

**GOVERNMENT COLLEGE OF ENGINEERING, AURANGABAD**  
 (An Autonomous Institute of Government of Maharashtra)  
**Department of Master of Computer Application**  
**FYMCA**  
**Curriculum Structure and Scheme of Evaluation**  
 Effective from June 2017

**SEMESTER-I**

<b>THEORY COURSES</b>												
Sr. No	Course Code	Subject	Scheme of Teaching (Hrs/Week)			Total Credits	Scheme of Evaluation (Marks)					
			L	T	P		Theory			Term Work	Practical /Viva-voce	Total
							Test	TA	ESE			
1	MC1001	Web Technology	4	0		4	20	20	60	-	-	100
2	MC1002	Computer Programming	3	1		4	20	20	60	-	-	100
3	MC1003	Computer Networks	3	1		4	20	20	60	-	-	100
4	MC1004	Database Management System	3	0		3	20	20	60	-	-	100
5	MC1005	Behavioral Science	3	0		3	20	20	60	-	-	100
<b>LABORATORY COURSES</b>												
1	MC1006	Lab Computer - Programming	-	-	4	2	-	-	-	25	50	75
2	MC1007	Lab Web Technology	-	-	2	1	-	-	-	25	25	50
3	MC1008	Lab Database Management System			4	2				25	50	75
4	MC1009	Lab Computer Networks			2	1				25	25	50
		<b>TOTAL</b>	<b>16</b>	<b>2</b>	<b>12</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>100</b>	<b>150</b>	<b>750</b>

**SEMESTER-II**

<b>THEORY COURSES</b>												
Sr. No	Course Code	Subject	Scheme of Teaching (Hrs/Week)			Total Credits	Scheme of Evaluation (Marks)					
			L	T	P		Theory			Term Work	Practical Viva-voce	Total
							Test	TA	ESE			
1	MC1010	Object Oriented Programming	3	1		4	20	20	60	-	-	100
2	MC1011	Operating Systems	3	1		4	20	20	60	-	-	100
3	MC1012	Data Structures	3	0		3	20	20	60	-	-	100
4	MC1013	Communication Skills	3	0		3	20	20	60	-	-	100
5	MC1014 To MC1016	Elective	4	0		4	20	20	60	-	-	100
<b>LABORATORY COURSES</b>												
1	MC1017	Lab :Object Oriented Programming	-	-	4	2	-	-	-	25	50	75
2	MC1018	Lab: Data Structures	-	-	2	1	-	-	-	25	25	50
3	MC1019	Lab:-Communication Skills			2	1				25	25	50
4	MC1020 To MC1022	Lab: Elective			4	2				25	50	75
		<b>TOTAL</b>	<b>16</b>	<b>2</b>	<b>12</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>100</b>	<b>150</b>	<b>750</b>

**L-Lectures, T-Tutorials, P-Practical's, TA-Teacher Assessment, ESE-End-Semester Examination**

**Elective- List**

MC1014-Computer Graphics  
 MC1015- Design & Analysis of Algorithms  
 MC1016-Microprocessor and Interfacing

**Elective-Lab**

MC1020-Lab: Computer Graphics  
 MC1021-Lab: Design & Analysis of Algorithm  
 MC1022-Lab: Microprocessor & Interfacing

**Course Code : MC1001**  
**Course Title : Web Technology**

**Teaching Scheme:**

Lectures : 4 Hrs/Week  
Total Credits : 4

**Examination Scheme:**

Test : 20 Marks  
Assignment : 20 Marks  
End Sem. Exam. : 60 Marks

**Course Educational Objectives:**

1. To give an introduction to basics of website because of the growing popularity of websites and web based application.
2. To make students familiar with the concepts of web designing.
3. To give students knowledge of advanced concepts of CSS helpful in creating professional Websites

**Course Outcomes Expected:**

1. After completion of these course students will be able to understand concepts of Web development, they will learn the new technologies associated with web.

**Contents:**

**Unit 1]** Introduction to Web, Introducing HTMLTags and Elements (Presentational, Basic Formatting, Lists, Links & Navigation, Images , Tables, Form Controls, Frame Element etc.), Properties of Tags & Events of the Elements. [8-Hrs]

**Unit 2]** Introduction to CSS – Adding CSS Rules, CSS Properties, CSS Selectors, Design Issues, Minimizing CSS, Inheritance in CSS, Reset in CSS, Browser Compatibility using CSS. [8-Hrs]

**Unit 3]** Learning JavaScript – Adding Scripts to your pages, Document Object Model, Starting Program with JavaScript, Functions, Operators, Conditional Statements, Looping. [8-Hrs]

**Unit 4]** Deployment – Introduction to domain and Hosting, Uploading website, Testing of website, Introduction to SEO, Using Analytics, AdWords and AdSense, Introduction to DHTML and XHTML. [8-Hrs]

**Unit 5]** Introduction to HTML 5, Introduction to CSS 3, Introduction to JQuery, Introduction to AJAX. [8-Hrs]

**Text /Reference books:**

1. Beginning HTML, XHTML, CSS, and JavaScript by Jon Duckett – Wrox Publication
2. Head First HTML with CSS & XHTML – O'Reilly Publication
3. HTML, CSS, JavaScript for Dummies
4. HTML & CSS: The Complete Reference, Fifth Edition By “Thomas Powell”

**Course Code : MC1002**  
**Course Title : Computer Programming**

**Teaching Scheme:**

Lectures : 3 Hrs/Week  
Tutorials : 1 Hrs/Week  
Total Credits : 4

**Examination Scheme:**

Test : 20Marks  
Assignment : 20Marks  
End Sem. Exam: 60 Marks

**Course Educational Objectives:**

1. To understand the nature of programming as human activity
2. To familiarize the students with basic concepts of computer programming and developer tools.
3. To understand the principles of data storage and manipulation
4. Emphasis to be given on problem solving and algorithm implementation using C programming language.
5. To present the syntax and semantics of
  - a. Variables
  - b. Arithmetic and assignment operators
  - c. Control statements (if/else)
  - d. Looping constructs (while, for)
  - e. Methods
  - f. Arrays
  - g. Pointers
  - h. File input/output (I/O)
6. To get prepared for the more advanced programming courses

**Course Outcomes Expected:**

At the end of a course the student will understand the concepts of:

- 1) Variables, data Types (including strings and arrays) and Expressions
- 2) Flow of Control
- 3) Functional and procedural abstraction and its importance in good program design
- 4) Pointers and memory allocation (static and dynamic)
- 5) Iteration and Recursion

**Contents:**

**Unit 1] Introduction** - Programming language concepts, Algorithm flow chart, program, Machine language, Assembly language, High-level language. Fundamentals of C Language - Constants, Variables, Data Types, Operators, Expressions, IO statements. [8-Hrs]

**Unit 2] Control Statements** –IF, Simple IF, IF..ELSE, Nesting of IF..ELSE, ELSE IF ladder, Switch Statement, ternary operator, GOTO Statement. Looping statements - For, While, Do-While, Nesting of iterative statements [8-Hrs]

**Unit 3] Arrays and Strings** - Single and two dimensional arrays, Strings, Operation on strings (with and without library functions). [8-Hrs]

**Unit 4] Functions** – Library and user defined functions, Elements of user defined function, Categories of functions, nesting of functions, Recursion, passing array to function. Structures & Unions - Declaring a structure and accessing structure members, array of structures, Structures within structures, passing structure to function, bit fields, unions. [8-Hrs]

**Unit 5] Pointers** – Declaration of pointers, pointer expressions, pointers and arrays, pointers and character strings, pointers as function argument. File handling – File type, opening and closing of files, I/O operations on file, command line argument. Dynamic memory allocation- Allocating a block of memory, Allocation multiple block of memory, releasing the used space, altering the size of block. [8-Hrs]

**Text books/Reference books:**

1. Programming in ANSI C by E/ Balagurusamy. MCGraw Hill companies.
2. Programming in C by Gottfried, Schaum Series, TMH
3. Let us C by Yashwant Kanitkar. BPB Publication
4. Programming in C by Avinash Pande. MIT Press
5. C: The Complete Reference by Herbert Schildt.McGraw Hill
6. Programming in ANSI C by Kerningham & D. Richie

**Course Code : MC1003**  
**Course Title : Computer Networks**

**Teaching Scheme:**

Lectures : 3 Hrs/Week  
Tutorials : 1 Hrs/Week  
Total Credits : 4

**Examination Scheme:**

Test : 20Marks  
Assignment : 20Marks  
End Sem. Exam: 60 Marks

**Course Educational Objectives:**

1. To demonstrate knowledge of basic principles of computer networking,
2. To make students familiar with the detailed functionality of the layered network architecture.
3. To enable students develop Internet applications and their protocols, and to develop student's own applications such as Client Server applications, Web Services etc.

**Course Outcomes Expected:**

1. Students will come to know about various protocols, models in Networks
2. Students will be aware of Network hardware, Media Types (cables , Wireless),
3. Students will be able to design, implement and analyze simple computer networks.
4. Students will know the different strategies of operations of TCP/UDP, FTP, HTTP, SMTP, SNMP

**Contents:**

**UNIT 1] Introduction**

Overview of Computer Network, Network hardware and software, Reference model- OSI and TCP/IP and their comparison Network layer-network layer design issues, various routing Algorithms and congestion control algorithms , Networking layer in the internet . [8-hrs]

**UNIT 2] Transport layer**

The transport services, elements of transport protocols, internet transport protocols, ATM – AAL layer protocols, Performance issues. [8-Hrs]

**UNIT 3] TCP/IP**

TCP/IP architecture, the internet protocols, IPv6, DHCP and Mobile IP , internet routing protocols , multicast routing ,The network layer in ATM networks [8-Hrs]

**UNIT 4] The Application layer**

Network security – principle of cryptography, secret key and public key algorithm, digital scanners, Domain name system-The DNS name space , resource records, name server, simple network management Protocol –SNMP model, Electronic mail- architecture and services, Message formats and message transfer, email privacy Usenet news- user view of Usenet and Usenet implementation [8-Hrs]

**UNIT 5] Multimedia Information and Networking**

Lossless data compression, ,Video on Demand, Transmission in ATM network,

Communication satellites.

[8-Hrs]

**Text/Reference Books:**

- 1) Computer Networks, Andrew. S. Tanenbaum, PHI
- 2) Communication Networks- Fundamental concepts and key architectures, Alberto, Leon –Garcia and Indra widjaja, Tata Mc-Graw Hill

**Course Code : MC1004**

**Course Title : Database Management System**

**Teaching Scheme:**

Lectures : 3 Hrs/Week  
Tutorials : 0 Hrs/Week  
Total Credits : 3

**Examination Scheme:**

Test : 20Marks  
Assignment : 20Marks  
End Sem. Exam: 60 Marks

**UNIT 1] Basic Concept & Data Models:** Data modeling ,Records and files, Abstraction and data integration, views ,Independence, Components of DBMS, Advantages and Disadvantages of DBMS, Data associations, Entity Relationship model, Relational model. [8-Hrs]

**UNIT 2] File Organization:** Introduction, serial files, sequential files, index sequential files, direct files, index using tree structure, logical and physical Pointers, Record placement. [8-Hrs]

**UNIT 3] Relational Model and Relational Database Manipulation:** Attributes and domains, Tuples , Relations & Schemes, Relation Representation, integrity rules, Relational algebra, Relational Calculus, Data Manipulation using SQL and PL/SQL. [8-Hrs]

**UNIT 4] Relational Database Design, Query Processing :** Normalization using Functional Dependency, Normalization using Join Dependency, Valued Dependencies, Domain by Normal Form, SNF.General Strategies for query processing, Transformation equivalent Expression evaluation, View Processing, Typical Query Processor. [8-Hrs]

**UNIT 5] Crash Recovery:** Reliability, Transactions, Recovery in Centralized DBMS, Reflecting Updates to database and recovery, buffer management, virtual memory, Disaster Memory. [8-Hrs]

**Text/Reference Books:**

1. Database System Concept: Korth, Silberschatz (TMH).
2. An Introduction to Database System: Bipin Desai. West Publication
3. Introduction to DBMS:C. J. Date (McGraw Hill Pub)



**Course Code : MC1005**  
**Course Title : Behavioral Science**

**Teaching Scheme:**

Lectures : 3 Hrs/Week  
Tutorials : 0 Hrs/Week  
Total Credits : 3

**Examination Scheme:**

Test : 20Marks  
Assignment : 20Marks  
End Sem. Exam: 60 Marks

**Course Outline (Tentative)**

Course 1: Briefly talking about the subject and syllabus of this course.

Why Human Relations are so important?

Course 2: Understanding Behavior, Human Relations, and Performance/ Chapter 1

Course 3: Personality, Stress, Learning, and Perception/Chapter 2

Course 4: Attitudes, Self-Concept, Values, and Ethics/Chapter 3

Course 5: Time and Career Management/Chapter 4

Course 6: Interpersonal Communication/Chapter 5

Course 7: Organizational Structure and Communication/Chapter 6

Course 8: Dealing with Conflict/Chapter 7

Course 9: Leading and Trust/Chapter 8

Course 10: Motivating Performance/Chapter 9

Course 11: Ethical Power and Politics/Chapter 10

Course 12: Team Dynamics and Leadership/Chapter 12

Course 13: Teams and Creative Problem Solving and Decision Making/Chapter 13

Organizational Change and Culture/Chapter 14

**Text/Reference Books:**

Human Relations in Organizations Applications and Skill Building Lussier, eighth edition , McGraw-Hill .

**Course Code : MC1006**

**Course Title : Lab: Computer Programming**

**Teaching Scheme:**

Practical :4 hrs/week

Total Credits :2

**Examination Scheme:**

Practical Exam. : 25 Marks

Term Work : 50 Marks

**Course Educational Objectives:**

- 1) To understand the nature of programming as human activity
- 2) To familiarize the students with basic concepts of computer programming and developer tools.
- 3) To get prepared for the more advanced programming courses

**Course Outcomes Expected:**

At the end of the course, a student will be able to:

- 1) Analyze a simple programming problem specification
- 2) Design a high-level (programming language independent) solution to the problem using functional abstraction and general imperative programming language constructs.
- 3) Write, compile, execute and debug a C program which maps the high-level design onto concrete C programming constructs.

**Suggestive list of experiments:**

1. A) Write a program to find area, perimeter of a rectangle by using formula: area =  $p * q$  and perimeter =  $2 * (p+q)$
2. B) Write a program to convert a given temperature in Celsius to Fahrenheit by using formula:  $F = 1.8 * \text{Celsius} + 32$
3. Write a program to count the number of occurrences of positive numbers, negative numbers and zeroes in a stream of data terminated by a specific number.
4. Write a program to display Fibonacci series.
5. Write a program to find the sum of digits of a no.
6. Write a program to find square, cube, square root and cube root of a number using switch case statement
7. Write a program using function to generate a series of prime numbers up to n, when n being entered by user.
8. Write a program to find largest number from given n numbers using function.
9. Write a program to find factorial of a number using recursive function.

10. Write a program to pass a structure as an argument to a function.
11. Write a program which will read a string and rewrite it in alphabetical order. i.e. STRING will be printed as GINRST
12. Write a program using pointers to copy the contents of one string to another and display the contents of both strings.
13. Write a program to copy contents of one file onto another file using command line arguments
14. Write a program to create a library function.

**Course Code : MC1007**

**Course Title : Lab: Web Technology**

**Teaching Scheme:**

Practical : 2 hrs/week

Total Credits : 1

**Examination Scheme:**

Practical Exam. : 25 Marks

Term Work : 25 Marks

**Course Educational Objectives:**

- 1) To give Students a Hands-on Experience on HTML, CSS and Other Web technologies.
- 2) To give Students a Hands-on Experience on Advanced Web Concepts.

**Course Outcomes Expected:**

- 1) After completion of these suggestive experiments students will get hands-on experience on developing a web site.

**Suggestive list of experiments:**

4. Working with Basic Formatting & Presentational Tags.
5. Working with Form Elements like Button, Textbox etc.
6. Creating Tables, Frames and Layouts
7. Creating Inline, External style sheets
8. Working with Advanced CSS
9. Using JavaScript
10. Writing Functions, Operators and Control Structures with JavaScript
11. Using JQuery to add Animation Effects
12. Using HTML 5 and CSS 3 Properties
13. Mini Website

**Course Code : MC1008**

**Course Title : Lab: Database Management Systems**

**Teaching Scheme:**

Practical : 4 hrs/week

Total Credits : 2

**Examination Scheme:**

Practical Exam. : 25 Marks

Term Work : 50 Marks

**Course Educational Objectives:**

- 1) To make students aware of the basic RDBMS concepts.
- 2) To make students create, populate, access and manipulate the RDBMS.

**Course Outcomes Expected:**

- 1) Students will be able to create, populate, access and manipulate the RDBMS.
- 2) Students will be able to write queries, generate expected outputs, optimize queries etc.

**Suggestive list of experiments:**

1. To study different types of DDL Commands.
2. To study different types of DDL Commands
3. To study different integrity constraints.
4. To study different types of SQL functions.
5. To study sub queries.
6. To study views.
7. To study different types of joins.
8. To demonstrate the use of Cursors in PL/SQL.
9. To demonstrate the use of functions in PL/SQL.
10. To demonstrate the use of procedure in PL/SQL.
11. To demonstrate the use of trigger in PL/SQL.

**Course Code : MC1009**  
**Course Title : Lab: Computer Networks**

**Teaching Scheme:**

Practical : 2 hrs/week  
Total Credits : 1

**Examination Scheme:**

Practical Exam. : 25 Marks  
Term Work : 25 Marks

**Course Outcomes Expected:**

1. To make students recognize the different internetworking devices and their functions.
2. To make students recognize Role of protocols in networking.

**Course Outcomes Expected:**

1. Students will be able to design and apply subnet masks and addresses to fulfill networking requirements.
2. To make students aware Features of TCP/IP Protocol
3. Students will be able to analyze the features and operations of various application layer protocols such as Http,DNS

**Suggestive list of experiments:**

1. Introduction to Networking Devices
2. Understanding / Illustrate the network features of peer to peer network .
3. Understanding / Illustrate the network features of Client Server network .
4. Build a Category 5 or Category 6 Unshielded Twisted Pair (UTP) Ethernet crossover cable
5. Connecting 2 Computers together using a Crossover cable
6. Configure TCP/IP in LAN
7. File Transfer / Sharing/ Virtual Desktop Access
8. Study of basic network command and Network configuration commands.
9. Program for simple RSA algorithm to encrypt and decrypt the data.
10. Client/Server chat application

## SEMESTER-II

**Course Code: MC1010**

**Course Title : Object Oriented Programming & Systems**

### Teaching Scheme:

Lectures : 3 Hrs/Week  
Tutorials : 1 Hrs/Week  
Total Credits : 4

### Examination Scheme:

Test : 20Marks  
Assignment : 20Marks  
End Sem. Exam: 60 Marks

### Course Educational Objectives:

- 1) To make the students proficient in basic programming skills
- 2) Understand the fundamental Object Oriented Concepts
- 3) To get the basic understanding of object-oriented software design
- 4) To present the syntax and semantics of the “C++” language as well as basic data types offered by the language
- 5) To get prepared for the more advanced programming courses

### Course Outcomes Expected:

- 1) Students will be aware of the basic Object Oriented Programming language concepts.
- 2) Students will be able to write the C++ code to achieve the OOPs concepts.

### Contents:

**Unit 1] Functions:** Function prototyping, inline functions, default arguments, const arguments, function overloading, friend function. [8-Hrs]

**Unit 2] Classes and Objects:** Specifying a class, Defining members of the class, making outside function inline, Nesting of member functions, Arrays within class, Static members, Arrays of objects, Objects as function arguments, friendly functions, constructors and destructors. [8-Hrs]

**Unit 3] Operator overloading and type conversion:** Overloading unary and binary operators, overloading binary operators with friend function, manipulating strings using operators, rules for operator overloading, type conversion. [8-Hrs]

**Unit 4] Inheritance:** Single inheritance, multilevel inheritance, multiple inheritance, Hierarchical inheritance, hybrid inheritance, virtual base class, abstract class, constructors in derived classes, virtual functions, pure virtual functions. [8-Hrs]

**Unit 5] File management:** Managing console I/O operations, classes for file stream operations, opening and closing file, Sequential I/O operations, Random Access Templates- Class template, class template with multiple parameters, function template, function template with multiple parameters, overloading of template functions, member function template, non-type template arguments. [8-Hrs]

**Text/Reference books:**

1. Object oriented programming in C++ by E. Balgurusamy Tata McGraw Hill
2. The C++ Programming Language by Bjarne stroustrup(Addison – Wesley)
3. OOP with C++ by Robert Lafore (Galgotia)
4. C++ Primer by Ranade & Zamir(McGraw-Hill)
5. C++: The Complete Reference, 4th Ed. by Herbert Schildt



**Course Code: MC1011**  
**Course Title : Operating Systems**

**Teaching Scheme:**

Lectures : 3 Hrs/Week  
Tutorials : 1 Hrs/Week  
Total Credits : 4

**Examination Scheme:**

Test : 20Marks  
Assignment : 20Marks  
End Sem. Exam: 60 Marks

**Course Educational Objectives:**

1. Define and list the functions of an operating system.
2. List resources involved in process creation and management.
3. Explain the use of paging and segmentation
4. Explain the function and structure of the I/O system
5. Describe path names and directory structure visible to end users

**Course Outcomes Expected:**

1. Differentiate between multiprocessing, multiprogramming, and multitasking.
2. Differentiate between programs, processes and threads.
3. Apply segmentation and paging techniques.
4. Compare file naming in Linux and Windows.

**Unit 1] Fundamentals of Operating System:-**OS services and Components, Multitasking, Multiprogramming, Multiprocessing Time Sharing, Buffering, Spooling, Distributed OS [8-Hrs]

**Unit 2] Process and Thread Management:-**Concept of process and threads ,Process states ,Process management ,Context switching Interaction between processes and OS,Multithreading,Example OS : Linux [8-Hrs]

**Unit 3] Memory Management:-**Memory partitioning,Swapping,Paging ,Segmentation ,Virtual memory Overlays ,Demand paging ,Performance of Demand paging ,Virtual memory concepts ,Page replacement algorithms ,Allocation algorithms ,Example OS : Linux [8-Hrs]

**Unit 4] I/O Systems:-**Secondary-Storage Structure, Disk structure ,Disk scheduling ,Disk management ,Swap-space management ,Disk reliability ,Stable storage implementation ,Introduction to clock ,Clock hardware ,Clock software [8-Hrs]

**Unit 5] File systems:-**File concept ,File support ,Access methods ,Allocation methods ,Directory systems ,File protection ,Free space management Example OS : Linux Case study: Android OS [8-Hrs]

**Text/Reference Books:**

- 1) Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts. Seventh edition. Addison-Wesley
- 2) Andrew Tanenbaum, Modern Operating Systems, Prentice Hall.

- 3) Operating Systems (5th Ed) – Internals and Design Principles By William Stallings, Prentice Hall
- 4) Operating Systems Achyut S. Godbole Tata Mc Graw Hill

**Course Code : MC1012**

**Course Title : Data Structures**

**Teaching Scheme:**

Lectures : 3 Hrs/Week

Total Credits : 3

**Examination Scheme:**

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

**Course Educational Objectives:**

1. To learn how data structure concepts are useful in problem solving.
2. To implement different ways of data structures such as stacks linked lists and trees.

**Course Outcomes Expected:**

1. Student will be able to appreciate the choices and tradeoffs which face a programmer in a real situation.

**Contents:**

**Unit 1] Introduction to data structure:** Arrays in C, Structures in C, Classes in C++, Primitive operations in stack, representing stacks in C, example- infix, postfix and prefix. [8-Hrs]

**Unit2] Queues and linked list:** queues and its representation, priority queue, array implementation, operations in stack, array implementation of lists, linked lists using dynamic variables, examples of list operations in C, circular lists, header nodes, doubly linked list, examples. [8-Hrs]

**Unit 3] Binary trees and graphs:** operations in binary trees, applications of binary trees, trees and their applications, C representation, tree traversal, inorder, preorder, postorder, general expressions as trees, evaluating an expression tree, constructing a tree, height balanced trees, B trees, B+ trees, traversal methods, applications, efficiency, minimum spanning tree, Kruskal's algorithm. [8-Hrs]

**Unit 4] Sorting and searching:** efficiency of sorting, bubble sort, quick sort, heap sort, insertion sort, merge and radix sort, basic search techniques. [8-Hrs]

**Unit 5] Storage management:** Automatic list management: reference count method, garbage collection, variations of garbage collection, Dynamic memory management: compaction of blocks of storage, first fit, best fit, worst fit, freeing storage blocks, buddy tag method, buddy system. [8-Hrs]

**Text/Reference books:**

Aaron M. Tanenbaum, "Data Structures using C and C++"

**Course Code : MC1013**  
**Course Title : Communication Skills**

**Teaching Scheme:**

Lectures : 3 Hrs/Week  
Tutorials : 0 Hrs/Week  
Total Credits : 3

**Examination Scheme:**

Test : 20Marks  
Assignment : 20Marks  
End Sem. Exam: 60 Marks

**Course Educational Objectives:**

1. To help Engineering students in acquiring adequate mastery of Communicative English
2. To provide language training to the students to enable them to understand and acquire knowledge in technical subjects.
3. To help students develop their personal and interpersonal skills to enable them to make their transition from college to workplace smoother and help them excel in their jobs
4. To develop vocabulary and technical writing of the student in professional discipline

**Course Outcomes Expected:**

- 1) Students will be able to improve their body language and soft skills.

**Contents:**

**Unit 1] Communication Skills & Soft Skills:** Basic Concept, Factors, Process and Types of Communication, Principles of Effective Communication, Barriers of Communication and how to overcome these barriers, Basic of Soft skills. [8-Hrs]

**Unit 2] Nonverbal Communication And Corporate Etiquettes:** Body Language and its different aspects, Voice Dynamics & Voice Modulation, Professional Appearance, Clothing Etiquettes and Corporate Dressing. [8-Hrs]

**Unit 3] Remedial Grammar and Vocabulary Building:** Parts of Speech, Types of Tense, Use of Articles, Synonyms and Antonyms, Find out the Grammatical Errors in the given sentences. [8-Hrs]

**Unit 4] Writing Skills And Business Correspondence:** Letter Writing, Office documents like Circular Notices, Minutes, Agenda And Memos, Report Writings, Resume Writing.

**Text books:**

1. Business Communication, Urmila Rai, S. M. Rai
2. Communication Skills , Leena Sen
3. William Sanborn, "Technical communication" Pearson publications.
4. "Presentation Skills for Managers", McGraw Hills brief case books.
5. Professional Communication Skill, Pravit S.R. Bhatia, S.Bhatia
6. Technical Report Writing Today: Daniel G. Riordan, Steven E. Pauley
7. Technical Writing: B. N. Basu
8. English Grammar Composition & Effective Business Communication, M. A Pink, S. E. Thomas.
9. Written Communication in English, by Sarah Freeman.

## Electives

**Course Code : MC1014**

**Course Title : Computer Graphics and Multimedia**

### Teaching Scheme:

Lectures : 4 Hrs/Week

Total Credits : 4

### Examination Scheme:

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### Course Educational Objectives:

1. To study the graphics techniques and algorithms.
2. To study the multimedia concepts and various I/O technologies.
3. To enable the students to develop their creativity

### Course Outcomes Expected:

1. Students will be able to draw & manipulate graphical objects, create more interactive GUIs
2. Students will be able to create and manipulate 2D and 3D objects programmatically and achieve animation effects.

### Contents:

**Unit 1] Computer Graphics System:** Overview of Computer Graphics, Computer Graphics Application and Software, Video display devices :- Color CRT Monitors, Raster scan & Random Scan Display Systems, DVST, Flat Panel Display :- LCD ,LED, Plasma display. 3D Viewing devices, Input & Output Devices. [8-Hrs]

**Unit 2] Graphics Output Primitives:** Scan Conversion, Rasterization, Line drawing algorithms, Circle drawing algorithms, Ellipse drawing algorithms, Character generation, Color Models & color application, Filled area algorithms, Aliasing & anti-aliasing. [8-Hrs]

**Unit 3] Two Dimensional Transformations, Clipping and windowing:** Basic transformations: Translation, Rotation, Scaling, Matrix representation and Homogeneous Coordinates, Composite transformations, Other Transformations: Reflection & Shear, Line Clipping algorithm, Viewing transformation, Polygon clipping algorithm, Interior/Exterior clipping, Text clipping. [8-Hrs]

**Unit 4] Basic 3D concepts and Computer Animation:** Different 3D display methods: Parallel projection, Perspective projection and Depth cueing, Basic 3D transformations, Spline representation, B-Spline curves & surfaces, Bezier curves & surfaces, Fractal geometry methods, classification of fractals, Design of animation sequences, animation functions, morphing, simulation, Virtual reality environments. [8-Hrs]

**Unit 5] Multimedia:** An Introduction, Multimedia Applications, Multimedia System Architecture Evolving technologies for Multimedia, Multimedia Databases, Compression & Decompression, Data & File Format standards, Multimedia I/O technologies, Digital voice and audio, Video image and animation, Compression through spatial & temporal redundancy, Multimedia authoring. [8-Hrs]

**Text/Reference books:**

- 1) Computer Graphics & Multimedia Techniques, A. P. Godse – Technical Publications, Pune
- 2) Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems and Design”, PHI, 2003
- 3) Computer Graphics: Donald Hearn and M. Pauline Baker, PHI
- 4) <http://www.cs.rit.edu/~ncs/Courses/570.shtml>

**Course Code : MC1015**  
**Course Title : Design & Analysis of Algorithms**

**Teaching Scheme:**

Lectures : 4 Hrs/Week  
Total Credits : 4

**Examination Scheme:**

Test : 20 Marks  
Assignment : 20 Marks  
End Sem. Exam. : 60 Marks

**Course Educational Objectives:**

This course introduces the analysis and design of algorithms.

After completion of this course, students will be able to do the following:

1. Analyze the asymptotic performance of algorithms
2. Apply different design and analysis methods

**Course Outcomes Expected:**

1. Describe and use different algorithmic techniques such as divide and conquer, greedy method, dynamic programming, backtracking and branch and bound.
2. Evaluate different algorithms using worst, average and best case analysis.
3. Perform competitive analysis of algorithms.

**Unit 1]: Introduction, Divide and conquer**

Algorithm performance analysis, complexity issues, recurrences, binary search, merge sort, quick sort, heap sort. [8-Hrs]

**Unit 2]: The greedy method**

Knapsack problem, job sequencing, Huffman code, minimal spanning tree, topological sorting. [8-Hrs]

**Unit 3]: Dynamic programming**

All pairs shortest path, optimal binary search tree, travelling salesman problem, flowshop scheduling. [8-Hrs]

**Unit 4]: Back tracking**

N-queens problem, sum of subsets, graph coloring, knapsack problem, Hamiltonian cycles. [8-Hrs]

**Unit 5]: Branch and bound**

LC branch and bound, FIFO branch and bound, Job sequencing problem with FIFO and LC branch and bound, 0/1 knapsack problem. [8-Hrs]

**Text/Reference Books –**

1. Fundamentals of computer algorithms (second edition)  
-Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities press



**Course Code : MC1016**

**Course Title : Microprocessor & Interfacing**

**Teaching Scheme:**

Lectures : 4 Hrs/Week

Total Credits : 4

**Examination Scheme:**

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

**Course Educational Objectives:**

1. To familiarize with the Intel 8086 Microprocessor & instruction set.
2. To develop & execute programs in assembly language .
3. To demonstrate 8255 interfacing with 8086 microprocessor.

**Course Outcomes Expected:**

1. Conversant with 8086 microprocessor and 8051 microcontroller
2. Understand, write, test and debug assembly language programs
3. Understand architectural advances in general purpose processors
4. Use the concepts for designing microcontroller based circuits using peripherals Apply high end microcontrollers for different applications

**UNIT 1] 8086 Architecture, Segmented memory, Pipelining and addressing modes [8-Hrs]**

**UNIT 2] Instruction set of 8086, Programming with 8086**

Use of Assembler

Debug, Development cycle, debugging software

Modular Programming, Procedures

Develop

[8-Hrs]

**UNIT 3] Designing 8086 CPU**

Basic 8086 CPU hardware design, Generating CPU clock and reset signals, Bus types and buffering techniques, 8086 minimum mode CPU module, 8086 maximum mode CPU module

[8-Hrs]

**UNIT 4] Main memory design - SRAM, ROM interfacing**

Basic input output – Parallel, serial Programmed and interrupt driver I/O DMA [8-Hrs]

**UNIT 5] Peripheral Controllers**

8255, 8259, 8279

[8-Hrs]

**Text/Reference Book –**

1. 8086 Family , Programming and interfacing – By John P. Uffenbeck, PHI 2001
2. Yu Chen Liu & Glenn A Gibson : Microcomputer Systems; The 8086/8088 Family, PHI

**Course Code : MC1017**

**Course Title : Lab: Object Oriented Programming & Systems**

**Teaching Scheme:**

Practical : 4 hrs/week

Total Credits : 2

**Examination Scheme:**

Practical Exam. : 25 Marks

Term Work : 50 Marks

**Course Educational Objectives:**

- 1) To make the students proficient in basic programming skills.
- 2) To present the syntax and semantics of the “C++” language as well as basic data types offered by the language.
- 3) To get prepared for the more advanced programming courses.

**Course Outcomes Expected:**

At the end of the course, a student will be able to:

- 1) Analyse a simple programming problem specification
- 2) Design a high-level (programming language independent) solution to the problem using functional abstraction and general imperative programming language constructs.
- 3) Write, compile, execute and debug a C++ program which maps the high-level design onto concrete C++ programming constructs

**Suggestive list of experiments:**

- 1 To calculate biggest of three numbers entered through constructor and then use destructor at end of program.
- 2 Write a program to find greatest of 3 numbers using friend function
- 3 Write a program to implement various types of constructors
- 4 Write a program to implement static members
- 5 Write a program to implement the concept of local class.
- 6 Write a program to overload binary + operator to add two times using friend function.
- 7 Create two classes, circle and rectangle with a member function showarea(). Write a program to find the difference between the area of circle and rectangle using friend class.
- 8 Write a program to convert class to basic type and class to class.
- 9 Write a program to enter the information of a student and then display it using the single inheritance concept ( One base class – personal, and two derived classes – physical and academic)
- 10 Write a program to illustrate the hierarchical inheritance. Create the base class called book and it is derived into two new classes, Engineering Book and Novel.

**Course Code : MC1018**  
**Course Title : Lab: Data Structures**

**Teaching Scheme:**

Practical : 2 Hrs/Week  
Total Credits : 1

**Examination Scheme:**

Practical Exam. : 25 Marks  
Term Work : 25 Marks

**Course Educational Objectives:**

- 1) To learn to design the basic data structure algorithms.
- 2) To apply the concepts of data structure for solving simple mathematical problems
- 3) To enable to implement complex data structures like trees & graphs in High level language.
- 4) To implement searching & sorting methods.

**Course Outcomes Expected:**

- 1) Student can able to appreciate the choices and tradeoffs which face a programmer in a real situation.

**Suggestive list of experiments:**

5. Write a program for implementing Stack and Queue.
6. Write a program for Singly Linked List and Doubly Linked List.
7. Write a program for Circular Queue using Linked List.
8. Write a program for Creation of Binary Tree and operations on it.
9. Write a program for Creation of Binary Threaded Tree.
10. Write a program for Depth First search and Breadth First search.
11. Write a program for Bubble Sort and Bucket Sort.
12. Write a program for Merge Sort and Heap Sort.
13. Write a program for Insertion Sort and Quick sort.
14. Write a program for Binary Search to search an element in the given sequence.

**Course Code : MC1019**

**Course Title : Lab: Communication Skills**

**Teaching Scheme:**

Practical : 2 hrs/week

Total Credits : 1

**Examination Scheme:**

Practical Exam. : 25 Marks

Term Work : 25 Marks

**Course Educational Objectives:**

- 1) To help engineering students in acquiring adequate mastery of Communicative and Functional English
- 2) To provide language training to the students to enable them to understand and acquire knowledge in technical subjects.
- 3) To help students develop their personal and interpersonal skills to enable them to make their transition from college to workplace smoother and help them excel in their jobs
- 4) To develop vocabulary and technical writing of the student in professional discipline

**Course Outcomes Expected:**

- 1) Students will be able to write technical reports and letters
- 2) Students will be able to make presentations on technical & non-technical topics for the customers as per the company needs..

**Suggestive list of experiments:**

1. Different Communication Situation.  
(Formal, Informal, Upward, Downward . etc)  
Telephonic Communication.  
(Enquiry, Leaving Message.etc)  
JAM Sessions  
Group Discussion.  
Debate.  
Presentation  
Interview  
Practical Based on the following Points:  
Parts of Speech,  
Types of Tense,  
Use of Articles,  
Synonyms and Antonyms,  
Find out the Grammatical Errors in the given sentences.
9. Practical Based on the following Points
  - a. Letter Writing,
  - b. Office documents like, Notices, Minutes, Agenda
  - c. Report Writings.
  - d. Resume Writing
10. Email Writing,
11. Listen to the Audio and Answer the Questions
12. Analyze the Data and answer The questions

**Course Code : MC1020**

**Course Title : Lab: Elective[Computer Graphics]**

**Teaching Scheme:**

Practical : 4 hrs/week

Total Credits : 2

**Examination Scheme:**

Practical Exam. : 25 Marks

Term Work : 50 Marks

**Course Educational Objectives:**

- 1) To study the basic graphics techniques and algorithms.
- 2) To study the multimedia concepts and programming.
- 3) To enable the students to develop their programming creativity.

**Course Outcomes Expected:**

1. Students will be able to implement the various algorithms programmatically.
2. Students will be able to use their creativity & create dynamic GUIs and animation effects.

**Suggestive list of experiments:**

- 1] Write a program demonstrating basic graphics functions.
- 2] Write a program for DDA Line drawing Algorithm
- 3] Write a program for Line drawing Algorithm
- 4] Write a program for Circle drawing Algorithm
- 5] Write a program for Ellipse drawing algorithm
- 6] Write a program for Character generation.
- 7] Write a program for filled area algorithm.
- 8] Write a program for 2D transformations.
- 9] Write a program for Line clipping Algorithm
- 10] Write a program for Polygon clipping algorithm.
- 11] Program for demonstrating computer animation.
- 12] Programs for multimedia.

**Course Code : MC1021**

**Course Title : Lab: Elective[Design & Analysis of Algorithm]**

**Teaching Scheme:**

Practical : 4 hrs/week

Total Credits : 2

**Examination Scheme:**

Practical Exam : 25 Marks

Term Work : 50 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Write a program for binary search with recursive and non-recursive methods.
2. Write a program for implementing sorting techniques – quick sort and merge sort
3. Write a program for implementing Prim's and Kruskal's algorithm.
4. Write a program for finding shortest path for multistage graph problem.
5. Write a program to implement knapsack problem.
6. Write a program to implement n-queens problem.
7. Write a program to implement sum of subsets.
8. Write a program for travelling salesman problem.

Practical Examination will consist of Performance and Viva-voice Examination The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

**Course Code : MC1022**

**Course Title : Lab: Elective[ Microprocessor & Interfacing]**

**Teaching Scheme:**

Practical : 4 hrs/week

Total Credits : 2

**Examination Scheme:**

Practical Exam. : 25 Marks

Term Work : 50 Marks

**Suggestive list of programs.**

1. Introduction to 8086.
2. 2.16-bit addition, subtraction, multiplication and division in Debug.
3. Assembly language program for 16-bit addition, subtraction, multiplication and division
4. Assembly language program for finding sum of series of 8-bit numbers in an array.
5. Assembly language program for finding largest and smallest number in an array.
6. Assembly language program for BCD multiplication.
7. Assembly language program for BCD division.
8. Assembly language program for BCD string addition.
9. Assembly language program for packed BCD to ASCII.
10. 8255 interfacing with 8086.