Security	Difference	Case Study:

	Firewall (Packet filtering, Application / proxy gateway, Circuit level gateway), Limitations of Firewall,	concerns in E-Commerce (Client-Server, Data and Transaction security),	security threats, attacks and security schemes.	<ol style="list-style-type: none"> 1. Security through firewall 2. Security over hardware 3. Security over databases
Week 7	Cryptography: Introduction to Cryptography and its need in EC,	Simplified model of conventional Encryption, Introduction of Encryption techniques	Encryption techniques: Symmetric Encryption- Data Encryption Standard,	Case Study: <ol style="list-style-type: none"> 1. Data encryption algorithm 2. Data Security in Banking System
Week 8	Triple DES, Asymmetric Encryption- Secret key encryption,	public and private pair key encryption, Digital Signatures,	Certificate Authority, Digital Certificate, Message Digest.	Case Study: <ol style="list-style-type: none"> 1. Secured data transaction through Web 2. Different Certificate Authorities- Paypal / GoDaddy
Week 9	Electronic Payments: Overview,	The SET protocol, SET network architecture,	categories of EPS, Digital token based EPS	Case Study: <ol style="list-style-type: none"> 1. Online Transactions in banking: any banking system
Week 10	e-cash, e-check, Smart Card, Credit / Debit Card based EPS	Online banking and impact of EC over CRM	SCM, Virtual Private Network.	Case Study: <ol style="list-style-type: none"> 1. Functioning of Credit / Debit Card 2. Customer service in E – Commerce 3. Understanding Logistics like Blue-Dart / DTDC

PREREQUISITES

Students should be familiar with procedural language like C and concepts of mathematics

OBJECTIVES

The objectives of this course are:

- To develop expertise in the specification, representation, and implementation of Data types and Data Structures.
- To be familiar with basic techniques of algorithm analysis.
- To be familiar with writing recursive methods.
- To get a good understanding of applications of Data Structures.
- To develop a base for advanced computer science study.

LEARNING OUTCOME

Concepts introduced in this course will help students to:

- be familiar with the complexity of algorithms and understanding their performance issues.
- be aware of the importance of correctness for algorithms.
- be familiar with trees and their applications.
- be familiar with graphs and their applications.
- be familiar with hash tables, lists and other commonly used data structures and thus will be able to choose an appropriate data structure for a given application.
- be able to write better, more correct programs through understanding rather than trial-and-error.
- be able to apply their knowledge of data structures to write more efficient programs in C.

Unit -I**8 Hrs**

Introduction and overview: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off.

(Text Book1:chpt1)

Arrays: Ordered List, Linear and Multidimensional Arrays, Representations of Array, Operations on Array: Traversal, Insertion, Deletion, Sorting, Searching: Linear Search, Binary Search, Sparse Matrix .

(Text Book1:chpt4, Text Book 3:chpt2)

Stacks: Definition and operations, Representations of stack, Operations on Stack: Push and Pop, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Implementation of Multiple stacks.

(Text Book1:chpt6, Text Book 2:chpt3, Text Book 3:chpt3)

Recursion: Recursive definition, Divide and Conquer, The Tower of Hanoi, Principles of Recursion: Guidelines for using Recursion, How Recursion works, Tail Recursion, When not to use Recursion.

(Text Book 2:chpt8)

Unit - II**8 Hrs**

Queues: Representations of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Implementation of Multiple queues, Circular queue, Dequeue and Priority Queue.

(Text Book 1:chpt6, Text Book 2:chpt3,4, Text Book 3:chpt3)

Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

(Text Book 1:chpt5, Text Book 2:chpt4, Text Book 3:chpt4)

Unit - III

8 Hrs

Trees: Basic terminology, Binary Trees, Binary tree representation, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm.

(Text Book 1:chpt7, Text Book 2:chpt9, Text Book 3:chpt5)

Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

(Text Book 1:chpt7, Text Book 2:chpt9)

Unit - IV

8 Hrs

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

(Text Book 1:chpt9, Text Book 2:chpt5, 6, Text Book 3:chpt9)

Sorting: Insertion Sort, Selection Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting.

(Text Book 3:chpt7)

Unit - V

8 Hrs

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

(Text Book 1:chpt8, Text Book 3:chpt8)

File: File, Queries and Sequential organizations, Index Technique: Primary, secondary and hash indexing, B Tree index files, B+ Tree index files, File organization: sequential, random and linked organization.

(Text Book 3:chpt10)

References

Text Books

1. S. Lipschutz, "Data Structures", Mc-Graw Hill International Editions.
2. Robert L Kruse, Bruce P. Leung, Clovis L. Tondo, "Data Structure and Program Design in C", PHI.
3. Ellis Horowitz, S. Sahni, D. Mehta, "Fundamentals of Data Structures in C++", Galgotia Book Source, New Delhi.

Reference Books

1. Y. Langsam, M. Augenstein and A. Tannenbaum, "Data Structures using C and C++", Pearson Education Asia.
2. Jean-Paul Tremblay, Paul. G. Soresan, "An introduction to data structures with Applications", Tata Mc-Graw Hill International Editions.
3. Elmasri, Navathe, "Fundamental of Database systems", Pearson Education.

A few web-links for tutorials/resources:

[WWW.funducode.com](http://www.funducode.com)

<http://www.nptel.iitm.ac.in/video.php?subjectId=106102064>

<http://www.cs.auckland.ac.nz/~jmor159/PLDS210/ppt/index.html>

Lecture wise break-UP

Week	Lecture 1	Chapter	Lecture 2	Chapter	Lecture 3	Chapter	Lab Meeting (CA204P)
Week -1	Introduction and overview: Basic Terminology, Elementary Data Organization, Data Structure operations	Ch-1, TB1	Algorithm Complexity and Time-Space trade-off.	Ch-1, TB1	Arrays: Ordered List, Linear and Multidimensional Arrays, Representations of Array	Ch-4, TB1/Appendix 3	Get familiar with various terminologies Used in data structures and data organization
Week -2	Operations on Array: Traversal, Insertion, Deletion	Ch-4, TB1 /Ch-2, TB3	Sorting, Searching and Sparse Matrix.	Ch-4, TB1 /Ch-2, TB3	Stacks: Definition and operations, Representations of stack, Operations on Stack: Push and Pop	Ch-6, TB1/Ch-3, TB2/ Ch-3/TB3	Array Operations and Stack Operations using array
Week -3	Application of stack: Conversion of Infix to Prefix and Postfix Expressions	Ch-6, TB1/Chapter-3, TB2/ Ch-3/TB3	Evaluation of postfix expression using stack. Implementation of Multiple stacks	Ch-6, TB1/Chapter-3, TB2/ Ch-3/TB3	Recursion: Recursive definition, Divide and Conquer, The Tower of Hanoi	Ch-8, TB2	Evaluation of Expressions
Week -4	Principles of Recursion: Guidelines for using Recursion, How Recursion works, Tail Recursion, When not to use Recursion	Ch-8, TB2	Queues: Representations of queues, Operations on Queue: Create, Add, Delete, Full and Empty	Ch-6, TB1/ Ch-3,4, TB2/ Ch-3, TB3	Circular queue	Ch-6, TB1/ Ch-3,4, TB2/ Ch-3, TB3	Recursion, Queue Operations

Week -5	Implementation of Multiple queues, Dequeue and Priority Queue	Ch-6, TB1/ Ch-3,4, TB2/ Ch-3, TB3	Linked list: Representation and Implementation of Singly Linked Lists, Traversing and Searching of Linked List	Ch-5, TB1/ Ch-4, TB2/ Ch-4, TB3	Overflow and Underflow, Insertion and deletion to/from single Linked Lists	Ch-5, TB1/ Ch-4, TB2/ Ch-4, TB3	Single Linked List
Week -6	Doubly linked list, Linked List in Array	Ch-5, TB1/ Ch-4, TB2/ Ch-4, TB3	Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction	Ch-5, TB1/ Ch-4, TB2/ Ch-4, TB3	Trees: Basic terminology, Binary Trees, Binary tree representation, Complete Binary Tree. Extended Binary Trees	Ch-7, TB1/ Ch-9, TB2/ Ch-5, TB3	Double Linked List and applications
Week -7	Array and Linked Representation of Binary trees, Traversing Binary trees	Ch-7, TB1/ Ch-9, TB2/ Ch-5, TB3	Threaded Binary trees. Traversing Threaded Binary trees	Ch-7, TB1/ Ch-9, TB2/ Ch-5, TB3	Huffman algorithm	Ch-7, TB1/ Ch-9, TB2/ Ch-5, TB3	Binary Tree
Week -8	Binary Search Tree (BST), Insertion in BST	Ch-7, TB1/ Ch-9, TB2	Deletion in BST, Complexity of Search Algorithm	Ch-7, TB1/ Ch-9, TB2	Path Length	Ch-7, TB1/ Ch-9, TB2	Binary Search Tree
Week -9	AVL Trees	Ch-7, TB1/ Ch-9, TB2	B-trees	Ch-7, TB1/ Ch-9, TB2	Sequential search, binary search,	Ch-9, TB1/ Ch-5,6, TB2/ Ch-9, Tb3	Height Balance Tree and Searching
Week -10	comparison and analysis of Searching	Ch-9, TB1/ Ch-5,6, TB2/ Ch-9, Tb3	Hashing, Collision Resolution Strategies	Ch-9, TB1/ Ch-5,6, TB2/ Ch-9, Tb3	Hash Table Implementation	Ch-9, TB1/ Ch-5,6, TB2/ Ch-9, Tb3	Searching comparison and Hash table implementation
Week -11	Sorting	Ch-7, TB3	Sorting	Ch-7, TB3	Sorting	Ch-7, TB3	Various Sorting approaches
Week -12	Graphs: Terminology	Ch-8, TB1/	Directed Graph,	Ch-8, TB1/	Graph Traversal,	Ch-8, TB1/	Graph representatio

	& Representations	Ch-8, TB3	Adjacency Matrix	Ch-8, TB3	Connected Component and Spanning Trees	Ch-8, TB3	n And traversal
Week -13	Minimum Cost Spanning Trees	Ch-8, TB1/ Ch-8, TB3	File, Queries and Sequential organizations	Ch-10, TB3	Primary, secondary and hash indexing	Ch-10, TB3	MST implementation
Week -14	B Tree index files	Ch-10, TB3	B+ Tree index files	Ch-10, TB3	File organization: sequential, random and linked organization	Ch-10, TB3	B Tree

CA 205: Object Oriented Systems and Programming with C++
L T P
3 1 3

PREREQUISITES

Students should be familiar with the basic discipline and the idea behind each of the main programming paradigms.

OBJECTIVES

The objectives of this course are:

- To understand and express the essential and interesting features of an application in the complex real world, an object-oriented model is built around.
- Familiarize with the development artifacts of object oriented systems.
- Understand the principals of objects encapsulation, inheritance, and polymorphism that form the foundation for object-oriented systems development.
- Familiarize with object oriented programming environment. The programming language specified is C++ that is one of the standard programming languages used in the industry and also forms the base of all object oriented languages.
- Introduction to the basic concepts of object oriented modeling.
- To be familiar with the Unified Modeling Language (UML). It is an object-oriented language for specifying, visualizing, constructing, and documenting the artifacts of software systems, as well as for business modeling.

LEARNING OUTCOME

- Develop an understanding of Object Oriented Systems.
- Develop hands on expertise in C++.

Unit – I

Object Modeling: Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, multiple inheritance, metadata, candidate keys, constraints.

(Text Book 2-chpt3, 4, 5, Text Book 1-chpt 1, 2,3)

Dynamic Modeling: Events and states, operations, nested state diagrams and concurrency, advanced dynamic modeling concepts, a sample dynamic model. (Text Book 1-chpt 5)

Unit – II

Functional Modeling: Data flow diagram, specifying operations, constraints, a sample functional model. OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies, comparison of methodologies: OMT with SA/SD, JSD.

(Text Book 1-chpt 6, Text Book 2-chpt 16)

Unit – III

Modeling with UML: UML terminology, Introduction of Things, Relationships and Diagrams of UML. (Ref. Book 1 chpt 9)

Testing Object Oriented Systems: Introduction, State Based testing. (Ref. Book 2, chpt 9)

Unit – IV

Introduction: History of C++, Advantage, Need, C++ Program Structure. **Classes and objects:** Class and Objects Creation, Constructors and Destructors, Access Specifiers, Inline Functions, Default Function Arguments, Static keyword, Function overloading Arrays as Class Member. Arrays of Object. String. The Standard C++ String Class. **Operator Overloading:** Overloading Unary Operators. Overloading. Binary Operators. Friend Functions, Friend Classes, **Pointers and Class Objects:** This Pointer, Pointers to objects, **Memory Management:** New and Delete, Garbage collection **Inheritance:** Concepts, Access Modifiers, Inheritance Types. (Text book 3, Text Book4)

Unit – V

Polymorphism Concepts: Virtual methods, Compile time Polymorphism, Run time Polymorphism. **Streams and File I/O** File streams, Streams with file handling, String streams, Built-in streams.

Templates and Exceptions: Function Templates, Class Templates, Exceptions, throw () and catch (), **The Standard Template Library:** Introduction Algorithms, Sequence Containers, Iterators, Specialized Iterators, Associative Containers, Storing User- Defined Object, Function Objects. (Text Book 3, Text Book 4)

Text Books:

1. James Rumbaugh etal, “Object Oriented Modeling and Design”, PHI
2. Ivar Jacobson etal, “Object Oriented Software Engineering: A Use Case Driven Approach”, Pearson Education
3. E. Balagurusamy, “Object Oriented Programming with C++”, TMH
4. Robert Lafore, “Object Oriented Programming in C++”, Techmedia Publication.

References:

1. Atul Kahate, “Object Oriented Analysis & Design”, TMH.
2. Yogesh Singh, Ruchika Malhotra, “Object Oriented Software Engineering”, PHI.
3. Herbert Sehlidt, “The Complete Reference c++”, TMH.
4. Schaum's Outline of Programming with C++, TMH.

Web References:

<http://www.amazon.com/Case-Driven-Object-Modeling-Addison-Wesley/dp/0201432897>
<http://nptel.iitm.ac.in/courses/Webcoursecontents/IIScBANG/System%20Analysis%20and%20Design/pdf/PPTs/mod9.pdf>

Lecture wise break-up

Week	Lecture 1	Chapter	Lecture2	Chapter	Lecture 3	Chapter	Lab Meeting (CA205P)
Week-1	Object Modeling and classes	Text Book2 Ch-1,2	links and association	Text Book2 Ch-1,2	generalization and inheritance	Text Book1 CH 1,2,3	Study of Use Case Diagram
Week-2	aggregation, abstract class	Text Book1 CH 1,2,3	multiple inheritance, metadata, candidate keys, constraints	Text Book 1 CH 1,2,3 Text Book 2 CH3, 4, 5	Dynamic Modeling: Events and states, operations, nested state diagrams and	Text Book1 CH 5	Study of Class Diagram

					concurrency		
Week-3	advanced dynamic modeling concepts	Text Book1 CH 5	advanced dynamic modeling concepts	Text Book 1 CH 5	A sample dynamic model	Text Book1 CH 5	Study of Activity Diagram
	Functional Modeling: Data flow diagram	Text Book1 CH6, Text Book2 CH16	Functional Modeling: Data flow diagram	Text Book 1 CH6, Text Book2 CH 16	Specifying operations, constraints, a sample functional model.	Text Book1 CH6, Text Book2 CH 16	Study of Sequence Diagram
Week-5	OMT (object modeling techniques) methodologies	Text Book1 CH6, Text Book 2 CH 16	OMT (object modeling techniques) methodologies	Text Book 1 CH 6 Text Book 2 CH 16	OMT (object modeling techniques) methodologies	Text Book1 CH6, Text Book2 CH 16	Study of State chart Diagram
Week-6	Examples and case studies to demonstrate methodologies, comparison of methodologies: OMT with SA/SD, JSD.	Text Book1 CH6, Text Book2 CH16 (refer to web references)	Examples and case studies to demonstrate methodologies, comparison of methodologies: OMT with SA/SD, JSD.	Text Book1 CH6, Text Book2 CH16 (refer to web references)	Modeling with UML: UML terminology,	Ref. Book1 CH 9	Case Studies
Week-7	UML terminology	Ch-9 Ref: Book1	Relationships and Diagrams of UML.	Ch-9 Ref: Book1	Introduction of Things	Ch-9 Ref: Book1	Case Studies
Week-8	Testing Object Oriented Systems: Introduction, State Based testing	Ref. Book 2, CH 9	Testing Object Oriented Systems: Introduction, State Based testing	Ref. Book2, CH 9	Testing Object Oriented Systems: Introduction, State Based testing	Ref. Book 2, CH 9	Case Studies
Week-9	Introduction: History of C++, Advantage, Need, C++ Program Structure	Text Book 4 CH-1	Classes and objects: Class and Objects Creation	Text Book3 CH-5, Text Book 4 CH-6	Constructors and Destructors, Access Specifiers,	Text Book3 CH6, Text Book4 CH-6	Creating Classes, Constructors, Destructors & Access Specifier
Week-10	Inline Functions, Default Function Arguments	Text Book3 CH-4, Text Book4 CH-13	Static keyword, Function overloading Arrays as Class Member	Text Book4 CH-11	Arrays of Object	Text Book4 CH-7	Inline functions, Static Keyword, Arrays of objects
Week-11	String. The Standard C++ String Class.	Text Book3 CH-15	Overloading Unary Operators. Overloading. Binary Operators	Text Book3 CH-7, Text Book4 CH-8.	Friend Functions, Friend Classes	Text Book 4 CH-11	Overloading and Friend Keyword
Week-12	Pointers and Class Objects: This Pointer,	Text Book3 CH-9	Pointers to objects Memory Management: New and Delete, Garbage collection	Text Book3 CH-9.	Inheritance: Concepts, Access Modifiers, Inheritance Types.	Text Book3 CH-8	Pointers and Inheritance
Week-13	Polymorphism Concepts: Virtual methods, Compile time Polymorphism, Run time Polymorphism	Text Book 3 CH-9	Streams and File I/O File streams, Streams with file handling, String streams, Built-in streams	Text Book3 CH-10,11	Streams and File I/O File streams, Streams with file handling, String streams, Built-in streams	Text Book3 CH-10,11	Polymorphism and File Handling

Week-14	Templates and Exceptions: Function Templates, Class Templates, Exceptions, throw () and catch (),	Text Book3 CH-12,13	The Standard Template Library: Introduction Algorithms, Sequence Containers, Iterators, Specialized Iterators	Text Book3 CH-14. Text Book CH-15.	Associative Containers, Storing User-Defined Object, Function Objects.	Text Book3 CH-14. Text Book4 CH-15.	Templates and Exception Handling
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CA206:

TECHNICAL WRITING

L : T : P :: 2 : 0 : 0

Credit : 2

Objective of The Course

To impart basic skills in Technical Communication in various formats of technical writing to MCA and second year UG students in the English language. Having achieved the basic skills in professional communication in English through laboratory practice teaching, the students are required to learn various forms of technical writings. Communication is not restricted to forms of verbal interaction among the professionals. Every professional is required to be proficient in Technical Communication as well. Such proficiency is desired to be achieved through class room learning of different formats of technical writing which are usually used in any technical profession.

Desired Outcome of The Course

The students must be able to :

- (a) Understand Communication as a process and channels of it in general and Technical Communication in particular.
- (b) Learn Technical writing including sentence structure and be able to understand and use technology specific words.
- (c) Write scientific articles, synopsis, reports (routine and annual) including Project and Sample Reports.
- (d) Write Technical Notes, Proposals and Articles.
- (e) Learn to records minutes of meetings, Seminars, workshops, make technical presentations and learn resume/CV writing.

Key Concepts

Communication as a process of interaction between originator and receiver.

Context of Technical Communication as means of indulgence in various forms and formats of technical writings as required in organizations-technological as well as commercial.

Writing Skills : Selection of words and phrases in technical writing leading to sentence structure as well as length and structure of paragraph. Writing scientific Articles, Reports, recording minutes and Notes, authoring and review of Research Articles.

Speaking Skills : Participation in Meetings, Seminars, Workshops and Technical Presentation.

Teaching Methodology

1. Equipping the student for competent techno-specific Technical Communication in English Language and enabling the student to be proficient in technical writing.
2. The teacher is required to teach the course through lectures, tutorials and samples of written technical formats.
3. The teacher must project himself as a proficient expert in technical writing of English language.

4. The course has to be taught in small batches so as to give individual attention to students – both, in the process of learning to write as well as participation in conferences, seminars, workshops and project presentations.

5. The Books suggested have portions of Technical Communication in each and as such the same be treated as base texts. Expansion of the parts be undertaken with the help of relevant matter through internet. Infact, the students be encouraged to enhance their technical writing skills by self learning.

NOTE: Assignments are to be given to reinforce the concepts and ensure total understanding of technical writing.

Text Books & References

1. M Ashraf Rizv, "Effective Technical Communication", Tata Mc Graw Hill Education Pvt. Ltd 2012.
2. Kavita Tyagi, Padma Misra, "Basic Technical Communication", PHI Learning Pvt Ltd, 2012.
3. Sangeeta Sharma, Binod Mishra, "Communication Skills for Engineers and Scientists", PHI Learning Pvt. Ltd, 2012.

Unit 1

Communication–Nature and process.

Channels of Communication–Down ward, upward and horizontal Communication. Networks and Barriers to Communication.

Technical Communication–Definition, Oral and written Technical Communication.

Importance and Need for Technical Communication

Nature of Technical Communication-Aspects and Forms of Technical Communication

Technical Communication Skills-Listening, Speaking, Reading and Writing (Improving these with comprehensions).

Unit 2

Techniques of Writing, Selection of words and phrases in technical writing.

Difference between Technical Writing and General Writing.

Abstract and specific words

Sentence structure, Requisites of sentence construction.

Paragraph Length and structure

Jargons and Cliché.

Unit 3

Scientific Article Writing.

Synopsis Writing, Project writing and Dissertation /Thesis Writing.

Report Writing- meaning, significance, structure and style.

Different type of Reports-routine reports and annual reports.

Project Reports

Sample Reports

Technical Articles-nature, significance and types.

Journal Articles and Conference Papers.

Unit 4

Technical Note Making

Mechanics and Note Writing Techniques.

Technical Proposals- meaning, structure, types and significance.

Types of Proposals

Review and Research Articles.

Elements of Technical Articles.

Text Books & References

1. M Ashraf Rizvi, "Effective Technical communication", Tata Mc Graw Hill Education Pvt. Ltd., 2012.
2. Kavita Tyagi, Padma Misra, "Basic Technical Communication", PHI Learning Pvt. Ltd, 2012.
3. Sangeeta Sharma, Binod Mishra, "Communication Skills for Engineers and Scientist", PHI Learning Pvt Ltd, 2012.
4. Felicity O' Dell & Michael Mc Carthy, "Englsh Collocations in Advanced Use." Cambridge University Press 2010.
5. Raymond Murphy. "Essential English Grammar." Cambridge University Press.

Suggested web-links:

<http://www.ego4u.com/>

<http://www.english4today.com/>

<http://www.learnamericanenglishonline.com/>

<http://learnenglish.britishcouncil.org/en/>

<http://www.englisch-hilfen.de/en/>

<http://www.englishclub.com/>

<http://www.englishlearning.com/>

<http://learningenglish.voanews.com/>

<http://www.usingenglish.com/dictionary.html>

http://www.mindtools.com/pages/article/newCS_99.ht

