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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Program: Bachelor of Science Honours (Information Technology) | | | | | | | Semester: I | | | |
| Course: Electronics & Communication Technology I | | | | | | | Code: | | | |
| Teaching Scheme | | | | | Evaluation Scheme | | | | | |
| Lecture | Practical | Tutorial | | Credits | Theory | | | | Practical | |
| Internal | External | | | Internal | External |
| 45 | Nil | Nil | | 3 | 40 | 60 | | | Nil | Nil |
|  | | | | | | | | | | |
| Internal Component | | | | | | | | | | |
| Class Test Duration Mins | | | Assignment& projects | | | | | Class Participation | | |
| 10 Marks 20 Mins | | | 20 | | | | | Nil | | |
|  | | | | | | | | | | |
| Learning Objectives  Students will try to learn:   1. The concept of various components and different codes 2. The concept of Boolean algebra and arithmetic operations. 3. Understand the Basic and Universal Gates and design and implementation of adders and subtractors 4. Design and implementation of Code convertors and Sequential circuits | | | | | | | | | | |
| Learning Outcomes  At the end of the course student should be able-   1. To understand different codes, number systems and their conversions. 2. To analyze and minimize Boolean expressions and perform arithmetic operations.   3. To understand the working of Gates and design and and implementation of adders and subtractors  4. To design and analyze code convertors and sequential circuits | | | | | | | | | | |
| Pedagogy   * PPTs, Case studies, Group discussions, Classroom Activity, Videos, Research papers, News articles etc. | | | | | | | | | | |

**Module 1** (12)

**Introduction to Electronics:** Analog Vs Digital**,** Introduction to semi-conductors, Semiconductor diodes. Introduction to Transistors.

**Number Systems and Codes** Introduction to number system and conversions: Binary, Octal, Decimal and Hexadecimal Number Systems

**Codes:** Gray Code, BCD Code, Excess-3 code, ASCII Code. Error Detection and Crrection: Hamming codes.

**Module 2** (11)

**Arithmetic Operations** : Binary arithmetic: addition, subtraction (1‟s and 2‟s complement), multiplication and division. Octal and Hexadecimal arithmetic: Addition and Subtraction (7‟s and 8‟s complement method for octal) and (15‟s and 16‟s complement method for Hexadecimal).

**Boolean Algebra and Logic gates:**

Theorems and Properties of Boolean Algebra, Boolean functions, Boolean function reduction using Boolean laws, Canonical forms, Standard SOP and POS form

**Module 3** (11)

**Basic Digital gates:** NOT , AND , OR , NAND , NOR , EXOR , EX-NOR, positive and negative logic, NAND-NOR Realization (Implementation of other gates using universal gates).

K-map method 2 variable, 3 variable, 4 variable, Don’t care condition

Introduction, Half and Full Adder, Half and Full Subtractor, Four Bit Binary Adder, One digit BCD Adder,

**Module 4** (11)

**Combinational Logic Design :**

code conversion, Encoder and Decoder, Multiplexers and Demultiplexers

**Sequential Logic Design :**

**Flip Flops :** SR, JK, D, T, master slave flip flop, Truth Table, excitation table and conversion

**Register:** Shift register, SISO, SIPO, PISO, PIPO, Bi- directional and universal shift register.

**Counters:** Design of synchronous and asynchronous, Modulo Counter, Up Down counter IC 74193, Ring and Johnson Counter.

**References:**

1. R. P. Jain, “Modern Digital Electronics”, Tata McGraw Hill.
2. Bernard Grob, Basic Electronics, 4th Edition
3. N.G.Palan, “Digital Electronics and Logic Design”,Technova
4. M. Morris Mano, “Digital Logic and computer Design”, PHI
5. Donald p Leach, Albert Paul Malvino, “Digital principles and Applications”, Tata McGraw Hill