NORTH MAHARASHTRA UNIVERSITY, JALGAON (M.S.)

Second Year Engineering (Information Technology)

Faculty of Engineering and Technology

Teacher and Examiner's Manual

Semester – III

W.E.F 2013 – 2014

Engineering Mathematics –III

Teacher, Paper setter and Examiner should follow the guidelines as given below.

Unit – I

Teacher should facilitate learning of basics of Laplace and Inverse Laplace transform, Solution of differential equations using Laplace Transform.

1.	**Laplace Transform**		**Lectures required**	**Reference**
	a	Definition of Laplace Transform, Existence of Laplace Transform, Laplace Transform of standard Functions.	1	1 & 2
	b	Theorems and properties of Laplace transform(without proof)	2	1 & 2
	c	Inverse Laplace Transform of standard Functions	1	1 & 2
	d	Properties of Inverse Laplace Transform	2	1 & 2
	e	Laplace Transform of Unit Step Functions	1	1 & 2
	f	Solution of Differential equations using Laplace Transform	1	1 & 2

References:

1	B.V. Raman, "Engineering Mathematics", Tata Mc Graw Hill
2	N. P. Bali, "A Text Book of Engineering Mathematics", Laxmi Publication

Unit – II

Teacher should facilitate learning of basic of Z- Transforms and Fourier Transform

2.	**Fourier Transform**		**Lecture required**	**Reference**
	a	Introduction to Fourier Integral theorem.	01	1
	b	Fourier Transforms and Inverse Fourier Transform	01	1
	c	Fourier Cosine Transforms and Inverse Fourier Cosine Transform	01	1
	d	Fourier Sine Transforms and Inverse Fourier Sine Transform	01	1
	Z-Transform			
	a	Definition of Z- Transform and standard properties of Z-Transform (without proof); Region of Convergence.	01	2
	b	Z-Transform of standard / elementary sequences	02	2
	c	Inverse Z-transform.	01	2

References:

1	Wylie C.R. & Barrett , " Advanced Engineering Mathematics", Mc Graw Hill
2	B.V. Raman, "Engineering Mathematics", Tata Mc Graw Hill

Unit - III

Teacher should facilitate learning of basics of Moments, Skewness, Kurtosis, Correlation and Regression, Probability distributions

3.	Statistics and Probability distributions		Lecture required	Reference
	a	Introduction to Mean, Mode, Median, Standard deviation, Variance, Coefficient of Variation	01	1 & 2
	b	Moments, Skewness and Kurtosis	02	1 & 2
	c	Correlation and Regression	02	1 & 2
	d	Binominal Distribution	01	1 & 2
	e	Poisson Distribution	01	1 & 2
	f	Normal Distribution	01	1 & 2

References:

1	H.K. Dass, "Advanced Engineering Mathematics", S. Chand Publication, New Delhi
2	N. P. Bali , "A Text Book of Engineering Mathematics", Laxmi Publication

Unit – IV

Teacher should facilitate learning of basics of testing of hypothesis and significance

4.	Testing of Hypothesis and significance		Lecture required	Reference
	a	Introduction to population parameters and statistics	01	1 & 2
	b	Testing of Hypothesis, Null Hypothesis, Alternative Hypothesis, Level of significance	01	1 & 2
	c	Test of significance of large sample	04	1 & 2
	d	Chi-square test	02	1 & 2

References:

1	H.K. Dass, "Advanced Engineering Mathematics", S. Chand Publication, New Delhi
2	N. P. Bali , "A Text Book of Engineering Mathematics", Laxmi Publication

Unit – V

Teacher should facilitate learning of basic of Fuzzy sets, Fuzzy Logic, Operations on Fuzzy sets and Fuzzy systems.

5.	Fuzzy sets and Systems		Lectures required	Reference
	a	Introduction to Fuzzy sets	01	1
	b	Standard fuzzy sets operations	02	1
	c	Crisp sets, Crisp sets vs. fuzzy sets	01	1
	d	Fuzzy arithmetic	01	1
	e	Constructing fuzzy sets and operation on fuzzy sets and systems	02	1
	e	Applications of Fuzzy sets	01	1

References:

1	George J. Klir and Bo Yuan, ''Fuzzy Sets and Fuzzy Logic: Theory and Applications"

Information Theory

Teacher, Paper setter and Examiners should follow the guidelines as given below.

Unit – I

Teacher should facilitate learning of security principles, attacks on security, various substitution and transposition techniques.

1.	Introduction to Cryptography		Lect required	Ref No
	a	Computer security concepts, Security attacks, Security services and Security mechanism.	02	1
	b	Symmetric cipher model, Substitution techniques.	02	1 & 2
	c	Transposition techniques, Rotor machines, Steganography, Cryptographic Protocols.	02	1 & 2
	d	Block cipher principles, Data Encryption Standard(DES), Differential and Linear cryptanalysis.	02	1

References:

1	William Stallings, "Cryptography and Network Security", Fifth edition, Pearson, 2011.
2	Bruce Schneider, "Applied cryptography: Protocols, Algorithms and sources code in C", Second edition, Willey, 2008.

Unit – II

Teacher should facilitate learning of Data Encryption Standard, Algorithmic types and modes, Number theory and RSA algorithm.

2.	Block Cipher, Number Theory and Public-key Cryptography		Lect required	Ref No
	a	Multiple encryption and Triple DES, Electronic code book.	02	1&2
	b	Cipher block chaining mode, Cipher feedback mode, Output feedback mode, Counter mode.	02	2
	c	Prime numbers, Fermat's and Euler's Theorems.	02	1&2
	d	Testing for primality, Chinese remainder theorem.	01	1&2
	e	Public key cryptography, RSA.	01	1

References:

1	William Stallings, "Cryptography and Network Security", Fifth edition, Pearson, 2011
2	Bruce Schneider, "Applied cryptography: Protocols, Algorithms and sources code in C", Second edition, Willey, 2008

Unit – III

Teacher should facilitate learning of Hash function, Digital signatures and Key management concept.

3.	Hash Functions, Digital Signature and Key Management		Lect required	Ref No
	a	Applications of hash functions, Simple hash functions Requirements and security.	01	1&2

	b	Secure Hash Algorithm (SHA), Introduction to Digital Signatures.	02	1
	c	ElGamal and Schnorr digital signature scheme, Digital signature standard.	02	1&2
	d	Symmetric key distribution using symmetric and asymmetric encryption, Distribution of public keys.	02	1&2
	e	X.509 certificates, Public key infrastructure (PKI).	01	1

References:

1	William Stallings, "Cryptography and Network Security", Fifth edition, Pearson, 2011
2	Bruce Schneider, "Applied cryptography: Protocols, Algorithms and sources code in C", Second edition, Willey, 2008

Unit – IV

Teacher should facilitate learning of Data compression, Lempel-Ziv compression techniques, Huffman coding technique.

4.	**Introduction to Data Compression**		**Lect required**	**Ref No**
	a	Introduction to Data Compression, Modeling and Coding.	01	1
	b	Ziv and Lempel, Lossy Compression.	01	1
	c	Shannon-Fano Algorithm, The Huffman Algorithm.	01	1&2
	d	Huffman Code: Counting the Symbols, Saving the Counts, Building the tree, Using the tree.	01	1&2
	e	Adaptive Huffman Coding: Adaptive coding, Building a tree.	02	1
	f	Arithmetic Coding, Statistical modeling.	02	1

References:

1	Mark Nelson and Jean-Loup Gailly, "The Data Compression Book", Second edition, BPB Publications
2	D.C. Hankerson , Greg A. Harris and Peter D. Johnson Jr., "Introduction to Information Theory and Data Compression", Second edition, CRC Press, 2003

Unit – V

Teacher should facilitate learning of Dictionary compression, sliding window compression, graphics and sound compression techniques

5.	**Graphics and Speech Compression**		**Lect required**	**Ref No**
	a	Dictionary based compression -Introduction -Static V/s Adaptive Dictionary -Representative Example	02	1
	b	Sliding window compression -Algorithm -Problems with LZ77 & Encoding Problem -LZSS Compression -Data Structure	02	1
	c	LZ78 compression and Speech compression -LZ78 Details	02	1&2

		-LZ78 Implementation -Digital Audio Concept -Lossless compression of sound		
	d	Lossy graphics compression -Statistical and Dictionary compression methods -Lossy compression -Adaptive coding -JPEG Standard -Implementation of DCT	02	1&2

References:

1	Mark Nelson and Jean-Loup Gailly, "The Data Compression Book", Second edition, BPB Publications
2	D.C. Hankerson , Greg A. Harris and Peter D. Johnson Jr., "Introduction to Information Theory and Data Compression", Second edition, CRC Press, 2003

Discrete Structure and Graph Theory

Teacher, Paper setter and Examiner should follow the following guidelines.

Unit - I

Teacher should facilitate learning of proposition along with their truth table, Set theory,

1.	Propositions, Sets, Probability		Lect required	Ref No
	A	**Propositions, compound proposition, basic logical operations, truth tables, tautology, contradiction.** Understanding propositions with their truth tables.	01	1,2
	B	**Quantifiers: universal and existential quantifiers.** Understand the concept of universal and existential quantifiers.	01	1,2
	C	**Set Theory: Set, Combinations of Sets.** Understand the set theory with different types of operations.	01	1,2
	D	**Mathematical Induction Principle.** Understand the mathematical insuction principle and how to solve the problem using mathematical induction	01	1,2
	E	**Cardinality of finite Sets, Rule of sum, Rule of product.** Understand the cardinality of finite sets for two and three variables.	02	1,2
	F	**Permutations, Combinations, Discrete Probability.** Understand to solve the problem using permutation, combination and by using the probability.	02	1,2

References:

1	C.L. Liu , " Elements of Discrete Mathematics", Second edition, TMH
2	Seymour Lipschutz,Marc Lipson, " Discrete Mathematics", Second edition, TMH

Unit - II

Teacher should facilitate learning of realation and function with real world example.

2.	Relation and Function		Lect required	Ref No
	a	**Definitions, properties of Binary relations.** Describes the relation and how it is related to binary relation with it's propertieas.	01	1,2
	b	**Equivalence Relations and partitions, Partial ordering relations and lattice.** Describe the difference between the equivalence relation and partial ordering relation.	02	1,2
	c	**Chains and antichains, Transitive Closure and Warshall's Algorithm.** Describe the chain and antichain, How the transitive closure is related to warshall's algorithm.	02	1,2
	d	**Functions Definitions, Composition of Functions** Understand the concept of function and composite function.	02	1,2
	e	**Types of Function, Recursive Functions, Pigeonhole principle.**	01	1,2

		Describe the different types of function.		

References:

1	C.L. Liu , " Elements of Discrete Mathematics", Second edition, TMH
2	Seymour Lipschutz,Marc Lipson, " Discrete Mathematics", Second edition, TMH

Unit – III

Teacher should facilitate learning of basic of recurrance realtion and analysis of alghorithm.

1.	**Recurrence Relation, Analysis of Algorithms**		**Lect required**	**Ref No**
	a	**Recurrence Relation, Linear Recurrence Relations with constant Coefficients** Understand the recurrance realtion and how this is used to solve the linear recurrence realtion with constant coefficients..	01	1,2
	b	**Homogeneous Solutions, Particular Solutions.** Understand how to find the homogeneous and particular solution.	01	1,2
	c	**Total solutions, Solution by the method of generating functions.** Understand the method for finding the total solution.	02	1,2
	d	**Introduction, Largest number algorithm** Undertsand the largest number algorithm.	01	1,2
	e	**Sorting algorithms: Bubble sort, Divide and conquer algorithms.** Understanding the different sorting techiques.	01	1,2
	f	**Binary search algorithm, strassens matrix multiplication** Understand the binary search algorithm and strassens matrix multiplication..	01	1,2
	g	**Time Complexity of Algorithms, Complexity of Problems, Tractable and Intractable Problems.** Understand the Time complexity of algorithm and problems.	01	1,2

References:

1	C.L. Liu , " Elements of Discrete Mathematics", Second edition, TMH
2	Seymour Lipschutz,Marc Lipson, " Discrete Mathematics", Second edition, TMH

Unit – IV

Teacher should facilitate learning of trees and the representation of trees using various ways like path and circuit. Also the representation of graph.

4.	**Trees, Graphs**		**Lect required**	**Ref No**
	a	**Basic terminology, multigraphs and weighted graph , paths and circuits.** Understand the concept of graph,multigraph,path and circuit.	01	1,2
	b	**Dijkstra's shortest path algorithms** Understand that how to find the shortest path algorithm by using Dijkshtr'a algorithm.	01	1,2

	c	**Euler and Hamiltonian Paths and circuits** Understand theEuler and Hamiltonian path and circuit.	01	1,2
	d	**Factors of a graph, Planner graph.** Defining a factor of a graph.	01	1,2
	e	**Trees, rooted trees, path length in rooted trees** Understand the tree and rooted tree for path length counting.	01	1,2
	f	**Prefix code, binary search trees, spanning trees and cut set, minimum spanning trees.** Understand to obtain the prefix code for binary search tree and find the minimum spanning tree**.**	01	1,2
	g	**Kruskal's and prim's algorithms for minimum spanning tree.** Understand the diffrernt ways for finding the minimul length.	02	1,2

References:

1	C.L. Liu , " Elements of Discrete Mathematics", Second edition, TMH
2	Seymour Lipschutz,Marc Lipson, " Discrete Mathematics", Second edition, TMH

Unit - V

Teacher should facilitate learning of.

5.	**Algebraic system, Boolean algebra**		**Lect required**	**Ref No**
	a	**Semigroup, Subsemigroup, Monoid, Submonid, Groups** Understand the semigroup ,monoid , submonoid .	01	1,2
	b	**Abelian Group, Subgroups, Isomorphism, Automorphism,Homomorphism , Ring, Integral domain ,field . .** Understand difference between the Isomorphism,Automorphism and Homomophism.	02	1,2
	c	**Lattice and Algebraic systems, Principle of duality** Understand the lattice and algebraic system.	01	1,2
	d	**Basic properties of lattice defined by lattices, distributive and complemented lattices** Understand different propertices of lattice.	01	1,2
	e	**Boolean lattices and Boolean algebras, Boolean functions and Boolean Expressions** Understand the Boolean lattice,function and expression.	01	1,2
	f	**Number system and Interconversion of number systems.** Understand the different types of number conversion system.(Binary,Octal,Decimal and Hexadecimal).	02	1,2

References:

1	C.L. Liu , " Elements of Discrete Mathematics", Second edition, TMH
2	Seymour Lipschutz,Marc Lipson, " Discrete Mathematics", Second edition, TMH

Digital System and Microprocessor

Teacher, Paper setter and Examiner should follow the guidelines as given below.

Unit - I

Teacher should facilitate learning of to logic gates, Boolean algebra and logic family.

1.	Review of fundamental concepts of digital electronics		Lect required	Ref No
	a	**Logic Gates** Understanding of Basic gates, universal gates & Exclusive gates.	02	01
	b	**Implementation of logic gates using universal gates** Understanding of Implementation of logic gates using universal gates	01	02
	c	**Digital Signal** Understanding of Positive & Negative logic	01	01
	d	**Boolean Algebra** Understanding of Boolean postulate and Theorems, solving examples of realization of Boolean functions using Boolean algebra.	02	01
	e	**K map for 2, 3 and 4 variables and its grouping** K map for 2, 3 and 4 variables and its grouping	02	01

References:

1	R.P. Jain, "Modern Digital Electronics" , TMH, Fourth edition.
2	M. Morris Mano, "Digital Logic and Computer Design", Pearson.

Unit - II

Teacher should facilitate learning of Combination logic design and Combination logic design examples.

2.	Combination logic design		Lect required	Ref No
	a	**K map for 5 and 6 variables and its grouping** K map for 5 and 6 variables and its grouping	02	01
	b	**Don't Care condition in Kmap** Don't Care condition in Kmap	01	01/02
	c	**Design of adder and subtractor** Half adder and full adder Half subtractor and full subtractor	02	01/02
	d	**Combination logic design examples** Solving examples based on combinational logic design	01	01/02
	e	**Design of multiplexer & demultiplexer** Design of multiplexer & demultiplexer	01	01/02
	f	**Design of comparator** Design of comparator	01	01/02

References:

1	R.P. Jain, "Modern Digital Electronics" , TMH, Fourth edition.
2	M. Morris Mano, "Digital Logic and Computer Design", Pearson.

Unit – III

Teacher should facilitate learning of Sequential Logic Design, Comparator, Parity checker and generator.

3.	**Sequential Logic Design**		**Lect required**	**Ref No**
	a	**Sequential Logic Design** One bit memory cell	01	01/02
	b	**Flip Flops** S-R and J-K flip flop	02	01/02
	c	**Flip Flops** T and D flip flop	01	01/02
	d	**Design of synchronous and asynchronous counter** Design of synchronous and asynchronous counter	02	01/02
	e	**Sequence generator & detector** Sequence generator & detector	02	01/02

References:

1	R.P. Jain, "Modern Digital Electronics", TMH, Fourth edition.
2	M. Morris Mano, "Digital Logic and Computer Design", Pearson.

Unit – IV

Teacher should facilitate learning of 8086 microprocessor basics.

4.	**8086 Microprocessor**		**Lect required**	**Ref No**
	a	**Introduction to Microprocessor** Introduction to microprocessor,	01	01/02
	b	**8086 architecture and register organisation** 8086 architecture and programming model	01	01/02
	c	**8086 Memory Segmentation** 8086 memory segmentation	01	01/02
	d	**8086 Addressing Modes** 8086 addressing modes	01	01/02
	e	**8086 Signal Descriptions** Functional pin diagram	01	01/02
	f	**8086 Instruction Set** 8086 instruction set	03	01/02

References:

1	A. K. Ray and K.M. Bhurchandi, "Advanced Microprocessors and

	Peripherals", Tata McGraw Hill, Third edition.
2	Douglas V Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill, Second edition.

Unit - V

Teacher should facilitate learning of 8085 assembly programming.

5.	8086 assembly programming		Lect required	Ref No
	a	**Assembler directives** Assembler directives	01	01/02
	b	**DOS and BIOS interrupts** INT 10H, INT 21H & INT 33H family	01	01/02
	c	**Macros and Procedures** Macros and Procedures	01	01/02
	d	**Assembly language programming of 8086** Display personal information using Macro	01	01/02
	e	**Assembly language programming of 8086** Program to compute addition/subtraction/factorial of given number using NEAR & FAR procedure	01	01/02
	f	**Assembly language programming of 8086** Program for password verification	01	01/02
	g	**Assembly language programming of 8086** Program for BCD addition	01	01/02
	h	**Assembly language programming of 8086** Program for BCD to HEX & HEX to BCD conversion	01	01/02

References:

1	A. K. Ray and K.M. Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill, Third edition.
2	Douglas V Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill, Second edition.

Object Oriented Technology

Teacher, Paper setter and Examiners should follow the guidelines as given below.

Unit - I

Teacher should facilitate learning of procedural, modular and object-oriented programming techniques. Limitations of procedural programming. Need of object-oriented programming. Object-Oriented Programming concepts and the basics of C++.

1.	Introduction to Object Oriented Programming		Lect required	Ref No
	a	**Introduction:** Introduction to procedural, modular and object-oriented programming techniques. Limitations of procedural programming. Need of object-oriented programming. Advantages, disadvantages and applications of OOP.	02	01 & 02
	b	**Object-Oriented Programming Concepts** Class, objects, abstraction, encapsulation, data hiding, inheritance, polymorphism and message passing.	02	01, 02 & 03
	c	**The Basics of C++** Basic data types and sizes, user-defined data types, variable declarations and variable names. Constants, standard input and standard output: input with cin, output with cout. Use of << and >> operators, operators in C++.	02	01 & 02
	e	**Expressions:** What are Expressions? operator precedence**,** precedence and order of evaluation**,** conditional expression**,** casting and type conversion.	02	01 & 02

References:

1.	E. Balagurusamy, "Object Oriented Programming with C++", Fifth Edition, Tata McGraw Hill, 2011.
2.	Robert Lafore, "Object Oriented Programming in C++", Fourth Edition, Pearson Education, 2002.
3.	Ashok N. Kamthane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education, 2006.

Unit - II

Teacher should facilitate learning of classes, objects, constructors and destructors, function overloading and operator overloading.

2.	Classes and Objects, Function and Operator Overloading		Lect required	Ref No
	a	**Class and Objects:** Concept of a class, defining a class, creating an object, memory allocation for objects, object scope. Data abstraction and data encapsulation. Scope resolution operator. Accessing of class members, defining member functions (inside/outside class). Static data and function members. Nesting of member functions.	02	01 & 03
	b	**Constructors and Destructors** Constructor, default constructor, parameterized constructors, default argument constructor, copy	02	02 & 03

		constructor and destructors.		
	c	**Functions in C++:** Introduction, argument passing, inline functions, recursive functions, function with default argument, call by reference, friend function, passing objects as arguments and returning object.	01	01 & 03
	d	**Function Overloading:** What is function overloading? **,** Rules for function overloading.	01	02
	e	**Operator overloading:** Introduction, rules for operator overloading. Overloading unary and binary operators using member function and friend function. Converting data types: basic to class type, class to basic type and class to another class type.	02	02

References:

1.	E. Balagurusamy, "Object Oriented Programming with C++", Fifth Edition, Tata McGraw Hill, 2011.
2.	Robert Lafore, "Object Oriented Programming in C++", Fourth Edition, Pearson Education, 2002.
3.	Ashok N. Kamthane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education, 2006.

Unit – III

Teacher should facilitate learning of pointer declaration, void pointers, pointers to class objects, this pointer, pointers to members and accessing private members with pointers. Arrays: characteristics of arrays, initialization of arrays. One dimensional and two dimensional arrays using pointers.

3.	**Pointers and Arrays**		**Lect required**	**Ref No**
	a	**Introduction** Pointer declaration, void pointers, pointers to class objects, this pointer.	03	01 & 02
	b	Pointers to members, accessing private members with pointers.	02	02 & 03
	c	**Arrays:** Characteristics of arrays, initialization of arrays, arrays within a class, arrays of objects.	01	01 & 03
	d	Dynamic memory allocation using new and delete operators. One dimensional and two dimensional arrays using pointers.	02	01 & 02

References:

1	E. Balagurusamy, "Object Oriented Programming with C++", Fifth Edition, Tata McGraw Hill, 2011.
2	Robert Lafore, "Object Oriented Programming in C++", Fourth Edition, Pearson Education, 2002.
3	Ashok N. Kamthane, "Object-Oriented Programming with ANSI and

	Turbo C++", Pearson Education, 2006.

Unit – IV

Teacher should facilitate learning of inheritance, types of inheritance, virtual function and polymorphism.

4.	**Inheritance, Virtual functions and Polymorphism**		**Lect required**	**Ref No**
	a	**Introduction** Base and derived classes. Inheritance types, access modifiers, single inheritance.	01	01 & 02
3	b	Multiple and multilevel inheritance, hybrid, hierarchical and multipath inheritance.	02	01 & 02
	c	Virtual base classes. Overriding base class members. Constructors and inheritance, calling base class constructor.	02	01 & 02
	d	**Virtual functions and Polymorphism:** Static and dynamic binding. Pointers to base and derived classes. Virtual functions, rules for virtual functions, working of virtual functions, pure virtual functions. Virtual base classes.	03	01 & 02

References:

1.	E. Balagurusamy, "Object Oriented Programming with C++", Fifth Edition, Tata McGraw Hill, 2011.
2.	Robert Lafore, "Object Oriented Programming in C++", Fourth Edition, Pearson Education, 2002.
3.	Ashok N. Kamthane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education, 2006.

Unit - V

Teacher should facilitate learning of the concept of files, file streams, file operations, managing console I/O and templates.

5.	**Files and Streams, Managing Console I/O Operations and Templates**		**Lect required**	**Ref No**
	a	**Files and Streams:** Concept of a file, file stream operations, opening a file using constructor and open function, closing a file, detecting end-of-file, file modes, file pointers.	03	01 & 02
	b	**Managing Console I/O Operations:** Introduction, C++ streams, stream classes, unformatted and formatted I/O, ios class functions and flags, manipulators.	02	01 & 02
	c	**Templates:** Introduction, function template and class template, overloading of templates functions, member function templates and template arguments.	03	01 & 02

References:

1.	E. Balagurusamy, "Object Oriented Programming with C++", Fifth Edition, Tata McGraw Hill, 2011.
2.	Robert Lafore, "Object Oriented Programming in C++", Fourth Edition, Pearson Education, 2002.

Soft Skills – III

Teacher, Paper setter and Examiners should follow the guidelines as given below.

Unit - I

Teacher should facilitate the learning basic foundation of mathematics.

1.	Arithmetic-1		Lecture required	Reference No
	a	**Number Systems** Basic Formulae, Divisibility Rules, Speed Maths, Remainder Theorem, Different Types of Numbers, Applications	01	01
	b	**HCF, LCM and Linear Equations** HCF – Successive Division and Prime Factorization Methods, LCM – Successive Division and Prime Factorization Methods, Applications, Linear Equations – Elimination Method, Substitution Method, Applications	01	01
	c	**Averages and Mixtures** Concept of Average, Faster Ways of Finding It, The Allegation Method, Applications	01	01

References:

1.	R. S. Aggarwal, "Quantitative Aptitude", S. Chand Publication, New Delhi, 2012.

Unit II

Teacher should facilitate the learning basic foundation of mathematics.

2.	Arithmetic-2		Lecture required	Reference No
	a	**Percentages** Concept of Percentage, Working with Percentages Applications	01	01
	b	**Profit and Loss** Difference between Cost and Selling Price, Concept of Profit Percentage and Loss Percentage, Applications	01	01
	c	**Time and Work** Basic Time and Work Formula, Relation between Time and Work, Applications	01	01

References:

1.	R. S. Aggarwal, "Quantitative Aptitude", S. Chand Publication, New Delhi, 2012.

Unit III

Teacher should facilitate the learning basic foundation of mathematics.

3.	Arithmetic-3		Lecture required	Reference No
	a	**Permutations and Combinations** Sum Rule of Disjoint Counting, Product Rule of Counting Concept of Factorial, Permutations, Linear Permutations, Combinations, Circular Permutations, Applications	01	01
	b	**Probability** Definition and Laws of Probability, Mutually Exclusive Events, Independent Events, Equally Likely Events, Exhaustive Events, Cards, Dice, Applications	01	01
	c	**Time and Distance** Speed, Conversion Factors for Speed, Average Speed, Moving Bodies – Passing, Crossing and Overtaking, Relative Speed, Boats and Streams, Applications	01	01

References:

1.	R. S. Aggarwal, "Quantitative Aptitude", S. Chand Publication, New Delhi, 2012.

Unit IV

Teacher should facilitate learning of critical thinking.

4.	Non-Verbal Reasoning		Lecture required	Reference No
	a	**Analogies** Different type of examples of analogies and its Applications	01	02
	b	**Classification** Different type of examples of analogies and its Applications	01	02
	c	**Sequences** Different type of examples of analogies and its Applications		02

References:

1.	R. S. Aggarwal, "A Modern Approach to Verbal Reasoning", S. Chand Publication, New Delhi, 2012.

Unit V

Teacher should facilitate the learning of a deep sense of analysis towards solving a problem

5.	Analytical Reasoning	Lecture required	Reference No

	a	**Analytical Puzzles** Classification Puzzles, Ordering Puzzles, Assignment puzzles, Applications	01	03
	b	**Letter and Number Series** Different Types of Letter Series, different types of Number Series, mixed Series	01	03
	c	**Coding and Decoding** Letter Coding, Number Coding, Mixed Coding, Odd Man Out, Applications	01	03

References:

1.	R. S. Aggarwal, "A Modern Approach to Non-Verbal Reasoning", S. Chand Publication, New Delhi, 2012.

Information Theory Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments:

	Group-A	Lab hours required
1	**Program for simple encryption and decryption of the message** - A simple encryption and decryption of a message can be implemented by using any programming language	02
2	**Program for Vernam Cipher (One-time Pad)** - Program should consist of encryption and decryption module	02
3	**Program for Simple Transposition Technique** - A simple transposition technique such as 'Rail Fence' technique can be implemented	02
4	**Program for Electronic Code Book (ECB) Mode** - Algorithmic mode ECB can be implemented - Program must exhibits the working of ECB i.e. block-by-block encryption and decryption	02
5	**Program for Cipher Block Chaining (CBC) Mode** - Algorithmic mode CBC can be implemented - Program must exhibits the working of CBC	02
6	**Program for Chinese Remainder Theorem** - A simple program is written to show the working of Chinese remainder theorem	02
7	**Program for Diffie-Hellman Key Exchange Algorithm** - Key exchange is a big problem in symmetric key and it can be resolved by using Diffie-Hellman key exchange algorithm	02
8	**Program for RSA Algorithm** - Public key algorithm (RSA) can be implemented for simple input - Program must consist of three modules: Key generation, Encryption and Decryption	02
9	**Study of Digital Signature** - A digital signature is a mechanism that enables the creator of a message to attach a code that acts as a signature.	02

	Group- B	Lab hours required
1	**Program for Caesar Cipher** -A simple program on Caesar cipher can be implemented -It should consists of two modules: encryption and decryption -Encryption: Cipher text=Plain text + (Key=3) -Decryption: Plain text=Cipher text - (Key=3)	02
2	**Program for Simple Stream Cipher** - Stream ciphers works on bit-by-bit basis - It should consists of two modules: encryption and decryption - Encryption: Cipher text bit=Plain text bit XOR Key bit - Decryption: Plain text bit =Cipher text bit XOR Key bit	02

3	**Study of JPEG Standard** - Image compression standard	02
4	**Study of Adaptive Huffman Coding technique** - Limitation of Huffman coding techniques are removed in adaptive coding	02
5	**Program for RLE Encoding Technique** - Run-Length encoding technique is lossless data compression technique. It is generally used for text and image compression	02

Note:

- Concerned faculty should suitably frame at least **10 practical** assignments **(SIX from PART – A and FOUR from PART – B)** out of the above list.
- Every assignment should include basic concept, flowchart, algorithm, print out of code with proper comments and output.
- Every student is required to submit the assignments in the form of journal.

Guidelines of ICA:

- ICA will be based on the practical assignments submitted by the students in the form of journal.
- Every student is required to submit the assignments in the form of journal.

Reference Books:

1. William Stallings, "Cryptography and Network Security", Fifth edition, Pearson, 2011.
2. Mark Nelson and Jean-Loup Gailly, "The Data Compression Book", Second edition, BPB Publications.
3. Bruce Schneider, "Applied cryptography: Protocols, Algorithms and sources code in C", Second edition, Willey, 2008.
4. AtulKahate, "Cryptography and Network Security", Second edition, TMH, 2007.
5. D.C. Hankerson , Greg A. Harris and Peter D. Johnson Jr., "Introduction to Information Theory and Data Compression", Second edition, CRC Press, 2003.
6. Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone, "Handbook of Applied Cryptography", CRC Press, 1996.
7. Forouzan, "Cryptography & Network Security", Second edition, TMH, 2010.

Discrete Structure and Graph Theory Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments:

		(Group A)	Lab hours required
	1	**A program for logical operations using bitwise operators** Perform logical operations like AND,OR,NOT,IF THEN,IF AND ONLY IF	02
	2	**A program for set operations: Union, Intersection, Difference, Symmetric difference** Perform set operations like union, intersection , difference, symmetric difference, complement	02
	3	**A program for generation of Power set of a given set** Producing power set for a given input set.	02
	4	**A program for generation of permutations** Producing permutations set for a given input set.	02
	5	**A program for generation of combinations** Producing permutations set for a given input set.	02
	6	**A Program for Bubble sort** Sorting of given numbers by using Bubble sort.	02
		(Group B)	**Lab hours required**
	7	**A Program for Matrix multiplication** Performing Multiplication of two matrices.	02
	8	**A Program for Binary search** Searching of a given number using binary search.	02
	9	**A Program for Shortest Path algorithm using Dijkstra's** Finding shortest path in a graph using Dijkstra's algorithm.	02
	10	**A program for implementation of Kruskal's algorithm** To find minimum spanning tree using kruskals algorithm.	02
	11	**A program for implementation of Prim's algorithm** To find minimum spanning tree using kruskals algorithm.	02
	12	**A program for Inter conversion of number system** Interconverting numbers from one base to another base.	02

Note:

- Concerned faculty should suitably frame at least 05 practical assignments from group A and 05 from group B of the above list.
- Every assignment should include theoretical concept, algorithm, print out of code with proper comments and output.
- Every student is required to submit the assignments in the form of journal.

Reference Books:

1. Kenneth H. Rosen, Discrete Mathematics and its Application, Fifth edition, TMH
2. V. K. Balakrishnan, " Graph Theory", TMH
3. B. Kolman , R. Busby and S. Ross, "Discrete Mathematical Structures" Fourth edition, Pearson
4. J. Treamblay , R. Manohar ," Discrete Mathematical structures with application to computer science" , TMH
5. Sukhendu dey, "Graph theory and its applications", Shroff publications.
6. John Dossey, Otto, Spence, Eynden, "Discrete Mathematics", Pearson publications, Fifth edition.

Digital System and Microprocessor Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments:

		Group-A (Digital System)	Lab hours required
	1	**Verify the truth table of all logic gates and verify the Demorgan's theorem** a. Draw the logical symbol and truth table Implement the connection on bread board and verify the truth table	02
	2	**Implement any logic gates by using universal gates** a. Construct logic gates using universal gates b. Implement the connection on bread board and verify the truth table	02
	3	**Construct and Implement Half Adder and Full adder** a. Construct Half Adder and Full adder b. Implement the connection on bread board and verify the truth table	02
	4	**Construct and Implement Half Subtractor and Full Subtractor** a. Construct Half Subtractor and Full Subtractor b. Implement the connection on bread board and verify the truth table	02
	5	**Construct and Implement various Code converters (Binary to Gray and Gray to Binary)** a. Construct Code Converter b. Implement the connection on bread board and verify the truth table	02
	6	**Verify Muliplexer and Demultiplexer** a. Construct Muliplexer and Demultiplexer b. Implement the connection on bread board and verify the truth table	02
	7	**Verify the truth table of BCD to 7-Segment display** a. Construct BCD to 7-Segment display b. Implement the connection on bread board and verify the truth table	02
	8	**Implement and verify S-R, J-K,D, and T flip flop using ICs** a. Construct flip flops b. Implement the connection on bread board and verify the truth table	02

	Group- B (8086 Microprocessor)		Lab hours required
	1	**Program using Macro** Display personal information using Macro	02
	2	**Program using NEAR and FAR Procedure** Program using NEAR and FAR Procedure	02
	3	**Perform arithmetic operations on two numbers** Addition/subtraction/multiplication of two numbers using NEAR and FAR Procedure	02
	4	**Find factorial of given number** Factorial of given number using recursive instruction	02
	5	**Program for Password Verification** Program for Password Verification	02
	6	**Perform the BCD Addition** Addition of two 16 bit BCD numbers	02
	7	**Program to Display System Time & Date** Display current time & date of system	02
	8	**Program for HEX to BCD Conversion and vice versa** Convert HEX no. to BCD no. and BCD no. to HEX no.	02

Note:

- Concerned faculty should suitably frame at least **10 practical** assignments **(FIVE from PART – A and FIVE from PART – B)** out of the above list.
- Every assignment should include truth table, Kmap, circuit diagram (for digital system) and flowchart, algorithm, code with proper comments and output (microprocessor).
- Every student is required to submit the assignments in the form of journal.

Reference Books:

1. M. Morris Mano, "Digital Logic and Computer Design", Pearson, 1979.
2. V.K.Puri, "Digital Electronic Circuit and System", Tata McGraw Hill, 1997.
3. F.J. Hill, "Digital Logic and Microprocessor", John Willy & sons.
4. Anandkumar, "Fundamentals of Digital Circuits", Pearson.
5. John Wiley and Sons, "Introduction to Switching Theory and Logic Design", Hill and Peterson, Third edition.
6. Douglas V Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill, Second edition.
7. Soumitra Kumar Mandal, "Microprocessor and Microcontroller: Architecture, Programming and Interfacing using 8085, 8086 and 8051", Tata McGraw Hill.
8. Ramesh Gaonkar, "Microprocessor architecture, programming and applications", Second edition.
9. B Ram, "Advanced Microprocessors and Interfacing", Tata McGraw Hill.
10. Peter Abel, "IBM PC Assembly Language and Programming", Pearson, Fifth edition.
11. Barry B Bray, "The Intel Microprocessors-Architecture, Programming and Interfacing",Pearson LPE/PHI, Seventh edition.

Object Oriented Technology Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments:

	Group-A		Lab hours required
	1	**Write a program for a simple class and object.** Performing simple arithmetic operations using C++ class and object like, a. Addition, b. Subtraction, c. Multiplication, d. Division.	02
	2	**Write a program for parameterized constructor.** Demonstrate the use parameterized constructor by passing different types of parameters to the constructor.	02
	3	**Write a program for overloading constructors.** Demonstrate the concept of overloading constructor functions using class and object.	02
	4	**Write a program to find the area of rectangle, triangle and sphere using function overloading.** To calculate the area of rectangle, triangle and sphere using function overloading and class and object.	02
	5	**Write a program to overload unary operator using member function.** Demonstrate the overloading of unary operators using the concept of member functions.	02
	6	**Write a program to overload binary operator using member function.** Demonstrate the overloading of binary operators using the concept of member functions.	02
	7	**Write a program for arrays of pointers to objects.** Declaring an array of pointers to objects using suitable example.	02
	8	**Write a program using single inheritance, multiple inheritance and hierarchical inheritance.** Demonstrate the use of single inheritance, multiple inheritance and hierarchical inheritance by taking suitable example.	02
	9	**Write a program using multilevel inheritance and hybrid inheritance.** Demonstrate the use of multilevel inheritance and hybrid inheritance by taking suitable example.	02
	10	**Write a program for virtual base classes.** To calculate the total mark of a student using the concept of virtual base class.	02
	11	**Write a program to read and write class objects from files.** Writing/reading class object to/from file.	02
	12	**Write a program to format output using ios class functions and flags.** To format the output using different ios class functions and flags.	02
	13	**Write a program to format output using manipulators.** To format the output using different manipulators.	02
	14	**Write a program using class template.**	02

		To swap the numbers using the concept of function template.	
	15	**Write a program for overloading of template functions.** Overload templates functions with the number of parameters.	02

		Group- B	Lab hours required
	1	**Write a program for the copy constructor.** To calculate factorial of a given number using copy constructor.	02
	2	**Write a program to overload unary operator using friend function.** Demonstrate the overloading of unary operators using the concept of friend function.	02
	3	**Write a program to overload binary + operator using member function for concatenation of two strings.** Demonstrate the overloading of binary + operator using the concept of member function for concatenation of two strings.	02
	4	**Write a program for matrix multiplication using new and delete dynamic memory allocation operators.** Perform the matrix multiplication using new and delete dynamic memory allocation operators.	02
	5	**Write a program to convert class type data to basic type data.** Perform the class type data conversion to any basic type data.	02
	6	**Write a program for run time polymorphism using virtual functions.** Perform the run time polymorphism using virtual functions.	02
	7	**Write a program for bubble sort using template functions.** Perform the bubble sort using the concept of template functions.	02

Note:

- Concerned faculty should suitably frame at least **10 practical** assignments **(SIX from PART – A and FOUR from PART – B)** out of the above list.
- Every assignment should include algorithm, print out of code with proper comments and output.
- Every student is required to submit the assignments in the form of journal.

Guidelines for ESE:

- ESE will be based on the practical assignments submitted by the students in the form of journal.
- In the ESE, the students may be asked to perform the practical assignment with minor modification.
- Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of the program, execution of the program, type of input and output for the program.

Reference Books:

1. E. Balagurusamy, “Object Oriented Programming with C++”, Fifth Edition, Tata McGraw Hill, 2011.
2. Robert Lafore, “Object Oriented Programming in C++”, Fourth Edition, Pearson Education, 2002.
3. Ashok N. Kamthane, “Object-Oriented Programming with ANSI and Turbo C++”, Pearson Education, 2006.

4. Rajesh K. Shukla, “Object-Oriented Programming in C++”, Wiley India, 2008.
5. Bjarne Stroustrup, “C++ Programming Language”, Third Edition, Addison Wesley, 2002.
6. Yashavant P. Kanetkar, “Let Us C++”, Second Edition, BPB Publications, 2003.
7. Venugopal K.R., “Mastering C++”, First Edition, TMH, 1999.
8. Mahesh Bhave, Sunil Patekar, “Object Oriented Programming with C++”, Second Edition, 2012.
9. Herbert Schildt, “The Complete Reference C++”, Fourth Edition, TMH, 2003.

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Second Year Engineering
(Information Technology)
Faculty of Engineering and Technology

Teacher and Examiner's Manual
Semester – IV
W.E.F 2013 – 2014

Data Communication

Teacher, Paper setter and Examiners should follow the guidelines as given below.

Unit - I

Teacher should facilitate learning of Basics of Data Communication, reference models, Signals and conversion of signal.

1.	**Introduction to Data Communication and Signals**		**Lect required**	**Ref No**
	a	Basics of Data Communication: Characteristics and Components	01	1, 2
	b	Data Representation and Data Flow	01	1, 2
	c	Networks, Introduction to ISO-OSI Reference model	02	1, 2
	d	Introduction to Signals and Transmission Impairments: Analog and Digital	02	01
	e	Periodic Analog Signals, Digital Signals	01	01
	f	Transmission impairment, data rate limits, Performance	01	01

References:

1	Behrouz a Forouzan, "Data Communications and Networking", Fourth edition: TMH
2	P. C. Gupta, "Data Communications", PHI

Unit - II

Teacher should facilitate learning of Transmission Modes, Digital to analog and Analog to analog conversion of signal.

2.	**Digital transmission and Analog transmission**		**Lect required**	**Ref No**
	a	**Digital to Digital Conversion** Line Coding, Block Coding	03	1, 2
	b	**Analog to Digital Conversion** Pulse Code Modulation (PCM)	01	1, 2
	c	**Transmission Modes** Serial Transmission , Parallel Transmission	01	01
	d	**Digital-to-analog Conversion** Aspects Of Digital-to-Analog Conversion, Modulation: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Quadrature Amplitude Modulation	03	1, 2

References:

1	Behrouz a Forouzan, "Data Communications and Networking", Fourth edition: TMH
2	P. C. Gupta,"Data Communications", PHI

Unit – III

Teacher should facilitate learning of Different transmission media and multiplexing.

3.		Multiplexing and Transmission Media	Lect required	Ref No
	a	**Multiplexing** Frequency-Division Multiplexing, Wavelength-Division Multiplexing Synchronous, Time-Division Multiplexing, Statistical Time-Division Multiplexing.	04	1, 2
	b	**Guided Media** Twisted-Pair , Coaxial and Fiber-Optic Cable	02	1, 2
	c	**Unguided Media** Wireless, Radio Waves, Microwaves, Infrared	02	1, 2

References:

1	Behrouz a Forouzan, "Data Communications and Networking", Fourth edition: TMH
2	P. C. Gupta,"Data Communications", PHI

Unit – IV

Teacher should facilitate learning of Switching and Multiple Access.

4.		Switching and Multiple Access	Lect required	Ref No
	d	**Circuit-switched Networks** Three Phases, Efficiency, Delay	02	01
	e	**Datagram networks** Routing Table , Efficiency, Delay	01	01
	f	**Virtual-circuit networks** Addressing, Three Phases, Efficiency, Delay in Virtual-Circuit Networks	01	01
	a	**Random Access** Aloha, Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple, Access With Collision Detection (CSMA/CD), Carrier Sense Multiple Access With Collision, Avoidance (CSMA/CA)	02	1,2
	b	**Control Access** reservation, polling, token passing	01	1,2
	c	**Channelization** Frequency Division Multiple Access (FDMA), Time-Division Multiple Access(TDMA), Code Division Multiple Access (CDMA)	01	1,2

References:

1	Behrouz a Forouzan, “Data Communications and Networking”, Fourth edition: TMH
2	P. C. Gupta,”Data Communications”, PHI

Unit - V

Teacher should facilitate learning of Error Control and Data Link Control.

5.		Error Control and Data Link Control	Lect required	Ref No
	a	**Types of errors** Redundancy, detection versus correction, forward error correction versus retransmission, coding , modular arithmetic	01	1, 2
	b	**Block coding** Error detection, error correction, hamming distance, minimum hamming distance.	01	1, 2
	c	**Linear block codes** Minimum distance for linear block codes, some linear block codes.	01	1, 2
	d	**Cyclic codes** cyclic redundancy check	01	1, 2
	e	**Checksum** idea, one's complement, internet checksum	01	1, 2
	f	**flow and error control** Stop and wait ARQ, Go-back-N ARQ, selective repeat ARQ, Piggybacking	03	1, 2

References:

1	Behrouz a Forouzan, “Data Communications and Networking”, Fourth edition: TMH
2	P. C. Gupta,”Data Communications”, PHI

Microprocessor & Microcontroller Interfacing

Teacher, Paper setter and Examiner should follow the following guidelines.

Unit – I

Teacher should cover some problems to have application based learning for memory interfacing and 8255 PPI.

1.	Basic I/O Interface		Lect required	Ref No
	a	MSDOS FAT	02	01
	b	MS DOS Device Drivers Types, Structure of device drivers.	03	01
	c	Basic I/O Interface: Introduction, 8255 PPI : Internal block diagram, control word and status word, modes of operation, numericals on control word design.	03	02

References:

1	Ray Duncan, "Advanced MS-DOS Programming", Second edition, Microsoft Press.
2	A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Third edition, Tata Mc Graw Hill.

Unit – II

2.			Lect required	Ref No
	a	8254(PIT) : Internal block diagram, control word format, operating modes, numericals on control word design.	03	01,02
	b	8251(USART) : Architecture and signal description, operating modes, interfacing with 8086 and numericals	03	01,02
	c	TSR programs : concept and implementation	02	01,02

References:

1	Douglas V.Hall, " Microprocessors and Interfacing : Programming and Hardware", second edition , Tata Mc Graw Hill.
2	A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Third edition, Tata Mc Graw Hill.
3	Peter Abel, " IBM PC Assembly language and programming" , Fifth edition, Pearson education/ Prentice Hall of India Pvt.Ltd.

Unit – III

3.	Overall Motherboard Component Logic		Lect required	Ref No
	a	Functional block diagram of PC	01	01,02
	b	Motherboard (8086/8088 based) : Motherboard components, motherboard logic, Reset logic, Interrupt logic, RAM parity logic, NMI logic, Wait state logic, Bus Arbitration logic, RAM & ROM logic,	03	02

		CPU logic, DMA logic, keyboard interface block diagram.		
	c	Microcomputer Display : Raster scan basics, Overview of character display control system.	01	01,02
	d	PC display adapters : CGA,EGA,VGA.	02	01,02
	e	Introduction to LCD and Plasma display.	01	01

References:

1	Douglas V.Hall, " Microprocessors and Interfacing : Programming and Hardware", Second edition , Tata Mc Graw Hill.
2	B Govindarajalu, "IBM PC Clones", Second edition, Tata Mc Graw Hill.

Unit – IV

Teacher should cover basic working principle of each peripheral before interfacing it with 8086. Each point includes interfacing diagram, control word design and assembly code for the same.

4.	**8086 Microprocessor Interface**		**Lect required**	**Ref No**
	a	Parallel Printer Interface	01	02,03,04
	b	7 segment display interface	01	02,03,04
	c	Disk reading methods: FM , MFM.	01	01,05
	d	Internal structure of Floppy disk and hard disk.	01	01,05
	e	Floppy Disk Controller : Overview, FDC system interface, Overall operation of floppy disk subsystem, 8272 FDC : internal block diagram and commands.	03	01,05
	f	Hard disk controller : HDC commands and device control block.	01	01,05

References:

1	Douglas V.Hall, " Microprocessors and Interfacing : Programming and Hardware", Second edition , Tata Mc Graw Hill.
2	A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Third edition, Tata Mc Graw Hill.
3	Peter Abel, " IBM PC Assembly language and programming" , Fifth edition, Pearson education/ Prentice Hall of India Pvt.Ltd.
4	Ray Duncan, "Advanced MS-DOS Programming", Second edition, Microsoft Press.
5	B Govindarajalu, "IBM PC Clones", Second edition, Tata McGraw Hill.

Unit - V

Teacher should cover basic concepts of 8051 microcontroller addressing modes and instruction set.

5.	**8051 Microcontroller Interfacing**		**Lect required**	**Ref No**
	a	Interfacing LEDs and 7 segment display.	02	01
	b	Keys and keyboard interfacing	02	01
	c	Interfacing ADC 0808/0809	01	01
	d	Interfacing DAC 0808/0809	01	01

	e	Interfacing stepper motors.	02	01

References:

1	A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Third edition, Tata Mc Graw Hill.

Data Structures

Teacher, Paper setter and Examiner should follow the following guidelines.

Unit - I

Teacher should facilitate learning of Algorithms, data, data structures and Types of data structures and data types in C.

1.	Introduction to Data Structures		Lect required	Ref No
	a	**Concept of Data, Data objects** Understanding basics of Data, Data Objects	01	02
	b	**Data structure, Abstract Data Type (ADT)** Understanding of different types of Data Structures and Abstract Data Types.	01	02
	c	**Implementation of data structure.** Implementation of different data structure	02	02
	d	**Basic terminologies with data structures, Types of data structure.** Understand the all the terms related to data structure and different types of data structures.	01	01
	e	**Data structures operations.** Understand the different operation performed on the dta structure.	01	01
	f	Arrays, structures and pointers.	02	01,03

References:

1	Seymour Lipschutz, "Data Structures", Schaums Outlines Tata McGraw Hill, 2006
2	Ellis Horowitz and Sartaj Sahani, "Fundamentals of Data Structures", Galgotia Publication.
3	G.S.Baluja, "Data Structures through C", Dhanpatrai Publications

Unit - II

Teacher should facilitate learning of C for stack and Queue. Also how the expressions are interconverted to other forms.

1.	Stack and Queue		Lect required	Ref No
	a	**Fundamentals of stack , data structure of stack**, Describes the stack and how the stack is used.	01	01
	b	**PUSH and POP operations on stack, recursion, tower of hanoi, function call, multiple stack** Describe the operations on stack and different applications of stack.	02	01,02
	c	**Applications of stack like infix, postfix and prefix and their interconversions** Describe how the stack is used for interconverstions	03	01,02

		of expressions.		
	d	**Fundamentals of queue, data structure of queue**, Insert and delete operations on queue.	01	01,02
	e	**Circular queue, priority queue, double ended queue, applications of queue.** Describe the different types of Queue.application of queue.	01	01,02

References:

1	Ellis Horowitz and Sartaj Sahani, "Fundamentals of Data Structures", Galgotia Publication.
2	Seymour Lipschutz, "Data Structures", Schaums Outlines Tata McGraw Hill, 2006.

Unit – III

Teacher should facilitate learning of Basic of Linked List

1.	**Linked Lists**		**Lect required**	**Ref No**
	a	**Fundamentals of linked lists, representation of linked list in memory** Understand the concept of linked list and how it is better than the array.	01	01
	b	**Memory allocation and garbage collection** How memory is used for new node and how it becomes free.	01	01
	c	**Basic operations on linked list like traversal, searching, insertion, deletion, copy and concatenation.** Traversal, Insertion, Deletion, Searching of elements.	02	01
	d	**Header linked list, representing polynomials using linked list.** How to use the header linked list and also how the linked list is used to store the polynomial.	01	01
	e	**Multivariable polynomials using generalized list.** Understanding the polynomials for multivariables using generalized linked list.	01	02
	f	**Two way Lists (Double Linked list),** Understand the advantages of double linked list over the single linked list.	01	01
	g	**Basic operations on two way lists like traversal, searching, insertion and deletion.** Perform the operation on two way list like traversal,searching, insertion and deletion**.**	01	01

References:

1	Seymour Lipschutz, "Data Structures", Schaums Outlines Tata McGraw Hill, 2006.
2	Ellis Horowitz and Sartaj Sahani, "Fundamentals of Data Structures", Galgotia Publication

Unit – IV

Teacher should facilitate learning of trees and the representation of trees using various ways and also traversal, binary search tree, AVL trees.

1.	Trees		Lect required	Ref No
	a	**Fundamentals of trees, representation of tree in memory need for user defined functions.** Understand the concept of tree and how it is better than linked list.	01	01
	b	**Traversing binary trees, traversal algorithms using stack.** Understand the different operation perform by using tree traversal algorithm.	01	01
	c	**Header nodes, threaded binary tree.** Understand the threaded binary tree.	01	01
	d	**Binary search trees, basic operations on BST like creation searching ,insertion,deletion.** Defining a structure, declaring structure for tree.	02	01
	e	**AVL search trees, insertion and deletion in an AVL search tree,LL, RR, LR and RL rotations**. Understand the AVL tree and balance the height of the tree.	02	02
	f	**Path lengths and Huffman algorithm.**	01	01,02

References:

1	Seymour Lipschutz, "Data Structures", Schaums Outlines Tata McGraw Hill, 2006.
2	Ellis Horowitz and Sartaj Sahani, "Fundamentals of Data Structures", Galgotia Publication.

Unit - V

Teacher should facilitate learning of.

1.	Searching and Sorting		Lect required	Ref No
	a	**Linear search, Binary search.** Understand the different searching techniques.	01	01
	b	**Hashing, Hash functions, Collision resolution.** Understand how the Hashing function is used to solve collision detection and resolution problem**.**	01	01
	c	**Open addressing, linear probing and modifications, chaining.** Understand the different types of collision resolution methods.	01	01 & 02
	d	**Time and Space complexity of an algorithm,Big 'O', 'Ω', '□' notations.** Understand different types of notations for time complexity of algorithm.	01	01
	e	**Sorting: Bubble sort, Insertion sort.** Understand the sorting techniques.	01	01 & 02

	f	**Selection sort, Merge sort, Quick sort.** Understand the sorting techniques.	02	01 & 02
	g	**Radix sort, Heap sort , Best, worst and average case time complexity of each of sorting and searching technique.** Understand the Best,worst and average case time complexity of the different sorting techniques.	01	01 & 02

References:

1	Seymour Lipschutz, "Data Structures", Schaums Outlines Tata McGraw Hill, 2006.
2	G.S.Baluja, "Data Structures through C", Dhanpatrai Publications.
3	Ellis Horowitz and Sartaj Sahani, "Fundamentals of Data Structures", Galgotia Publication.

Computer Organization

Teacher, Paper setter and Examiner should follow the following guidelines.

Unit - I

Teacher should facilitate learning of Functional Units, Basic operational concepts, Bus structure, Instruction formats, Expanding op-codes, General Addressing Modes.

1.		Introduction to system concepts	Lect required	Ref No
	a	**Functional Units**	01	01
	b	**Basic operational concepts**	01	01 & 02
	c	**Bus structure** Single, Two & Multiple	02	01
	d	**Instruction formats** zero, one, two, three and One & half address	02	01
	e	**Expanding op-codes**	01	01 & 03
	f	**General Addressing Modes**	01	01

References:

1	Hamacher, Vransic, Zaky, "Computer Organization", Fifth edition, McGraw Hill international.
2	J.P. Hayes, "Computer Architecture and Organization", Third edition. McGraw Hill international.
3	Tanenbaum, "Structured Computer Organization", Pearson.

Unit - II

Teacher should facilitate learning of Number representation, Sign addition & subtraction, Multiplication of positive numbers using sequential circuit binary multiplier, Booths algorithm, bit pairing of multipliers, Restoring and non-restoring division algorithm. Floating Point system.

2.		Arithmetic	Lect required	Ref No
	a	**Number representation:** Signed & magnitude, 1s & 2s Compliment. Sign addition & subtraction.	02	01
	b	**Multiplication of numbers:** sequential circuit binary multiplier Booths algorithm, bit pairing of multipliers	02	01
	c	**Division Algorithm:** Restoring and non-restoring	02	01
	d	**Floating Point system** Single & Double precision, IEEE floating point format.	02	01

References:

1	Hamacher, Vransic, Zaky, "Computer Organization", Fifth edition, McGraw Hill international.

Unit – III

Teacher should facilitate learning of Processing Unit and Control Unit.

3.	Processing Unit		Lect required	Ref No
	a	**Processing Unit** Single & Three bus organization inside CPU, Execution of complete instruction (no timing diagram).	02	01
	b	**Control Unit:** Hardwired control, Micro programmed control	04	01
	c	Microinstructions, Micro program sequencing	01	01
	d.	Wilkes design.	01	02

References:

1	Hamacher, Vransic, Zaky, "Computer Organization", Fifth edition, McGraw Hill international.
2	J.P. Hayes, "Computer Architecture and Organization", Third edition, McGraw Hill international.

Unit – IV

Teacher should facilitate learning of Memory, Memory hierarchies, Cache Memories

4.	Memory		Lect required	Ref No
	a	**Memory:** SRAM, DRAM, ROM, PROM EPROM, EEPROM,	02	01
	b	**Introduction :** SDRAM, RDRAM, DDRSDRAM (without any figure & organization), Memory hierarchies.	03	01
	c	**Cache Memories**: Concepts, Mapping functions, Virtual memory, memory interleaving, Introduction to Flash memory.	03	01

References:

1	Hamacher, Vransic, Zaky, "Computer Organization", Fifth edition, McGraw Hill international.

Unit - V

Teacher should facilitate learning of System Organization.

5.	System Organization		Lect required	Ref No
	a	**System Organization**: Bus Concept, Bus arbitration techniques	02	01 & 02
	b	Daisy chaining, polling, Independent requesting	02	01 & 02
	c	PCI Bus, SCSI Bus, USB	02	01 & 02
	d	RISC & CISC concepts, RISC Vs CISC, RAID Concepts	02	01 & 02

References:

1	Hamacher, Vransic, Zaky, "Computer Organization", Fifth edition, McGraw Hill international.
2	J.P. Hayes, "Computer Architecture and Organization", Third edition , McGraw Hill international.

Computer Graphics and Multimedia

Teacher, Paper setter and Examiner should follow the guidelines as given below.

Unit – I

Teacher should facilitate learning of Basic Concepts of computer graphics.

1.	Basic Concepts		Lect required	Ref No
	a	**Basic Concepts:** Introduction to computer graphics, Application of Computer Graphics.	02	01
	b	**Graphics Devices:** Hardware devices- Input & Output devices, CRT, display and controller, Vector and raster scan display.	02	01 & 02
	c	**Linear and Circle Generation**: Line generation – DDA and Bresenhams algorithm Antialiasing.	02	01
	d	Circle Generation – DDA and Bresenham's Algorithm.	01	01 & 03
	e	**Character Generation** – Stroke principal, Starburst principle, Bitmap method.	01	01 & 03

References:

1	"Computer graphics", ISRD group, THM publications, eleventh reprint 2012.
2.	David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, Second edition
3.	Steven Harringtom, "Computer graphics A Programming Approach", McGraw Hill.

Unit - II

Teacher should facilitate learning of Concepts of Polygons.

1.	Polygons		Lect required	Ref No
	a	**Polygons:** Types, Representations, Entering polygon,	01	01
	b	**Polygon filling:** Edge flag, Seed fill, Flood fill, Scan conversion algorithm.	02	01
	c	An Inside outside test.	01	01
	d	**Scan conversion:** Real time scan conversion, Solid area scan conversion, Run length encoding and Cell encoding.	02	01 & 02
	e	**Segments:** concepts, segment table, segment creation, deletion, renaming, closing.	02	01 & 02

References:

1	"Computer graphics", ISRD group, THM publications, eleventh reprint 2012.
2.	David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, Second edition.

Unit – III

Teacher should facilitate learning of Transformations, Clipping, Hidden Surfaces & Line.

1.	2D & 3D Geometry		Lect required	Ref No
	a	**2D & 3D Geometry:** 2D transformation -Translation, Scaling, Rotation with examples.	02	01 & 02
	b	Rotation about an arbitrary point, Shearing.	01	01 & 02
	c	**3 D transformations**- Translation, Scaling, Rotation with examples.	02	01
	d	Rotation about an arbitrary axis.	01	01
	e	Shearing. Parallel & Perspective projections, 2D viewing transformation.	02	02 & 03

References:

1	"Computer graphics", ISRD group, THM publications, eleventh reprint 2012.
2.	David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, Second edition.
3.	Steven Harringtom, "Computer graphics A Programming Approach", McGraw Hill.

Unit – IV

Teacher should facilitate learning of windowing, clipping process as well as hidden lines & surfaces.

1.	Windowing and Clipping		Lect required	Ref No
	a	**Clipping Fundamentals:** Types of clipping, Line Clipping: Cohen Sutherland algorithm	01	01
	b	Mid-point subdivision algorithm, generalized clipping with Cyrus Beck Algorithm.	02	01 & 02
	c	Polygon Clipping: Sutherland-Hodgeman algorithm.	01	01 & 02
	d	**Hidden Surfaces and Lines:** Introduction, Back face removal algorithm, Z-buffer algorithm,	02	03 & 04
	e	Warnock's Algorithm, Painter algorithm.	02	03 & 04

References:

1	"Computer graphics", ISRD group, THM publications, eleventh reprint 2012.
2.	David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, Second edition.
3.	Steven Harringtom, "Computer graphics A Programming Approach", McGraw Hill
4.	Donald Hearn and Pauline Baker," Computer Graphics", Pearson LPE, Second edition.

Unit - V

1.	Light, Color and Shading		Lect required	Ref No
	a	**Light and Color**: Basic illumination models-Diffused Illumination,	02	01
	b	Point source illumination, Color Models: RGB, HVS, CYM.	02	01
	c	**Graphics Standard**: Introduction to graphics kernel system with basic primitives.	02	01 & 02
	d	**Curves:** Bezier Curve, B Spline & Corner.	02	01 & 02

References:

1	David F. Rogers, "Procedural Elements for Computer Graphics:, Tata McGraw Hill, Second edition.
2	Steven Harringtom, "Computer graphics A Programming Approach", McGraw Hill.

Application Development Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments:

	(Group A)	No. of Hours required
1	**Develop a complete web page using HTML basic tags** - A simple web page that includes basic tags such as head, body, text formatting tags, lists, paragraph, image tags etc.	02
2	**Design a web form containing CSS, Table and Layout** - A simple web form with CSS style sheet attached - It should also contain Tables and Layouts	02
3	**Design a single page web site for a university containing a description of the courses offered, it should also contain some general information about the university such as its history, the campus and its unique features** - A complete web page for University site including all necessary details	02
4	**Demonstration of Tables, Frames and Hyperlinks in an HTML Document** - A web page that includes all basic elements such as Tables, Frames and Hyperlinks	02
5	**Implementation of calculator using VB or Java script** - Simple calculator using VB or java script language	02
	(Group B)	**No. of Hours required**
1	**Develop a web page for student information using XML.** - XML based web page showing student information	02
2	**Create a web page on Menu (Food/Books/Cars) in XML without any Style Sheet Information** - XML based web page showing Food/Books/Car details	02
3	**Create a web page on CD Catalog in XML with external Style Sheet attached.**	02
4	**Create a well formed application using XML and DTD**	02
5	**Program to sort the numbers in an array** - A simple java program for sorting the numbers in a given array	02
6	**Program to implement simple java application using Key Listener** - A simple java program that demonstrates the use of key listener	02
7	**Implementation of calculator using Applet**	02
8	**Design a form using AWT**	02

Note:

- Concerned faculty should conduct at least 04 practical assignments from group A and 06 from group B of the above list.
- Every assignment should include algorithm, print out of program with proper comments and output.
- Every student is required to submit the assignments in the form of journal.

Reference Books:

1. Jon Duckett, "Beginning HTML, XHTML, CSS, and JavaScript", John Wiley & Sons publication, 2010.
2. Heather Williamson, "XML: The Complete Reference", First edition, Tata McGraw-Hill Education, 2001.
3. Herbert Schildt, "Java: The Complete Reference", Seventh edition, Tata McGraw-Hill Education, 2006.
4. Thomas A. Powell, "HTML & CSS: The Complete reference", Fifth edition, TMH 2010.
5. Elliotte Rusty Harold, "XML 1.1 Bible", Third edition, Willey Publication, 2004.
6. Steven Holzner, "XML: A Beginner's Guide", First edition, TMH, 2009.
7. Herbert Schildt, "Java: A Beginners Guide", Fifth edition, TMH, 2011.
8. Yashavant Kanetkar, "Let Us Java", BPB Publication, 2011.

Data Communication Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments:

Group-A		Lab hours required
1	Comparative analysis of different types of network cables with Specifications - Practical Study of different types of network cables – CAT-5, CAT – 6. - Study of different parameters for cables like type, Bandwidth, Length, Application. - Study of different cable specifications comparisons.	02
2	Implementation of Network performance calculator.	02
3	Network related commands such as ARP, IPCONFIG, PING, TRACERT, NSLOOKUP, GETMAC, NETSTAT etc.	04
4	I.T Infrastructure planning using Network Connecting Devices.	02
5	Network Connecting Devices Specifications and configurations. - Define Repeater ,Hub, Switch, Router - Use of Repeater, Hub, Switch, Router - Technical Specification and configuration of Repeater, Hub, Switch, Router	04

Group- B		Lab hours required
1	Implementation of Stop and Wait Protocol - Study of Stop and Wait mechanism. - Prepare an algorithm for sender and receiver. - Write separate module for sender and receiver. - Test using simple data.	02
2	Implementation of Internet checksum - Study of Internet Checksum mechanism logic. - Prepare Algorithm for sender and receiver. - Write simple programs for sender and receiver.	02
3	Crimping of cross-wire and straight-through UTP cable to inter-	02

	connect two computers - Study of crimping tool. - Study of color coding of Network cables. - Crimping the cable using Crimping Tool - Test the crimping by interconnecting two computers & using any standard software tool.	
4	Interconnections of computers in Local Area Network to share resources. - Configure and verify computers in LAN using control panel. - Consider Printer as a shared resource. - Consider any Disk Drive as a shared resource - Perform Sharing operation for printer & Disk Drive.	02
5	Implementation of cyclic redundancy check - A simple Program should consist of a certain number of check bits, (checksum), are appended to the message being transmitted	02

Note:

- Concerned faculty should suitably frame 08 practical assignments (Four from PART – A and Four from PART – B) from above list.
- Every student is required to submit the assignments in the form of journal.

Guide lines for ICA:

ICA shall be based on continuous evaluation of student performance throughout semester and practical assignment submitted by the student in the form of journal.

Reference Books:

1. Behrouz A Forouzan, "Data Communications and Networking", Fourth edition: Tata McGraw Hill.
2. P. C. Gupta, "Data Communications", PHI Publications.
3. William Stallings, "Data & Computer Communications", Seventh edition: PHI Publication.
4. Leon - Garcia, Indra Widijaja, "Communication Networks Fundamental Concepts and Key Architectures", Second edition: McGraw Hill Education.
5. Achyut Godbole, "Data Communication Networks", Tata McGraw Hill.
6. Bruce Hartpence, "Packet Guide to Routing and Switching", O'Reilly.
7. Bruce Hartpence, "Packet Guide to Core Network Protocol" , O'Reilly.
8. James Irvine & David Harle, "Data Communication and Networks: An Engineering Approach", Wiley Edition.

Microprocessor & Microcontroller Interfacing Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments.

	Group-A		Lab hours required
	1	Program for mouse interfacing.	02
	2	Program for graphics editor.	02
	3	Program for PC to PC communication using serial port.	02
	4	Program for parallel printer interfacing.	02
	5	Program for ADC interfacing with 8086.	02
	6	Program for DAC interfacing with 8086.	02
	7	Program for stepper motor interfacing.	02
	8	Program for printer device driver.	02

	Group- B		Lab hours required
	1	Program for interfacing LEDs.	02
	2	Program for interfacing 7-segment displays.	02
	3	Program for keyboard interfacing.	02
	4	Program for ADC interfacing.	02
	5	Program for DAC interfacing.	02
	6	Program for stepper motor interfacing.	02

Note:

- Concerned faculty should suitably frame at least 1**0 practical** assignments **(Six from PART – A and Four from PART – B)** out of the above list.
- Every assignment should include algorithm, print out of program with proper comments and output(if possible).
- Every student is required to submit the assignments in the form of journal.

Guidelines for ESE:

- ESE will be based on the practical assignments submitted by the students in the form of journal.
- In the ESE, the students may be asked to perform the practical assignment with minor modification.
- Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of program, execution of the program, type of input and output for the program.

Reference Books:

1. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", Second edition, Tata McGraw Hill.
2. A. K. Ray & K. M. Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Third edition, Tata Mc Graw Hill.
3. Ray Duncan, "Advanced MS-DOS Programming", Second edition, Microsoft Press.
4. Peter Abel, " IBM PC Assembly language and programming" , Fifth edition, Pearson education/ Prentice Hall of India Pvt. Ltd.
5. B. Govindarajalu, "IBM PC and Clones", Second edition, Tata McGraw Hill.

Data Structures Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments.

		(Group A)	Lab hours required
	1	**Implementation of stack using array or linked list.** Performing simple operations like push, pop and display with respect to stack.	02
	2	**Implementation of queue using array or linked list.** Performing simple operations like insertion and deletion of an element into the queue.	02
	3	**Implementation of circular queue using array or linked list.** Performing simple operations like insertion and deletion of an element into the circular queue.	02
	4	**Conversion of infix expression to postfix expression.** performing simple conversions of given infix expression into postfix expression.	02
	5	**Conversion of postfix expression to infix expression**. performing simple conversions of given postfix expression into infix expression.	02
	6	**Program for addition of two single variable polynomials using linked list.** performing the addition of two polynomials using linked list.	02
		(Group B)	**(Group A)**
	1	**Implementation of double linked list & perform insertion, deletion and searching.** Performing the operations on double linked list like insertion ,deletion and searching.	02
	2	**Creation of binary tree & perform all non-recursive traversals.** Create the binary tree and perform the inorder,preorder and postorder traversal.	02
	3	**Creation of binary search tree & perform insertion, deletion and printing in tree shape.** Create the Binary Search tree and performing the operations on BST like insertion, deletion and printing in tree shape.	02
	4	**Create a hash table and handle the collision using linear probing with or without replacement.** creation of hash table and handle the collision using linear probing with or without replacement.	02
	5	**Implementation of Quick Sort.** Sort the given set of numbers using Quick sort.	02
	6	**Implementation of Radix sort.** Sort the given set of numbers using Radix sort.	02
	7	**Implementation of Merge sort.** Sort the given set of numbers using Merge sort.	02

	8	**Conversion of infix expression to prefix expression.** Performing simple conversions of given infix expression into prefix expression.	02

Note:

- Concerned faculty should suitably frame at least FIVE practical assignments from group A and 05 from group B of the above list.
- Every assignment should include theoretical concept, algorithm, print out of program with proper comments and output.
- Every student is required to submit the assignments in the form of journal.

Guidelines for ESE:

- ESE will be based on the practical assignments submitted by the students in the form of journal.
- In the ESE, the students may be asked to perform the practical assignment with minor modification.
- Evaluation will be based on the paper work of concept understanding of topic and algorithm, understanding of the logic and the syntax, quality of program, execution of the program, type of input and output for the program.

Reference Books:

1. G.S.Baluja, "Data Structures through C", Dhanpatrai Publications.
2. Ashok N. Kamthane, "Introduction to Data structures in C",Person Publications,2007.
3. Aarom Tanenbaum, Yedidyah Langsam, Moshe Augenstein, "Data structures using C", Pearson Publication.
4. Alfred Aho, John Hopcroft, Jeffrey Ullman, "Data Structures and Algorithms",Pearson Publications.
5. E.Balagurusamy,"Data Structures using C",Tata MacGraw Hill Publications.
6. P.S.Deshpande, O.G.Kakde, "C and Data Structures", dreamtech press Publications.
7. Rajesh K.Shukla, "Data Structures using C and C++" ,Willy India Publication.

Larry Nyhoff, "ADTs' Data Structures and prolems with C++",Pearson Publications.

Computer Graphics and Multimedia Lab

LAB COURSE CONTENT

Teacher should facilitate learning following lab experiments.

		Group A (Computer Graphics)	Lab hours required
	1	**Study of various Graphics Commands** Finds different graphics commands like line, circle, polygon , square etc.	02
	2	**Line generation using DDA** Draw straight line using DDA algorithm.	02
	3	**Different Line Style using Bresenhams Algorithm** Draw different styles of line like – Dotted Line , Dashed Line,etc.	02
	4	**Circle Generation using Bresenhams Algorithm** Draw 8 way symmetry circle by using Bresenhams algorithm.	02
	5	**Program for Polygon Filling** Draw polygon & then filled it by using any filling method like seed fill, flood fill or scan line algorithm.	02
	6	**Program for 2D Transformations (Translation, Rotation and Scaling)** Perform 2D transformation on any polygon like- Translation, Rotation & Scaling.	02
	7	**Program for Segmentation** Crete segment, Close segment, Delete segment & Open segment.	02
	8	**Program for 3D rotation** Perform 3D transformation on any polygon like- Translation, Rotation & Scaling.	02
	9	**Program for Parallel Projections** To draw polygon & show Parallel projection on it.	02
	10	**Program for Perspective Projection** To draw polygon & show Perspective projection on it.	02
		Group B (Multimedia)	
	1	**Program for animation using C/C++.**	02
	2	**Program using flash.**	02
	3	**Program using dream viewer.**	02
	4	**Mini Project based on creating animation using Maya.**	02

Guidelines for ESE:

- ESE will be based on the practical assignments submitted by the students in the form of journal.
- Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of program, execution of the program, type of input and output for the program .
- Simple program codes may be asked based on above syllabus.

Text Books:

1. "Computer graphics", ISRD group, THM publications, Eleventh reprint 2012.
2. Ranjan Parekh, "Principles of Multimedia", McGraw Hill.

Reference Books:

1. David F. Rogers, "Procedural Elements for Computer Graphics, Tata McGraw Hill,Second edition.
2. Shirley, Marshner, "Fundamentals of Computer Graphics", 3rd Ed, CRC Publication/ A.K. Peters.
3. Steven Harringtom, "Computer graphics A Programming Approach", MGH.
4. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI.
5. Maurya, "Computer Graphics: with virtual reality system", Wiley India.
6. Donald Hearn and Pauline Baker," Computer Graphics", Pearson LPE, Second edition.
7. Rao and Prasad," Graphics user interface with X windows and MOTIF", New Age.
8. Foley, Vandam, Feiner, Hughes, "Computer Graphics Pricipals & Practice", Pearson Second edition.