

**Swami Ramanand Teerth Marathwada University, Nanded**  
**B.Sc. Second Year Computer Science (Optional)**  
**Annual Pattern**  
**With Effect from 2009-10**

**Aims and Objectives:**

1. To provide a professional level of competence in the most common languages, systems, methods and tools.
2. To provide a sound understanding of principles of Computer Science.
3. To a strong sense of professionalism in students.
4. To reflect the current and emerging trends in the computing fields.

**Academic Programme:**

The programme is of three years duration, B.Sc.- I, B.Sc.-II and B.Sc.-III year  
The scheme of instructions and examination of theory and practical papers is as follows.

**B.Sc. II year**

<b>Paper No.</b>	<b>Paper Title</b>	<b>Teaching Periods Per Week ( Theory/ Practical)</b>	<b>Marks</b>	<b>Total Periods</b>	<b>Duration of Examination</b>
IV	Digital Electronics and 8085, 8086 Microprocessor	03 Periods Theory	100	80	03 Hours
V	Programming in C++	03 Theory Periods	100	80	03 Hours
VI	Computer Lab-II ( Practical Based on Paper IV )	01 Practical (03 Periods)	100	20 Minimum Practicals	03 Hours
VII	Computer Lab-III ( Practical Based on Paper V )	01 Practical (03 Periods)	100	20 Minimum Practicals	03 Hours

**Paper IV - Digital Electronics and 8085, 8086 Microprocessor**  
**Marks: 100 Period -80**

**Section -A (Digital Electronics and 8085 Microprocessor) Marks: 50, Period: 40**

- 1. Logic Gates ( 8 Period)**  
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 ( 8 Period)**  
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 ( 8 Period)**  
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 (8 Period )**  
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 ( 8 Period)**  
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.

**Section -B (8086 Microprocessor)**

**[Marks 50, Period 40]**

- 1. Introduction to 8086 (6 Period)**  
8086 Architecture, Segmentation and address transition, 8086 pin description, Addressing modes,
- 2. 8086 Instruction Set (10 Period)**  
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 ( 8 Periods)**  
Data Definition and Storage Allocation, Structure, Records, Assigning Names to Expression, Segment Definition, Program Termination, Alignment Directives, Value Returning Attribute Operator
- 4. Modular Programming ( 8 Periods)**  
Linking and Relocation (Segment combination, Access to External Identifiers)  
Stack, Procedures (Calls, Returns, Procedure Definition, Recursive Procedure)  
Interrupt and Interrupt Routines,

**5. Macros (8 Periods)**  
ASM- 86 Macro Facilities, Local Labels, Nested Macros, Controlled Expansion and Other Function, Program Design, Program Design Example.

**References 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 Glenn 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 V - Programming in C++ ( Marks 100, Periods 80)**

**Section -A ( Marks : 50. Periods: 40)**

**1. Introduction and basic concepts of C++ (5 periods)**

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 (6 period)**

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++ (7 period)**

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 (7 period)**

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 (7 period)**

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 (8 period)**

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

**Section -B ( Marks : 50. Periods: 40)**

**7. Inheritance (8 period)**

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

**8. Pointers, Virtual Function and Polymorphism (8 period)**

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

**9. Console I/O Operation and Working with File (10 period)**

Classes for File stream, Unformatted I/O operations, Formatted console I/O operation , Managing Output with manipulators.

Classes for file stream operations, Opening and Closing file, Detecting end-of-file, Open(): File Modes, File Pointers and Their Manipulation, Sequential Input and Output Operations.

**10 . Templates (8 period)**

Class Template, Class Template with Multiple Parameter, Function Templates, Function Templates with Multiple parameters

**11. Exception Handling (6 period)**

Basics of Exception Handling, Exception Handling Mechanism, Throwing mechanism, Catching Mechanism, Rethrowing an Exception.

**Reference Books:-**

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

**Paper VI Computer Lab-II (Practical Based on Paper IV: 8085 and 8086)**

At Least 20 practical's of 8086 Microprocessor Assembly Language Programming

**Paper VII Computer Lab-III ( Practical Based on Paper V : C++ )**

Minimum 20 Programs using C++

Note: Student should maintain the Record book/Journal of Practical work for both papers VI and VII.