St. Xavier’s College, Autonomous
DEPARTMENT OF PHYSICS
SYLLABUS UNDER AUTONOMY FOR SEMESTER VI
COMPUTER SCIENCE (APPLIED COMPONENT)

COURSE: S.PHY.6.07

PROGRAMMING IN C++ 

[ 30 LECTURES]

Learning objectives: To study object oriented programming language C++

UNIT I  

(15 LECTURES)

Introduction to classes: Introduction to class, access specifiers(private and public) defining member functions, instance of a class(object), need of private members, inline member functions.

Object initialization and clean up: constructors, destructors, constructors that accept arguments, overloaded constructors, default constructor and destructor, arrays of objects

UNIT –II  

( 15 LECTURES)

More about classes: static members, friends of classes, member wise assignment, copy constructors.

Operator Loading: Overloading assignment operator, this pointer, Overloading math operators, overloading relational operators.

Inheritance: Basics of inheritance, types of inheritance, protected members and class access, constructors and destructors, Overriding base class functions, call by value, call by reference.

Polymorphism and virtual member functions: Concept of polymorphism, abstract base class and pure virtual functions, base class pointers, classes derived from derived classes, Multiple inheritance (concept only).

Additional Ref: 1) Schaum series-“Programming in C++”
2) Cohoon & Davidson- “C++ program Design”

CIA:PROBLEM SOLVING/MULTIPLE CHOICE QUESTION
MICROCONTROLLER [30 LECTURES]

Learning objectives: To study microcontroller 8051 and its applications.

UNIT – I [15 LECTURES]

1) **Introduction to microprocessor**: comparing microprocessor and microcontroller, The 8085 and the 8051, A microcontroller survey, Development systems for microcontroller.

2) **The 8051 Architecture**: 8051 microcontroller hardware, Input/Output pins, ports and circuits, External memory, counter and timers, Serial data input/output, interrupts.

3) **Basic Assembly language programming concepts**: A generic computer, Mechanics of programming, The Assembly language programming process, The PAL practice CPU, Programming, Programming tools and techniques, Programming the 8051.

SELF STUDY

**Numbering Systems and Binary Arithmetic**:
Symbolic numerical systems, positional numerical systems, Integer binary number, Fractional binary number, Binary Addition, Subtraction, Division and Multiplication, Binary codes.

UNIT – II [15 LECTURES]

1) **Moving Data**: Addressing modes, External data moves, codes memory read only data moves, push and pop opcodes, data exchange.

2) **Logical Operations**: Byte – level logical operations, Bit – level logical operations, Rotate and Swap operations.

3) **Arithmetic Operations**: Flags, Incrementing and Decrementing, Addition, Subtraction, Multiplication and Division, Decimal arithmetic.

4) **Jump and Call Instructions**: The jump and call program range, Jumps, calls and subroutines, Interrupts and returns, more details on interrupts.

**References**

CIA: Programing /MULTIPLE CHOICE QUESTIONS
PAPER I:
Object Oriented Programming using C++
(Perform minimum 4 experiments from the list given below)
1. Rectangle Class (page 494 GB)
2. Complex class for performing arithmetic with complex numbers (page 449 DD)
3. Class called Rational for addition, subtraction & multiplication (page 449 DD)
4. Time Class (page 502 GB) / Date class
5. Function overloading: Absolute value of integer, float, double
6. Operator overloading – Unary operators prefix/postfix
7. Operator overloading – Binary operators – Addition of distances (Robert Lafore)
8. Rectangle to Polar Co-ordinate conversion & vice versa. (Robert Lafore – 2 Dimension)
9. Functionality of INT (refer Robert Lafore)
10. Inheritance problems (Garry Bronson – Base class circle, Derived class – cylinder)
11. Quadratic equation using Object Oriented techniques
12. Traffic lights (ref. Garry Bronson)
13. Polymorphism and Virtual function problems. (Garry Bronson)


PAPER II:
With the help of 8051 Microcontroller: (minimum four)
1. Interface with 8 bit Digital to Analog convertor for waveform generation.
2. Primary Counter (Display with LED).
3. Switch Interfacing.
4. Detection of external interrupt.
5. Computer Interfacing.

References:-

CIA: PRACTICAL SKILLS WILL BE TESTED
COURSE: S.PHY.6.05

Learning Objectives: To learn about various electronic measuring instruments

MEASURING INSTRUMENTS [30 Lectures]

UNIT I: (15 Lectures)
I) Analog & Digital Multimeters

II) Active Filters and ADC & DAC Digital Instruments
1. Active Filters: Introduction, Active Filters, 1st order low/high pass filter, 2nd order low/high pass Butterworth filter, Band pass filter, Wide band pass filter, Wide band rejection filter and Narrow band rejection filter.

UNIT II: Digital Instruments and CRO (15 lectures)
2. CRO: Introduction, CRO Block Diagram, CRT Connection, Vertical Amplifier Basic Function of Sweep Generator, Horizontal Deflection System, Triggered Sweep, Trigger Pulse, Delay Line, Dual Trace CRO.

References:

CIA: PROBLEM SOLVING/MULTIPLE CHOICE QUESTIONS
MICROCONTROLLER
Learning objectives: To study microcontroller 8051 and its applications.

UNIT – I
4) Introduction to microprocessor: comparing microprocessor and microcontroller, The 8085 and the 8051, A microcontroller survey, Development systems for microcontroller.

SELF STUDY
Numbering Systems and Binary Arithmetic:
Symbolic numerical systems, positional numerical systems, Integer binary number, Fractional binary number, Binary Addition, Subtraction, Division and Multiplication, Binary codes.

UNIT – II
5) Moving Data: Addressing modes, External data moves, codes memory read only data moves, push and pop Opcodes, data exchange.
6) Logical Operations: Byte – level logical operations, Bit – level logical operations, Rotate and Swap operations.
7) Arithmetic Operations: Flags, Incrementing and Decrementing, Addition, Subtraction, Multiplication and Division, Decimal arithmetic.
8) Jump and Call Instructions: The jump and call program range, Jumps, calls and subroutines, Interrupts and returns, more details on interrupts.

References
CIA: Programming /MULTIPLE CHOICE QUESTIONS
St. Xavier’s College, Autonomous
DEPARTMENT OF PHYSICS
SYLLABUS UNDER AUTONOMY FOR SEMESTER VI
ELECTRONIC INSTRUMENTATION (APPLIED COMPONENT)

COURSE: S.PHY.6.05 & 6.06.PR

PAPER I:

EXPERIMENTS:
1. 2\textsuperscript{nd} order active Low pass / High pass filters.
2. Digital to Analog Convertor using Opamp.
3. Digital frequency meter / Voltmeter.
4. 2\textsuperscript{nd} order active notch filter.

DEMO:
1. Analog to Digital Convertor.
2. Study of 8:1 multiplexer (74LS151) and its applications and study of 1:4 De-
multiplexer (74LS155) and its applications.

PAPER II:

With the help of 8051 Microcontroller:
6. Interface with 8 bit Digital to Analog convertor for waveform generation.
7. Primary Counter (Display with LED).
8. Switch Interfacing.

References :-
K.J.Ayala : The 8051 microcontroller architecture, programming and applications, 2\textsuperscript{nd} edition, Thomas Delmar learning.

CIA: PRACTICAL SKILLS WILL BE TESTED