

Course Title: **Digital Logic (3 Cr.)**

Course Code: **CACS105**

Year/Semester: **I/I**

Class Load: **5 Hrs. / Week (Theory: 3 Hrs, Practical: 2 Hrs.)**

Course Description

This course presents an introduction to Digital logic techniques and its practical application in computer and digital system.

Course Objectives

The course has the following specific objectives:

- To perform conversion among different number systems
- To simplify logic functions
- To design combinational and sequential logic circuit
- To understand industrial application of logic system.
- To understand Digital IC analysis and its application
- Designing of programmable memory

Course Contents

Unit 1 Introduction

2 Hrs.

- 1.1 Digital Signals and Wave Forms
- 1.2 Digital Logic and Operation
- 1.3 Digital Computer and Integrated Circuits (IC)
- 1.4 Clock Wave Form

Unit 2 Number Systems

5 Hrs.

- 2.1 Binary, Octal, & Hexadecimal Number Systems and Their Conversions
 - 2.1.1 Representation of Signed Numbers-Floating Point Number
 - 2.1.2 Binary Arithmetic
- 2.2 Representation-of BCD-ASCII-Excess 3 -Gray Code -Error Detecting and Correcting Codes.

Unit 3 Combinational Logic Design

16 Hrs.

- 3.1 Basic Logic Gates NOT, OR and AND
- 3.2 Universal Logic Gates NOR and NAND
- 3.3 EX-OR and EX-NOR Gates
- 3.4 Boolean Algebra:
 - 3.3.1 Postulates & Theorems
 - 3.3.2 Canonical Forms - Simplification of Logic Functions
- 3.5 Simplification of Logic Functions Using Karnaugh Map.
 - 3.5.1 Analysis of SOP And POS Expression
- 3.6 Implementation of Combinational Logic Functions
 - 3.6.1 Encoders & Decoders

- 3.6.2 Half Adder, & Full Adder
- 3.7 Implementation of Data Processing Circuits
 - 3.7.1 Multiplexers and De-Multiplexers
 - 3.7.2 Parallel Adder -Binary Adder-Parity Generator /Checker-
Implementation of Logical Functions Using Multiplexers.
- 3.8 Basic Concepts of Programmable Logic
 - 3.8.1 PROM
 - 3.8.2 EPROM
 - 3.8.3 PAL
 - 3.8.4 PLA

Unit 4 Counters & Registers

16 Hrs.

- 4.1 RS, JK, JK Master - Slave, D & T Flip flops
 - 4.1.1 Level Triggering and Edge Triggering
 - 4.1.2 Excitation Tables
- 4.2 Asynchronous and Synchronous Counters
 - 4.2.1 Ripple Counter: Circuit and State Diagram and Timing Waveforms
 - 4.2.2 Ring Counter: Circuit and State Diagram and Timing Waveforms
 - 4.2.3 Modulus 10 Counter: Circuit and State Diagram and Timing Waveforms
 - 4.2.4 Modulus Counters (5, 7, 11) and Design Principle, Circuit and State Diagram
 - 4.2.5 Synchronous Design of Above Counters, Circuit Diagrams and State Diagrams
- 4.3 Application of Counters
 - 4.3.1 Digital Watch
 - 4.3.2 Frequency Counter
- 4.4 Registers
 - 4.4.1 Serial in Parallel out Register
 - 4.4.2 Serial in Serial out Register
 - 4.4.3 Parallel in Serial out Register
 - 4.4.4 Parallel in Parallel out Register
 - 4.4.5 Right Shift, Left Shift Register

Unit 5 Sequential Logic Design

6 Hrs.

- 5.1 Basic Models of Sequential Machines
 - Concept of State
 - State Diagram
- 5.2 State Reduction through Partitioning and Implementation of Synchronous Sequential Circuits
- 5.3 Use of Flip-Flops in Realizing the Models
- 5.4 Counter Design

Laboratory Works

1. Gates using Active and Passive Elements
2. Half Adder and Full Adder
3. 16:1 Multiplexer
4. 1:16 Demultiplexer
5. Digital Watch by Counters
6. Shift Registers

Teaching Methods

The general teaching methods includes class lectures, group discussions, case studies, guest lectures, research work, project work, assignments (theoretical and practical), and exams, depending upon the nature of the topics. The teaching faculty will determine the choice of teaching pedagogy as per the need of the topics.

Evaluation

Examination Scheme				
Internal Assessment		External Assessment		Total
Theory	Practical	Theory	Practical	
20	20 (3 Hrs.)	60 (3 Hrs.)	-	100

Text Books

1. Floyd, "Digital Fundamentals", PHI.
2. Morris Mano, "Digital Design", Prentice Hall of India.
3. Tocci.R.J, "Digital systems-Principles & Applications"-Prentice Hall of India.

Reference Books

1. B. R. Gupta and V.Singhal, "Digital Electronics" 4th Edition, S.K Kataria & sons, India.
2. Fletcher.W.I., "An Engineering Approach to Digital Design", Prentice Hall of India.
3. Millman & Halkias, "Integrated Electronics".
4. V.K.PURI, "Digital Electronics", TMH.

Course Title: **English I (3 Cr.)**

Course Code: **CACS103**

Year/Semester: **I/I**

Class Load: **4 Hrs. / Week (Theory: 3 Hrs., Tutorial: 1 Hr.)**

Course Description

This course aims at helping students combine the knowledge of the English language with their technical knowledge with special emphasis on vocabulary acquisition and grammatical accuracy. It offers up-to-date technical content, authentic reading and listening passages covering a wide range of topics like the use of virtual reality in industry, personal computing, viruses and security, information systems, and multimedia. Letter-writing section offers a complete guide to writing work-related letters and comprehensive glossary of technical terms forms a useful mini-dictionary of computing terminology.

Course Objectives

The main objectives of the course are to:

- impart effective language skills to students and enable them to use language accurately, clearly and concisely,
- acquaint students with language used in computer study through extensive reading activity,
- help them to enhance their ability to use language in a proper way with specific focus on grammatical accuracy and writing competence,
- enable students to improve work-related letter writing skills with special attention to presentation and structure, and
- familiarize them with innovation in computer science while introducing them with the language used in this field.

Course Contents

A. LEARNING THE LANGUAGE

Unit One

9 Hrs.

I. Personal Computing

The Processor

Language Focus A: Contextual Reference

II. Portable Computers

Operating Systems

Language Focus B: Word formation, prefixes

III. Online Services

Data Transmission

Language Focus C: Word formation, suffixes

Unit Two

12 Hrs.

- I. Computer Software
Comparing Software Packages
Language Focus D: Making Comparisons
- II. Computer Networks
Network Configurations
Language Focus E: Time Sequence
- III. Computer in Education
CALL
Language Focus F: Giving Examples
- IV. Virtual Reality
VR Input Devices
Language Focus G: Classifying

B. ORGANIZING AND WRITING TEXTS

Unit Three

9 Hrs.

- I. Programming and Languages
C Languages
Language Focus H: Organizing Information
- II. Computer Viruses
Computer Security
Language Focus I: Listing
- III. Computers in the Office
Computer System
Language Focus J: The Passive

Unit Four

6 Hrs.

- I. Computers in Medicine
Data Storage and Management
Language Focus K: Explanations and Definitions
- II. Robotics
Robot Characteristics
Language Focus L: Compound Noun

Unit Five

9 Hrs.

- I. Machine Translation
AI and Expert System
Language Focus M: Cause and Effect

II. Multi Media
Computer-to-video-conversion
Language Focus N: Making Predictions

III. Computer Graphics
24 bit Color
Language Focus O: Letter Writing

Teaching Methods

The course expects communicative language teaching (CLT). Facilitating the learning process, the instructors are expected to stimulate the students to work as per the spirit of the course and make learning a joyful experience.

Evaluation

Internal Evaluation: 40%

Attendance - 5
Presentation/classroom participation- 5
Writing sample- 15
Mid-term test- 15

Final Evaluation- 60%

Comprehension
Vocabulary formation
Grammar testing
Writing of multiple forms

Prescribed Textbook

1. Boeckner, Keith and P. Charles Brown. *Oxford English for Computing*. London: Rutledge, 1993.

