

**Swami Ramanand Teerth Marathwad University,  
Nanded**

**B.Sc II Year  
Computer Science (Optional)**

(Semester Pattern)

( W.E.F. – June 2010)

Paper No	Paper Title	Teaching Periods/week	Marks (university Evaluation)	Marks (Internal Evaluation)	Total Marks	Total periods	Duration of Examination
<b>Semester - III</b>							
VI	Digital Electronics & 8085 Microprocessor	03	40	10	50	40	03 Hours
VII	Programming in C++	03	40	10	50	40	03 Hours
<b>Semester - IV</b>							
VIII	8086 Microprocessor	03	40	10	50	40	03 Hours
IX	Programming in Java	03	40	10	50	40	03 Hours
X	<b>Computer Lab-2</b> (Annual Practical based on Paper No VI & VIII)	01 Practical (03 Periods)	100		100	20 Minimum Practical	03 Hours
XI	<b>Computer Lab-3</b> (Annual Practical based on Paper No VII & IX)	01 Practical (03 Periods)	100		100	20 Minimum Practical	03 Hours

**Paper No: VI**  
**Digital Electronics & 8085 Microprocessor**  
**(Theory)**

**1. Logic Gates**

Positive and negative logic, NOT gate, OR gate, AND gate, NAND gate, NOR gate, EX-OR and EX-NOR gates with Symbol & truth table, Universal properties of NAND & NOR gates.

**2. Boolean Algebra**

Boolean operations, Rules and Laws of Boolean algebra, DeMorgan's theorems (First and Second), Simplification of Combinational Logic Circuit using Boolean Algebra, Deriving Logic Circuit in SOP and POS form

**3. Karnaugh Mapping**

Introduction to K-Map, Representation of SOP and POS form on K-Map, Pairs, Quads, Octet in K-Map, K-Map Simplification( Overloading Group, Rolling the Map, Eliminating Redundant group) , Minimization of POS form., Don't Care condition, Five and six variable K-Map

**4. Flip-Flop**

A 1-Bit Memory Cell, Clocked S-R Flip-Flop, J-K Flip-Flop, J-K Master Slave Flip-Flop, D-type Flip-Flop, Clocked and Unlocked D-Type Flip-Flop ,T-type Flip-Flop

**5. 8085 Microprocessor**

Introduction to Microprocessor, Features of 8085, 8085-Architecture, De-Multiplexing of address and data bus, 8085 clock circuit, Instruction fetching and execution operation of microprocessor.

**6. Interrupts**

The 8085 Interrupts, Software Interrupts

**Ref. Books :**

1. Digital Electronics with Practical Approach First Edition - G. N. Shinde, Shivani Pub., Nanded
2. Digital Principles and Applications- A. P. Malvino, McGraw Hill International Editions(Fourth Edition)
3. Modern Digital Electronics- R. P. Jain, Tata McGraw Hill Pub. Company(Third Edition)
4. Microprocessor 8085 by B. Ram
5. 8086/8088 Family Architecture, Programming and Design – Yu-Cheng Liu and Gelell A Gibson Pearson Prentice Hall
6. Microprocessor Architecture Programming & Application- Ramesh Gaonkar, Willey Estern.
7. Digital Electronics: An Introduction to Theory and Practice-William H. Gothmann, Prentice Hall of India.

**Paper No: VII :**  
**Programming in C++**  
**(Theory)**

**1. Introduction and basic concepts of C++**

Basic concepts of OOP's., Benefits and Applications. Structure of C++ program Keywords, identifiers, Data-types, Operators in C++, Operator precedence and associativity

**2. Branching and Looping Statements**

Simple If statement, If... Else statement, Nested If ... Else statement, The Switch statement, The while statement, The Do-While statement, The For statement

**3. Functions in C++**

Function, Function prototyping, Default arguments, Reference variable, Call by Reference, Return by Reference, Inline function, Function overloading, Friend and Virtual Function.

**4. Class and object**

Specifying a class , Defining Member Function, Nesting of member function, Private Member Function, Memory allocation for objects, Static data member, static Member function, Array of Object, Object as Function Argument, Returning Objects.

**5. Constructor and destructor**

Constructor, Parameterized Constructor, Multiple Constructor in Class, Constructor with Default Arguments, Dynamic Initialization of Object, Copy Constructor, Dynamic Constructor, Destructor.

**6. Operator Overloading and Type Conversion**

Defining Operator Overloading, Unary and Binary Operator Overloading, Overloading Binary Operators using Friend, Manipulation on String Using Operator, Rules for overloading Operator, Type Conversion

**7. Inheritance**

Defining Derived Class, Type of Inheritance ( Single, Multiple, Multilevel, Hierarchical, Hybrid Inheritance), Virtual base class, Abstract class

**8. Pointers, Virtual Function and Polymorphism**

Polymorphism, Pointers, Pointers to Object, This Pointer, Pointer to Derived Classes, Virtual Function, Pure Virtual Function,

**Reference Books:-**

1. Object-Oriented Programming with C++ -E-Balgurusamy
2. The C++ Complete Reference -TMH Publication
3. Let us C++ -Yashwant kanetkar

**Paper No: VIII :**  
**8086 Microprocessor**  
**(Theory)**

**1. Introduction to 8086**

8086 Architecture, Segmentation and address transition, 8086 pin description, Addressing modes,

**2. 8086 Instruction Set**

Assembler Instruction Format, Data Transfer Instructions, Arithmetic Instructions, Logical Instructions ,Branch Instructions, Loop Instructions, NOP and HLT instruction, Flag instructions, Shift and Rotate Instructions, Assembly Language Programming of 8086

**3. Directives and Operation**

Data Definition and Storage Allocation, Structure, Records, Assigning Names to Expression, Segment Definition, Program Termination, Alignment Directives, Value Returning Attribute Operator

**4. Modular Programming**

Linking and Relocation (Segment combination, Access to External Identifiers) Stack, Procedures (Calls, Returns, Procedure Definition, Recursive Procedure) Interrupt and Interrupt Routines,

**5. Macros**

ASM- 86 Macro Facilities, Local Labels, Nested Macros, Controlled Expansion and Other Function, Program Design, Program Design Example.

**Ref. Books :**

1. 8086/8088 Family Architecture, Programming and Design – Yu-Cheng Liu and Gelell A Gibson Pearson Prentice Hall
2. Microprocessor Architecture Programming & Application- Ramesh Gaonkar, Willey Estern.
3. Digital Electronics: An Introduction to Theory and Practice-William H.Gothmann, Prentice Hall of India.

**Paper No: IX :**  
**Programming in Java**  
**(Theory)**

**1. Java Evolution.**

Java History, Java Features, How java differs From C and C++, Java and Internet. Java support systems Introduction to B simple java program, An application with two classes, Java program structure, Java statement, implementation of a java program, Java virtual machine, Command Line Arguments.

**2. Constants, Variables, Data Types**

Declaration of variable, Giving Values to variables, Scope of Variables, Symbolic Constants, Type Casting Getting Values of variables, Standard Default values, Arithmetic, Relational, Logical, Assignment, increment, Decrement, Conditional, Bit wise and Special operators, Arithmetic Expressions and precedence of arithmetic Operators, Operators precedence and Associativity, Mathematical Function.

**3. Decision Making, Branching and Looping**

Decision making with if statement, Simple if statement, if...else statement: Nesting of if...else, Switch statement, the? Operator, The while statement, do statement, for statement.

**4. Classes, Object and Methods**

Introduction, Defining a class, Adding variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors. Method Overloading, Static Members, Nesting of Method, Inheritance: Extending a class, Overriding Method, Final variable and Methods.

**5. Arrays. Strings and Vectors**

Introduction, One-dimensional Arrays, Creating an one dimensional array, Two-dimensional Arrays, Creating an two dimensional array, String Arrays, String Method

**6. Interfaces - Multiple Inheritances**

Introduction, Defining Interface, Extending Interface, Implementing Interface.

**7. Packages: Putting Classes Together**

Introduction, Java API package, Using system packages, Naming Conventions, Creating Packages, Accessing a package, Using a Package, Adding a class to a package.

**Ref. Books :**

1. Programming with Java - A primer  
-By E. Balagurusamy (Tata Me Graw Hill)
2. Java 2 Complete Reference

**Paper No: X :**  
**Computer Lab-2**  
**(Practical)**

Annual Practical based on Paper No VI & VIII , At least 20 practical exercise from paper No VI & VIII consisting of Study of digital electronics , Assembly language programming and Interfacing.

**Paper No: XI :**  
**Computer Lab-3**  
**(Practical)**

Annual Practical based on Paper No VII & IX At least 20 practical exercise based on programming in C++ and Java.