**FOR EI SCROLL DOWN**

St. Xavier's College, Autonomous

**DEPARTMENT OF PHYSICS**

**SYLLABUS UNDER AUTONOMY for SEMESTER V**

**COMPUTER SCIENCE (APPIED 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, 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.

**Reference**: Tony Gaddis – " Programming in C++" 3rd Edition

Additional Ref: 1) Schaum series-" Programming in C++"

2) Cohoon & Davidson- " C++ program Design"

**CIA: Programming /MULTIPLE CHOICE QUESTIONS**

St. Xavier's College, Autonomous
**DEPARTMENT OF PHYSICS**
**SYLLABUS UNDER AUTONOMY FOR SEMESTER V**
**COMPUTER SCIENCE (APPIED 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:**


1) Modern Digital Electronics - R.P. Jain ( 3rd edition, Tata McGraw Hill).
2) Microprocessor Architecture, programming and applications with 8085 - Ramesh Gaonkar, ( 5th Edition, Prentice Hall of India).
3) Digital Computer Electronics – Malvino and Brown


CIA: PROBLEM SOLVING/MULTIPLE CHOICE QUESTIONS AND 8085 PROGRAMMING

St. Xavier's College, Autonomous

**DEPARTMENT OF PHYSICS**

**SYLLABUS UNDER AUTONOMY FOR SEMESTER V**

**COMPUTER SCIENCE(APPIED 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 Sring 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

**Practical Examination: Note:** Algorithms ,Flowchart optional. Printout of source code and output compulsory.

**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:


1) Modern Digital Electronics by R.P. Jain 3rd edition, Tata McGraw Hill.
2) Microprocessor Architecture, programming and applications with 8085 By Ramesh Gaonkar , 5th Edition, Prentice Hall of India.


**CIA: PRACTICAL SKILLS WILL BE TESTED**

St. Xavier's College, Autonomous

**DEPARTMENT OF PHYSICS**

**SYLLABUS UNDER AUTONOMY FOR SEMESTER V**

**ELECTRONIC INSTRUMENTATION (APPIED COMPONENT)**

**COURSE: S.PHY.5.05**

**Learning objectives**: To study various electronics instruments.

**Analog circuits and instruments**[ 30 LECTURES]

**UNIT1**: Electronic Components, Transducers and Display Devices(15 Lectures)

1. **Temperature measurements**: Resistance thermometer, thermocouple & thermistor.
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 segmentLED display, BCD to seven segment decoder / driver, Liquid crystal displays.

**UNIT II**: Signal Generators, Signal Conditioning and Power supplies(15 Lectures)

1. **Oscillators:** Wien Bridge Oscillator, Triangular wave generator, Sawtooth wave generator and Function generator using OP-AMP, Positive & Negative Clippers using OP-AMP, 555 Timer applications: Tone Burst Oscillator (Temperature to frequency conversion), Voltage controlled frequency shifter.
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**

Adjustable Positive Voltage Regulator(LM 317), Adjustable Negative Voltage Regulator (LM 337), Formation of adjustable bipolar Voltage Regulator using LM317 and LM337, Fixed Output Voltage Regulator with current booster.

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:**

1. Basic Electronics and Linear Circuits - N. N. Bhargava, D. C. Kulshreshtha and S. C. Gupta. Technical Teachers training Institute, Tata McGraw Hill Publishing Company Limited.
2. Modern Electronic Instrumentation & Measurement Techniques - Albert D. Helfrick& William D. Cooper (PHI) Edition.
3. Electronic Instrumentation - H. S. Kalsi,( 2nd Edition, Tata McGraw Hill).
4. Digital Principle & Applications - Malvino & Leach ($6^{th}$ edition, TMH)

CIA:PROBLEM SOLVING/MULTIPLE CHOICE QUESTIONS

St. Xavier's College, Autonomous

**DEPARTMENT OF PHYSICS**

**SYLLABUS UNDER AUTONOMY FOR SEMESTER V**

**ELECTRONIC INSTRUMENTATION (APPIED 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) Modern Digital Electronics - R.P. Jain( $3^{rd}$ edition, Tata McGraw Hill).
4) Microprocessor Architecture, programming and applications with 8085 - Ramesh Gaonkar, ( $5^{th}$ Edition, Prentice Hall of India).
3) Digital Computer Electronics – Malvino and Brown

CIA:PROBLEM SOLVING/MULTIPLE CHOICE QUESTIONS AND 8085 PROGRAMMING

St. Xavier's College, Autonomous

**DEPARTMENT OF PHYSICS**

**SYLLABUS UNDER AUTONOMY FOR SEMESTER V**

**ELECTRONIC INSTRUMENTATION (APPIED COMPONENT)**

**COURSE: S.PHY.5.05&5.06.PR**

## PAPER I:

**Experiments:** (Minimumfour 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.
4. Adjustable voltage regulator using LM 317 and LM 337.
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:

3) Modern Digital Electronics by R.P. Jain 3rd edition, Tata McGraw Hill.
4) Microprocessor Architecture, programming and applications with 8085 By Ramesh Gaonkar, 5th Edition, Prentice Hall of India.

CIA: PracticalSKILLS will be tested.