

**NORTH MAHARASHTRA UNIVERSITY,
JALGAON (M.S.)**

**Second Year Engineering
(Computer)
Faculty of Engineering and
Technology**



**COURSE OUTLINE
Semester - III
W.E.F 2013 - 2014**

Annexure - I

SE Semester - III

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory			Practical	Total	
						ISE	ESE	ICA	ESE		
Engineering Mathematics-III	A	3	1	---	4	20	80	---	---	100	4
Analog & Digital Electronics	B	3	---	---	3	20	80	---	---	100	3
Discrete Structure & Graph Theory	D	3	1	---	4	20	80	---	---	100	4
Microprocessor & Microcontroller	D	3	---	---	3	20	80	---	---	100	3
Object Oriented Technology	D	3	---	---	3	20	80	---	---	100	3
Soft Skills - III	C	1	---	2	3	---	---	50	---	50	2
Analog & Digital Electronics Lab	B	---	---	2	2	---	---	50	---	50	1
Discrete Structure & Graph Theory Lab	D	---	---	2	2	---	---	25	25 (PR)	50	1
Microprocessor & Microcontroller Lab	D	---	---	2	2	---	---	25	25 (PR)	50	1
Object Oriented Technology Lab	D	---	---	2	2	---	---	25	25 (PR)	50	1
Total		16	2	10	28	100	400	175	75	750	23

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

SE Semester - IV

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	Theory		Practical		Total	
						ISE	ESE	ICA	ESE		
Data Communication	D	3	---	---	3	20	80	---	---	100	3
Microprocessor & Microcontroller Interfacing	D	3	1	---	4	20	80	---	---	100	4
Data Structures	D	3	1	---	4	20	80	---	---	100	4
Computer Organization	D	3	---	---	3	20	80	---	---	100	3
Computer Graphics	D	3	---	---	3	20	80	---	---	100	3
Application Development Lab	B	1	---	2	3	---	---	50	---	50	2
Data Communication Lab	D	---	---	2	2	---	---	50	---	50	1
Microprocessor & Microcontroller Interfacing Lab	D	---	---	2	2	---	---	25	25 (PR)	50	1
Data Structures Lab	D	---	---	2	2	---	---	25	25 (PR)	50	1
Computer Graphics Lab	D	---	---	2	2	---	---	25	25 (PR)	50	1
Total		16	2	10	28	100	400	175	75	750	23

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

Engineering Mathematics –III

COURSE OUTLINE

Course Title	Short Title	Course Code
Engineering Mathematics -III	EM-III	

Course Description:

This course is aimed at introducing the fundamentals of basic Mathematics to undergraduate students. The background expected includes a prior knowledge of Mathematics from first year engineering or diploma and familiarity with various laws, principles and theories. The goals of the course are to understand the basic principle of Mathematics and its application in different area.

Lecture	Hours / Week	No. of Weeks	Total Hours	Semester Credits
	03	15	40	04
Tutorial	01	15	13	

Prerequisite Course(s): Engineering Mathematics-I, Engineering Mathematics-I / Diploma Mathematics.

COURSE CONTENT

Engineering Mathematics -III

Semester- III

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks

Tutorial: 1 hour / week

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

1. Laplace Transform (08 Hours, 16 marks)

- Definition and Existence of Laplace transforms.
- Laplace Transform of elementary/standard functions.
- Theorems and Properties of Laplace Transform (without proof).
- Inverse Laplace Transform.
- Laplace Transform of Unit step function.
- Solution of differential equations using LT.

2. Fourier Transform and Z-Transform (08 Hours, 16 marks)

A) Fourier Transform:

- Introduction to Fourier Integral theorem.
- Fourier Transforms, Fourier Cosine Transforms, Fourier Sine Transform and their inverse.

B) Z- Transform:

- Definition and standard properties (without proof)
- Region of Convergence.
- Z-Transform of standard / elementary sequences.
- Inverse Z-transform.

3. Statistics and Probability distributions (08 Hours, 16 marks)

- Introduction to Mean, Mode, Median standard deviation, Variance, Coefficient of Variation.
- Moments, Skewness and kurtosis.
- Correlation and Regression.
- Binominal Distribution.
- Poisson distribution.
- Normal distribution.

4. Testing of Hypothesis and Significance (08 Hours, 16 marks)

- Introduction to population parameters and statistics.
- Testing of Hypothesis, Null Hypothesis and Alternative Hypothesis.
- Level of Significance.
- Test of Significance of large sample.
- Chi-Square test.

5. Fuzzy Sets and System (08 Hours, 16 marks)

- Introduction to Fuzzy sets.
- Standard Fuzzy sets operations.
- Crisp sets, Crisp sets verses Fuzzy sets.
- Fuzzy arithmetic.
- Constructing Fuzzy sets and operations on Fuzzy sets and systems
- Applications of Fuzzy sets.

Text Book:

1. Debashis Dutta, "Textbook of Engineering Mathematics", New Age International Publishers.
2. Witold Pedrycz and Fernando Gomide, "An Introduction to Fuzzy Sets: Analysis and Design", Prentice Hall of India, New Delhi.

Reference Books:

1. H.K. Dass, "Advanced Engineering Mathematics", S. Chand Publication, New Delhi.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Eastern Ltd.
3. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publication, Delhi.
4. Wylie C.R. & Barrett, "Advanced Engineering Mathematics", Mc Graw Hill
5. B.V. Raman, "Engineering Mathematics", Tata Mc Graw Hill.
6. N. P. Bali, "A Text Book of Engineering Mathematics", Laxmi Publication.
7. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic: Theory and Applications".

Analog and Digital Electronics

COURSE OUTLINE

Course Title
Analog & Digital Electronics

Short Title Course Code
ADE

Course Description:

This course provides an introduction to Operational Amplifier & its applications. Digital electronics & its applications covering: different types of codes, Boolean laws, sop and pos form, K map technique, Arithmetic circuits such as Adder, Subtractor. Multiplexer, Demultiplexer and their application; different types of flip-flops.

Lecture	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): Fundamental knowledge of EEEE (Elements of Electronics and Electrical Engineering).

COURSE CONTENT

Analog & Digital Electronics

Semester-III

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks

Tutorial: 1 hour / week

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

- 1 Operational Amplifier Basics & applications (08 Hours, 16 marks)**
 - a Advantages of ICs over discrete components
 - b Block diagram of op-amp ,op-amp symbol, op-amp IC 741- pin diagram
 - c Basic arithmetic operation circuits.
 - d Instrumentation amplifier
 - e V to I and I to V converter, its applications
 - f Sample and hold circuit

- 2 Comparators and Signal Generators (08 Hours, 16 marks)**
 - a Inverting and non inverting comparator.

- b Zero crossing detector, window detector
- c Schmitt trigger, its advantages.
- d Limitation of op-amp as comparator.
- e Waveform generator circuits.
- f Timer IC 555 & its operating modes.

3 Review of fundamental concepts (08 Hours, 16 marks)

- a Basic gates, universal gates & Exclusive gates
- b Digital Signal, Positive & Negative logic
- c Boolean Algebra: Boolean postulate and Theorems
- d Examples of realization of Boolean functions using Boolean algebra
- e Introduction to digital logic families: DTL, TTL & CMOS

4 Combination logic design (08 Hours, 16 marks)

- a Standard representation of logical function.
- b K map representation of logical function.
- c Simplification of logical function using K map for 2, 3 & 4 variables.
- d K map with Don't care condition.
- e Design of half adder, full adder half subtractor, full subtractor.

5 Combination logic design examples (08 Hours, 16 marks)

- a Example of combinations logic circuit.
- b Implementation with the help of Basic/Universal gates.
- c Design of multiplexer & Demultiplexer.
- d Design of comparator circuits using logic gates.
- e Design of parity generator & checker circuit using logic gates.
- f Introduction to sequential logic circuit.

Text Books:

1. D. Roy Chaudhary, Shail Jain "Linear Integrated Circuit", New Age International, Second edition.
2. R.P. Jain "Modern Digital Electronics", TMH, Third edition.

Reference Books:

1. Ramakant A. Gaikward "Op amp and Integrated circuit", PHI, Fourth edition, 2012.
2. Coughling, Driscoll "Op amps and Linear Integrated Circuits", Pearson education, Sixth edition.
3. M. Morris Mano "Digital Logic and Computer Design", Pearson.
4. A Anandkumar "Fundamentals of Digital Circuits", Pearson.

5. Sergio Franco "Design with Operational Amplifier and Analog Integrated Circuits", TMH- Third edition.
6. Botkar "Integrated circuits", Khanna Pub.

Discrete Structure and Graph Theory

COURSE OUTLINE

Course Title
Discrete Structure and Graph Theory

Short Title Course Code
DSGT

Course Description:

The objective of this course is to introduce the students to the fundamentals of Discrete Structures and also with Graph Theory with concepts of the C programming language and enable them to apply these concepts for solving real world problems.

Lecture	Hours / Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	04
Tutorial	01	15	15	

Prerequisite Course(s): Fundamental knowledge of C

COURSE CONTENT

Discrete Structure and Graph Theory

Semester-III

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

Tutorial: 1 hour / week

End Semester Examination (ESE) : 80 Marks

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

- 1. Propositions, Sets, Probability (08 Hours, 16 marks)**
 - a Propositions, compound proposition, basic logical operations, truth tables, tautology, contradiction.
 - b Quantifiers: universal and existential quantifiers.
 - c Theory: Set, Combinations of Sets, Mathematical Induction Principle.
 - d Cardinality of finite Sets, Rule of sum, Rule of product.
 - e Permutations, Combinations.
 - f Discrete Probability.

- 2. Relations and Functions: (08 Hours, 16 marks)**
- a Definitions, properties of Binary relations.
 - b Equivalence Relations and partitions, Partial ordering relations.
 - c Lattice, chains and antichains.
 - d Transitive Closure and Warshall's Algorithm.
 - e Functions Definitions, Composition of Functions, Types of Function.
 - f Recursive Functions, Pigeonhole principle.
- 3. Recurrence Relation and Analysis of Algorithms (08 Hours, 16 marks)**
- a Recurrence Relation, Linear Recurrence Relations with constant Coefficients.
 - b Homogeneous Solutions, Particular Solutions, total solutions, Solution by the method of generating functions.
 - c Introduction, Largest number algorithm, sorting algorithms: Bubble sort.
 - d Divide and conquer algorithms: binary search algorithm.
 - e strassens matrix multiplication, Time Complexity of Algorithms.
 - f Complexity of Problems, Tractable and Intractable Problems.
- 4. Graphs and Trees (08 Hours, 16 marks)**
- a Basic terminology, multigraphs and weighted graph , paths and circuits.
 - b Dijkstra's shortest path algorithms.
 - c Euler and Hamiltonian Paths and circuits .
 - d factors of a graph, Planner graph.
 - e Trees, rooted trees, path length in rooted trees.
 - f prefix code, binary search trees.
 - g spanning trees and cut set, minimum spanning trees.
 - h kruskal's and prim's algorithms for minimum spanning tree.
- 5. Algebraic system Boolean algebra (08 Hours, 16 marks)**
- a Semigroup, Subsemigroup, Monoid, Submonoid.
 - b Abelian Group, Subgroups.
 - c Isomorphism, Automorphism, Homomorphism .
 - d Ring, Integral domain ,field .
 - e Lattice and Algebraic systems, Principle of duality.
 - f basic properties of lattice defined by lattices, distributive and complemented lattices.
 - g Boolean lattices and Boolean algebras, Boolean functions and Boolean Expressions.
 - h Number system and Interconversion of number systems.

Text Books:

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

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.

Microprocessor and Microcontroller

COURSE OUTLINE

Course Title
Microprocessor and Microcontroller

Short Title Course Code
MPMC

Course Description:

The objective of this course is to introduce the students to the fundamentals of microprocessor, microcontroller and microprocessor programming and enable them to apply these concepts for solving real world problems.

Lecture	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): Fundamental knowledge of microprocessor basics.

COURSE CONTENT

Microprocessor and Microcontroller

Semester-III

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

1. 8086/8088 Microprocessor (08 Hours, 16 marks)

- a. 8086 Architecture
- b. 8086 Programming Model
- c. 8086 Memory Segmentation
- d. 8086 Instruction Set
- e. DOS & BIOS Interrupts
- f. Macro and Procedure

2. 8086 Configuration & Other Peripherals (08 Hours, 16 marks)

- a. 8086 Minimum Mode

- b. 8086 Maximum Mode
- c. 8259A PIC block diagram
- d. 8259A operating modes
- e. DMA Basics
- f. 8237 DMAC

3. Main Memory Design (08 Hours, 16 marks)

- a. 8086 interfacing with RAM
- b. 8086 interfacing with ROM
- c. Address decoding
- d. Address decoding techniques: Full, Block and Block
- e. Troubleshooting the memory module

4. Multiprocessor Configuration (08 Hours, 16 marks)

- a. Tightly & loosely coupled system
- b. Bus arbitration schemes
- c. NDP Basics
- d. 8087 architecture and programming model
- e. 8087 data types
- f. 8087 instruction set and programming
- g. Interconnection of 8087 with 8086

5. Microcontroller (08 Hours, 16 marks)

- a. Introduction to Microcontroller
- b. 8051 microcontroller Architecture
- c. 8051 hardware Features
- d. Input/output pins and Internal RAM organization
- e. Ports and Circuits and External memory
- f. Counters and Timers and Serial data I/O, Interrupts

Text Books:-

1. A. Ray, K. Bhurchandi, "Advanced Microprocessors and Peripherals: Architecture, Programming & Interfacing", Tata McGraw Hill, Third edition, 2004.
2. Kenneth Ayala, "The 8051 Microcontroller Architecture, Programming & Applications", Penram International, Second edition, 2006.

Reference Books:

1. Soumitra Kumar Mandal, "Microprocessor and Microcontroller: Architecture, Programming and Interfacing using 8085, 8086 and 8051", Tata McGraw-Hill.
2. Douglas V Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill, Second edition.
3. Peter Abel, "IBM PC Assembly Language and Programming", Pearson, 5th edition.
4. Ramesh Gaonkar, "Microprocessor architecture, programming and applications", Second edition.
5. K Uma Rao, "8051 Microcontroller: Internals, Instructions, Programming and Interfacing", Pearson.
6. John E. Uffenbeck, "The 8086/ 8088 Family: Design, Programming and Interfacing", Pearson, 1987.
7. Barry B Bray, "The Intel Microprocessors-Architecture, Programming and Interfacing", Pearson LPE/PHI, Second edition.
8. M.T.Savaliya, "8086 Programming and Advanced Processor Architecture", Wiley India.
9. V Udayashankra, "8051 Microcontroller", Mc-Graw-Hill.
10. I. Scott Mackenzie, "The 8051 Microcontroller", Pearson.

Object Oriented Technology

COURSE OUTLINE

Course Title
Object Oriented Technology

Short Title Course Code
OOT

Course Description:

The objective of this course is to introduce the students to the concepts of C++ programming language and enable them to apply these concepts for solving real world problems.

Lecture	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): C Programming.

COURSE CONTENT

Object Oriented Technology

Semester-III

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks
Paper Duration (ESE) : 03 Hours
Internal Sessional Exam (ISE) : 20 Marks

1. Introduction to Object Oriented Programming

(08 Hours, 16 marks)

- a. Introduction to procedural, modular and object-oriented programming techniques.
- b. Limitations of procedural programming.
- c. Need of object-oriented programming. Advantages, disadvantages and applications of OOP.
- d. Class, objects, abstraction, encapsulation, data hiding, inheritance, polymorphism and message passing.
- e. The basics of C++
- f. Expressions

2. **Classes and Objects, Function and Operator Overloading**
(08 Hours, 16 marks)
 - a. Class and objects
 - b. Constructors and destructors:
 - c. Functions in C++
 - d. Function Overloading
 - e. Operator overloading

3. **Pointers and Arrays** **(08 Hours, 16 marks)**
 - a. Introduction, pointer declaration, voids pointers.
 - b. Pointers to class objects, this pointer.
 - c. Pointers to members, accessing private members with pointers.
 - d. Characteristics of arrays, initialization of arrays.
 - e. Arrays within a class, arrays of objects.
 - f. Dynamic memory allocation using new and delete operators.
 - g. One dimensional and two dimensional arrays using pointers.

4. **Inheritance, Virtual functions and Polymorphism**
(08 Hours, 16 marks)
 - a. Introduction, base and derived classes. Inheritance types, access modifiers.
 - b. Single inheritance, multiple and multilevel inheritance, hybrid, hierarchical, multipath inheritance and virtual base classes.
 - c. Overriding base class members. Constructors and inheritance, calling base class constructor.
 - d. Static and dynamic binding. Pointers to base and derived classes.
 - e. Virtual functions, rules for virtual functions, working of virtual functions, pure virtual functions.
 - f. Virtual base classes.

5. **Files and Streams, Managing Console I/O Operations and Templates**
(08 Hours, 16 marks)
 - a. Concept of a file, file stream operations.
 - b. Opening a file using constructor and open function, closing a file, detecting end-of-file, file modes, file pointers.
 - c. Introduction to C++ streams, stream classes, unformatted and formatted I/O.
 - d. ios class functions and flags, manipulators.
 - e. Introduction to function template and class template.

- f. Overloading of templates functions.
- g. Member function templates and template arguments.

Text 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.

Reference Books:

1. Ashok N. Kamthane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education, 2006.
2. Rajesh K. Shukla, "Object-Oriented Programming in C++", Wiley India, 2008.
3. Bjarne Stroustrup, "C++ Programming Language", Third Edition, Addison Wesley, 2002.
4. Yashavant P. Kanetkar, "Let Us C++", Second Edition, BPB Publications, 2003.
5. Venugopal K.R., "Mastering C++", First Edition, TMH, 1999.
6. Mahesh Bhawe, Sunil Patekar, "Object Oriented Programming with C++", Second Edition, 2012.
7. Herbert Schildt, "The Complete Reference C++", Fourth Edition, TMH, 2003.

- iv. Linear Equations – Elimination Method
- v. Substitution Method
- vi. Applications

c. Averages and Mixtures

- i. Concept of Average
- ii. Faster Ways of Finding It
- iii. The Allegation Method
- iv. Applications

Unit-II: Arithmetic-II

(03 Hours, 10 marks)

a. Percentages

- i. Concept of Percentage
- ii. Working with Percentages
- iii. Applications

b. Profit and Loss

- i. Difference between Cost and Selling Price
- ii. Concept of Profit Percentage and Loss Percentage
- iii. Applications

c. Time and Work

- i. Basic Time and Work Formula
- ii. Relation between Time and Work
- iii. Applications

Unit-III: Arithmetic-III

(03 Hours, 10 marks)

a. Permutations and Combinations

- i. Sum Rule of Disjoint Counting
- ii. Product Rule of Counting
- iii. Concept of Factorial
- iv. Permutations
- v. Linear Permutations
- vi. Combinations
- vii. Circular Permutations
- viii. Applications

b. Probability

- i. Definition and Laws of Probability
- ii. Mutually Exclusive Events
- iii. Independent Events
- iv. Equally Likely Events
- v. Exhaustive Events
- vi. Cards
- vii. Dice
- viii. Applications

c. Time and Distance

- i. Speed
- ii. Conversion Factors for Speed
- iii. Average Speed
- iv. Moving Bodies – Passing, Crossing and Overtaking
- v. Relative Speed
- vi. Boats and Streams
- vii. Applications

Unit-IV: Non-Verbal Reasoning

(02 Hours, 10 marks)

a. Analogies

- i. Examples
- ii. Applications

b. Classification

- i. Examples
- ii. Applications

c. Sequences

- i. Examples
- ii. Applications

Unit-V: Analytical Reasoning

(03 Hours, 10 marks)

a. Analytical Puzzles

- i. Classification Puzzles
- ii. Ordering Puzzles
- iii. Assignment Puzzles
- iv. Applications

b. Letter and Number Series

- i. Different Types of Letter Series
- ii. Different Types of Number Series
- iii. Mixed Series

c. Coding and Decoding

- i. Letter Coding
- ii. Number Coding
- iii. Mixed Coding
- iv. Odd Man Out
- v. Applications

Guide lines for ICA:

ICA will be based on credit tests and assignments submitted by the student in the form of journal.

Reference Books:

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

Analog & Digital Electronics Lab

LAB COURSE OUTLINE

Course Title
Analog & Digital Electronics

Short Title Course Code
ADE

Course Description:

This laboratory provides students with a comprehensive study of operational amplifier, its various applications & digital circuits.

	Hours / Week	No. of Weeks	Total Hours	Semester Credits
Laboratory	02	15	30	01

Total Semester Credits: 1

Prerequisite Course(s): Fundamental knowledge of Elements of Electrical and Electronics Engineering.

LAB COURSE CONTENT

Outline of Content:

(Note: Minimum FOUR Experiments from group A and FOUR from group B.)

Group A

1. Design of Inverting & non -inverting summing amplifier.

Performing simple arithmetic operations of addition using op-amp in both configurations.

2. Design of Instrumentation amplifier.

Find out the gain of instrumentation amplifier theoretically & practically.

3. Design of active integrator and differentiator circuits.

Take the response of circuit for different waveforms.

4. Find out the hysteresis voltage of Schmitt trigger circuit

Measure the hysteresis voltage.

5. Generate square, triangular and saw tooth wave using op-amp.

Measure the output frequency.

6. Timer using IC 555 in monostable and astable mode.

Calculate the delay provided by IC 555.

Group B

1. Verification of the truth table of logic gates and verification of De Morgan's theorem.

Implement the circuit to verify the operation of logic gates & De-Morgan's theorem.

2. Construction of basic gates using universal gate (NAND / NOR)

To verify the truth table of basic gates using universal gates.

3. Construction of half adder & full adder circuit. Implementation of full adder with the help of two half adder circuit & one OR gate.

Construct the circuits & verify the truth table.

4. Construction of Half subtractor & full subtractor Circuit.

Construct the circuits & verify the truth table.

5. Conversion of Gray to Binary and Binary to gray code.

- a. Prepare the truth table of Gray to binary code.
- b. All the 16 combinations of inputs are given at respective pins
- c. Verify the truth tables of Gray to binary code.

6. Verification of truth table of multiplexes & flip flops.

- a. Prepare the truth table of multiplexer & flip-flops.
- b. Based on the select line one of the input will be selected at the output.
- c. Observe the output of multiplexer and verify the truth table.
- d. Examine the output of flip-flops and validate the truth table.
- e. Check out the output for J-K flip-flops, when J and k both inputs are at logic .

Guide lines for ICA:

- ICA will be based on the practical assignments submitted by the students in the form of journal.
- Evaluation will be based on the circuit diagram, understanding of the operation of circuit, observations, type of input and output for circuit.

Reference Books:

1. Ramakant A. Gaikward – “Op amp and Integrated circuit”, PHI, Fourth edition, 2012.
2. Coughling, Driscoll - Op amps and Linear Integrated Circuits, Pearson education, Fourth edition.
3. Digital Logic and Computer Design by M. Morris Mano, Pearson.
4. Fundamentals of Digital Circuits by A Anandkumar, Pearson.
5. Sergio Franco - Design with Operational Amplifier and Analog Integrated Circuits, TMH- Third edition.

Discrete Structure and Graph Theory Lab

LAB COURSE OUTLINE

Course Title
Discrete Structure and Graph Theory

Short Title Course Code
DSGT

Course Description:

This laboratory provides students with a comprehensive study of the C programming language in discrete structures and graph theory. Classroom lectures stress the strengths of C which provide students with the means of writing efficient codes for discrete structures and graph theory.

	Hours / Week	No. of Weeks	Total Hours	Semester Credits
Laboratory	02	15	30	01

Total Semester Credits: 1

Prerequisite Course(s): Fundamental knowledge of C.

LAB COURSE CONTENT

Outline of Content:

(Note: Minimum FIVE experiments from the group A and minimum FIVE experiments from the group B.)

(Group A)

- 1. A program for logical operations using bitwise operators.**

Perform logical operations like AND,OR,NOT,IF THEN,IF AND ONLY IF

- 2. A program for set operations: Union, Intersection, Difference, Symmetric difference.**

Perform set operations like union, intersection, difference, symmetric difference, complement

- 3. A program for generation of Power set of a given set.**

Producing power set for a given input set.

- 4. A program for generation of permutations.**

Producing permutations set for a given input set.

- 5. A program for generation of combinations.**

Producing permutations set for a given input set.

6. A Program for Bubble sort.

Sorting of given numbers by using Bubble sort.

(Group B)

1. A Program for Matrix multiplication.

Performing Multiplication of two matrices.

2. A Program for Binary search.

Searching of a given number using binary search.

3. A Program for Shortest Path algorithm using Dijkstra's.

Finding shortest path in a graph using Dijkstra's algorithm.

4. A program for implementation of Kruskal's algorithm.

To find minimum spanning tree using kruskals algorithm.

5. A program for implementation of Prim's algorithm.

To find minimum spanning tree using kruskals algorithm.

6. A program for Inter conversion of number system.

Interconverting numbers from one base to another base.

Text Books:

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

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.

Microprocessor and Microcontroller Lab

LAB COURSE OUTLINE

Course Title
Microprocessor and Microcontroller

Short Title Course Code
MPMC

Course Description:

This laboratory provides students with a comprehensive study of the basic concepts of microprocessor and microcontroller. Classroom lectures stress the strengths of microprocessor programming, which provide students with the means of writing efficient, maintainable, and portable code.

	Hours / Week	No. of Weeks	Total Hours	Semester Credits
Laboratory	02	15	30	01

Total Semester Credits: 1

Prerequisite Course(s): Fundamental knowledge of assembly programming language.

LAB COURSE CONTENT

Outline of Content:

(Note: Concerned faculty should suitably frame at least 10 experiments related to 8086 and 8087 only. Program based on 8087 are compulsory.)

(Group A)

1. Program using Macro

Display personal information using Macro

1. Program using NEAR and FAR Procedure

Addition of two numbers using NEAR and FAR Procedure Perform

2. Perform addition/subtraction/multiplication of two numbers

Addition/subtraction/multiplication of two numbers using NEAR and FAR Procedure

3. Find factorial of given number

Find factorial of given number using recursive instruction

4. Program for Password Verification

Program for Password Verification

5. Perform the BCD Addition

Add two 16 bit BCD numbers

6. Program to Display System Time & Date

Display current Time & Date of system

7. Program for addition of first 50 BCD Numbers

Add first 50 BCD Numbers, result is also BCD number

(Group B)

1. Program for HEX to BCD Conversion and vice versa

Convert HEX no. to BCD no. and BCD no. to HEX no.

2. Generate sine wave using 8087 instructions

Generate sine wave using 8087 instructions

3. Generate sum of series using 8087 instructions

Generate sum of series such as $1+x/1!-x/2!$

4. Solve the Quadratic Equations using 8087 instructions

Simplify the Quadratic Equations using 8087 instructions

5. Generate Fibonacci series

Generate Fibonacci series

Guide lines for ESE:

1. Emphasis should be given to assembly language programming based on 8086 and 8087.
2. In programming, emphasis should be given to algorithm, program with proper comments and input-output.
3. Simple assembly language program (for 8086 and 8087only) may be asked based on above syllabus.

Reference Books:

1. Soumitra Kumar Mandal, "Microprocessor and Microcontroller: Architecture, Programming and Interfacing using 8085, 8086 and 8051", Tata McGraw-Hill.
2. Douglas V Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill, Second edition.
3. Peter Abel, "IBM PC Assembly Language and Programming", Pearson, Fifth edition.
4. Barry B Bray, "The Intel Microprocessors-Architecture, Programming and Interfacing", Pearson LPE/PHI, Seventh edition.

Object Oriented Technology Lab

LAB COURSE OUTLINE

Course Title
Object Oriented Technology

Short Title Course Code
OOT

Course Description:

This laboratory provides students with a comprehensive study of the C++ programming language. Classroom lectures stress the strengths of C++, which provide students with the means of writing efficient, maintainable, and portable code.

	Hours / Week	No. of Weeks	Total Hours	Semester Credits
Laboratory	02	15	30	01

Total Semester Credits: 1

Prerequisite Course(s): Fundamental knowledge of Computers and C programming

LAB COURSE CONTENT

Outline of Content:

(Note: Minimum SIX Experiments from group A and FOUR from group B.)

Group A

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.

2. Write a program for parameterized constructor.

Demonstrate the use parameterized constructor by passing different types of parameters to the constructor.

3. Write a program for overloading constructors.

Demonstrate the concept of overloading constructor functions using class and object.

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.

5. Write a program to overload unary operator using member function.

Demonstrate the overloading of unary operators using the concept of member functions.

6. Write a program to overload binary operator using member function.

Demonstrate the overloading of binary operators using the concept of member functions.

7. Write a program for arrays of pointers to objects.

Declaring an array of pointers to objects using suitable example.

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.

9. Write a program using multilevel inheritance and hybrid inheritance.

Demonstrate the use of multilevel inheritance and hybrid inheritance by taking suitable example.

10. Write a program for virtual base classes.

To calculate the total mark of a student using the concept of virtual base class.

11. Write a program to read and write class objects from files.

Writing/reading class object to/from file.

12. Write a program to format output using ios class functions and flags.

To format the output using different ios class functions and flags.

13. Write a program to format output using manipulators.

To format the output using different manipulators.

14. Write a program using class template.

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.

Group B

1. Write a program for the copy constructor.

To calculate factorial of a given number using copy constructor.

2. Write a program to overload unary operator using friend function.

Demonstrate the overloading of unary operators using the concept of friend function.

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.

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.

5. Write a program to convert class type data to basic type data.

Perform the class type data conversion to any basic type data.

6. Write a program for run time polymorphism using virtual functions.

Perform the run time polymorphism using virtual functions.

7. Write a program for bubble sort using template functions.

Perform the bubble sort using the concept of template functions.

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 Bhawe, Sunil Patekar, "Object Oriented Programming with C++", Second Edition, 2012.
9. Herbert Schildt, "The Complete Reference C++", Fourth Edition, TMH, 2003.

Guide lines 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.

**NORTH MAHARASHTRA UNIVERSITY,
JALGAON (M.S.)**

**Second Year Engineering
(Computer)**

Faculty of Engineering and Technology



COURSE OUTLINE

Semester – IV

W.E.F 2013 – 2014

Data Communication

COURSE OUTLINE

Course Title
Data Communication

Short Title Course Code
DC

Course Description:

This course is aimed at introducing the fundamentals of data communications to undergraduate students. The goals of the course are to understand the basics and knowledge about the Data Communications using components and protocols of data communications.

Lecture	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): Fundamentals of Data Communication.

COURSE CONTENT

Data Communication

Semester- IV

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

1 Introduction to Data Communication and Signals

(08 Hours, 16 marks)

- a Basics of Data Communication: Characteristics and Components
- b Data Representation and Data Flow
- c Networks, Introduction to ISO-OSI Reference model
- d Introduction to Signals and Transmission Impairments: Analog and Digital
- e Periodic Analog Signals, Digital Signals
- f Transmission impairment, data rate limits, Performance

2 Digital transmission and Analog transmission

No of Lect – 8, Marks:16

- a Digital to Digital Conversion
 - b Analog to Digital Conversion
 - c Transmission Modes
 - d Digital-to-analog Conversion
- 3 Multiplexing and Transmission Media (08 Hours, 16 marks)**
- a Multiplexing
 - b Guided Media
 - c Unguided Media
- 4 Switching and Multiple Access (08 Hours, 16 marks)**
- a Circuit-switched Networks
 - b Datagram networks
 - c Virtual-circuit networks
 - d Multiple Access
- 5 Error Control and Data Link Control (08 Hours, 16 marks)**
- a Types of errors
 - b Block coding
 - c Linear block codes
 - d Cyclic codes
 - e Checksum
 - f Flow and error control

Text Books:

1. Behrouz A Forouzan, "Data Communications and Networking", Fourth edition: Tata McGraw Hill.
2. P. C. Gupta, "Data Communications", PHI Publications.

Reference Books:

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

Microprocessor & Microcontroller Interfacing

COURSE OUTLINE

Course Title

Microprocessor & Microcontroller Interfacing

Short Title Course Code

MPMCI

Course Description:

The objective of this course is to introduce the students to the fundamentals of microprocessor & microcontroller interfacing with assembly programming language and enable them to apply these concepts for real world applications.

Lecture	Hours / Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	04
Tutorial	01	15	15	

Prerequisite Course(s): Fundamental knowledge of Microprocessors & Microcontrollers.

COURSE CONTENT

Microprocessor & Microcontroller Interfacing

Semester- IV

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks

Tutorial: 1 hour / week

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

1. Basic I/O Interface

(08 Hours, 16 marks)

- a. MSDOS FAT
- b. MS DOS Device Drivers Types, Structure of device drivers.
- c. 8255 PPI : Internal block diagram, control word and status word, modes of operation, numericals on control word design.

2.

(08 Hours, 16 marks)

- a. 8254(PIT) : Internal block diagram, control word format, operating modes, numericals on control word design.

- b. 8251(USART) : Architecture and signal description, operating modes, interfacing with 8086 and numericals.
- c. TSR programs : concept and implementation.

3. Overall Motherboard Component Logic (08 Hours, 16 marks)

- a. Functional block diagram of PC.
- b. Motherboard (8086/8088 based) : Motherboard components.
- c. Motherboard logic : Reset logic, Interrupt logic, RAM parity logic, NMI logic, Wait state logic, Bus Arbitration logic, RAM & ROM logic, CPU logic, DMA logic, keyboard interface block diagram.
- d. Microcomputer Display : Raster scan basics, Overview of character display control system.
- e. PC display adapters : CGA,EGA,VGA.
- f. Introduction to LCD and Plasma display.

4. 8086 Microprocessor interface (08 Hours, 16 marks)

- a. Parallel Printer Interface
- b. 7 segment display interface.
- c. Disk reading methods: FM , MFM.
- d. Internal structure of Floppy disk and hard disk.
- e. Floppy Disk Controller : Overview, FDC system interface, Overall operation of floppy disk subsystem, 8272 FDC : internal block diagram and commands.
- f. Hard disk controller : HDC commands and device control block.

5. Microcontrollers and Interfacing (08 Hours, 16 marks)

- a. Interfacing LEDs and of 7-segment displays.
- b. Interfacing keys and keyboard interfacing .
- c. Interfacing 0808/0809 ADC.
- d. Interfacing DAC 0808.
- e. Interfacing stepper motor.

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

COURSE OUTLINE

Course Title
Data Structures

Short Title Course Code
DS

Course Description:

The objective of this course is to introduce the students to the fundamentals of Data Structure with concepts of the C programming language and enable them to apply these concepts for solving real world problems.

Lecture	Hours / Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	04
Tutorial	01	15	15	

Prerequisite Course(s): Fundamental knowledge of C

COURSE CONTENT

Data Structures

Semester - IV

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks

Tutorial: 1 hour / week

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

- 1. Introduction to Data Structures (08 Hours, 16 marks)**
 - a Introduction of data and data object.
 - b Data structure and Abstract Data Type(ADT).
 - c Implementation of different data structures.
 - d Basic terminologies with data structures, types of data structures.
 - e Data structure operations.
 - f Concept of arrays, pointer and structures.

- 2. Stack and Queue (08 Hours, 16 marks)**
 - a Detailed knowledge of data structure like stack, queue & circular queue.
 - b Polish notations & interconversions by using stack.

c Use of stack in function call, recursion, tower of Hanoi.

3. Linked Lists (08 Hours, 16 marks)

- a Understand the concept of linked list data structure.
- b Pros & Cons of array compared with linked list.
- c Creation, traversing, searching, insertion, deletion operations w.r.t. single linked list.
- d Pros & cons of single linked list, double linked list
- e Polynomial addition using single linked list as well as storing multivariable polynomials using generalised list.

4. Trees (08 Hours, 16 marks)

- a Creation, traversing, searching, insertion, deletion operations w.r.t. binary search tree.
- b Concept of threaded binary tree, tree traversals (recursive & non-recursive).
- c Concept of Huffman Algorithm.
- e Height Balanced Tree (AVL Search Tree).

5. Searching and Sorting (08 Hours, 16 marks)

- a Basics of searching techniques.
- b Basics of sorting techniques.
- c Different sorting algorithms including Bubble, Insertion, Selection, Quick, Merge, Heap, Radix.
- d Time and Space complexity of an algorithm with big 'O', ' Θ ', ' Ω ' notations.
- e Best, Worst, and Average case time complexity of each of these algorithms.

Text Books:

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

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

Computer Organization

COURSE OUTLINE

Course Title
Computer Organization

Short Title Course Code
CO

Course Description:

This course introduces the students about the computer. It includes the terms, concepts, architectures, formats and addressing. This course also describes the Memory organization etc.

Lecture	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): Introduction to Computer.

COURSE CONTENT

Computer Organization

Semester- IV

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

End Semester Examination (ESE) : 80 Marks

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

- 1. Introduction to system concepts (08 Hours, 16 marks)**
 - a. To introduce students to System Concept.
 - b. To learn about Instruction format.
 - c. To learn General addressing Modes.
 - d. To learn about Expanding op-codes.
 - e. To learn about Bus Structures.

- 2. Arithmetic (08 Hours, 16 marks)**
 - a. To know how Numbers are represented.
 - b. To learn Multiplication using Booths and Bit-pairing Algorithms.
 - c. To learn Division using Restoring and Non-Restoring Methods.
 - d. To learn addition and Subtraction of signed numbers.
 - e. To learn Floating point System.

- 3. Processing Unit (08 Hours, 16 marks)**
- a To design control unit.
 - b Designing Control unit using hardwired and Micro programmed methods.
 - c Learning Wilkes Design method.
 - d To learn Bus organization.
 - e To learn execution of complete instruction.
- 4. Memory (08 Hours, 16 marks)**
- a Memory organization techniques.
 - b To know cache memory organization.
 - c To know Virtual memory.
 - d To learn basic concepts of memory.
 - e Introduction to SDRAM, RDRAM, DDRSDRAM, Flash memory.
- 5. System Organization (08 Hours, 16 marks)**
- a To know concepts system buses.
 - b To know Daisy chaining, polling.
 - c Concepts of PCI bus, SCSI bus, Universal Serial Bus.
 - d RISC and CISC .

Text Book:

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

Reference Books:

1. J.P. Hayes, "Computer Architecture and Organization", Third edition, McGraw Hill international.
2. Sajjan Shiva, "Computer Organization Design & Architecture", CRC Press Publication.
3. Tanenbaum, "Structured Computer Organization", Pearson.
4. William Stallings, "Computer Organization and Architecture", Sixth edition, Pearson.
5. Swati Saxena, "Computer Organization" Dhanpat Rai.
6. Murdocca, Heuring, "Computer Architecture & Organization", Second edition, Wiley.
7. Nicholas Carter, "Computer Architecture", Schaum's Outline.

Computer Graphics

COURSE OUTLINE

Course Title
Computer Graphics

Short Title Course Code
CG

Course Description:

This course introduces the students about the concepts of user interface with graphics system. It includes the graphics standards, transformations, filling & clipping objects, 2D&3D. This course also describes about graphics applications corresponds with scientific work as well as animation, simulation, etc.

Lecture	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	03	15	45	03

Prerequisite Course(s): Engineering Graphics.

COURSE CONTENT

Computer Graphics

Semester- IV

Teaching Scheme

Examination Scheme

Lecture: 3 hours / week

Tutorial: 1 hour / week

End Semester Examination (ESE) : 80 Marks

Paper Duration (ESE) : 03 Hours

Internal Sessional Exam (ISE) : 20 Marks

1. **Basic Concepts (08 Hours, 16 marks)**
 - a. Introduction to computer graphics
 - b. Graphics Standards
 - c. Interactive Computer Graphics
 - d. Linear and Circle Generation

2. **Polygons (08 Hours, 16 marks)**
 - a. Polygons
 - b. Types of Polygons
 - c. Polygon filling
 - d. Scan conversion algorithm
 - e. Segments

3. **2D & 3D Geometry (08 Hours, 16 marks)**
 - a. 2D transformation primitives and concepts

- b. 3 D transformations
- c. 3D viewing transformation
- d. Concept of parallel perspective projections
- e. Viewing parameters

4. Windowing & Clipping (08 Hours, 16 marks)

- a. 2 D clipping and 3D clipping
- b. Generalized clipping
- c. Polygon Clipping
- d. Hidden Surfaces and Lines

5. Light, Color & shading (08 Hours, 16 marks)

- a. Shading algorithm
- b. Color Models – RGB, HVS, CYM
- c. Graphical User Interface
- d. Graphics Standard
- e. Graphics Applications

Text Books:

1. "Computer graphics", ISRD group, THM publications, eleventh reprint 2012.

Reference Books:

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

Application Development Lab

LAB COURSE OUTLINE

Course Title
Application Development Lab

Short Title Course Code
ADL

Course Description:

The objective of this course is to introduce the students to the fundamentals of web development. It includes the technologies like HTML, XML, CSS and Scripting Languages.

Lecture	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	01	15	15	02

Prerequisite Course(s): Fundamental knowledge of Computers.

LAB COURSE CONTENT

This course will use advanced techniques in creating documents for the World Wide Web. Emphasis will be placed on HTML, JavaScript, XML and Java.

1 Introduction to HTML (03 Hours)

- a. Tags and Elements
- b. Separating Heads from Bodies
- c. Attributes
- d. Basic Text Formatting
- e. Presentational and Phrase Elements
- f. List
- g. Links and Navigation

2 CSS Style Sheet and Scripting Languages (03 Hours)

- a. URLs
- b. Images, Audio, and Video
- c. Tables, Forms and Frames
- d. Cascading Style Sheets
- e. Page Layout
- f. Scripting Language (Java, VB)

3 Introduction to XML (03 Hours)

- a. XML Basics

- b. XML Elements
- c. Working with DTD

- 4 DTD and Style Sheet (03 Hours)**
 - a. Adding Style, Using Schemas

- 5 Introduction to Java (03 Hours)**
 - a. Basic Input/output
 - b. Applet Class
 - c. Event handling
 - d. Introduction to AWT: working with windows, Graphics and Text

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 OUTLINE

Course Title
Data Communication Lab

Short Title Course Code
DC

Course Description:

This laboratory provides students with a comprehensive study of the Data Communication concepts and practical implementation of Data Communication concepts.

Laboratory	Hours per Week	No. of Weeks	Total Hours	Semester Credits
	02	15	30	01

Total Semester Credits: 1

Prerequisite Course(s): Fundamental knowledge of Data Communication.

LAB COURSE CONTENT

Outline of Content:

Group A

1. Comparative analysis of different types of network cables with Specifications
 - Study of different types of Network cables – CAT-5, CAT – 6.
 - Study of different cable specifications comparisons.
2. Implementation of Network performance calculator.
 - Simple Program for Calculating Network Performance.
3. Network related commands such as ARP, IPCONFIG, PING, TRACERT, NSLOOKUP, GETMAC, NETSTAT etc.
 - Practical use of Network commands ARP
 - Study of IPCONFIG for IP configurations
 - Study of PING command for finding destination reachable or not.
 - Study of TRACERT command
 - Study of NSLOOKUP command
 - Study of GETMAC to get MAC address.

- Study of NETSTAT to get the network status.
4. I.T Infrastructure planning using Network Connecting Devices.
 - Consider our own college as a case & prepare a planning for I.T. infrastructure.
 5. Network Connecting Devices Specifications and configurations.
 - Practical study of Network Connecting device – Repeater.
 - Practical study of Network Connecting device – Switch /HUB.
 - Practical study of Network Connecting device – Router

Group B

1. Implementation of Stop and Wait Protocol
 - Study the working of stop and wait protocol
 - Implementation of simple client and server should be simple
 - Modular approach should be followed.
2. Implementation of Internet checksum
 - Consider a simple example
 - Study it theoretically.
 - Implementation of same .
3. Crimping of cross-wire and straight-through UTP cable to inter-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
4. Interconnections of computers in Local Area Network to share resources.
 - Study of concept of LAN & Shared resources.
 - Interconnect computers in LAN
 - Share and make the use of shared resources.
5. Implementation of cyclic redundancy check
 - Study the concept of CRC.
 - Consider Suitable example.
 - Implement same using modular approach.

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.

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.

6. Program for stepper motor interfacing.

Guide lines 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 OUTLINE

Course Title

Data Structures Lab

Short Title Course Code

DS

Course Description:

This laboratory provides students with a comprehensive study of the C programming language in data structures. Classroom lectures stress the strengths of C which provide students with the means of writing efficient codes for different data types and data structures.

	Hours per Week	No. Of Weeks	Total Hours	Semester Credits
Laboratory	2	15	30	1

Total Semester Credits: 1

Prerequisite Course(s): Fundamental knowledge of C.

LAB COURSE CONTENT

Outline of Content:

(Note: Minimum FIVE experiments from the Group A and FIVE experiments from the Group B .)

(Group A)

1. Implementation of stack using array or linked list.

Performing simple operations like push, pop and display with respect to stack.

2. Implementation of queue using array or linked list.

Performing simple operations like insertion and deletion of an element into the queue.

3. Implementation of circular queue using array or linked list.

Performing simple operations like insertion and deletion of an element into the circular queue.

4. Conversion of infix expression to postfix expression.

Performing simple conversions of given infix expression into postfix expression.

5. Conversion of postfix expression to infix expression.

Performing simple conversions of given postfix expression into infix expression.

6. **Program for addition of two single variable polynomials using Linked List.**

Performing the addition of two polynomials using Linked List.

(Group B)

1. **Implementation of double linked list & perform insertion, deletion and searching.**

Performing the operations on double linked list like insertion, deletion and searching.

2. **Creation of binary tree & perform all non-recursive traversals.**

Create the binary tree and perform the Inorder, Preorder and Postorder traversal.

3. **Creation of binary search tree & perform insertion, deletion and printing in tree shape.**

Create the Binary Search tree performing the operations on BST like insertion, deletion and printing in tree shape.

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.

5. **Implementation of Quick Sort.**

Sort the given set of numbers using Quick sort.

6. **Implementation of Radix Sort.**

Sort the given set of numbers using Radix sort.

7. **Implementation of Merge Sort.**

Sort the given set of numbers using Merge sort.

8. **Conversion of Infix Expression to Prefix Expression.**

Performing Simple conversions of given Infix Expression into prefix Expression.

Text Books:

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

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 Publications.
4. Alfred Aho, John Hopcroft, Jeffrey Ullman, "Data Structures and Algorithms", Pearson Publications.
5. E. Balagurusamy, "Data structures using C", Tata McGraw 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.
8. Larry Nyhoff, "ADTs' Data Structures and prolems with C++", Pearson Publications.

Guide lines 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.

5. Program for 2D Transformations (Translation, Rotation and Scaling)

Perform 2D transformation on any polygon like- Translation, Rotation & Scaling.

6. Program for Segmentation

Create segment, Close segment, Delete segment & Open segment.

7. Program for line clipping

Clip line by using any one at least- Sutherland Cohen line clipping algorithm, Mid-point subdivision algorithm, Generalized clipping with Cyrus-Beck Algorithm.

8. Program for Polygon clipping

Clip line by using - Sutherland-Hodgeman algorithm

(Group B)

1. Program for 3D rotation

Perform 3D transformation on any polygon like- Translation, Rotation & Scaling.

2. Program for Parallel Projections

To draw polygon & show Parallel projection on it.

3. Program for Perspective Projection

To draw polygon & show Perspective projection on it.

4. Program for Animation

Show movement of any objects.

5. Program for Bezier Curve

Consider four control points, by finding & joining mid points draw curve.

6. Mini Project: Developing some Graphics application

Create any graphics application.

7. Study assignment on any latest GUI application or mini-project.

Make study of any latest GUI application or develop any mini-project on it.

Guide lines 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. David F. Rogers, "Procedural Elements for Computer Graphics, Tata McGraw Hill, Second edition.
2. Shirley, Marshner, "Fundamentals of Computer Graphics", Third edition, CRC Publication/ A.K. Peters.
3. Steven Harrington, "Computer graphics A Programming Approach", MGH.
4. Maurya, "Computer Graphics: with virtual reality system", Wiley India.
5. Foley, Vandam, Feiner, Hughes, "Computer Graphics Principals & Practice", Pearson, Second edition.
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. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI.