

Course Outline

Course Title: Digital Electronics-I

Course Code: (Phy-21306) 2 + 1 Credit Hours

Convener: Prof. Dr. Sheikh Aftab Ahmad

Major Topics
Introductory Digital Concepts: Digital and analog quantities, binary digits, logic levels and digital waveforms, introduction to logic operations.
Overview of logic functions, fixed function integrated circuits, introduction to test instruments and digital system application.
Number Systems and Codes: Binary, octal and hexadecimal numbers systems, their inter-conversion, Binary arithmetic, 2's complements of binary numbers, arithmetic operations with signed numbers, Different codes (BCD, ASCII, Gray etc.), parity in codes, digital system application.
Logic Gates: Concepts of logic, truth table, basic logic gates, NAND, NOR, Exclusive-OR, Exclusive NOR gates, applications.
Boolean Algebra: Boolean operations and expressions, Boolean Laws, De-Morgan's Theorem, Boolean analysis of logic circuits, simplification of Boolean expression by Boolean laws and theorems, Standard forms of Boolean expressions, K-maps and their uses, don't care condition
Midterm Examination
Combinational Logic: Basic combinational logic circuits, implementing combinational logic, universal properties of NAND and NOR gates
Combinational logic using NAND and NOR gates, logic circuit operation with pulse waveforms,
Functions of Combinational Logic: Basic adders, parallel binary adders
Comparators, decoders, encoders, code converters,
Multiplexers, demultiplexers, parity generators/checkers.
Flip-Flops and Related Devices: Latches, edge-triggered flip-flops, master-slave flip-flops
Operating characteristics and application of flip-flops
One-shots, the 555 timer, review of the course and final exercises
Final Examination

Text Book

Digital Fundamentals (11th Edition) by Thomas L. Floyd

Reference Books

Logic and Computer Design Fundamentals 3rd Edition by Mano and Kime, Pearson Prentice Hall, (ISBN: 0-13-140539-X)

Digital Computer Fundamentals by T. C. Bartee, McGraw-Hill

Digital Electronics, 5th Edition by R. L. Tokheim, McGraw-Hill (ISBN 0-07-116796-X)

Assignments: You will be allocated and asked to submit five assignments on the following contact.

Contact: Professor (R) Sheikh Aftab Ahmad via email draftab2@yahoo.com