Centre for High Energy Physics
Faculty of Science
University of the Punjab, Lahore

Course Outline

Program	BSCP	Course Code	CPHY 343	Credit Hours	3

Course Title	Digital Electronics

Course Introduction

Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, etc.Digital signals are more accurate and reliable than analog signals, as they are less susceptible to noise and interference. Digital signals can be easily stored, processed, and transmitted, as they are easy to represent with 1s and 0s. This course provides the detailed understanding of the principles and procedure of digital electronics.

Learning Outcomes

The course will introduce basic principles of digital electronics. Its objectives are as following.

1. Understanding fundamental principles of digital electronics.
2. Basic components of combinational and sequential logic.
3. Understand the components and functioning of processor logic design.

Course Content

Week 1	Review of characteristics of semiconductor diodes
Week 2	Transistors, and their simple applications
Week 3	Digital electronics: Binary and other number systems
Week 4	Boolean algebra, Boolean functions
Week 5	Digital logic gates. Simplification of Boolean functions: The map method, Product of Sums simplification, NAND and NOR simplification
Week 6	The tabulation method. Combinational logic, Adder and Subtractor
Week 7	Code conversion, Multilevel NAND and NOR circuits.
Week 8	Sequential logic: Flip flops, Flip flops excitation table
Week 9	Design of counter. Registers, Shift register, Ripple counter, Synchronous counter
Week 10	Timing Sequences, Memory unit. Register transfer logic

Week 11	Processor logic design: Processor organization,
Week 12	Arithmetic logic unit, Status register, Shifter, Accumulator.
Week 13	Control logic design: Control organization, Hard-Wired Control
Week 14	Microprogram control, Control of processor unit, PLA control. LabView
Week 15	Introduction to LabView, Virtual Instruments, Block Diagrams,
Week 16	Controls and indicators, Data Acquisition, Debugging

Textbooks and Reading Material

1. Digital Logic and Computer Design, M. M. Mano, *Prentice-Hall Inc*(1995).
2. Digital Fundamental (11thEdition) , T. L. Floyd, *Prentice-Hall* (2015).
3. Digital Electronics: Principles and Applications, R. Tokheim, *McGraw-Hill* (2013).
4. Digital Electronics, R. Dueck and K. Reid, *Cengage Learning* (2011).

Teaching Learning Strategies

The instructor is required to make use of examples of the text books and The students are required to solve a large portion of related exercises/questions/problems of the main textbooks.

Assignments: Types and Number with Calendar

At least two assignments and two quizzes. A course project may also be assigned.

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester.At least fifty percent of the question paper would involve new problems related to the concepts learned in the course. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.