



Medi-Caps University
Faculty of Engineering

Annexure – I


Syllabus for B.Tech. III Semester

B.Tech – Information Technology

B.Tech – Information Technology –III Semester

S. No	Course Code	Course Name	L	T	P	Credit
1	IT3BS03	Discrete Structure	3	1	0	4
2	IT3ES10	Digital Circuit and Systems	3	1	2	5
3	IT3CO01	Introduction to Problem Solving and Programming	3	1	0	4
4	IT3CO03	Object Oriented Programming	3	1	0	4
5	IT3CO11	Computer Graphics and Multimedia	3	1	2	5
6	IT3MC05	Technical Presentation	0	0	2	0
7	IT3OE14	Computer Programming-II (JAVA)	2	0	2	3
Total			17	5	8	25
Total Contact Hours			30			

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3BS03	Discrete Structures	3	1	0	4

UNIT I LOGIC:

Propositional equivalence, predicates and quantifiers, proofs, proof methods and strategy, sets operations, functions, sequences and summation, mathematical induction, recursive definitions and structural induction, program correctness.

Counting: The basics of counting, the pigeonhole principle, permutations and combinations, recurrence relations, solving recurrence relations, generating functions, inclusion-exclusion principle, application of inclusion-exclusion.

UNIT II RELATIONS:

Relations and their properties, n-array relations and their applications, representing relations, closure of relations, equivalence of relations, partial orderings.

UNIT III GROUP THEORY:

Groups, subgroups, generators and evaluation of powers, cosets and Lagrange's theorem, permutation groups and Burnside's theorem, isomorphism, automorphisms, homomorphism and normal subgroups, rings, integral domains and fields.

UNIT IV LATTICE THEORY:

Lattices and algebras systems, principles of duality, basic properties of algebraic systems defined by lattices, distributive and complimented lattices, Boolean lattices and Boolean algebras, uniqueness of finite Boolean expressions, prepositional calculus. Coding theory: Coding of binary information and error detection, decoding and error correction.

UNIT V GRAPH THEORY:

Introduction to graphs, graph terminology, representing graphs and graph isomorphism, connectivity, Euler and Hamilton paths, planar graphs, graph coloring, introduction to trees, application of trees.


TEXT BOOKS:

1. K.H. Rosen: Discrete Mathematics and its application, Tata McGraw Hill.
2. C. L. Liu: Elements of Discrete Mathematics, TMH.
3. B.Kalman: Discrete Mathematical Structure,

REFERENCES:

1. "Discrete Mathematical Structures", Tremblay and Manohar, Tata McGraw Hill
2. Maggard Thomson "Discrete Mathematics",
3. "Discrete Mathematics", Semyour Lipschutz, Varsha Patil Iind Edition Schaum's Series, TMH
4. Kolman, Busby and Ross, "Discrete Mathematical Structures". PHL.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3ES10	Digital Circuit and Systems	3	1	2	5

UNIT- I NUMBER SYSTEM :

Introduction to binary numbers, data representation , binary, octal, hexadecimal number system and their conversion, Various coding schemes such as BCD codes, Excess-3 code, Gray code, Hamming code, error detection and correction. Binary arithmetic, Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard forms, minimization techniques, Sum of products and Product of Sums Simplification, Karnaugh's map method, Quine Mecluskey method.

UNIT II LOGIC GATES AND COMBINATIONAL LOGIC:

Digital Logic Gates such as AND, OR, NAND,NOR, EX-OR,EX-NOR. Realization of Boolean functions using logic gates. Adders, subtractors, BCD adder, magnitude comparator, decoders and encoders, multiplexers and demultiplers, code converters. Analysis and design of combinational circuits. Implementation of combinational logic using multiplexers, decoders etc.

UNIT III SEQUENTIAL CIRCUITS:

Introduction, comparison of sequential and combinational circuits. Various types of flip-flops and their conversions, triggering of flip flops, timing issues, setup and hold times, registers, counters, ring, johnson, asynchronous and synchronous. Finite state machines, Moore and Mealy, design of synchronous sequential circuits.

UNIT IV MEMORIES:

ROM, PLA and PAL. Memories : organisation and construction of RAM, SRAM, DRAM, ROM, PROM, EPROM, EEPROM.

UNIT V LOGIC FAMILIES:

DTL, RTL, TTL, IIL, PMOS, NMOS and CMOS logic families, interfacing between TTL and MOS vice-versa.

Text Book:

1. D Roy Choudhury, Digital Circuits,Vol-I & II, Eureka Publication.
2. M. Mano, Digital and Computer Design, Pearson Education.

REFERENCES :

1. Leach and Malvino, Digital Principles and Applications, TMH.
2. Millman and Taub, Pulse, Digital and Switching Waveforms, MGM.
3. A.Anand Kumar: Digital Circuits, PHI.
4. Salivahanam and Ari Vahagan: Digital Circuits and Design, Vikas Publishing House.

LIST OF PRACTICALS

1. To test and study of operation of all logic gates for various IC's

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2. Implementation of AND, OR, NOT, XOR and XNOR gates using universal gates.
3. Binary addition by half adder and full adder.
4. Binary subtraction by half subtractor and full subtractor circuit.
5. Design of BCD to excess-3 code converter.
6. Realization of circuit for binary to gray conversion and vice-versa.
7. Verification of Demorgans' theorem.
8. Study of RS, JK, T and D flip flops
9. Realization of 4 bit binary counter.
10. Realization of 4-bit shift register.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3CO01	Introduction to Problem Solving and Programming	3	1	0	4

UNIT I : INTRODUCTION TO PROBLEM SOLVING:

Defining a Problem, Problem Solving in Everyday Life, Types of Problems, Difficulties with Problem Solving, Problem Solving with Computers, Steps for Problem Solving, Problem Solving Techniques, Problem Solving Examples, Design a Solution, organizing solution, testing the Solution, Evaluating the solution.

UNIT II : NUMERICAL PROBLEM SOLVING:

Summation of a Set of Numbers, Sine Function Computation, Reversing the Digits of an Integer, Character to Number Conversion, The Smallest Divisor of an Integer, Generating Prime Numbers, Hash Searching, Computing the Prime Factors of an Integer, Raising a Number to a Large Power, Computing the nth Fibonacci Number.

UNIT III : PROGRAMMING PARADIGM:

Definition, Top down and bottom up approach, Common paradigms, Imperative, Declarative, Structured, Procedural, Functional, Object oriented and Event driven.

UNIT IV : PROBLEM SOLVING WITH FLOW CHART:

Overview of Flowchart, Flowchart notations, rules to create flowchart, Advantages and disadvantages of flowchart, flowchart examples.
 Problem Solving using Decision Tables: Definition of Decision Table, Rules to create decision table, advantage and disadvantage of decision table, Decision table examples.

UNIT V : PROBLEM SOLVING WITH ALGORITHM AND PSEUDO CODE:

Introduction to algorithm, Steps to write an algorithm, Characteristics of algorithm, relationship between data and algorithm, Analysis of algorithm, pseudo code notations, writing pseudo code for problems.

TEXT/REFERENCE BOOK:

1. How to solve it by Computer, R.G. Dromey, Pearson Publication
2. Problem Solving and Programming Concepts, Maureen Sprankle, Jim Hubbard, Prentice Hall
3. Flowcharts: Plain & Simple: Learning & Application Guide, Joiner Associates Staff, Oriol Publication
4. Decision Table Languages and Systems 1st Edition, John R. Metzner Bruce H. Barnes, Elsevier
5. Program Design With Pseudocode (Computer Program Language), Therold E. Bailey, Kris Lundgaard





LIST OF SUGGESTED PRACTICALS :

1. Study of various tools for problem solving like raptor, decision table creator, scratch etc.
2. Draw a flow chart for mathematical problems.
 - 2.1 Flowchart for LCM and HCF
 - 2.2 Flowchart for Geometric figures.
 - 2.3 Flowchart for addition and multiplication of
3. Flowchart for process execution of computer.
4. Flowchart for transaction in banking system.
 - 4.1 flowchart for withdraw money from ATM.
 - 4.2 Flowchart for Deposit money into account.
 - 4.3 Flowchart for transfer money from one account to another account.
5. Flowchart for working of vehicle engine.
6. Write and implement a pseudo code for Xerox machine.
7. Write and implement pseudo code for different operations on array such as searching, sorting, merging etc.
8. Write and implement pseudo code for scheduling a railway track.
9. Create decision table for payroll system.
10. Create decision table to classify new accounts in bank by assuming suitable data.
11. Create a decision table to select the largest of four distinct numbers.



Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3CO03	Object Oriented Programming	3	1	2	5

UNIT-I

Introduction to object oriented programming, Characteristics, Applications, difference between object oriented and procedure based programming, object oriented programming languages, Object oriented concepts: Abstraction, Encapsulation, Polymorphism, Inheritance and Information Hiding.

UNIT-II

Abstract data types, Objects and classes, Attributes and Methods, Objects as software units, Encapsulation and Information hiding, Objects instantiations and interactions, Object lifetime, Static and dynamic objects, global and local objects, Metaclass, Modeling the real world objects.

UNIT-III

Relationships between classes, Association of objects, Types of Association, Recursive Association, Multiplicities, Navigability, Named association, Aggregation of objects. Types of Aggregation, Delegation, Modeling Association and Aggregation.

UNIT-IV

Inheritance and Polymorphism, Types of polymorphism, Static and dynamic polymorphism, Operator and Method overloading, Inherited methods, Redefined methods, the protected interface, Abstract methods and classes, Public and protected properties, Private operations, Disinheritance, Multiple inheritance.

UNIT-V

Container Classes, Container types, typical functions and iterator methods, Heterogeneous containers, Persistent objects, stream, and files, Object oriented programming languages.

TEXT BOOKS:

1. David Parsons: Object oriented programming with C++; BPB publication.
2. E. Balaguruswami, "Object Oriented Programming in C++", TMH.

REFERENCE BOOKS:

1. Object oriented programming in C++ by Robert Lafore: Galgotia
2. Scott W Amber, The Object Primer, Cambridge.
3. Timothy Budd, Object Oriented Programming, Pearson Education.

LIST OF EXPERIMENTS:

1. Write a program to find out the largest number using function.

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2. Write a program to find the area of circle, rectangle and triangle using function overloading.
3. Write a program to implement complex numbers using operator overloading and type conversion.
4. Write a program using class and object to print bio-data of the students.
5. Write a program which defines a class with constructor and destructor which will count number of object created and destroyed.
6. Write a program to implement single and multiple inheritances taking student as the sample base class.
7. Write a program to add two private data members using friend function.
8. Write a program using dynamic memory allocation to perform 2x2 matrix addition and subtraction.
9. Write a program to create a stack using virtual function.
10. Write a program that store five student records in a file.
11. Write a program to get IP address of the system.
12. Write a program to shut down the computer system.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3CO11	Computer Graphics and Multimedia	3	1	2	5

UNIT-I

Introduction to Raster Scan displays, Pixels, Frame buffer, Vector & Character generation, Random Scan systems, Display devices, Scan Conversion techniques, Line Drawing: simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms: Midpoint Circle drawing and Bresenham's Algorithm, Polygon fill algorithm: Boundary-fill and Flood-fill algorithms

UNIT-II

2-D Transformation: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms

UNIT-III

3-D Transformations: Translation, Rotation and Scaling. Parallel & Perspective Projection: Types of Parallel & Perspective Projection, Hidden Surface elimination: Depth comparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm. Curve generation, Bezier and B-spline methods. Basic Illumination Model: Diffuse reflection, Specular reflection, Phong Shading, Gouraud shading, Ray Tracing, Color models like RGB, YIQ, CMY, HSV.

UNIT-IV

Multimedia : Characteristics of a multimedia presentation , Uses of Multimedia, Text –Types, Unicode Standard ,text Compression, Text file formats, Audio- Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats ,Audio Processing software ,Video-Video color spaces, Digital Video, Digital Video processing, Video file formats.

UNIT -V

Animation: Uses of Animation, Principles of Animation, Computer based animation, 3D Animation, Animation file formats, Animation softwares. Compression: Lossless/Lossy Compression techniques, Image, Audio & Video Compressions, MPEG Standards ,Multimedia Architecture, Multimedia databases

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TEXT BOOK

1. Donald Hearn and M.P. Becker "Computer Graphics" Pearson Pub.

REFERENCES

1. Parekh "Principles of Multimedia" Tata McGraw Hill
2. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill
3. Maurya, "Computer Graphics with Virtual Reality System " , Wiley India
4. Pakhira, "Computer Graphics ,Multimedia & Animation", PHI learning
5. Andleigh. Thakral , "Multimedia System Design " PHI Learning

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT30E14	Computer Programming-II (JAVA)	2	0	2	3

UNIT-II BASICS OF JAVA:

Overview of Java, History and Evolution of Java, Feature of Java, Difference between Java, C++ and C, Structure of java program, Basics of JDK, JRE and JVM, Installation of JDK, Simple Java Program, Compilation and Execution of Java program. Elements of Java: keywords, data types, variable, declaration and initialization of a variable, the scope and life time of variable, constants, literals, identifiers, operators, types of java statements, Unicode System, Naming Convention, Comments, Arrays, type conversion and casting.

UNIT-II OOPS CONCEPTS:

Feature and advantages of OOP, Introducing class, objects and methods, types of class, declaration and initialization of objects, access modifiers, Constructors, this Keyword, final keyword, Garbage Collection, Methods overloading and overriding, Constructors Overloading, static and dynamic binding, Using Objects as Parameters, Inheritance and its types, Interfaces.

Java Packages: Definition of package, types of package, differentiate package from header file, importing package, creating package, introduction and creation of API.

UNIT-III STRING IN JAVA:

Overview of string, Immutable String, String Comparison, String Concatenation, Substring, Methods of String class, String Buffer class, String Builder class, Creating Immutable class to String method, String Tokenizer class.

I/O Handling: File Output Stream & File Input Stream, Byte Array Output Stream, Sequence Input Stream, Buffered Output Stream & Buffered Input Stream, File Writer & File Reader, Char Array Writer, Input from keyboard by Input Stream Reader, Input from keyboard by Console, Input from keyboard by Scanner, Print Stream class, Print Writer class.

UNIT -IV EXCEPTION HANDLING:

Defining exception, types of exception, exception class, try and catch block, Multiple catch block, Nested try, finally block, throw keyword, Exception Propagation, throws Keyword, Exception Handling with Method Overriding.
Multithreading: Overview of thread, thread types, Life Cycle of a Thread, Creating Thread, Thread Scheduler, Sleeping a thread, Joining a thread, Thread Priority, Daemon Thread, Thread Pooling, Thread Group, Shut down Hook, Performing multiple task by multiple thread, Runnable class.

UNIT V JAVA APPLET: Applet Basics, The Applet Class, Applet Architecture, Applet Initialization and Termination, Simple Applet Display Methods, Simple Banner Applet,



Using the Status Window, The HTML APPLET Tag, Passing Parameters to Applets, Improving the Banner Applet.

Introducing the AWT: Working with Windows, Graphics, and Text, AWT Classes, Window Fundamentals, Component, Container, Panel, Frame.

TEXT BOOKS:

1. E. Balagurusamy, "Programming with java A Primer", McGrawHill.
2. Naughton & Schildt, "The Complete Reference Java 2", Tata McGraw Hill.
3. Horstmann & Cornell, "Core Java 2" (Vol I & II), Pearson.
4. Sharanam Shah, "Core Java 8 for Beginners", Shroff Publisher.

OTHER REFERENCES:

1. Oracle University, JAVA SE 8 programming ,Course Topics
2. Some other online tutorials of JAVA like javatpoint, tutorial-point etc.

LIST OF PRACTICALS:

1. Write a program that accepts two numbers from the user and print their sum.
2. Write a program to calculate addition of two number using prototyping of methods.
3. Program to demonstrate function overloading for calculation of average.
4. Program to demonstrating overloaded constructor for calculating box volume.
5. Program to show the detail of students using concept of inheritance.
6. Program to demonstrate package concept.
7. Program to demonstrate implementation of an interface which contains two methods declaration square and cube.
8. Program to demonstrate exception handling in case of division by zero error.
9. Program to demonstrate multithreading.
10. Program to display "Hello World" in web browser using applet.
11. Program to add user controls to applets.
12. Write a program to create an application using concept of swing.

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