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 2023 onwards)

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

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

➢ Foster the acquisition of comprehensive knowledge in Electronics science and technology among students.

➢ Facilitate students in staying updated with the latest trends and developments in the field of Electronics.

➢ Create opportunities for students to pursue careers as researchers and developers, fulfilling the specific demands of the electronics industry.

➢ Enable students to effectively formulate, analyze, and solve real-life problems encountered in the electronics industry.

B. Sc. Part – II Electronics
(CBCS June 2023 onwards)
Course Outcomes
Semester – III Paper – V
(Electronic Communication Systems)

Course Outcomes:

After studying this course, the students are able to

- Students will develop a thorough understanding of the concepts, elements, and workings of electronic communication systems, including modulation, demodulation, transmission, and reception.

- Knowledge of Signal Analysis and Processing: Students will gain knowledge of methods used in communication systems for signal analysis and processing, such as Fourier analysis, filtering, and noise reduction.

- Knowledge of Modulation Techniques: Students will learn about various modulation methods, including amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM), and comprehend the uses and benefits of each.

Semester – III Paper – VI

(Introduction to Microprocessor 8085)

Course Outcomes:

After studying this course, the students are able to –

- Understanding of Microprocessor Architecture: Students will gain a thorough understanding of the 8085 microprocessor's architecture, including all of its many functional units and links between them.

- Knowledge of Instruction Set: Students will gain knowledge of the 8085 microprocessor's instruction set, which will enable them to comprehend and develop assembly language programmes for fundamental operations.

- Programming Skills: Using the 8085 microprocessors, students will learn to develop effective and optimised assembly language programmes for a variety of applications.

B. Sc. Part – II Electronics
(CBCS June 2023 onwards)
Course Outcomes
Semester – IV Paper – VII
(Digital Modulation technique and Mobile telephone systems)

Course Outcomes:

After studying this course the students are able to –

- Students will get a thorough grasp of digital modulation techniques, such as amplitude shift keying (ASK), frequency shift keying (FSK), and phase shift keying (PSK), as well as how they are used in mobile phone networks.

- Students will learn about the principles, architecture, and operation of the Global Positioning System (GPS), as well as the satellite constellation, signal acquisition, tracking, and location determination algorithms.

- Application of Digital Modulation in Mobile Communication: Students will comprehend the use of digital modulation techniques in wireless internet access, multimedia messaging, voice and data transmission, and other aspects of mobile phone systems.

Semester – IV Paper – VIII

(Microcontroller and Embedded Systems)

Course Outcomes:

- Understanding of Microcontroller Architecture: Students will gain a thorough understanding of the registers, memory organization, and numerous functional blocks that make up the 8051 microcontroller's architecture and internal structure.

- Writing effective and optimized assembly language programmes for the 8051 microcontroller, displaying their comprehension of the instruction set, addressing modes, and control flow, will become a skill for students in programming.

- Interfacing and Peripheral Integration: Students will learn how to integrate peripherals such as sensors, actuators, displays, and communication modules into embedded systems by interfacing the 8051 microcontroller with a variety of external devices and peripherals.

Choice Based Credit System
B.Sc. - II (2013-24)
Semester- III Paper- V
DSC 9C: Electronic Communication systems
Credits: 02 (Marks -50) Hours: 30 (37.5 Lectures of 48 minutes)

Unit	Contents	Hours Allotted
1	**Electronic Communication**: 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. Concept of antenna and its working principal.	**08**
2	**Analog Modulation-Demodulation:** Need for modulation, Amplitude Modulation (AM) modulation index and frequency spectrum. Generation of AM (using Transistor), Concept of DSB & SSB and generation. Amplitude Demodulation (diode detector).	**10**
3	**Frequency Modulation:** 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) and Block diagram and working of FM Super heterodyne radio receiver..	**10**
4.	**Introduction to Communication and Navigation System:** **Satellite communication** 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 frequency.	**10**

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

Choice Based Credit System
B.Sc. - II (2023-24)
Semester- III Paper- VI
DSC 9D: Introduction to Microprocessor 8085
Credits: 02(Marks -50) Hours: 30 (37.5 Lectures of 48 minutes)

Unit	Contents	Hours Allotted
1	**Microcomputer Organization**: Basic componants 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.	06
2	**8085 Microprocessor Architecture:** Main features of 8085. Block diagram and Pin-out diagram of 8085. Data and address buses. Registers, ALU, Stack memory, Program counter,Flag registers	08
3	**Instruction set of 8085:** Instruction classification,Addressing modes of Instructions, Instruction set (Data transfer including stacks. Arithmetic, logical, branch, and control instructions). Subroutines, delay loops Instruction cycle in 8085 with example MVI instruction, concept of machine cycle and T-states	08
4	**8085 Programming :** Programs for:Addition,Substraction,Multiplication,Division,Block transfer. Subroutines, delay loops using single register and register pair. Program for 1's and 2's complement, masking of higher and lower nibbles.	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
• Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford University Press

Choice Based Credit System
B.Sc. - II (2023-24)
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
1	**Analog Pulse Modulation**: Channel capacity, Sampling theorem, Basic Principles-PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing techniques: FDM & TDM only	**08**
2	**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).	**10**
3	**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, simplified block diagram of mobile phone handset. Concepts of GSM.	**10**
4	**Multiple Access Techniques & Wireless Communication:** Concepts of SDMA, CDMA, TDMA and FDMA technologies, 2G, 3G and 4G, Bluetooth, Wi-Fi, RFID & GPS navigation system concepts only (qualitative idea only)	**08**

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

Choice Based Credit System
B.Sc. - II (2023-24)
Semester- IV Paper- VIII
DSC 10D: 8051 Microcontroller and Embedded System

Credits: 02(Marks -50) Hours: 30 (37.5 Lectures of 48 minutes)

Unit	Contents	Hours Allotted
1	**Introduction to 8051Microcontroller:** Architecture of embedded system, Difference between microprocessor and microcontroller, overview of MCS51 family (89C51, 89C52, 89C2051, 8751, DS5000), Pin diagram of 8051 microcontroller, architecture of 8051, RAM structure of 8051, SFR'S in 8051., PSW register, ROM Memory.	08
2	**Instruction Set of 8051 Microcontroller:** Addressing modes of 8051 instructions, Instruction set of 8051: data transfer, arithmetic, Logical, Jump, call, Single bit instructions,	08
3	**Facilities in 8051:** Timers in 8051, Registers involved in 8051 timers, Time delay calculations in mode1 and mode 2, Sources of interrupts in 8051, Registers involved in 8051 interrupts, External interrupts programming, interrupts priority.	08
4	**8051 Programming:** Assembly language programming: generate square wave on port pin, Interfacing of LED and Switch, Relay, Stepper motor, seven segment display (to display message "HELP")	06

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, 2nd Ed., 2007, Pearson Education India.
- Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford Universty

ELECTRONICS LAB
B.Sc. II
Semester – III
Credits: 02 Hours: 30
Group A

AT LEAST 03 AND 05 EXPERIMENTS RESPECTIVELY FROM FOLLOWING USING HARDWARE AND SIMULATIONS (minimum 08).

1. To design an 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. (Block transfer or Block exchange)

8. 1' complement and 2's complement of 8-bit number

9. finding odd and even number

10.program to find the sum of series numbers.

Group C

Experiments using 8051 microcontroller (minimum 06):

1To 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 (8bit) on LED's.

5.Program to glow the first four LEDs the 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 acount down from 9 to 0 in the seven-segment display.

8.To interface seven segment display with 8051 microcontroller and display 'HELP' in the seven segment display.

9. To toggle '1234' as '4321' in the seven segment 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.

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

11. LED flasher using IC-555.

Marks Distribution of Practical (LAB):

Group	A	B	C	D	Journal	Industrial visit	Seminar	Project like Experiment	Total
Marks	20	20	20	20	08	04	04	04	**100**