**ST. XAVIER'S COLLEGE [AUTONOMOUS], KOLKATA**

Department of Computer Science

| **Paper Code: HCSCR1022T** | **Computer System Architecture (Theory)** | **Marks: 60** |
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| **Sl. No.** | **Topic** | **No. of Periods** |
| | **Group A (26 periods)** | |
| 1 | **Data Representation and Basic Computer Arithmetic**<br>Number systems, complements: 1's complement and 2's complement, fixed and floating point representation, character representation, addition, subtraction, multiplication and division algorithms for integers | 6 |
| 2 | **Digital System Design**<br>Logic Gates and circuits, Truth Tables, Boolean Algebra, Bollean Function, Simplification, Combinational circuits – multiplexers, decoders, de-multiplexers, encoders, comparators, Sequential Circuits – Flip-flops – RS, D, JK, Master Slave, T; Registers – Shift, Parallel; Counters – Excitation Tables, Synchronous, Asynchronous | 20 |
| | **Group B (26 periods)** | |
| 1 | **Introduction to Computer**<br>Functional Units, Basic I/O devices, Storage devices, Bus Structure | 2 |
| 2 | **Basic Computer Organization and Design**<br>Organization of a model computer: CPU registers, Bus Interconnection design of basic computer, machine language, assembly language, Instruction Execution Cycle, Instruction formats, Addressing mode, instruction codes, concept of instruction pipelining, RISC, CISC | 8 |
| 3 | **Central Processing Unit**<br>Micro-Programmed Control Unit, Combinational ALU Design: Adders, Subtractors, 2's complement adder-subtractor | 8 |
| 4 | **Memory Organization**<br>Design of the RAM, Associative memory, Cache memory: Mapping techniques, Introduction to Virtual Memory. | 8 |
| | **Total** | **52** |

**Books and References:**


1. Digital Computer Electronics, Malvino and Brown, Tata McGraw-Hill
2. Digital Logic and Computer Design, M Morrs Mano, Pearson education India
3. M. Mano, Computer System Architecture, Pearson Education 1992
4. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India,2009
5. Carl Hamacher, Computer Organization, Fifth edition, McGrawHill, 2012.
6. Computer Architecture and Organization, Hayes, McGraw-Hill
7. Computer Organization and Design, P. Pal Chaudhuri, Prentice-Hall of India Pvt.Ltd


| **Paper Code: HCSCR1022P** | **Computer System Architecture (Practical H/W)** | **Marks: 40** |
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