Nanomaterials: Introduction of nanoscience and technology, structure, properties and applications of Carbon nanotubes	
Text and Reference Books	
1. Solid State Physics by S.O. Pillai (New Age Science Ltd., New Delhi) 2. Solid state Physics by A-J. Dekkar (McMillan and Co., London) 3. Introduction to Solid State Physics by C. Kittel (Wiley Eastern, New Delhi) 4. Concept of Modern Physics by Arthur Beiser(Tata Mc Graw Hill)	

Course Code: BEC-201	**Digital Electronics and Computer Organization**	
Course category	:	Engineering Fundamental (EF)
Pre-requisite Subject	:	NIL
Contact hours/week	:	Lecture: 3, Tutorial : 1 , Practical: 2
Number of Credits	:	5
Course Assessment methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce, two minor tests and one major theory & practical examination.
Course Objectives	:	The course is aimed to develop the concepts of digital electronic and computer organization skills of engineering students that are imperative for effective understanding of engineering subjects.
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Acquired knowledge about basics of digital electronics and solving problems related to number systems and Boolean algebra. 2. Ability to identify, analyze and design combinational and sequential circuits. 3. To design, implement and evaluate various synchronous and asynchronous sequential circuits and applications. 4. Acquired knowledge about internal circuitry and logic behind any digital system. 5. Ability to understand basic building blocks of a computer system and addressing techniques in computer organization. 6. Acquired knowledge about Indian Super Computer 'PARAM'.		
Topics Covered		
UNIT-I		
Overview of Digital Electronics: Number Systems, Boolean algebra: Representation of values and complements, De'Morgans theorem-simplifying expressions. AND, OR, NOT, XOR, XNOR, NAND, NOR gates and their truth tables, Combinational logic circuits for expressions		**9**

using NAND and NOR gates, Logic circuit families and characteristics, SSI, MSI, LSI and VLSI circuits	
UNIT-II	
Combinational and sequential circuits: (Simple block diagrams, truth tables and IC packages only required). Adders, decoders, multiplexers, encoder circuits, Flip-flops: RS, clocked RS, JK, D and T flip flops, Master slave flip flops, edge and level triggering, Multivibrators - Astable, Bistable, Monostable, counters-ripple and decade. Registers, latches and Tristate buffers.	**9**
UNIT-III	
Building blocks of a computer system: Basic building blocks-I/O, memory, ALU, Control and their interconnections, Control unit and its functions- Instruction-word, Instruction execution cycle, organizational sequence of operation of control registers; controlling of arithmetic operations; branch, skip, jump and shift instructions, ALU-its components. **Addressing techniques and registers:** Addressing techniques-Direct, immediate addressing; paging, relative, Indirect and indexed addressing. Memory buffer register; accumulators; Registers-Indexed, General purpose, Special purpose; overflow, carry, shift, scratch registers; stack pointers; floating point; status information and buffer registers	**9**
UNIT-IV	
Memory: Main, RAM, static and Dynamic, ROM, EPROM, EAROM, EEPROM, Cache and Virtual memory. Interconnecting System components: Buses, Interfacing buses, Bus formats-address, data and control, Interfacing keyboard, display, auxiliary storage devices, and printers. I/O cards in personal computers. Development of Indian Super Computer 'PARAM': History, Characteristics, Strengths, Weakness and basic Architecture.	**9**

LIST OF EXPERIMENTS

1. Design and verification of following arithmetic circuits using 74xx family ICs.
   a. Half adder and Full adder
   b. Half subtractor and full subtractor
2. To perform the code conversion- binary to gray and gray to binary and its truth table verification.
3. To design a combinational logic circuit using 74xx family ICs and its truth table verification in both SOP and POS forms.
4. Realization of 2:4 decoders and 4:2 encoder circuit and verification of its truth table.
5. To design and verify the truth table of multiplexer and demultiplexer circuits.
6. To design a 1-bit comparator using 74xx family ICs and to study the performance of 4-bit comparator IC 7485.

Text and Reference Books

1. Digital principle and applications Malvino and Leach- (TMH)
2. A.S.Tannenbaum : Structured Computer Organization, Pearson
3. Thomas C. Bartee : Digital Computer Fundamentals, McGraw-Hill
4. Duglus V Hall : Microprocessors and Interfacing: programming and Hardware, McGraw-Hill, 1986