

# **B . S c . P a r t I I**

## **ELECTRONICS**

### **Paper I**

#### **ELB 201 : COMMUNICATION ELECTRONICS**

**Theory:**

**Max. Marks :50**

---

#### **Unit-1**

**Electronic communication:** Introduction to communication – means and modes. Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals. Concept of Noise, signal-to-noise (S/N) ratio.

#### **Unit-2**

**Analog Modulation:** Amplitude Modulation, modulation index and frequency spectrum. Generation of AM (Emitter Modulation), Amplitude Demodulation (diode detector), Concept of Single side band generation and detection. Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver

**Analog Pulse Modulation:** Channel capacity, Sampling theorem, Basic Principles-PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing.

#### **Unit-3**

**Digital Pulse Modulation:** Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques, Sampling, Quantization and Encoding. Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Binary Phase Shift Keying (BPSK).

**Optical Communication:** Introduction of Optical Fiber, Block Diagram of optical communication system.

#### **Unit-4**

**Introduction to Communication and Navigation systems:**

**Satellite Communication–** Introduction, need, Geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Satellite visibility,

transponders (C - Band), path loss, ground station, simplified block diagram of earth station. Uplink and downlink.

## **Unit-5**

**Mobile Telephony System** – Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, simplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only). GPS navigation system (qualitative idea only)

### **Reference Books:**

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
  2. Advanced Electronics Communication Systems- Tomasi, 6<sup>th</sup> edition, Prentice Hall.
  3. Modern Digital and Analog Communication Systems, B.P. Lathi, 4<sup>th</sup> Edition, 2011, Oxford University Press.
  4. Electronic Communication systems, G. Kennedy, 3<sup>rd</sup> Edn., 1999, Tata McGraw Hill.
  5. Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill
  6. Communication Systems, S. Haykin, 2006, Wiley India
  7. Electronic Communication system, Blake, Cengage, 5<sup>th</sup> edition.
  8. Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press
-

**Paper II**  
**ELB 202 :MICROPROCESSOR ANDMICROCONTROLLER**

**Theory:**

**Max. Marks :50**

### **Unit-1**

**Microcomputer Organization:** Input/Output Devices. Data storage (idea of RAM andROM). Computer memory. Memory organization & addressing. Memory Interfacing. Memory Map.  
**8085 Microprocessor Architecture:** Main features of 8085. Block diagram. Pin-outdiagram of 8085. Data and address buses. Registers. ALU. Stack memory. Program counter.

### **Unit-2**

**8085 Programming :**Instruction classification, Instructions set (Data transfer includingstacks. Arithmetic, logical, branch, and control instructions). Subroutines, delay loops. Timing & Control circuitry. Timing states. Instruction cycle, Timing diagram of MOV and MVI. Hardware and software interrupts.

### **Unit-3**

**8051 microcontroller:** Introduction and block diagram of 8051 microcontroller,architecture of 8051, overview of 8051 family, 8051 assembly language programming, Program Counter and ROM memory map, Data types and directives, Flag bits and Program Status Word (PSW) register, Jump, loop and call instructions.

### **Unit 4**

**8051 I/O port programming:** Introduction of I/O port programming, pin out diagram of8051 microcontroller, I/O port pins description & their functions, I/O port programming in 8051 (using assembly language), I/O programming: Bit manipulation.

**8051 Programming:** 8051 addressing modes and accessing memory locations usingvarious addressing modes, assembly language instructions using each addressing mode, arithmetic and logic instructions,

### **Unit 5**

8051 programming in C: for time delay & I/O operations and manipulation, for arithmetic and logic operations, for ASCII and BCD conversions.

**Introduction to embedded system:** Embedded systems and general purpose computersystems. Architecture of embedded system. Classifications, applications and purpose of embedded systems.

**Reference Books:**

1. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
  2. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
  3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2<sup>nd</sup> Ed., 2007, Pearson Education India.
  4. Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford University Press
  5. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
  6. Embedded Systems: Design & applications, S.F. Barrett, 2008, Pearson Education India
  7. Introduction to embedded system, K.V. Shibu, 1<sup>st</sup> edition, 2009, McGraw Hill
  8. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning
-

## ELECTRONICS LABORATORY

*The scheme of practical examination will be as follows-*

<b>Experiment</b>	<b>--</b>	<b>30</b>
<b>Viva</b>	<b>--</b>	<b>10</b>
<b>Sessional</b>	<b>--</b>	<b>10</b>
<b>Total</b>	<b>--</b>	<b>50</b>

### **ELB 203P: COMMUNICATIONELECTRONICS LAB (Hardware and Circuit Simulation Software) 60 Lectures Max.Marks:25**

1. To design an Amplitude Modulator using Transistor
2. To study envelope detector for demodulation of AM signal
3. To study FM - Generator and Detector circuit
4. To study AM Transmitter and Receiver
5. To study FM Transmitter and Receiver
6. To study Time Division Multiplexing (TDM)
7. To study Pulse Amplitude Modulation (PAM)
8. To study Pulse Width Modulation (PWM)
9. To study Pulse Position Modulation (PPM)
10. To study ASK, PSK and FSK modulators

#### **Reference Books:**

1. Electronic Communication systems, G. Kennedy, 1999, Tata McGraw Hill.
2. Electronic Communication system, Blake, Cengage, 5th edition.

# **ELB 204P: MICROPROCESSOR AND MICROCONTROLLER**

## **LAB(Hardware and Circuit Simulation Software)**

**Max.Marks:25**

**At least 06 experiments each from Section-A and Section-B**

### ***Section-A: Programs using 8085 Microprocessor***

1. Addition and subtraction of numbers using direct addressing mode
2. Addition and subtraction of numbers using indirect addressing mode
3. Multiplication by repeated addition.
4. Division by repeated subtraction.
5. Handling of 16-bit Numbers.
6. Use of CALL and RETURN Instruction.
7. Block data handling.
8. Other programs (e.g. Parity Check, using interrupts, etc.).

### ***Section-B: Experiments using 8051 microcontroller:***

1. To find that the given numbers is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's .
5. Program to glow the first four LEDs then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left
7. Program to run a countdown from 9-0 in the seven segment LED display.
8. To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
9. To toggle '1234' as '1324' in the seven segment LED display.
10. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clockwise direction.
11. Application of embedded systems: Temperature measurement & display on LCD

### **Reference Books:**

1. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
2. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2<sup>nd</sup> Ed., 2007, Pearson Education India.
4. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
5. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning