DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO. ACAD / NP /MCA/B.E. Elect. & Electr./98/2012

It is hereby notified for the information of all concerned that, on the recommendations of the Faculty of Engineering & Technology the Academic Council at its meeting held on 06-07-2012 has accepted the **Revised Syllabi of M.C.A. First Year & B.E. Electrical and Electronics Engineering** under the Faculty of Engineering & Technology as **appended herewith**

This is effective from the academic year 2012-2013 and onwards.

All concerned are requested to note the contents of this circular for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. ACAD/ NP/ MCA/B.E.
ELECT. & ELECTR.ENGG./2012/
20678-99
A.C.S.S. I.No.85

Date:- 03-08-2012.

Director,
Board of College and
University Development.

Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.

Copy to :-

1] The Controller of Examinations,
2] The Superintendent, [Engineering Unit],
3] The Superintendent, [Eligibility Unit],
4] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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Dr BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Revised Structure and Syllabus of First Year Engineering

M.C.A.

EFECTIVE FROM - 2012-13 & ONWARDS

Faculty of Engineering & Technology

Proposed Curriculum structure of First Year M.C.A.

w.e.f. July 2012

Part – I

Sr.No	Subject Code	Subjects	Teaching Scheme [Hours/Week]		Examination Scheme [Marks]					Duration of Theory Examination
			Lecture	Practical	Theory	CT	TW	PR	Total	
1	MCA 101	Object Oriented Programming Using C++	4	--	80	20			100	3 Hrs
2	MCA 102	Operating System	4	--	80	20	--	--	100	3 Hrs
3	MCA 103	Computer Organization	2	--	50	--	--	--	50	2 Hrs
4	MCA 104	Numerical Methods and Statistical Techniques	4	--	80	20	--	--	100	3 Hrs
5	MCA 105	Accounts & Financial Management	4	--	80	20	--	--	100	3 Hrs
6	MCA 121	Lab I Object Oriented Programming Using C++	--	2	--	--	25	25	50	--
7	MCA 122	Lab II Operating System	--	2	--	--	25	25	50	--
8	MCA 123	Lab III Computer Organization	--	2	--	--	50	--	50	--
9	MCA 124	Lab IV Linux	--	2	--	--	50	50	100	--
Total of I			18	8	370	80	150	100	700	

Part – II

Sr.No	Subject Code	Subjects	Teaching Scheme [Hours/Week]		Examination Scheme [Marks]					Duration of Theory Examination
			Lecture	Practical	Theory	CT	TW	PR	Total	
1	MCA 151	Core Java	4	--	80	20	--	--	100	3 Hrs
2	MCA 152	Data Structure Using C++	4	--	80	20	--	--	100	3 Hrs
3	MCA 153	Professional Communication Skill	2	--	50	--	--	--	50	2 Hrs
4	MCA 154	Discrete Mathematical Structures	4	--	80	20	--	--	100	3 Hrs
5	MCA 155	Principles of Programming Language	4	--	80	20	--	--	100	3 Hrs
6	MCA 171	Lab V Core java	--	2	--	--	25	25	50	--
7	MCA 172	Lab VI Data Structures Using C--	--	2	--	--	25	25	50	--
8	MCA 173	Lab VII Communication Lab	--	2	--	--	50	--	50	--
9	MCA 174	Lab VIII HTML and PHP Lab	--	2	--	--	50	50	100	--
Total of II			18	8	370	80	150	100	700	
Total of I and II					740	160	300	200	1400	

CT : Class Test

TW : Term Work

PR: Practical

Title of the subject: Object Oriented Programming Using C++
Course Code: MCA 101

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objectives:

- To learn the Object-Oriented approach to programming
- Facilitate the students to use C++ as a language of expression of logic
- To train students to exploit Object-Oriented features effectively in real world

Unit 1: **Introduction to C++:** **[10 Hrs]**
Procedural Vs Object oriented programming, characteristics of object oriented programming.

C++ Programming Basics:
Keywords, Constants and Variables, data types, operators, type conversions, output with cout, input with cin, preprocessor directives, cascading and manipulators. Decisions and Loops statements, Array, Structure, Functions

Unit 2: **Classes and Objects:** **[10 Hrs]**
Class, Object, Class members, Access specifiers, Arrays as class Member Data, Arrays of object, Scope resolution operator, Static class members, passing an object to function, returning an object to function, friend function, and Dynamic memory allocation.
Constructors and Destructors, Function overloading, Default function arguments, Function overloading and ambiguity

Unit 3: **Operator Overloading:** **[10 Hrs]**
Overloading unary and binary operators using member function and friend function, Data Conversion, Pitfalls of Operator Overloading

Inheritance:
Concept of Inheritance, types of inheritance, Derived class and Base class, public and private inheritance, Constructors, Destructors and Inheritance, Virtual base class, Containership

Pointers:
Introduction, pointer to object, this pointer, pointer to derived classes
Polymorphism:
Virtual functions, pure virtual functions, Abstract class, Virtual destructors

Unit 4: File I/O: **[10 Hrs]**
Stream class hierarchy, Formatted file I/O, Character I/O, Binary I/O, File pointers, Command Line Arguments

Exception Handling:
Simple exceptions, multiple exceptions

Templates:
Introduction to templates, function and class templates

STL:
Introduction to Standard Template Library, STL Programming Model, Sequence, Container Adapter, Integrator, algorithms, Predicates, Allocators

Text Books:

1. Object Oriented Programming In C++ Robert Lafore, Galgotia
2. C++ The Complete Reference - HERBERT SCHILDT
3. C++ Programming Language Bjarne Stroustrup

Reference Books:

1. Object Oriented Programming with C++ - E. BALAGURUSWAMY
2. Let us C++ Yeshwant Kanetkar
3. Object Oriented Programming Using C++ - B.Chandra

Digital Reference:

www.cplusplus.com

Title of the subject: Operating System
Course Code: MCA 102

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objectives:

- The objective of this course is to provide an introduction to the internal operation of modern operating systems. In particular, the course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

Unit 1: **Introduction :**
Overview of all system software, Operating system, I/O Manager, Assembler, Compiler, Linker, Loader, Principles of I/O hardware and software, Types of Operating System and Operating System Structure **[10 Hrs]**

Fundamentals of OS :
OS services and components, multitasking, multiprogramming, buffering, spooling, System calls and types of system calls.

Unit 2: **Memory Management:**
Swapping, Contiguous memory allocation, Paging, Segmentation.

Virtual Memory Management:
Demand Paging, Page Replacement Algorithms, Thrashing. **[10 Hrs]**

Secondary Storage Management: Disk Structure, Disk Scheduling Algorithm, RAID

Unit 3: **Process Management:**
Process concept and Scheduling, Inter process Communication, Threads , Threads Vs Process

Process Synchronization:
Critical Section Problem, Semaphores, Classical Problems of process Synchronization **[10 Hrs]**

Deadlocks:
System model, Deadlock Characterization, Methods of handling Deadlocks, Dead lock prevention, deadlock avoidance , Deadlock detection and recovery from deadlock.

Unit 4: **File System:**
File System structure, File system implementation, Directory structure and Implementation, Allocation Method, VFS **[10 Hrs]**

Special Purpose Operating System:

Basics of Multimedia Operating System, Real Time Operating System and Distributed Operating System

Text Books:

1. Operating System Principles By Silberschatz, Galvin, Gagne (Seventh Edition)
2. Operating System-Internal and Design Principles by William Stalling (Sixth Edition)
3. Modern Operating System By Andrews Tanenbaum

Reference Books:

1. Operating System - A Concept-Based Approach By Dhamdhere (Second Edition)
2. Operating Sytem by Dietel, Chofenes

Digital Reference:

1. http://en.wikipedia.org/wiki/Operating_system
2. http://nptel.iitm.ac.in/

Title of the subject: Computer Organization
Course Code: MCA 103

Teaching Scheme:
Lectures: 2 hrs/week

Examination Scheme:
Theory Paper: 50 marks [2 hrs]

Unit 1: **Computer Components and Function**: [5 Hrs]
Computer Components, computer functions, Interconnection structures, Bus interconnection and PCI

Computer Arithmetic:
The Arithmetic and Logical Unit, Integer Representation, Integer Arithmetic, Floating-Point Representation, Floating Point Arithmetic.

Unit 2: **Memory:** [5 Hrs]
Cache Memory, Internal and External Memory

Input /Output:
External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access.

Unit 3: **Process Structure and Function:** [5 Hrs]
Processor Organization, Register Organization, Instruction Cycle

Unit 4: **8086 Microprocessor:** [5 Hrs]
Architecture and Instruction Set

Text/Reference Books:

1. Computer Organization and Architecture By William Stalling(Eighth Edition)
2. Computer Architecture and Organization by John P. Hayes
3. Computer System Architecture by M.Morris Mano PHI publication

Digital Reference:

1. http://en.wikipedia.org/wiki/Computer_architecture

Title of the subject: Numerical Methods and Statistical Techniques

Course Code: MCA 104

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objectives:

- The purpose of numerical analysis is to find acceptable approximate solutions when exact solutions are either impossible and to devise alternate methods of solution better suited to the capabilities of computers.
- Computer performance plays an important role in computer system design. The objective to introduce statistical techniques is to develop understanding to how performance measurements and their quantitative analysis using statistical techniques are useful in understanding, comparing and enhancing a computer system.

Unit 1: **Roots of Equation**: Bisection method, Regula -Falsi method, Newton-Raphson method, Rate of convergence. **[10 Hrs]**

Linear Algebraic Equations: LU decomposition technique, Gauss Jordan and Gauss Elimination methods, Jacobi and Gauss Seidel methods.

Unit 2: **Interpolation:** Finite difference, Newton's forward and backward interpolation formulae, Central Difference formulae Gauss forward and backward difference formulae, Newton's divided difference Formula, Lagrange's interpolation formula. **[10 Hrs]**

Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rule, Boole's rule, Waddle's rule

Ordinary Differential Equations: Euler's Method, Midpoint method, Runge Kutta Method.

Unit 3: **Measures of location**: Mean, Median, Mode, Percentiles, Quartiles; Measures of Variability: Range, Inter-quartile Range, Variance, Standard Deviation, Coefficient of Variation. **[10 Hrs]**

Probability Theory: Probability concept, Types of probability - A priori probability and empirical probability, objective and subjective probability. Calculations of probability - in case of simple events, mutually exclusive events, compound events, Jacob Bernoulli's theorem, Bayes theorem, Essentials of permutation and combinations.
Probability Distribution: Random variable, Binomial theorem, Poisson Distribution, Exponential Distribution, Normal Distribution.

Unit 4: **Regression and Correlation Analysis:** Regression analysis and its assumptions, Simple linear regression model – scattered diagram method and least square method. Standard error of estimate, Correlation Analysis, Coefficient of determination and coefficient of correlation, Methods of **[10 Hrs]**

coefficient of correlation -- least square, simple regression coefficient, Karl Pearson. Probable error of coefficient of correlation.

Text Books/Reference Books:

1. R.A. Johnson and C.B. Gupta, "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 7th edition, 2007 (For units 3, 4 and 5).
2. Grewal, B.S. and Grewal,J.S., " Numerical methods in Engineering and Science", 6th Edition, Khanna Publishers, New Delhi, 2004.
3. R.E. Walpole, R.H. Myers, S.L. Myers, and K Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia , 8th edition, 2007.
4. Chapra, S. C and Canale, R. P. "Numerical Methods for Engineers", 5th Edition, Tata McGraw-Hill, New Delhi, 2007.
5. Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
6. Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.

Digital Reference:

1. http://www.academicearth.org/
2. http:/.videolectures.net

Title of the subject: Accounts & Financial Management
Course Code: MCA 105

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objectives:

- This course provides an introduction to financial and management accounting. It is aimed at providing a broad understanding of the theory and practice of financial accounting, management accounting and financial management, both for non-specialist students and as a foundation for further study in the area.

Unit 1: **Fundamentals of Accountancy and accounting statement** **[10 Hrs]**
Basic Accounting terms, Financial Accounting: Double Entry Accounting system, Classification of accounts, Concepts and conventions in accounting, Accounting process, Depreciation. Journalisation: Rules for Journalisation, posting in a ledger, subsidiary books, preparation of trial balance, Bank Reconciliation statement. Final Accounts: Preparation of Trading and profit and loss Account and Balance sheet of a proprietary and partnership firms.

Unit 2: **Ratio Analysis** **[10 Hrs]**
Ratio analysis: Introduction, Classification of financial ratios, Statement of changes in financial position.

Unit 3: **Cost Accountancy** **[10 Hrs]**
Cost Accounting: Advantages of Cost Accounting, Comparison with financial accounting, Nature and elements of cost, Classification of Cost, Cost volume profit analysis., Break-even chart .Standard costing. Advantages, Variance analysis

Unit 4: **Budget and Budgetary Control** **[10 Hrs]**
Definition and objective, Preparation of various types of budgets including cash budget, fixed budget and flexible budget. Cost Accumulation system - Job and procedure.

Text/Reference Books:

1. V. K. Saxena & C. D. Vashist "Essentials of Cost Accounting"
2. Khan and Jain "Management Accounting", Tata Megraw Hill.
3. A.P. Rao, Management Accounting", EPH
4. Satish Inamdar, Cost and Management accounting", Everest Publishing House
5. Dr.Sanjay Patankar, Management Accounting",
6. Dr.Mahesh Kulkarni , Management Accounting" ,
7. T.S. Grewal, Element of Accounts, S. Chand & Co.
8. Accounting and financial management by Ramchandran T – Scitech publication
9. Management accounting principles by R.N. Anthony and J.S.Reece

Digital Reference:

http://www.nptel.iitm.ac.in

Title of the subject: Lab I Object Oriented Programming Using C++
Course Code: MCA 121

Teaching Scheme:	Examination Scheme:
Practical: 2 hrs/week	Practical Exam: 25 Marks
	Term work: 25 Marks

TERM WORK:
Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:
1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

PRACTICAL EXAMINATION:
The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

Suggested List of Experiments:
Minimum 3 experiments from each unit of course code 101 should be carried out (Preferably on Linux platform)

Title of the subject: Lab II Operating System
Course Code: MCA 122

Teaching Scheme:	Examination Scheme:
Practical: 2 hrs/week	Practical Exam: 25 Marks
	Term work: 25 Marks

TERM WORK:
Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:
1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

PRACTICAL EXAMINATION:
The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

Suggested List of Experiments:

1. 3 assignments based on different memory management techniques.
2. 3 Programs on Process Scheduling Algorithm
3. 2 Program on Page Replacement Algorithm
4. 1 Programs on Disk Scheduling Algorithm
5. 1 assignments based on analyzing special purpose operating systems

Title of the subject: Lab III Computer Organization
Course Code: MCA 123

Teaching Scheme:	Examination Scheme:
Practical: 2 hrs/week	**Term work: 50 Marks**

TERM WORK:
Term work shall consist of minimum of 3 case study based on the above syllabus. Each student will be submitting individual report of the case study. The assessment on the term work shall be done on the following criteria:

1. Continuous assessment.
2. Presentation on case study.

Oral examination on the syllabus and the term work, mentioned above.

Suggested List of Experiments:

1. Study of different Computer architectures
2. DMA Controller
3. Assignment on RS232
4. 6 assignments based on 8068 microprocessor using TASM

Title of the subject: Lab IV Linux Lab
Course Code: MCA 124

Teaching Scheme:	Examination Scheme:
Practical: 2 hrs/week	**Practical Exam: 50 Marks**
	Term work: 50 Marks

Objectives:

- The primary objective of this course is to familiarize students with the basics necessary to operate within the Linux environment.

Unit 1: **Introduction to Linux:** **[4 Hrs]**
Architecture of Linux, Linux File System Structure, GNOME and KDE Desktops, Installation of Linux.

Unit 2: **Commands and Utilities:** **[4 Hrs]**
General Purpose Utilities, User and Session Management Commands, File System Navigation Commands Text Processing Tools, Communication commands.

Unit 3: **Editor and Shell Scripting :** **[4 Hrs]**
Vi Editor, Writing simple shell scripts, command line arguments, Condition and Control Structure

Unit 4: **Application Installation** **[4 Hrs]**
Different Methods of Software installation (Ex. RPM, Yum Server, etc)

Unit 5: Installation and Backup [4 Hrs]

Obtaining kernel source, Installing kernel source, Compiling kernel source , Backup and Recovery

TERM WORK:

Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:

1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

PRACTICAL EXAMINATION:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

Suggested List of Experiments:

1 Architecture of Linux and Linux File System structure
2 Installation of Linux, GNOME and KDE Desktop
3 General Purpose Utilities, User and Session Management Commands,
4 File System Navigation Commands, Text Processing Tools , Communication commands.
5 vi-Editor and Shell Script Basic
6 Shell Scripting - Condition and Control Structures.
7 Installation Using RPM / YUM Server
8 Open Office Installation and Applications
9 Installation and Compilation of Kernel Source
10 Back Up using tar

Text/Reference Books:

Sumitabha Das: "Unix concepts & applications", TMH

Digital Reference:

www.linuxcommand.org
http://www.freeos.com/guides/lsst/
http://www.debianhelp.co.uk/
http://www.linuxguide.it/command_line/linux_commands_by.html
http://www.rpm.org/
http://www.freebsd.org/
https://help.ubuntu.com/community/Kernel/Compile
http://ubuntuforums.org/showthread.php?t=35087

Title of the subject: Core Java
Course Code: MCA 151

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objectives:

To enable the students to understand the core principles of the Java Language and use visual tools to produce well designed, effective applications and applets.

Unit 1: **[10 Hrs]**

Basics of Java: Java's importance to the internet, Java's Magic: The Byte Code, Java Buzzwords, Basic syntax of Java - Identifiers, Keywords & Data Types , Strings And Characters, Arithmetic Operators And Expressions, Type Conversion in Assignments, Comments

Classes in Java: Introduction to Methods, Constructors, This Keyword, Overloading Methods, Overloading Constructors, Using objects as Parameters, A closer look at argument passing, Returning objects, Understanding Static, Command Line Arguments.

Inheritance: Basics, Using Super, Method Overriding, Abstract methods and Class, Using Final with Inheritance, Packages, Importing Packages and Interfaces.

Unit 2: **[10 Hrs]**

Graphics Programming:

Applets: An Overview of Applets, the Life Cycle of an Applet, creating applets, the Graphics Class, Using Colors, Displaying Text, Using Applets in a Web Page

Abstract Window Toolkit (AWT): Introducing the AWT: Working with Windows, Graphics, and Text, Using AWT Controls, Layout Managers, and Menus

Swing: Introduction to swing, swing features, Swing components, working with swing, swing basic containers, User Interface Components (Buttons, Text Fields, Text Areas, Check Boxes, Radio Buttons, Japplet etc.) Layouts and Layout Managers, Using Dialogs, JoptionPane class, Input Dialog Boxes, Timers & Sliders, Progress Bars, Tables

Unit 3: **[10 Hrs]**

Event Handling: The Delegation Event Model, Event handling classes and Interfaces.

Exception handling: Fundamentals, Exception Types, Uncaught Exceptions, Using Try and Catch, Multiple Catch Clauses, Throw, throws, finally, Built-in Exceptions and creating your own Exception Sub Classes.

Unit 4: **[10 Hrs]**

Multithreading: Java Thread Model, The Main thread, Creating a Thread, Creating Multiple Threads, Using Alive() and Join(), Thread Priorities, Synchronization, Inter thread Communication, Suspending, Resuming and Stopping Threads.

JDBC: Basics of Database Connectivity, Introduction to JDBC, JDBC Architecture, Steps to create JDBC Application, insert, update, delete and select operations

I/O Package:

Files and Directories, Overview of Codes and Streams, Buffered Character Streams, Byte Streams

Text Books:

1. Herbert Schildt: "The Complete Reference Java2", 5th Edition TMH Publications.
2. Deitel & Deitel: "How To Program JAVA", Pearson Education

Reference Books:

1. E Balguruswamy: "Programming with Java- A Primer", TMH
2. Cay S Horstmann, Fary Cornell Core Java Vol I and Vol II : Sun Microsystems Press
3. Steven Holzner, JAVA 2 Programming Black Book, Wiley India.

Digital Reference:

1. http://docs.oracle.com/javase/tutorial/

Title of the subject: Data Structures Using C++
Course Code: MCA 152

Teaching Scheme:	**Examination Scheme:**
Lectures: 4 hrs/week	**Theory Paper: 80 marks [3 hrs]**
	Class Test: 20 Marks

Objectives:

- To introduce algorithmic analysis, fundamental data structures, problem solving paradigms
- To study the representation, implementation and application of basic data structures.
- To introduce algorithmic strategies and time complexity analysis of problems.

Unit 1: **Introduction**: Data Structures, types, importance, Abstract data Type. **[10 Hrs]**

Array :
Arrays in C++, Dynamically Allocated Arrays, One and two Dimensional Arrays, Multi Dimensional Arrays, Structures and Unions

Stack:
LIFO structure, creates, POP, PUSH, delete stack

Queue:
FIFO structure Priority Queues, Circular Queues, operations on Queues

Hash Function
Address calculation techniques, Common hashing functions ,Collision resolution ,Linear probing, Quadratic

Unit 2: **Linked List:** **[10 Hrs]**
Create List, Insert node (empty list, beginning, middle, end), Delete node(First, general case), search list, retrieve node, add node, remove node, print list, append linked list, array of linked lists.
Complex Linked List Structures:
Header nodes, Circularly-Linked List, Doubly Linked List, Multilinked Lists.

Unit 3: **Tree:** **[10 Hrs]**
General tree terminology, tree traversal, polish notations, Concept and basic Operations on: Binary tree, Threaded Binary tree, Binary Search Tree, Heap

Unit 4: **Graphs:** **[10 Hrs]**
Operations (Add vertex, Delete Vertex, Add Edge, Delete Edge, Find Vertex) ,Traverse Graph (Depth-First, Breadth-First) ,Graph Storage Structures (Adjacency Matrix, Adjacency List) , Minimum Spanning Tree, Shortest Path Algorithm (Dijkstra's algorithm, Kruskal's algorithm, Prim's algorithm, Warshall's algorithm)

Sorting Technique: Bubble, Insertion, Selection, Quick sort, Radix sort

Text Books:

1. Fundamentals of Data Structures in C [2 nd Edition], Ellis Horowitz, Sartaj Sahani, Susan Anderson Freed, Universities Press.
2. Data structure by Lipschutz, MGH

Reference Books:

1. Data and file structure by A. Tanenbaum by PHI
2. Data structure using C by Trembly

Digital Reference:

1. http://www.roseindia.net/tutorial/datastructure

Title of the subject: Professional Communication Skills
Course Code: MCA 153

Teaching Scheme:	**Examination Scheme:**
Lectures: 2 hrs/week	**Theory Paper: 50 marks [2 hrs]**
Practical: 2 hrs/week	**Term Work: 50 marks**

Objectives:

- To equip students with effective speaking and listening skills in English
- To help them develop their soft skills and people skills, that will make the transition from college to workplace smoother and help them to excel in their jobs.
- To enhance students' performance at Placement Interviews, Group Discussions and other recruitment exercises.

Unit 1: **Introduction:** **[5 Hrs]**
Formal and Informal Introduction

Basic Grammar :
Noun, Pronoun, verbs, Tenses: Simple present tense, Present continuous Tense, Present perfect tense, Present perfect continuous Tense, Past tense: Simple past tense, Past continuous tense, Past perfect tense, past perfect continuous Tense, Future Tense: Simple future Tense, Simple Present Tense, Present Continuous Tense, future continuous Tense, Future perfect Tense

Unit 2: **Speaking:** **[5 Hrs]**
Phonetics: Intonation , Ear Training ,Correct Pronunciation , Sound recognition exercises -Common Errors in English

Conversations:
Face to Face Conversation, Telephone conversation, Role play activities.

Business Correspondence:
Principles of letter writing, Job Application with Resume, Leave applications.

Unit 3: **Interviews:** **[5 Hrs]**
Types of Interview, Preparing for the Interview, Types of Interviews, Interview Questions, Direct Questions, Open ended questions, Closed questions, How to crack an Interview- Video Samples

Group Discussion
Why is GD part of selection process? - Structure of a GD - Moderator-led and other GDs ,Strategies in GD, Team work , Body Language - Video Samples

Unit 4: **Soft Skills** **[5 Hrs]**
Time Management , Articulateness ,Assertiveness , Psychometrics , Innovation and Creativity , Stress Management & Poise - Video Samples

Presentation Skills

Strategies for developing Self Confidence ,Elements of an effective presentation, Structure of a presentation , Presentation tools , Voice Modulation ,Audience analysis , Body Language - Video Samples

Text Books:

1. Meenakshi Raman and Sangeetha Sharma, Technical Communication- Principles and Praticer, Oxford University Press; New Delhi(2004)
2. Barker, A- Improve your Communication Skills - Kogan Page India Pvt. Ltd. ,New Delhi(2006)

Reference Books:

1. Adrian Doff and Christopher Jones- Language In Use (Upper- Intermediate),Cambridge University Press, First South Asian Edition(2004)
2. John Seely, The Oxford Guide To Writing and Speaking, Oxford University Press , New Delhi (2004)
3. Meenakshi Raman and Sangeetha Sharma, Technical Communication - Principles and Practice, Oxford University Press, New Delhi (2004)
4. Barker, A - Improve your communication skills – Kogan Page India Pvt Ltd, New Delhi (2006)
5. Adrian Doff and Christopher Jones – Language in Use (Upper-Intermediate), Cambridge University Press, First South Asian Edition (2004)
6. John Seely, The Oxford Guide to writing and speaking, Oxford University Press, New Delhi (2004)

Digital Reference:

1. http:/ www.words300.com/ebooks/15ways.pdf
2. http:/ www.talkenglish.com
3. http:/ testfunda.com examprep websitepages gdpilessons/VideoGDPI.aspx

Title of the subject: Discrete Mathematical Structures
Course Code: MCA 154

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objectives:

- To train the students with mathematical foundations of Computer Science
- To give a feel of core mathematics required in many subjects of Computer Science

Unit 1: **Sets and Probability**: Sets, Discrete probability, conditional probability, Elementary counting principles: Pigeonhole Principle, Inclusion-Exclusion Principle, Principles of Mathematical Induction: Mathematical Induction, First Principle of Mathematical Induction, Generalized principle of Mathematical Induction **[10 Hrs]**

Unit 2: **Logic**: Logical connectives: Negation, Conjunction, Disjunction, Conditional Proposition, Bi-conditional Proposition, Truth Tables, Tautology, Contradiction, Logical Equivalence, Valid Arguments, Methods of Proof **[10 Hrs]**

Boolean algebra: Definition and Properties, Sub-Boolean Algebra Direct Product and Homomorship, Atoms, Stone's Representation Theorem, Boolean Expressions and Their Equivalences, Min term and Max Terms, Boolean algebra, Values of Boolean Expressions, Canonical Forms, Boolean Functions, Symmetric Boolean Functions.

Unit 3: **Recurrence Relations**: Generating functions, Construction of Recurrence relation Discrete Numeric Functions and Recurrence Relations, Homogenous Recurrence Relation, Non-Homogenous Recurrence Relation, Particular Solutions, Use of Generating Functions to solve Recurrence Relation. **[10 Hrs]**

Unit 4: **Graphs** : Terminology, Isomorphism of Graphs, Matrix Representation of Graph, Sub graphs, Induced Sub graphs, Complement of Sub graphs, Union and Intersection of Two Graphs, Connected and Disconnected Graphs, Walks, Paths and Circuits, Weighted Graphs and Shortest paths Algorithms, Eulerian and Hamilton graph, Bridges of Konigsberg , The traveling salesman problem. **[10 Hrs]**

Trees: Terminology, Center of tree, Fundamental Circuits and cut sets, Binary trees, Tree isomorphism, Tree traversal, Spanning trees.

Text/Reference Books:

1.C.L.Liu , "Elements of Discrete Mathematics", Tata McGraw-Hill Publication
2. Kollman, Busby and Ross, "Discrete Mathematical Structures", PHI

3. Discrete Mathematical Structures with Application to Computer Science (Mcgraw Hill - New Delhi) By Tremblay, J.P. & Manohar
4. Discrete Mathematics and Its Applications (Mcgraw Hill - New Delhi) By Rosen, Kenneth L.
5. Discrete Mathematics by Seymour Lipschutz,Marc Lipson(Schaum's Series)

Title of the subject: Principles of Programming Language

Course Code: MCA 155

Teaching Scheme:
Lectures: 4 hrs/week

Examination Scheme:
Theory Paper: 80 marks [3 hrs]
Class Test: 20 Marks

Objectives:

- . To develop understandability of underlying fundamental concept and principles of different programming language in general.

Unit 1: **Introduction:** **[10 Hrs]**

The Art of Language Design ,The Programming Language Spectrum , Compilation and Interpretation, Programming Environments, An Overview of Compilation ,Lexical and Syntax Analysis ,Semantic Analysis and Intermediate Code Generation ,Target Code Generation ,Code Improvement

Programming Language Syntax:

Specifying Syntax ,Scanning, Parsing, Syntax Errors

Unit 2: **Names, Scopes, and Bindings:** **[10 Hrs]**

The Notion of Binding Time, Object Lifetime and Storage Management ,Scope Rules, Implementing Scope, The Meaning of Names Within a Scope, The Binding of Referencing Environments, Macro Expansion, Separate Compilation

Semantic Analysis:

The Role of the Semantic Analyzer ,Attribute Grammars, Evaluating Attributes, Action Routines, Space Management for Attributes, Decorating a Syntax Tree

Unit 3: **Control Flow:** **[10 Hrs]**

Expression Evaluation , Structured and Unstructured Flow, Sequencing, Selection, Iteration, Recursion, No determinacy

Data Types:

Type Systems, Type Checking, Records (Structures) and Variants (Unions),Arrays, Strings, Sets ,Pointers and Recursive Types, Lists, Files and Input/Output, Equality Testing and Assignment

Unit 4: **Building a Runnable Program** **[10 Hrs]**

Back-End Compiler Structure, Intermediate Forms, Code Generation Address Space Organization, Assembly, Linking, Dynamic Linking,

Run-time Program Management

Virtual Machines, Late Binding of Machine Code, Inspection/Introspection

Code Improvement

Phases of Code Improvement, Peephole Optimization, Redundancy Elimination in Basic Blocks, Global Redundancy and Data Flow Analysis, Loop Improvement I, Loop Improvement II, Register Allocation

Text Books/Reference Books:

1. Programming Language Pragmatics, by Michael L. Scott Third Edition Morgan Kaufmann Publishers
2. Principles of Programming Languages by Gilles Dowek
3. Concepts of Programming Languages by Sebesta

Digital Reference:

1. http://books.google.co.in/books?id=ZCdaTVi-SJgC&printsec=frontcover#v=onepage&q&f=false

Title of the subject: Lab V Core Java
Course Code: MCA 171

Teaching Scheme:	**Examination Scheme:**
Practical: 2 hrs/week	**Practical Exam: 25 Marks**
	Term work: 25 Marks

TERM WORK:
Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:
1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

PRACTICAL EXAMINATION:
The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

Suggested List of Experiments:
Minimum 3 experiments in each unit of course code 151 should be carried out

Tools to be used –
JDK 1.5 onwards, TextPad / EditPlus, Eclipse 3.x)

Title of the subject: Lab VI Data Structures Using C++
Course Code: MCA 172

Teaching Scheme:	**Examination Scheme:**
Practical: 2 hrs/week	**Practical Exam: 25 Marks**
	Term work: 25 Marks

TERM WORK:
Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:
1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

PRACTICAL EXAMINATION:
The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

Suggested List of Experiments:

1 Write a program to demonstrate insertion, deletion, search and displaying of an element in an array.
2 Write a program to demonstrate operations performed on stack.
3 Write a program to demonstrate operations on queue.
4 Write a program to demonstrate operations on singly link list.
5 Write a program to implement singly link list as a stack.
6 Write a program to implement operations on double link list.
7 Write a program to demonstrate creation, traversing and searching in Binary Search Tree.
8 Program to convert infix expression to postfix and infix to postfix.
9 Write a program to traverse a graph using DFS with an adjacency matrix.
10 Write a program to traverse a graph using BFS with an adjacency matrix.
11 Write a program to demonstrate sorting algorithm.(using any one of these techniques: bubble, Insertion, selection)

Title of the subject: Lab VII Professional Communication Skills
Course Code: MCA 173

Teaching Scheme:	**Examination Scheme:**
Practical: 2 hrs/week	**Term work: 50 Marks**

TERM WORK:
Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:
1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

Suggested List of Experiments:

1 Formal and Informal Introduction about themselves
2 Reading Comprehension, with proper Pitch, Volume, Rate, Quality, animation , Pause, Posture and Eye contact
3 Assignment on Report Writing, Letter Writing and Memo Writing
4 Structuring their own resume and the cover letter in the Industry required format
5 Ethics to be followed in different types of E-mail communication
6 To conduct Mock Interviews and provide feedback on what and how to improve.
7 To conduct Mock GD and provide feedback on what and how to improve.
8 Writing and describe an Event/Incident/Experience without grammatical mistakes
9 Writing and delivering a speech using good vocabulary.
10 Presentation Skills: Students make presentations on given topics using gestures and eye contact.

Title of the subject: Lab VIII HTML and PHP Lab
Course Code: MCA 174

Teaching Scheme:
Practical: 2 hrs/week

Examination Scheme:
Practical Exam: 50 Marks
Term work: 50 Marks

Objectives:
After completion of this practical session, students will be able to write and understand HTML and PHP code, and use it to build dynamic web pages. They will also be able to install and configure third-party PHP packages.

Unit 1:	Basic Concept	**[4 Hrs]**
Unit 2:	Introduction to HTML HTML programs on paragraph, text, list creation	**[4 Hrs]**
Unit 3:	HTML programs on adding graphics, tables and links. HTML programs on frames: frameset and frame tag, form tags	**[4 Hrs]**
Unit 4:	Introduction of PHP, Mysql database, Apache Server Simple PHP programs on conditional and control structure and array.	**[4 Hrs]**
Unit 5:	PHP program which uses database i.e MYSQL. Creation of Web site using HTML, PHP and Mysql database.	**[4 Hrs]**

TERM WORK:
Term work shall consist of minimum of 10 programs/Assignments to be developed based on the above syllabus .The assessment on the term work shall be done on the following criteria:
1. Continuous assessment.
2. Performing the Experiment in the Lab.
3. Oral examination on the syllabus and the term work, mentioned above.

PRACTICAL EXAMINATION:
The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

Suggested List of Experiments:

1. Web standard: Standard Process, Advantage of Standard, Current Web Standard. Basic web designing: Introduction to web browser, architecture of web browser, web page, Static & dynamic web pages, home page, web-site, Web-servers & clients.
2. Basics of Internet, Internet Domains• Web standard: Standard Process, Advantage of Standard, and Current Web Standard. Basic web designing: Introduction to web browser, architecture of web browser, web page, Static & dynamic web pages, home page, web-site, Web-servers &

clients. Basic's of Internet, Internet Domains

3 Structure of HTML program , Html program using following attributes:
- Text formatting: paragraph, line break, headings , drawing lines
- Text styles: Bold, italics, underline
- Lists: types of lists viz. unordered, ordered, definition lists

4 Adding graphics: image, background, border, using width and height attributes.
- Tables : creation and setting attributes of table
- Linking documents (Links): External document references, internal document references.

5 HTML program to Add Frame frameset and forms to the page.

6 PHP Program to calculate factorial of a given number, Program for arrays to search element

7 PHP program to calculate number is prime or not , generate the prime no. between given range

8 Create database and table in MYSQL and create the PHP page to submit the data in database

9 Create PHP page to insert, update, and delete the data in Mysql database from HTML form.

10 Create a small website which should include all features studied above.

Text /Reference books:

1. The Complete Reference – HTML and XHTML Thomas A. Powell

2. The Complete Reference – PHP by Steven Holzner - TMH

Digital Reference:

1. www.w3schools.com