St. Xavier’s College, Autonomous  
DEPARTMENT OF PHYSICS  
SYLLABUS UNDER AUTONOMY for SEMESTER V  
COMPUTER SCIENCE (APPLIED COMPONENT)  
COURSE: S.PHY.5.07  

PROGRAMMING IN C++  
[30 LECTURES]  

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

UNIT I  
(15 LECTURES)  

Introduction to Computers and Programming: Programs and programming languages, the programming process, Procedural and object oriented programming.  
Object oriented terms: object, class, data hiding, encapsulation, inheritance and polymorphism  
Website for Object oriented terms  
http://java.sun.com/docs/books/tutorial/java/concepts/  

Introduction to C++: The parts of a C++ program, The cout object, preprocessor directive(#include), variables and constants, Identifiers and rules for naming identifiers, Data types(integer, Char, floating point, bool), variable assignment and initialization, scope of variable, Arithmetic operators, comments.  
Expressions and Interactivity: The cin object, entering multiple values, reading strings, Mathematical expressions, operator precedence and associativity, type coercion, overflow and underflow, typecast operator, #define directive, multiple and combined assignment, formatting input and output, precision, mathematical library functions.  
Making Decisions: Relational operators, if statement, flags, concepts of compound statement, if/else statement, if/else if statement, trailing else, nested if statements, logical operators, validating user input, scope of a variable, comparing strings, conditional operator, switch statement.

UNIT II  
(15 LECTURES)  

Looping: Increment and decrement operators, for loop, while loop, sentinels, do-while loop, nested loops, break and continue statement.  
Functions: need for functions, defining and calling functions, function prototypes, sending information into a function (parameter passing), changing the value of the parameter, the return statement, returning a value from a function, local and global variables, static local variables, default arguments to a function, returning a value from a function, reference arguments, overloaded functions.  
Arrays: Concept of arrays, accessing array elements, array initialization, processing array contents, copying and printing contents of an array, arrays as function arguments, two dimensional arrays, arrays of strings.  
Pointers: concept of a pointer, pointer variables, relationship between arrays and pointers, pointer arithmetic, initializing pointers, comparing pointers, pointer as a function parameters, dynamic memory allocation.

Additional Ref: 1) Schaum series-“Programming in C++”
CIA: Programming /MULTIPLE CHOICE QUESTIONS

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COMPUTER SCIENCE (APPLIED COMPONENT)

COURSE: S.PHY.5.08

MICROPROCESSOR [30 LECTURES]

Learning objectives: To study microprocessor 8085 and its applications.

UNIT – I [15 LECTURES]
1) **Multiplexers**: Their use in Combinational Logic design, multiplexer tree.
2) **De-multiplexer**: Their use in Combinational Logic design, De-Multiplexer tree.
3) **Computer Memories**: Memory Classification, Charge coupled device memory.
4) **8085**: 8085 Bus organization, 8085 Hardware model, 8085 programming model, The 8085 Microprocessor, Microprocessor Communication and Bus Timings, De-multiplexing address and data bus, Generating control signals, A detailed look at 8085 Microprocessor.

UNIT – II [15 LECTURES]
1) **8085 Instructions**: Instruction size, Opcode format, Addressing Modes, The 8085 Instruction set (Classification), Data Operations, Arithmetic Operations.
2) Logical Operations, Branch Operations, Stack
3) Introduction to Advanced Instructions, interrupt instructions.

Main References:
3) Digital Computer Electronics – Malvino and Brown

CIA: PROBLEM SOLVING/MULTIPLE CHOICE QUESTIONS AND 8085 PROGRAMMING
St. Xavier’s College, Autonomous
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SYLLABUS UNDER AUTONOMY FOR SEMESTER V
COMPUTER SCIENCE(APPLIED COMPONENT)
COURSE:S.PHY.5.07& 5.08PR

PAPER I:
Part - A: Structured  programming using C++.  
(Perform minimum 1 experiment from each A1 to A4)

A-1 Control structures:
1. Temperature Conversion (Page 151 GB)
2. Triangle classification problem
3. A function calculator (Rational expression evaluator) (Page 125 RL)
4. Binary, Hex, Octal equivalents of decimal numbers in range 1 through 256
   (page 154 DD)

A-2 Functions:
5. Use functions: a) To find if an integer is a perfect number &
    b) Print all perfect numbers in the range 1 to 1000 (page 232 DD)
6. Use functions: a) To find if a given integer is a prime or not
    b) Print all prime numbers between 1 and 500 (page 232 DD)
7. Use functions: To find GCD of two integers (page 232 DD)

A-3 Arrays:
8. Mean, Variation and Deviance of a set of numbers (page 299 GB)
9. Linear Search / Binary Search
10. Selection Sort / Bubble Sort / Insertion Sort

A-4 String Manipulation:
11. a) To find if a given string is a palindrome or not
    b) Reversing a string (Print a string backwards)(page 303 DD)
12. Use of string-compare & string-copy
13. To arrange names alphabetically

Ref:
GB: Garry Bronson
DD: Deital & Deital
RL: Robert Lafore

PAPER II: Writing Assembly Language Program (minimum four)
1. To Add , Subtract , Multiply and Divide two 8 bit / 16 bit numbers.
2. To find largest and smallest number from a given array.
3. Arranging a given array of numbers in ascending / descending order.
4. To transfer the block of data in memory to another block of memory.
5. To count Odd / Even (+ve / -ve) numbers from a given array.
6. Counter with delayed display.

Main References:

CIA: PRACTICAL SKILLS WILL BE TESTED

St. Xavier’s College, Autonomous
DEPARTMENT OF PHYSICS
SYLLABUS UNDER AUTONOMY FOR SEMESTER V
ELECTRONIC INSTRUMENTATION (APPLIED COMPONENT)
COURSE: S.PHY.5.05

Learning objectives: To study various electronics instruments.

Analog circuits and instruments [30 Lectures]
UNIT I: Electronic Components, Transducers and Display Devices (15 Lectures)
2. Pressure & Displacement Transducers: Strain Gauges (derivation of gauge factor is not expected), LVDT, Capacitive transducers, Load Cell.
3. Optical Transducers & display devices: LED, LCD, and Dot Matrix Display, Seven segment LED display, BCD to seven segment decoder / driver, Liquid crystal displays.

UNIT II: Signal Generators, Signal Conditioning and Power supplies (15 Lectures)
2. Instrumentation Amplifier & its applications: Basic Instrumentation Amplifier, Instrumentation system.
   SELF STUDY: Applications of Instrumentation Amplifier, Temperature Indicator, light intensity meter, analog weight scale.
3. Power Supplies Linear & Switching Regulators
   Basic & Monolithic Switching Regulators (Buck, Boost and Buck Boost) – Only Basic Configuration.
   SELF STUDY: Constant Current Source (Grounded Load) using OP-AMP and transistor.

References:

CIA: PROBLEM SOLVING/MULTIPLE CHOICE QUESTIONS

St. Xavier’s College, Autonomous
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SYLLABUS UNDER AUTONOMY FOR SEMESTER V
ELECTRONIC INSTRUMENTATION (APPLIED COMPONENT)

COURSE: S.PHY.5.06

MICROPROCESSOR [30 LECTURES]

Learning objectives: To study microprocessor 8085 and its applications.

UNIT – I [15 LECTURES]
5) Multiplexers: Their use in Combinational Logic design, multiplexer tree.
6) De-multiplexer: Their use in Combinational Logic design, De-Multiplexer tree.
7) Computer Memories: Memory Classification, Charge coupled device memory.
8) 8085: 8085 Bus organization, 8085 Hardware model, 8085 programming model, The 8085 Microprocessor, Microprocessor Communication and Bus Timings, De-multiplexing address and data bus, Generating control signals, A detailed look at 8085 Microprocessor.

UNIT – II [15 LECTURES]
4) 8085 Instructions: Instruction size, Opcode format, Addressing Modes, The 8085 Instruction set(Classification), Data Operations, Arithmetic Operations.
5) Logical Operations, Branch Operations, Stack
6) Introduction to Advanced Instructions, interrupt instructions.

Main References:
3) Digital Computer Electronics – Malvino and Brown
CIA: PROBLEM SOLVING/MULTIPLE CHOICE QUESTIONS AND 8085 PROGRAMMING

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ELECTRONIC INSTRUMENTATION (APPLIED COMPONENT)

COURSE: S.PHY.5.05&5.06.PR

PAPER I:

Experiments: (Minimum four to be performed.)

1. Wave Shaping (Using Opamp or 555 Timer).
2. Thermistor characteristics and its use as a temperature sensor.
3. Square and Triangular wave generator using Opamp with concept of duty cycle.
5. Instrumentation Amplifier with three OpAmps.

Demo

1. Study of 3:8 Decoder (74LS138) and study of 8:3 priority Encoder (74LS148) and their applications.
2. Study of Latch (74LS373) and its use in seven segment display.

PAPER II:

Writing Assembly Language Programs

7. To Add, Subtract, Multiply and Divide two 8 bit / 16 bit numbers.
8. To find largest and smallest number from a given array.
9. Arranging a given array of numbers in ascending / descending order.
10. To transfer the block of data in memory to another block of memory.
11. To count Odd / Even (+ve / -ve) numbers from a given array.
12. Counter with delayed display.

(Programs for minimum four of the above tasks are to be written and executed)

Main References:


CIA: PracticalSKILLS will be tested.