Anekant Education Society's
Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
Autonomous

Course Structure & Credit Distribution for F. Y. B. Sc. (Computer Science) Electronic Science (Sem. II)
(2022-23)

Semester	Paper Code	Title of Paper	No. of Credits
II	UCSEL121	Semiconductor Devices & Circuits	2
	UCSEL122	Digital Electronic Circuits	2
	UCSEL123	Electronic Practical's	2

SYLLABUS (CBCS) FOR F. Y. B. Sc. Computer Science
(w.e.f. June, 2022)

Class   : F.Y. B. Sc.(Comp. Sci.)   (Semester- II)
Paper Code   : UCSEL121
Title of Paper : Semiconductor Devices & Circuits
Paper   : I
Credit   : 2   No. of lectures: 36

- **Learning Objectives:**
   1. To study characteristic features of semiconductor devices
   2. To study elementary electronic circuits and applications
   3. To study applications of semiconductor devices

- **Learning Outcomes:**
   At the end of this course, students should be able to:
      1. Getting the fundamental knowledge of electronics components & circuits.
      2. Identify active and passive components and understand basic circuit theory
      3. Solve & minimize complex electronic circuits.

Unit 1: Basic of Semiconductor   (04)
Introduction to semiconductor materials, Energy level diagram, Intrinsic & Extrinsic semiconductors, n-type semiconductor, p-type semiconductor.

Unit 2: Semiconductor Diodes & Circuits   (10)
Study of semiconductor active components (w.r.t. symbol, working principle, characteristics, parameters, specifications, applications): P-N junction diode, Zener diode, Varactor diode, Light Emitting Diode(LED),Photo diode, Optocoupler, Rectifiers, clipper and clamper circuits.

Unit-3:Bipolar Junction Transistor and its applications   (12)
Bipolar Junction Transistor (symbol, types, construction, working principle, I-Vcharacteristics, parameters, specifications),concept of amplifier, transistor as a amplifier, configurations of transistors (CC,CE& CB), Biasing circuit (Potential divider only), DC load line (CE), Q point, ,concept of class A, B, C and class AB amplifiers, transistor as a switch.

Unit-4: UJT and FETs   (10)
Uni-Junction Transistor (UJT), Junction Field Effect Transitor (JFET), Metal Oxide Semiconductor Field Effect Transistor (MOSFET) (Symbol, construction, working principle, I-V characteristics), JFET as voltage variable resistor.

Reference Books:
1. Basic Electronics: Bernard Grob, McGraw Hill Publication, 8th Revised Edition,2010
2. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition. 2012
3. Modern Digital Electronics: R.P. Jain, Mcgraw Hill

ANEKANT EDUCATION SOCIETY'S

TULAJARAM CHATURCHAND COLLEGE of ARTS, SCIENCE AND COMMERCE, BARAMATI

(AUTONOMOUS)

F. Y. B. Sc. (Computer Science)

SEMESTER : II (2022 Pattern)

Paper II: UCSEL 122: Digital Electronic Circuits

(2022-23)

(2 Credits, 36 lectures)

Objectives:

1. To know about different Combinational Circuits.

2. Study and construction of sequential logic circuits, understanding design of flip flops.

3. To understand Binary different Counters and Shift Registers.

4. To get knowledge about the computer memories

Learning Outcomes:-

1. Design number of combinational circuits using logic gates.

2. Design various flip flops, counters and determining outputs.

3. Design different types of shift registers.

4. Design different types of memory elements for particular operation.

Unit I: Combinational Circuits   **(10L)**

      Introduction , Multiplexer (4:1), Demultiplexer (1:4), Encoders , Decimal to BCD , Octal to Binary, Priority Encoder, Decoders – BCD to 7 Segment Decoder, 7 segment display, Types of 7 segment display - Common Anode, Common Cathode, Digital comparator.

Unit II: Flip Flops   **(6L)**

      Introduction to Sequential Circuits, Flip Flops – RS Flip Flop using NAND Gate, Clocked RSFF, DFF, JKFF, TFF, MSJKFF and Excitation Table of Flip flops.

Unit III: Counters and Shift Registers (10L)

Counters –Asynchronous Type – 3 bit Up and Down and Up-Down counter, Synchronous Type - 3 bit and 4 bit Up and Down Counter, Concept of Modulus Counters, IC 7490. (Time Diagrams of all counters are expected).

Shift Registers – SISO, SIPO, PISO, PIPO shift registers, Ring Counter using DFF, Johnson Counter.

Unit IV: Basics of Computer Organization and Memory
(10L)

Basic Computer Organization, Concept of Address Bus, Data Bus, Control Bus. CPU Block Diagram and Explanation of each block, Register based CPU organization, Concept of Stack & its organization, Memory Architecture, Memory hierarchy, Types of Memories (Role of Cache memory, Virtual Memory), Vertical and Horizontal Memory Expansion.

Recommended Books:

1. **Digital Electronics : Principles, Devices and Applications - Anil K. Maini (Wiley)**
2. **Digital Fundamentals - Floyd T.N. and Jain R.P. (Pearson Educations)**
3. **Digital system Design – M. Morris Mano (Pearson Education)**
4. **Digital Principles and Applications –Leach, Malvino, Saha (TMH)**
5. **Computer System Architecture - Morris Mano, Prentice Hall of**

SYLLABUS (CBCS) FOR F. Y. B. Sc. (Computer Science)
(w.e.f. June, 2022)

Class : F.Y. B. Sc. (Computer Science)
Semester : II
Paper Code : UCSEL 123
Paper : III
Title of Paper : Electronic Practical's
Credit : 2

- **Learning Objectives:**

    1. To teach students how to draw different symbols, logic diagrams and circuit

       diagrams.

    2. To develop skill of circuit connections.

    3. To train them to design and analyse circuits for specific purpose.

    4. To motivate them to work on different mini projects.

- **Learning Outcomes:**

    At the end of this course, students should be able to:

    1. Identify different components, devices, IC's, as well as their types.

    2. Understand basic parameters.

    3. Know operation of different instruments used in the laboratory.

    4. Connect circuit and do required performance analysis.

Group A: Activity (Any One)

Perform any one of the following activities with proper documentation.

1. Hobby Projects

2. Internet Browsing

3. Industrial Visit / Live Work Experience

4. Market Survey of Electronic Systems

5. Study Tour and Its Report Writing.

6. IC testing

Group B : Analog Electronics (Any Four)

1. Study of forward and Reverse biased characteristics of PN Junction Diode

2. Study of breakdown characteristics and voltage regulation action of Zener diode.

3. Study of output characteristics of Bipolar Junction Transistor in CE mode.

4. Study of output and transfer characteristics of JFET/MOSFET

5. Study of I-V characteristics of UJT and Demonstration of UJT based relaxation oscillator.

6. Study of low voltage Half-wave, Full-wave and Bridge rectifier circuits.

7. Study of amplification action of BJT.

8. Study of clipping circuit (Bias).

9. Study of opto-coupler.

10. Study of angular response of LED.

11. Study of transistor as switch.

Group B : Digital Electronics (Any Four)

1. Study of RS, JK D and T flip-flop using NAND gate.

2. Study of Up/Down Counter.

3. Study of Decade Counter (IC-7490).

4. Study of 4-bit Shift Register.

5. Build and Test Multiplexer and Demultiplexer using gates.

6. Build and Test Keyboard Encoder.

7. Build and Test Diode Matrix ROM.

8. Study of Decoders.

9. Study of Four bit ALU.

10. Study of Read/Write Action of RAM Using IC 7489.