SOLPAUR UNIVERSITY, SOLAUR
M.C.A. (under faculty of Engineering) SYLLABUS
(w. e. f. June 2009)

Solapur University, Solapur.								
Syllabus of First Year MCA (Under Faculty of Engg.)								
Semester	Paper Name	L	T	P	TH	TW	POE	Total
1	Discrete Mathematical Structure (Includes Finite State Automata)	4			100			100
	Fundamentals of computer and Programming in C	4	1		100			100
	Digital Electronics	4		2	100	25		125
	Computer oriented numerical methods and statistics	3	1		100			100
	Industrial Management and organizational Behaviour(IMBO)	4			100			100
	Programming Laboratory –I (C-Programming)			4		25	50	75
	Seminar-I		2			50		50
	Total	19	4	6	500	100	50	650
		L	T	P	TH	TW	POE	Total
2	Computer Oriented Operations Research	4			100			100
	Unified Modeling Language	4			100			100
	Data Structure-I	4		2	100	50	50	200
	Microprocessor	4		2	100	50		150
	Software Engineering	3			100			100
	Programming Laboratory-II (C++ Programming)	1		4		25	50	75
	Seminar-II		2			25		25
	Total	20	2	8	500	150	100	750

Discrete Structure

Lecture: 4 hr / week Theory: 100 Marks

SECTION-I

1. **Graph Theory-** **(4 hr)**
   Basic Graph terminologies and basic theories, Types of graphs, Operations on graph, Re-presentation of graph, Adjacency and Incidence Matrix.

2. **Eulerian Graphs-** **(5 hr)**
   Fleury's algorithm, Hamilton graph, Gray code, Bipartite graph, Weighted graph, Traveling salesman problem Trees, Properties of tree, Spanning tree, Rooted tree, Binary tree, tree traversal and polish notations.

3. **Set Theory :** **(6 hr)**
   Basic concept of set theory, types of operations on sets, ordered pairs, Cartesian products, Relations, Binary relations, Matrix and graph representation, equivalence classes, partitions of a set, partial order relation, POSET, and Hasse diagrams
4. **Functions:** **(5 hr)**
   Function-types, composition of functions, Inverse function, Properties of lattice, complemented lattice, distributed lattice, bounded lattice

SECTION - II

5. **Theory of Automata-** **(3 hr)**
   Definition of an automata, Description of finite Automata, Transition Systems, Properties of transition function, Acceptability of a string by FA.

6. **Non-Deterministic Finite State Machines-** **(10 hr)**
   Non-Deterministic Finite State Machines, The equivalence of DFA and N-DFA, Mealy and Moore Machine, Minimization of Finite Automata.

7. **Regular Sets and Regular Grammar-** **(7 hr)**
   Regular Expressions, Finite Automata and Regular Expressions, Pumping Lemma for Regular sets, Application of Pumping Lemma, Closure properties of regular sets, Regular sets and regular grammar.

Text Book:

1. Discrete Mathematics by Lipschutz, MGH(for unit 1 to 5)
2. Theory of Computer Science by K.L.P.Mishra, PHI(for unit 6 to 8)
3. Discrete Mathematical Structure by Trembly and Manohar

Reference Book:

1. Graph Theory by Narsing Deo
2. Discrete Mathematical Structure by Rosen
3. Introduction to Computer theory by Danniel I.A.Cohen, John Wiley and sons

Fundamentals of computer and 'C' programming

Lecture: 4 hr / week Tutorial : 1 hr / week Theory: 100 Marks

SECTION-I

1. Introduction to computer (3 hr)

Evolution, classification of computer, organization of computer.

2. Concepts of Errors (4 hr)

Truncation errors and errors due to noise, Error correction and detection techniques.

3. Computer Languages (5hr)

Types of languages, compiler, assembler, interpreter, linker, loader

4. Operating System (5 hr)

Types and functions of an operating system, Introduction to windows, GUI and user Friendliness etc. Unix operating environment.

5. Networking (3 hr)

Concept of networking, network topologies, types of network(LAN, MAN, WAN) Concept of Internet, overview of client-server and distributed network environment

SECTION-II

7. Introduction : (2 hr)

What is C, Getting started with C, Algorithm, Flowchart , Importance Of C, Applications Of C.
Constants, Variables, Keywords, Data types, Operators, Operator precedence, Expressions, I/O Statements.

8. Control Statements- (3 hr)

if, if –else ,nested if, nested if-else, conditional operator, switch, while, do-while, for, break ,continue , goto , nested iterative statements.

9. Arrays- (3 hr)

What are Arrays ,Why use Arrays, Array initialization, Bound Checking, Single and Multidimensional Arrays

10. Strings and Functions (3 hr)

What are Strings ,Standard Library ,String functions, Operations on string(Without using library functions). What is a Function, Why use Function, Passing values in function, Library Functions, Call by value and
Call by reference, Recursion, Adding function to library.

11. The C Preprocessor- (2 hr)

Features Of C Preprocessor, Macro expressions, File Inclusion, Conditional Compilation, Build process.

12. Structures , Unions, pointers- **(4 hr)**

Why use structure, Array of Structure, Nested Structure, Union, Difference between Structure and Union, Declaration of pointers, Use Of Pointers, Pointer Arithmetic, Pointer to arrays, function and structure.

13. File Handling- **(3 hr)**

Data Organization , File Operations, File Opening Modes, Text Vs Binary Files, Database Management

Text books-

1) Let us C (Yashvant Kanetkar)

2) P.K. Sinha- Fundamental of computer.

Reference Books :

1. Agarwal and pershad- Mastering PC Software
2. Godbole- Operating System
3. Programming in ANSI C by Kerninghamm & D.Ritchie
4. Programming in ANSI C by E Balguruswamy

Digital Electronics

Lecture: 4 hr / week | Practical : 2 hr / week
Theory: 100 Marks | Term Work: 25 Mark

Section-I

1. Binary Arithmetic & codes (5 hr)

Binary arithmetic operations: addition, subtraction, multiplication, Division of binary numbers, Subtractions using 2's compliment method, Binary odes: BCD, Excess-3, Gray codes, Error detecting and correcting codes, ASCII Codes.

2. Boolean Algebra (7 hr)

Boolean Laws and Expression using Logic Gates, Realization of different gates using Universal gates, De-Morgan's Theorem, Duality Theorems. Standard forms: SOP, POS, Simplification of Switching function & representation (Maxterm & Minterm), Boolean expression & representation using logic Gates, Propagation delay in logic Gate.

3. Boolean Function Reduction Techniques (5 hr)

Karnaugh map: K-Map Format up to 4 Variables, Mapping & Minimization of SOP & POS Expression, Don't care Condition, Conversion from SOP to POS and POS to SOP form using K-Map, Minimization of multiple Output circuits.

4. Logic Families (3 hr)

Digital IC Specification Terminology, Logic Families: TTL, CMOS.

Section-II

5. Combinational Circuits Design (5 hr)

Adder & Substractor (Half and Full), Parallel Binary Adder, BCD Adder, Parity Bit Generator, Comparators, Decoder, BCD to 7-Segment Decoder, Encoders, Multiplexers, De-multiplexers.

6. Sequential Circuits Elements (8 hr)

Flip-flop & Timing Circuits: SR latch, Edge Triggered flip-flop: D, JK, T Flip-flop, Asynchronous Inputs, Characteristic table of Flip-flop, Excitation table of Flip-flop, Master Slave JK Flip-flop, Inter conversion of Flip-flop.

7. Applications of Sequential Circuits (7 hr)

Shift Register: Buffer Register, Controlled Buffer Register, Data transmission in Shift Register SISO, SIPO, PISO, PIP0, Bidirectional Shift Register, Universal Shift Register, Counter: Classification , Ripple or Asynchronous Counter, Up-down Counter, Mod-n Counter.

Text Books:

1. R.P.Jain 'Modern Digital Electronics ' III rd Edition- Tata Mc Graw Hill, Publication.
2. A. Anand Kumar 'Fundamentals of Digital Circuits' –PHI.
3. M. Morris Mano 'Digital Design'-(III rd Edition)-PHI.

Reference Books:

1. William I.Fletcher.'An Engineering Approach to Digital Design'- PHI/Pearson.
2. Norman Balabanian Bradle Carlson. 'Digital Logic Design Principles' Wiley Publication.
3. Rajkamal 'Digital Systems Pricniples and Design'- Pearson.
4. A.P.Malvino, D.P.Leach 'Digital Principles & Applications '-VIth Edition- Tata Mc Graw Hill Publication.

Computer Oriented Numerical Methods & Statistics

Lecture: 3 hr / week Tutorial : 1 hr / week Theory: 100 Marks

SECTION-I

1. **Solutions of transcendental polynomial equations-** Bisection method, False-position method, N-R method (Implement by using 'C' Language) **(5 hr)**

2. **Linear equations-** Cramer's rule, Gauss elimination method, Gauss Jordon method, Gauss seidel iterative method (Implement by using 'C' Language) **(5 hr)**

3. **Interpolation-** Lagrange's method, Newton's forward and backward formula, Interpolation. (Implement by using 'C' Language) **(4 hr)**

4. **Numerical Integration-** Trapezoidal, 1/3 Simpson's Rule, 3/8 Simpson's Rule, Romberg's method. (Implement by using 'C' Language) **(6 hr)**

SECTION-II

5. **Ordinary differential equations-** Euler's method, Taylor series method, Runge-Kutta method. (Implement by using 'C' Language) **(5 hr)**

6. **Frequency distributions**- Mathematical expectations, moment generating and cumulative functions, discrete probability distribution, least square co-relation and regression method. **(6 hr)**

7. **Sampling and test**- Introduction , types of sampling, sampling distribution, standard error, test of significance, null hypothesis, test of significance for large samples, test for difference of proportions, test for single mean and difference of standard deviation, CHI square distribution, CHI square variate, test for population variates. **(9 hr)**

Tex Books :

1. **Computer oriented numerical methods ny V Rajaraman, PHI**
2. **Introduction methods of numerical analysis by S.S. Sastry, PHI**

Reference Books:

1.Numerical methods for engineers by S.C. Chapra TMH

2. Fundamentals of mathematical statistics by S.C. Gupta, V.K. Kapoor, S. Chand

Industrial Management and Organizational Behaviour

Lecture: 4 hr / week Theory: 100 Marks

Section-I

1.Industrial Management- Meaning, definition, nature, objects, process role & importance of management, management levels & functions.. **(4 hr)**

2. Evolution of Industrial Management – approaches to management: classical, behavioral, quantitative, systems, contingency, operational with their features, uses and limitations. Idea about F.W. Tayler's scientific management, Henry fayol's management principles and elton mayo's hawthorne studies. **(4 hr)**

3. Planning & Control – Definition, nature, importance, process, essentials of good plan & good control, relation between planning & control, span of control. (4 hr)

4. Organization- Line, staff, line and staff, functional & committee organization : characteristics, advantages, disadvantages. **(4 hr)**

5. Recent trends in management – control technique: Budget, DEP, PPC, MRP, MBO, JIT, PERT,CPM, Kaizrn- only introductory treatment

Recent Trends – social responsibility of management, management change, management crisis, TQM, stress management, International management. **(4 hr)**

Section-II

6. Introduction to O.B. – Definition, nature, scope, Individual behavior, nature importance, factors affecting on individual behavior. **(2 hr)**

7. Idea about personality & perception & attitude- Definition, nature, types, factors, influencing the same, their relation with O.B. **(3 hr)**

8. Motivation- definition, nature, importance, theories of motivation- need theory, two factors theory, theory x & y , victor vroom's expectancy theory, goal setting theory, theory 'Z' and mclellands theory:- features advantages and disadvantages of each. Effective utilization of same by managers. **(5 hr)**

9. Leader & leadership – leader- types and functions, leadership- definition, nature, theories, traits, behavioral, managerial grid, path goal theory, Likert's four systems of management, styles of leadership, continuum of leadership style.. **(4 hr)**

10. Communication- Process of communication, verbal and non-verbal communication, upwards and downwards communication, its importance, barriers to communication, ways of improving communication in industrial organization.

Job satisfaction: definition, nature, factors influencing job satisfaction, incentives-types, financial and non fanatical, job rotation, job enrichment, employee morale, it's effect on productivity, turnover and absenteeism. **(6 hr)**

Text Book :

1) Organizational behavior by Dr. Anjali Ghanekar
2) Organization behavior by stephen Robhins

Reference books:

1] Principal of management by S.M. Gujarathi, H.R. Ramanath, H.R. Appannaiah
2] organization behavior by K Aswaphappa
3] Management theory practice by C.B. Gupta

Programming laboratory- I (C-programming)

Practical: **4 hr / week**
Term work: 25 Marks **Practical/Oral: 50 Marks**

LIST OF EXPERIMENTS

16 to 18 experiments from the list should be conducted

Programming laboratory –I

Sr. no	Title
1.	Program to swap of two numbers
2.	Program to find largest of three numbers
3.	Program to simulate calculator using switch statements
4.	Program to find factorial number of using while
5.	Program to find sum of numbers from m to n using do-while
6.	Program to check a given number is perfect or not using for
7.	Program to search an element exists or not in given Array
8.	Program to sort numbers
9.	Program to find left and right diagonal elements in a given 3×3 matrix
10.	Program to length of string without using strlen
11.	Program to concatenate two strings without using strcat function
12.	Program to copy one string to another string using strcpy
13.	Program to find given number is prime or composite (use function)
14.	Program to find given number is Armstrong or not (use Recursion)
15.	Program to find area of circle using preprocessor
16.	Program to create structure of employee and display the same
17.	Program to create structure of student and to store information in a file
18.	Program to read a file and print information from file
19.	Program to copy contents of one file into another file
20.	Program to count characters ,spaces, tabs and new line in file
21.	Menu drive program for elementary database management

Seminar- I

Tutorial: 2 hr / week **Term work : 50 marks**

The objective of the seminar is to give the students extra benefits, that is student should learn additional topics on his own which are other than the syllabus. Students are expected to collect the literature pertaining to their topics from different magazine, papers etc. and present them in the form of seminar

Computer Oriented Operations Research

Lecture: 4 hr / week **Theory: 100 Marks**

SECTION-I

1. Linear Programming and its applications: (7 hr)

Graphical solutions of two variable problems, Computational procedure of simplex method, artificial variable techniques: BigM and Two phase simplex method, duality in L.P.P. The dual simplex method, revised simplex method. Special linear programming problems: Transportation and assignment problems.

2. Integer Programming: (3 hr)

Gomory's cutting plane technique, Branch and Bound method

3. Introduction to Game theory: (7 hr)

Minimax, Maximin principles, two person zero sum game, pure and mixed strategies, algebraic method to solve 2 X 2 game, solution of pay-off matrices of m X 2 and 2X n order, graphical solution, principle of dominance and modified dominance property, Brown's algorithm, game theory and L.P.P.

4. Queuing Theory (waiting line models) (3 hr)

Arrival distribution theorem, distribution of inter arrival times, Model I (Birth & death model) (M/M/1) : (∞ / FCFS) in detail

SECTION -II

5. Deterministic Inventory Models: (7 hr)

Model 1-a : The economic lot size with uniform demand.
Model 1-b : Economic lot size with different rates of demand in different cycles
Model 1-c : Economic lot size with finite rate of replenishment (EOQ production model)
Model 2- a: The EOQ with constant rate of demand, scheduling time constant
Model 2-: The EOQ with constant rate of demand scheduling time variable
Model 2-c: The production lot size model with shortage.
Model with one and two price breaks.

6. Probabilistic Inventory models: (4 hr)

(stochastic Inventory model) (Instantaneous demand, no set-up cost model), discrete & its continuous case.

7. CPM & PERT : Introduction to CPM & PERT ,Completion of events on scheduled time, examples on optimum duration & minimum duration cost. Introduction to sequencing problem, n-jobs, two machine & three machines. Simulation & formation of Markov chains(markov analysis), simulation. **(5 hr)**

8. Equipment Replacement:

Replacement of items whose maintenance cost increases with time & money value is constant and when money value changes with constant rate, group replacement of items that fail completely. **(4 hr)**

Text Books :

1. Operation research by S.D. Sharma

References :

1. Operation research by kantiswaroop
2. Introduction to OR : Billey E Gillet TMH
3. Optimization theory : S.S. Rao & Wiley.
4. Principles of database system : J.D. Ullman, Galgotia
5. Introduction to probability and queuing theory for engines: Kishore Trivedi
6. LP & NW model : S.K. Gupta, EWF
7. Operations Research : Taha

Unified Modeling Language

Lecture: 4 hr / week **Theory: 100 Marks**

SECTION- I

1. Introduction

Efforts of standardization, integration, OMG approval for UML, Scope of UML, Conceptual model of UML, architecture meta model, mechanisms, unified software development life cycle, overview of UML diagrams **(10 hr)**

2. Structural Modeling using UML

Classes, Relationships, common mechanisms, things, relations, class diagrams, interfaces, types and roles, packages, instances and object diagrams, modeling groups of elements, modeling architectural views. **(10 hr)**

SECTION-II

3. Behavioral Modeling using UML

Interactions, use cases, use case diagram and activity diagram, event and signals, state machines, processes and threads, time and space, state chart diagrams modeling concept / prototypical instances, links, object interactions. Interaction diagrams. **(10 hr)**

4. Architectural modeling using UML

Components, Deployment, collaboration, patterns and frameworks, component diagrams, Deployment diagrams, pattern and frame work. **(10 hr)**

Text Books :

1. The Unified Modeling Language User Guide: Grady Booch
2. James Ram Baugh, I var Jacobson (Addison Wesley)

References :

1. Practical object oriented design with UML – Mark Priestley
2. UML in a Nut Shell : Sinon Alhair

Data Structure

Lecture: 4 hr / week **Practical : 2hr / week**
Theory: 100 Marks **Term Work:50 Mark** **POE: 50 Mark**

Section -I

1. Fundamental notions: Data, data representation, data types, Primitives and composite data types , choice of data structure and complexity of an algorithms, array, records, pointers **(4 hr)**

2. Stacks and Queues: Processing the stacks, Linked list implementation, Application of Stacks for _expression solving, Non recursive implementation of recursive algorithms. Processing the queues, Linked list implementation, Priority queues and their applications. Deques, **(7 hr)**

3.Linked List: Processing linked list, Circularly linked list, Doubly linked list, Multilinked lists, String and characters manipulation using arrays and linked list. **(6 hr)**

4. Searching and Sorting: Sorting- insertion, selection, merge, radix sort, searching and data modification. **(5 hr)**

Section – II

5. Indexing and hashing : Basic concepts, Indexing, B-tree index file , static and dynamic hash function. **(6 hr)**

6. Trees: Representation of hierarchical relationships, Tree processing, Binary trees, linked list implementation, traversal algorithms, Graph theory solutions and tree traversals, Binary trees, binary search trees, searching and inserting in binary trees, deleting in a binary search tree, Threaded binary trees, Height balanced trees, General Trees. Heap sort, path lengths, Huffman's algorithm **(8 hr)**

7. Graph : Graph theory terminology, sequential representation of graphs, adjacency matrix, path matrix, Warshall's algorithm for shortest path, operations on graphs, traversing a graph **(8 hr)**

Tex Book:

1. Data and file structure by Tanenbaum PHI

2. Data structure by rajani jindal

Reference:

1. Data structure using C : trembly

2. Data structure by Lipschutz, MGH

Microprocessor

MICROPROCESSOR

Lecture: 4 hr / week **Practical : 2 hr / week**
Theory: 100 Marks **Term Work:50 Mark**

SECTION - I

1. 8085 Functional Block Diagram (**6 hr)**

Internal Architecture of 8085 microprocessor, Pin out diagram, Signal description, De-multiplexing of address and Data lines, Clock Driver Circuits, Power ON reset Circuit, Wait state generation

2. Basic System Timings **(4 hr)**

Introduction to Transition State Diagram, Opcode Fetch, Operand Fetch, Memory Read, Memory Write, Idle machine Cycle, Microprocessor 8085 minimum system block diagram.

3. Instruction Set and Programming **(10 hr)**

Addressing modes of 8085, Instruction format and encoding, Instruction Set and Programming, Timing Diagrams of each instruction

SECTION – II

4. Interrupt **(3 hr)**

Hardware Interrupt Structure of 8085, Priority Structure, Interrupt Acknowledge machine cycle, Software interrupt, concept of vectored interrupt and non- vectored interrupt

5. Programmable Peripheral Interfacing (8255) (**5 hr)**

Block Diagram of 8255, I/O mapped I/O and Memory mapped I/O, interfacing of 8255 using I/O mapped I/O and Memory mapped I/O, BSR feature, Mode 0, Mode 1, and Mode 2

6. Serial input output **(5 hr)**

Concept of Serial Communication, Synchronous and Asynchronous serial communication, Serial Communication using SID and SOD pin, Block Diagram of 8251 (USART) , interfacing with 8085 microprocessor, command word register and status register of 8251. Study of RS 232 Protocol

7. System interface **(7 hr)**

Interfacing of Memory , RAM memory and ROM memory, Interfacing of LED and 7 – Segment displays, 4 * 4 matrix key pad interfacing using 8255, Stepper motor interfacing using 8255, Programmable interval Timer 8253, interfacing of 8253 with 8085

Term Work

Software Based:- (Simulate using any simulation software Min 6)

01. Addition and subtraction of two 8-bit numbers with programs based on different addressing modes of 8085A.

02. Addition and subtraction of two 16-bit numbers. (Using 2's complement method)

03. Addition and subtraction of two 16-bit BCD numbers. (Using DAA instruction)

04. Multiplication of two 8-bit numbers using the method of successive addition and Shift & add.

05. Division of two 8-bit numbers using the method of successive subtraction and shift & subtract.

06. Block transfer and block exchange of data bytes.

07. Finding the smallest and largest element in a block of data.

08. Arranging the elements of a block of data in ascending and descending order.

Hardware Based:- (Min 5)

01. Program controlled data transfer using 8255 PPI.

02. Study of interrupts by enabling them in main line program and then executing different subroutines when TRAP, RST 7.5, RST 6.5 & RST 5.5 are activated.

03. Interfacing 7 segment LED display using 8255A – in static and dynamic mode.

04. Interfacing keyboard-using 8255.

05. Interfacing stepper motor with microprocessor using 8255A – in half and Full excitation.

06. Frequency measurement using 8253 / 8254.

07. RS – 232 transmission and reception using 8251.

Text Book:

1. Microprocessors architecture and programming application with 8085 by R.S.Gaonkar (MCH)

References

1 Microprocessors and programmed logic by Kenneth L. Short (PHI)

2 Microprocessors and digital systems by Douglas Hall (MCH)

4 Microprocessors/Hardware interfacing and applications by Barry & Bery (PHI)

5 Microcomputer peripheral Handbook, application notes manual – INTEL

Software Engineering

Lecture: 3 hr / week **Theory: 100 Marks**

SECTION –I

1. Introduction to Software Engineering: (3 hr)
Characteristics, Applications, Crisis Problem and Cause, s/w engineering paradigm, classic life cycles, prototyping, spiral model, fourth generation techniques.

2. Requirement Analysis Basic: (7 hr)
System analysis, requirement analysis, communication techniques, analysis principals, basic notation and mechanics of structured analysis, object oriented concepts, object oriented analysis modeling.

3. Requirement Analysis Techniques and Methods: (5 hr)
Data structure oriented methods, format specification techniques, automated techniques for requirement analysis.

4. Software designing fundamental: (5 hr)
Design process and fundamentals, effective modular design, data design, architectural and procedural design.

SECTION –II

5. Software Designing: (6 hr)
Data flow oriented design, Object oriented design, data oriented design, user interface design.

6. Software Testing Techniques: (7 hr)

Fundamentals of Testing, White Box Testing, Basic path testing, Unit testing, Integration testing, validation testing, system testing.

7. Software Quality Assurance: (3 hr)

Software quality factors, quality assurance, formal approaches to SQL , software reliability.

8. Software Maintenance: (4 hr)

Definition, characteristics, maintainability, maintenance task, maintenance side effects, Reverse engineering and reengineering.

Text Books:
1. Software Engineering – a practical approach by Roger S. Pressman, MGH
2. Software Engineering - M. A. Ansari.

Reference books:
1. Software Engineering – Shoomar, PHI
2. system analysis and design- Award, TMH

Programming laboratory- II (C++ programming)

Lecture :1 hr / week **Practical: 4 hr / week**
Term work: 25 Marks **Practical/Oral: 50 Marks**

1. **Introduction to OOP :**
   History, basic concept of OOP, Difference between procedure oriented programming language and object oriented programming language, Benefits, Applications of OOP
2. **Graduating to C++:**
   Flexible declarations, Type casting, Difference between structure and class, function prototypes, function overloading
3. **Class & objects:**
   Specifying a class, making an outside function inline, default arguments in functions, nesting of member functions, arrays within a class, static data member and member functions, array of objects, static data member and member function, objects as function arguments, accessing friend functions, returning objects, new and delete.
4. **Constructors and destructors :**
   Default constructor, parameterized constructor, copy constructors, dynamic constructors, destructors
5. **Operator overloading :**
   Defining operator overloading, overloading unary and binary operators, rules for overloading, overloading << and >>
6. **Inheritance:**
   Types of inheritance, virtual base classes, abstract classes, constructors in derived class, classes within classes, private and protected inheritance
7. **Pointers, virtual functions and polymorphism**
   Pointer to object, this pointer, pointers to derived classes, why virtual functions? , virtual function, pure virtual functions, object slicing, virtual functions and constructors, destructors and virtual destructors
8. **Templates**
   Function templates, class templates, overloading of templates, non template arguments.
9. **Working with files**
   File I/O with stream, File copy programs, file opening modes, binary I/O elementary, database management, error handling during file operations.

References:

1. Let Us C++ : Yashwant Kanetkar
2. Object oriented programming C++ : E-balagurusamy

Seminar- II

Tutorial: 2 hr / week **Term work : 25 marks**

The objective of the seminar is to give the students extra benefits, that is student should learn additional topics on his own which are other than the syllabus. Students are expected to collect the literature pertaining to their topics from different magazine, papers etc. and present them in the form of seminar

SOLPAUR UNIVERSITY, SOLAUR
M.C.A. (under faculty of Engineering) SYLLABUS
(w. e. f. June 2009)

Solapur University, Solapur.								
Syllabus of First Year MCA (Under Faculty of Engg.)								
Semester	Paper Name	L	T	P	TH	TW	POE	Total
1	Discrete Mathematical Structure (Includes Finite State Automata)	4			100			100
	Fundamentals of computer and Programming in C	4	1		100			100
	Digital Electronics	4		2	100	25		125
	Computer oriented numerical methods and statistics	3	1		100			100
	Behavioral and organizational science(BOS)	4			100			100
	Programming Laboratory –I (C-Programming)			4		25	50	75
	Seminar-I		2			50		50
	Total	19	4	6	500	100	50	650
		L	T	P	TH	TW	POE	Total
2	Computer Oriented Operations Research	4			100			100
	Unified Modeling Language	4			100			100
	Data Structure-I	4		2	100	50	50	200
	Microprocessor	4		2	100	50		150
	Software Engineering	3			100			100
	Programming Laboratory-II (C++ Programming)	1		4		25	50	75
	Seminar-II		2			25		25
	Total	20	2	8	500	150	100	750

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Solapur University, Solapur.								
Syllabus Of Second Year MCA (Under Faculty Of Engg.)								
Semester	Paper Name	L	T	P	TH	TW	POE	Total
3	Computer graphics with multimedia	4		2	100	25		125
	System Programming	4		2	100	25		125
	Computer organization and architecture	4			100			100
	Relational database management system	3		2	100	25	50	175
	Computer algorithm	3			100			100
	Programming Laboratory –III (VB-Programming)		2	2		25	50	75
	Mini project			2		50		50
	Total	18	2	10	500	150	100	750

		L	T	P	TH	TW	POE	Total
4	Operating system	4			100			100
	Data mining	3		2	100	50		150
	Computer networks	4		2	100	25	50	175
	Artificial intelligence	3			100			100
	Elective-1	4			100			100
	Programming Laboratory-IV (Java Programming)	2		4		25	50	75
	Mini project			2		50		50
	Total	20	0	10	500	150	100	750

Elective -1: 1.Advance computer architecture
2.Software testing and Quality Assurance
3.ERP

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Solapur University, Solapur.								
Syllabus Of Third Year MCA (Under Faculty Of Engg.)								
Semester	Paper Name	L	T	P	TH	TW	POE	Total
5	Mobile communication	4			100			100
	Web design techniques	3		2	100	25		125
	Internet technology	3			100			100
	Elective-2	4			100			100
	Network administration	2		2	100	50		150
	Programming Laboratory –V (.NET Programming)		2	4		25	50	75
	Software project development in .NET			4		50	50	100
	Total	16	2	12	500	150	100	750

		L	T	P	TH	TW	POE	Total
6	Software Development Project					150	100	250
	Grand Total							3900

Elective -2: 1.Distributed Database
2.Bio-Informatics
3.Neuro and Fuzzy System