



Estd. 1962

NAAC 'A' Grade

**Faculty of Science and Technology**

Syllabus For

**B. Sc. Electronics**

**Part – II (Sem III & IV)**

(To be implemented from June 2019 onwards)

(Subject to the modifications that will be made from time to time)

**B. Sc. Electronics**  
**(CBCS June 2018 onwards)**  
**Programme Outcomes**

- To provide opportunities to the students to acquire sound knowledge of Electronics science and technology.
  
- To provide opportunity to students to learn the latest trends in Electronics.
  
- To provide opportunities to the students become researchers and developers to satisfy the needs of the core Electronics Industry.
  
- To provide opportunities to the students to formulate, analyze and solve real life problems faced in Electronics Industry.

**B. Sc. Part – II Electronics**  
**(CBCS June 2019 onwards)**  
**Course Outcomes**

**Semester – III Paper – V (Communication Electronics)**

**Course Outcomes:**

After studying this course the students are able to –

- Understand functioning of basic communication systems.
- Understand analog modulation & demodulation techniques.
- Understand satellite communication & navigation systems.

**Semester – III Paper – VI**

**(Introduction to microprocessor 8085 and Microcontroller 8051)**

**Course Outcomes:**

After studying this course the students are able to –

- Understand microcomputer organization and architecture of  $\mu$ P 8085.
- Understand instruction set and programming of  $\mu$ P 8085.
- Understand 8051 family and architecture of  $\mu$ C 8051.

**B. Sc. Part – II Electronics**  
**(CBCS June 2019 onwards)**  
**Course Outcomes**

**Semester – IV Paper – VII**

**(Digital modulation and mobile telephone systems)**

**Course Outcomes:**

After studying this course the students are able to –

- Understand analog pulse modulation techniques viz. PAM, PWM & PPM.
- Understand digital pulse modulation techniques viz. ASK, FSK PSK & BPSK.
- Understand mobile telephone system and networks Viz GSM, CDMA, TDMA & FDMA.

**Semester – IV Paper – VIII**

**(Microcontroller and Embedded Systems)**

**Course Outcomes:**

After studying this course the students are able to –

- Understand addressing modes and instruction sets of  $\mu\text{C}$  8051.
- Understand facilities in  $\mu\text{C}$  8051 viz. timer, time delay calculations in different modes and serial communications.
- Understand programming of  $\mu\text{C}$  8051 and real world interfacing.
  - Introduction to embedded system and programming in C.

# B.Sc. - II Electronics

Choice Based Credit System (2019-20)

Semester- III Paper- V

**DSC- C9: Communication Electronics**

Credits: 02 (Marks -50)

Teaching Scheme: 3 Lectures/ week

Hours: 36 (45 Lectures of 48 minutes)

Unit	Contents	Hours Allotted
1	<b>Electronic Communication:</b> Introduction to communication- means and modes, 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.	08
2	<b>Amplitude Modulation-Demodulation:</b> Need for modulation, Amplitude Modulation (AM), mathematical expression, modulation index & frequency spectrum. Generation of AM (using Transistor), DSB generation using FET. SSB generation by phase shift method. Amplitude Demodulation (diode detector). Block diagram and working of AM Super heterodyne radio receiver	10
3	<b>Angle Modulation-Demodulation:</b> 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), Block diagram and working of FM Super heterodyne radio receiver.	10
4	<b>Introduction to Communication and Navigation System:</b> <b>Satellite communication</b> Introduction, Need, Geosynchronous satellite orbits, geostationary satellite, advantages of geostationary satellite. Satellite visibility, transponders (C- Band), path loss, ground station, simplified block diagram of earth station. Uplink and down link.	08

## Reference Books:

- Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
- Advanced Electronics Communication Systems- Tomasi, 6<sup>th</sup> edition, Prentice Hall.
- Electronic Communication systems, G. Kennedy, 3<sup>rd</sup> Edn., 1999, Tata McGraw Hill.
- Principles of Electronic communication systems – Frenzel, 3<sup>rd</sup> edition, McGraw Hill
- Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press

### Choice Based Credit System

B.Sc. - II (2019-20)

Semester- III Paper- VI

### DSC -C10: Introduction to Microprocessor 8085 and Microcontroller 8051

Credits: 02(Marks -50)

Teaching Scheme: 3 Lectures/ week

Hours: 36 (45 Lectures of 48 minutes)

Unit	Contents	Hours Allotted
1	<b>Microcomputer Organization:</b> Basic components of microcomputer(CPU,Program memory,Data memory,input and output ports, idea of RAM (SDRAM,DRAM) Types of ROM Memory organization & addressing. Memory Interfacing.Memory Map.	08
2	<b>8085 Microprocessor Architecture:</b> Main features of 8085. Block diagram and Pin-out diagram of 8085. Data and address buses. Registers, ALU, Stack memory, Program counter,Flag register.	10
3	<b>8085 Programming:</b> Instruction classification,Addressing modes of Instructions, Instruction set (Data transfer including stacks. Arithmetic, logical, branch, and control instructions). Subroutines, delay loops Programs for:Addition,Substraction,Multiplication,Division,Block transfer.	10
4	<b>8051Microcontroller:</b> Diffrence between microprocessor and microcontroller, overview of 8051 family, Pin diagram diagram of 8051 microcontroller, architecture of 8051, RAM structure of 8051,SFR'S in 8051.,PSW rgister, ROM Memory.	08

#### Reference Books:

- Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
- Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
- 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.
- Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford University Press

**Choice Based Credit System**  
 B.Sc. - II (2019-20)  
 Semester- IV Paper- VII  
**DSC -D9: Digital Modulation and Mobile telephone system**  
 Credits: 02(Marks -50)

Teaching Scheme: 3 Lectures/ week

Hours: 36 (45 Lectures of 48 minutes)

Unit	Contents	Hours Allotted
<b>1</b>	<b>Analog Pulse Modulation:</b> Channel capacity, Sampling theorem, Basic Principles-PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing techniques: FDM & TDM only	<b>08</b>
<b>2</b>	<b>Digital Pulse Modulation:</b> 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).	<b>10</b>
<b>3</b>	<b>Mobile Telephony System</b> – 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, simplified block diagram of mobile phone handset. Concepts of GSM.	<b>10</b>
<b>4</b>	<b>Multiple Access Techniques &amp; Wireless Communication:</b> Concepts of SDMA, CDMA, TDMA and FDMA technologies, 2G, 3G and 4G, Bluetooth, Wi-Fi, RFID & GPS navigation system concepts only (qualitative idea only)	<b>08</b>

**Reference Books:**

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

**Choice Based Credit System**  
 B.Sc. - II (2019-20)  
 Semester- IV Paper- VIII  
**DSC -D10: 8051 Microcontroller and Embedded System**  
 Credits: 02(Marks -50)

Teaching Scheme: 3 Lectures/ week

Hours: 36 (45 Lectures of 48 minutes)

Unit	Contents	Hours Allotted
1	<b>8051 Microcontroller:</b> Addressing modes of 8051 instructions, Instruction set of 8051: data transfer, arithmetic, Logical, Jump, call, Single bit instructions ,	08
2	<b>Facilities in 8051:</b> Timers in 8051,Registers involved in 8051 timers, Time delay calculations in mode1 and mode 2,Serial communication Facility( Registers, Baud rate, RS-232 standards )	10
3	<b>8051 programming:</b> Assembly language programming: generate square wave on port pin, Interfacing of LED and Switch, LCD display, Stepper motor, Program to transmitt and receive data using serial communication.	10
4	<b>Introduction to Embedded Systems:</b> Architecture of embedded system, Data types, Control flow Statements (IF, IF-ELSE, WHILE, DO-WHILE and FOR) in embedded C, <b>8051-Programming in C:</b> for time delay & I/O operations and manipulation, for arithmetic and logic operations, for ASCII and BCD conversions.	08

**Reference Books:**

- Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
- 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.
- Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford University Press
- 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
- Embedded Systems: Design & applications, S.F. Barrett, 2008, Pearson Education India
- Introduction to embedded system, K.V. Shibu, 1<sup>st</sup> edition, 2009, McGraw Hill
- Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning
- Let us C, Yashwant Kanetkar
- Programming in ANSI C, Balguruswami



## **ELECTRONICS LAB B.Sc. II Semester – III**

**Credits: 02 Hours: 30**

### **Group A Experiments to be performed using hardware/ software (minimum 08).**

1. To study Amplitude Modulator using Transistor/ Op-amp
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 modulator
- 11 To study PSK modulator
- 12 To study FSK modulator

### **Group B Programs using 8085 Microprocessor (minimum 06)**

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.).

## **ELECTRONICS LAB B.Sc. II Semester – IV**

**Credits: 02 Hours: 30**

### **Group C: Experiments using 8051 microcontroller (minimum 06):**

- 1 To find that the given numbers is prime or not.( Using Simulator)
2. To find the factorial of a number.(Using Simulator)
3. Study of timers of 8051 in mode 1 and mode 2.
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.(Using Simulator)
7. Program to run a countdown from 9 to 0 in the seven segment display.
8. To interface seven segment /LCD display with 8051 microcontroller and display 'HELP' in the seven segment/LCD display.
9. To toggle '1234' as '4321' in the seven segment/LCD 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.

### **Group D: (Skill Enhancement Course)**

#### ***Skill Enhancement Experiments (minimum 06):***

1. Designing of PCB using Software
2. Development of PCB
3. Soldering techniques: Assemble electronic circuit
4. Temperature Controller using IC 741
5. Designing of Variable Power Supply using LM 317
6. Build Regulated Power Supply using IC 7805
7. Build Dual Power Supply using IC 7809 and IC 7909
8. Assemble Electric Board with switches, sockets and MCB and measure Voltage, Current and Power for given device
9. Study and fault finding of: Fan /Iron/ Mixer/Cell phone Charger
10. Build Lighting system using LED, Solar Panel and Chargeable Battery

#### **Distribution of Marks for Practical Exam (LAB)**

<b>Group</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>Journal</b>	<b>Industrial visit</b>	<b>Seminar/ Project</b>	<b>Total</b>
<b>Marks</b>	20	20	20	20	08	04	08	<b>100</b>