Dharmanand Shikshan Sanstha's

LAL BAHADUR SHASTRI MAHAVIDHYALAYA, DHARMABAD

PROFORMA FOR PROGRAM AND COURSE OUT COME (2.6.1) (AY -2022-23)

Name of the Teacher : A. G. Chawhan

Department : Electronics

Program : B Sc Class: I Year, Semester-I Subject: Electronics

Course Code : CCEI-A Paper No. I

Paper Title : Basic Electronics and Network Analysis

Unit Number	**Unit Name**	**Topics**	**Unit wise outcome**
1	**Basic Circuit Analysis**	Ohm's law, KCL, KVL, Sign convention of IR drops and EMF's, Series circuits-proportional voltage formula, voltage divider, open & shorts in series circuits, Parallel Circuits- proportional current formula, , open & shorts in parallel Circuits	1. List of three forms of Ohm's law, Use Ohm's law to calculate V,I & R in a circuit, 2. Apply -proportional voltage formula, voltage divider and proportional current formula in series & parallel circuit. 3. Describe the effect of Open & short in series & parallel circuit
2	**Network Theorems**	Ideal constant voltage & current source, Super position theorem Thevenin's theorem, Norton theorem, Maximum power transfer theorem	1.Apply superposition theorem to find out voltage across two points in a circuit containing more than one voltage source 2. Determine the Thevenin's & Norton's equivalent circuits w.r.t. any pair of terminals in a complex circuit.

			3. Apply Thevenin's & Norton's theorems in solving for an unknown voltage or current. 4. Apply Maximum power transfer theorem to deliver max. power to communication network.
3.	**Phasor Algebra**	Symbolic notation, significance of operator j Conjugate complex number, Various forms of vector representation, Arithmetic operation of vectors, Powers and roots of vector quantity	1.Explain the operator j 2. Define a complex number & explain the difference between the rectangular & polar forms of complex number, 3. Add, subtract, multiply & divide complex number 4. Convert complex number from rectangular to polar, rectangular to exponential and vice versa 5. Explain how to use complex numbers to solve series & parallel AC circuits containing R,L & C
4.	**AC fundamentals**	Types of AC waveforms, Cycle, time period, frequency, amplitude Amplitude of AC voltage/current Characteristics of AC wave, Different values of sinusoidal voltage/current, Phase of AC & phase difference, Vector representation of an AC quantity,	1. Define the term Resonance & list the characteristics of series & parallel resonant circuit. 2. Explain how the Resonant frequency formula is derived. Calculate the Q factor of series & parallel resonant circuit,

		R-L circuit, R-C circuit, R-L-C series circuit, Resonance in series R-L-C circuit, Resonance curve, Bandwidth & Q factor of series R-L-C circuit, Parallel resonance- Resonance curve, Q factor, Bandwidth & Q factor of parallel resonant circuit Transformer and its working	3. Explain the concept of bandwidth of resonant circuit & calculate the bandwidth of series & parallel resonant circuit.

Specify Course Outcome: After completion of this course students will be able to

1. Apply KCL & KVL to given circuits, determine the polarity of IR drop across the resistor to know the characteristics of series & parallel resistive circuit
2. Apply network theorems to simplify the given network.
3. Apply various forms of vector representation of AC quantity
4. Distinguish between AC and DC sources, relate various characteristics of sinusoidal voltages and understand the use of resonant circuits

Name of the Teacher: **Dr Y. S. Joshi**

Department: **Electronics**

Program: B.Sc. Class: First Year Sem I Subject: Electronics

Course Code: CCE-I B Paper no. II

Paper Title: Basic Digital Electronics

Unit Number	Unit Name	Topics	Unit-wise Outcomes
I	**Number Systems and Codes**	Decimal, Binary Octal and Hexadecimal number systems, inter conversions of number systems, Binary arithmetic (addition, subtraction, multiplication, division), 1's compliment, 2's compliment, binary subtraction using 1's and 2's compliments, Codes: BCD, Gray code, Conversion of BCD to Binary, Binary to Gray code and vice versa, ASCII code.	1. Understood the meaning of analogue & digital signals 2. Inter conversions of number systems
II	**Logic Gates**	Positive logic, Negative logic, Definition, symbol and truth table of NOT, OR, AND, NOR, EX-OR, EX-NOR gates. De-Morgan's theorem, Universal properties of NAND and NOR gates, bubbled OR gate, bubbled AND gate, gate propagation delay time, power dissipation.	Knowledge of various logic gates and Able to draw logic circuit for a given Boolean expression.
III	**Boolean Algebra and K-Map**	Boolean operations, logic expressions, rules and laws of Boolean algebra, Simplification of Boolean expression, SOP & POS form of Boolean expressions for logic network minterms, maxterms, Simplification of Boolean expression using K-map up to 4 variables for SOP.	Able to analyse, transform, minimize Boolean expression & implement it. .
IV	**Arithmetic Circuits**	Half Adder, full adder, realization of half and full adder using gates, parallel binary adder, half and full subtractor.	Knowledge to design various arithmetic circuits.

Specify Course outcome: After completion of this course students will be -

1. able to distinguish between analogue & digital signal/data.
2. able to draw logic circuit for a given Boolean expression.
3. able to analyse, transform, minimize Boolean expression & implement it.

Signature of Teacher

Name of the Teacher : A G Chawhan

Department : Physics

Program : B Sc Class: I Year, Semester- II Subject: Electronics

Course Code : CCEII-A Paper No. III

Paper Title : Semiconductor Devices and Electronic Instruments

Unit Number	**Unit Name**	**Topics**	**Unit wise outcome**
1	**Semiconductor Diodes**	Construction, working & V-I characteristics of PN junction diode Effect of temperature on Barrier potential. LED , Zener diode, Photo diode & Varactor diode	Explain the basic construction of a diode, draw the schematic symbol of diode & identify anode & cathode, describe how to forward & reverse bias a diode List the Construction, working & V-I characteristics of LED, Zener diode, Photo diode & Varactor diode
2	**Transistors**	Construction & working of NPN & PNP transistor, F-F,R-R & F-R biasing, α_{dc} & β_{dc} of transistor & their relationship, CE transistor characteristics: Collector & base curves Construction, working & V-I characteristics of UJT, FET and MOSFET	List the three doped regions of transistor and explain the roe of each doped regions of transistor, identify the schematic symbol of npn & pnp transistor Define α_{dc} & β_{dc} of transistor & relationship between them Describe the construction of JFET, explain hoe an input voltage controls the output current in JFET working & V-I characteristics of FET

3.	**Rectifiers & Voltage Regulators**	Block diagram of power supply, Half, full & Bridge rectifier, shunt capacitor filter Load & Line regulation, Zener shunt regulator	Explain the working of power supply. Theoretical & Mathematical explanation of HWR, FWR & Bridge rectifier. Working of shunt capacitor filter, Explain the concept of Load & Line regulation, How does Zener shunt regulator work.
4.	**Multimeter &CRO**	Multimeter: applications of multimeter, sensitivity of Galvanometer, Conversion of Galvanometer into voltmeter & ammeter CRO: CRT, deflection sensitivity of CRT, Applying signal across vertical plates, display signal waveforms on CRO, Signal pattern on screen, various controls of CRO, Applications of CRO	Explain the construction & working of moving coil meter. Calculate the value of shunt & series resistance required to extend the current & voltage range of a basic moving coil meter Explain the construction & working of CRT Working of various controls of CRO Measurement of Amplitude, Frequency & phase of alternating waveform.

Specify Course Outcome: After completion of this course students will be able to

1. Understand the V-I characteristics of various semiconductor diodes

2. Understand input & output characteristics of transistors.

3. Distinguish between the unregulated & regulated power supply

4. Use of multimeter & CRO

Signature of Teacher

Name of the Teacher: **Dr Y. S. Joshi**

Department: **Electronics**

Program: B.Sc. Class: First Year Sem II Subject: Electronics

Course Code: CCEII-B (Paper-IV)

Paper Title: Digital Logic Circuits

Unit Number	Unit Name	Topics	Unit-wise Outcomes
I	Data Processing Circuits	Introduction to multiplexers, designing of 2:1 MUX, 4:1 MUX, and 8:1 MUX, introduction to demultiplexers, designing of 2:1 DMUX, 4:1 DMUX, and 8:1 DMUX, Encoders: decimal to BCD encoder, priority encoder, Decoders: BCD to decimal decoder, BCD to seven segment decoder.	Able to present the use of data processing circuits like mux, demux, encoders and decoders.
II	Flip- Flops	1-bit memory cell, S-R flip-flop, clocked S-R flip-flop, preset and clear facility in flip–flop, J–K flipflop, race around condition, master-slave JK Flip Flop, D-type and T-type flip flop.	1. Knowledge of various flip-flops. 2.Able to distinguish between JK Flipflop & JKMS Flipflop; between T Flipflop & D Flipflop.
III	Sequential logic circuit	Concept of counters, types of counters, modulo of counter, 2-bit, 3-bit and 4-bit asynchronous counters, 2-bit, 3-bit and 4-bit synchronous counters, mod-5counter, decade counter using IC 7490, ring counter, shift registers: SISO, SIPO, PISO, PIPO.	Acquire the skill of using FFs for given application such as register, counter etc.
IV	Data Converters	D to A converters: R-2R Ladder DAC, characteristics of DAC, resolution, linearity, accuracy, settling time. A to D converters: parallel comparator ADC, successive approximation ADC, Characteristics of ADC: resolution, conversion time, quantization error.	Able to understand the uses of ADC & DAC.

Course Outcome: After completion of this course students will be -

1. able to distinguish between JK Flipflop & JKMS Flipflop, T Flipflop & D Flipflop.
2. acquire the skill of using FFs for given application such as register, counter etc.
3. able to present the use of MUX, DMUX.
4. able to understand the uses of ADC & DAC.

Signature of Teacher

Name of the Teacher: **Dr. K S Kanse**

Department: **Electronics**

Program: B.Sc. Class: Second Year Sem III Subject: Electronics

Course Code: CCE-III (Section A) Paper No. VI

Paper Title: Amplifiers

Unit Number	Unit Name	Topics	Unit-wise Outcomes
I	Transistor Biasing	DC load line, Q-point and maximum undistorted output, factors affecting bias variations, stability factor, stability factor for CB and CE circuits, base bias with emitter feedback, base bias with collector feedback, voltage divider bias.	Knowledge of transistor biasing.
II	Signal Amplifiers	h-parameters, an equivalent circuit for BJT transconductance model, analysis of CE-amplifier, CB-amplifier, and CC-amplifier using h-parameters.	Analysis of small signal amplifier using h-parameters and designing of CE amplifier.
III	Operational Amplifier	Theory of differential amplifier, CMRR, constant current replacement for RE, block diagram of Op-Amp, characteristics of an ideal Op-Amp, concept of virtual ground, input offset voltage, input offset current, input bias current, input and output impedances of Op-Amp, slew rate, Op-Amp inverting amplifier, Op-Amp non-inverting amplifier	Concept of an ideal amplifier, knowledge of IC 741.
IV	Applications of Op-Amp	Op-Amp as an adder, Op-Amp as subtractor, Op-Amp as differentiator, Op-Amp as an integrator, Op-Amp as comparator, Op-Amp as Schmitt's trigger, solving of differential equations using Op-Amp, voltage to current converter with floating load, current to voltage converter.	Knowledge of various applications of IC 741

Course Outcome:

1. Knowledge of transistor biasing.
2. Analysis of small signal amplifier using h-parameters and designing of CE amplifier.
3. Concept of an ideal amplifier, knowledge of IC 741 and its applications.

Signature of teacher

Dr K S Kanse

Name of the Teacher: **Dr Y. S. Joshi**

Department: **Electronics**

Program: B.Sc. Class: Second Year Sem III Subject: Electronics

Course Code: CCE-III (Section B) Paper No. VII

Paper Title: Fundamentals of Microprocessor

Unit Number	Unit Name	Topics	Unit-wise Outcomes
I	Architecture of 8085 Microprocessor	Block diagram of microprocessor based system, features of Intel 8085, block diagram of Intel 8085, function of each block, functional pin diagram of Intel 8085 and pin description, demultiplexing of AD0–AD7 bus using latch IC 74LS373.	Knowledge of the microprocessor based systems.
II	Instruction Set of 8085	Instruction cycle, machine cycle, T state, instruction format (1, 2, 3 byte), addressing modes, classification of instructions, instruction set of 8085.	Knowledge of Instruction set of 8085 and ALP skills.
III	Programming of 8085	Simple Assembly Language Programs (addition, subtraction, 1's complement, 2's complement, smaller no. and larger no., sum of series, block transfer), delay, delay subroutine using one register and register pair.	Apply the knowledge of instructions of Assembly Language Programming skills. .
IV	IC 8255 and Its applications	Block diagram of IC 8255, Functional pin diagram of IC 8255, Operating modes of 8255, control word pattern of 8255 and its application for interfacing LED and switch.	Working and applications of ICs Intel 8255

Course Outcome:

1. Knowledge of microprocessor based systems.
2. Knowledge of Instruction set of 8085 and Assembly Language Programming skill.
3. Knowledge of interfacing chip IC 8255 and its application to interface I/O Devices.

Signature of Teacher

Dr Y. S. Joshi

Name of the Teacher: **Dr. K S Kanse**

Department: **Electronics**

Program: B.Sc. Class: Second Year Sem IV Subject: Electronics

Course Code: CCE-IV (Section A) Paper No. VIII

Paper Title: Oscillators and Multivibrators

Unit Number	Unit Name	Topics	Unit-wise Outcomes
I	Feedback Principles	Concept of positive and negative feedback, advantages and disadvantages of negative feedback, gain stability, increased bandwidth, decreased distortion, decreased noise.	Will be able to understand the feedback in electronics.
II	Sinusoidal Oscillators	Requirements of an oscillator, Barkhausen criterion, Hartley oscillator, Colpitt's oscillator, R-C oscillators: phase-shift oscillator, Wien bridge oscillator, (circuit diagram, working condition for oscillations and expression for frequency for each oscillator)	Will be able to understand working principle of various oscillators.
III	Multivibrators	Transistor as a switch, transistorisedastable multivibrator, transistorized monostable multivibrator, transistorized bistable multivibrator, transistorized Schmitt's trigger, block diagram of IC 555, IC 555 as monostable multivibrator.	Will be able to understand working principal of multivibrators.
IV	Time Base Circuits	Introduction, types of time base circuits, methods of generating time base waveforms, exponential sweep circuit, sweep circuit using transistor switch, sweep circuit using UJT, transistor constant current sweep, Miller sweep circuit, bootstrap sweep circuit.	Will be able to understand working of various time base circuits

Course Outcome:

1. Understanding of positive and negative feedback.
2. Knowledge of working of an oscillator.
3. Working principle of multivibrators and applications of IC 555
4. Knowledge of various time base circuits.

Signature of teacher

Dr. K S Kanse

Name of the Teacher: **Dr Y. S. Joshi**

Department: **Electronics**

Program: B.Sc. Class: Second Year Sem IV Subject: Electronics

Course Code: CCE-IV (Section B) Paper No. IX

Paper Title: Introduction to Microcontroller

Unit Number	Unit Name	Topics	Unit-wise Outcomes
I	Microcontroller Intel 8051	Block diagram of microcontroller, comparison between microprocessor and microcontroller, pin diagram, features of 8051, functional pin diagram, pin description, architectural block diagram of 8051, function of each block, structure of internal RAM	Knowledge of the internal architecture of 8051 and function of each block.
II	Instruction Set of Microcontroller Intel 8051	Classification of instructions, syntax of instructions, addressing modes, function and execution of every instruction.	Knowledge of Instruction set of 8051
III	8051 Assembly Language Programming	Programmes for addition, subtraction, multiplication, division, OR, AND, XOR operations, 1's complement, 2's complement, sum of series, binary to gray conversion, gray to binary conversion, larger of two numbers, smaller of two numbers and transfer of data block.	Apply the Knowledge of instruction set to learn Assembly Language Programming skills of 8051. .
IV	SFRs, Timers and Interrupts of 8051	Special function registers (list, structure and uses), timers, programming of timers/counters in various modes, interrupts, priority structure of interrupts.	Knowledge of SFRs, Timers and Interrupts of 8051

Course Outcome:

1. Knowledge of internal architecture of 8051 and function of each block.
2. Instruction set of 8051 and ALP skills.
3. Knowledge of SFRs, Timers and Interrupts of 8051.

Signature of Teacher

Dr Y. S. Joshi

Name of the Teacher : A G Chawhan

Department : Electronics

Program : B Sc Class: III Year, Semester-V Subject: Electronics

Course Code : DECE-I

Paper Title : Communication Electronics –I (P-XII)

Unit Number	Unit Name	Topics	Unit wise outcome
1	Basic of Communication System	Introduction, Block diagram of Basic communication system, Classification of communication systems: Direction, Nature of signal & Technique of transmission, Need of Modulation, Types of Modulation, Bandwidth	Explain the working of Basic communication system. Detailed Classification of communication systems based on three different themes. Void reasons towards Need of Modulation, Different Types of Modulation, Calculation of Bandwidth
2	Amplitude Modulation	Amplitude Modulation theory, Mathematical representation of AM wave, Modulation Index, frequency spectrum of AM wave, Bandwidth of AM wave, Power relations of AM wave, AM circuits: Basic circuit for BJT Collector modulation, Amplitude Modulator circuit.	Derivation of expression of AM wave. Explanation of frequency spectrum & Bandwidth of AM wave, Derive Power contents of AM wave. Generation and Detection of AM wave
3.	Frequency Modulation	Theory of Frequency Modulation, Mathematical	Derivation of expression of FM wave.

		representation of FM wave, Bandwidth of FM wave, Generation of FM- Direct method for FM generation, Transistor reactance modulator, Varactor reactance modulator,	Explanation of Bandwidth of FM wave, Generation of FM wave With three methods.
4.	Pulse Modulation	Introduction, Classification of Pulse Modulation systems, Sampling theorem, Nyquist Criteria, Basic Principles of Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation, Generation & Detection of PAM **Digital Pulse Modulation :** Introduction, PCM transmitter, PCM Receiver, Quantization Process, Quantization error, Applications of PCM, Advantages & Disadvantages of PCM	Explain the classification of Pulse Modulation systems, Sampling theorem, Nyquist Criteria, Introduction to PAM, PWM & PPM Explain PCM Transmitter Receiver, Quantization Process, Quantization error, Applications of PCM, Advantages & Disadvantages of PCM

Specify Course Outcome: After completion of this course students will be able to

1. Understanding of communication systems.

2. Understand working of Analogue modulation techniques.

3. Understand working of Analogue pulse modulation system.

4. Understand working of Digital Pulse Modulation**.**

Specify Program outcome

After completion of this course, students will be able to explain various types of communication system based of concept of modulation. The course enables the students to explain importance of modulation in communication system.

Signature of teacher

Dr A G Chawhan

Name Of the Teacher: **Dr Tak A S** Academic Year : **2022-23**

Department : Physics

Program: B Sc III SEM V Subject: Electronics PXIII

Course Code :CCEI -B

Paper Title : Introduction to Microcontroller 8051

Unit No	Unit Name	Topics	Unit wise outcome
I	Microprocessors to Microcontrollers	Block Diagram of a microprocessor, Block Diagram of a microcontroller, Comparison between microprocessor and microcontroller	Majority students passed
II	Introduction to Microcontroller 8051	Features, Pin diagram, functional pin diagram and pin description, Architecture, Reset, Memory organization, CPU timings.	Majority students passed
III	Instruction Set of Microcontroller 8051	Addressing modes, Data transfer Instructions, Arithmetic Instructions, Logical Instructions, Branch Instructions, Bit Manipulation Instructions	Majority students passed
IV	Assembly Language Programming For Microcontroller 8051	Introduction to 8051 Assembly programming, Assembling and running an 8051 program, The Program Counter and ROM space in 8051, 8051 Data types and Directives, Simple Assembly Language Programs for 8051	Majority students passed

Specify Course outcome : All students acquired fundamental knowledge and are ready to acquire advance knowledge of l Electronics

Specify Programoutcome: Program gave good platform to face challenges while studying skill development programs like EMBEDDED SYSTEM DESIGN, AUTAMATION & SKDA etc

Signature of Teacher

Dr Tak A S

Name of the Teacher : A G Chawhan

Department : Electronics

Program : B Sc Class: III Year, Semester-VI Subject: Electronics

Course Code : DECE-II

Paper Title : Communication Electronics –I (P-XIV)

Unit Number	Unit Name	Topics	Unit wise outcome
1	Radio Receivers	Introduction, Block diagram of communication receiver, Tuned radio Frequency Receiver, Superheterodyne Receiver, Characteristics of Radio Receivers- Selectivity, Sensitivity & fidelity, Image frequency & its rejection, Double Spotting	Working of TRF & Superheterodyne Radio Receiver, Explain Characteristics of Radio Receivers and the method to calculate it experimentally, Meaning & Calculation of Image frequency & its rejection, Concept of Double Spotting
2	Microwaves & Radar System	Introduction to Microwave properties, Applications of Microwaves, Basic Principles of Radar System, Block Diagram of Basic Pulsed Radar, Radar Range Equation, Moving target indication, CW Doppler Radar.	Explain few properties & applications of Microwaves. Explain working principles of a radar, Working of different blocks of Basic Pulsed Radar, Derive Radar Range Equation, Explain working of Moving target indicator Radar & CW Doppler Radar
3.	Introduction to Mobile Communication	Historical perspectives, Cellular System, 3G System, 4G System	Explain Historical Background of Mobile Communication, Working of Cellular System, Brief introduction to 3G & 4G

			System
4.	Introduction to Optical Fibres	Structure of Optical Fibres, Classification of Optical Fibres, Propagation of Light, Refraction & Snell's law, Total Internal Reflection, Light propagation through Optical Fibre, Acceptance angle & Numerical Aperture, Dispersion, Intermodal Dispersion, fibre characteristics, Fibre losses, Calculation of Losses, Choice of wavelength, Fibre Optic Communication, Applications of Fibre Optic Communication, Advantages & Disadvantages of Optical Fibre.	Explain structure of Optical Fibres Explain various types of Optical Fibres, Explain Propagation of Light through Optical fibres with reference to Refraction & Snell's law, Total Internal Reflection, Calculation of Acceptance angle & Numerical Aperture & Intermodal Dispersion & Fibre losses, Explain Applications , Advantages & Disadvantages of Fibre Optic Communication.

Specify Course Outcome: After completion of this course students will be able to

1. Understanding of Radio receiver communication systems.

2. Understand working of various types of Radar & their working.

3. Understand structure, types & working of Optical Fibres system.

Specify Program outcome

The successful completion of this course allows the students to make use of appropriate communication system at proper place. He now has knowledge of radio receivers, radars and fibre optic communication systems along with mobile.

Signature of teacher

Dr A G Chawhan

Name Of the Teacher: Dr **Tak A S** Academic Year **2022-23**

Department : Physics

Program: B Sc III SEM VI Subject: Electronics P XV

Course Code: (Sec B)

Paper Title: Microcontroller 8051 Programming and Interfacing

Unit No	Unit Name	Topics	Unit wise outcome
I	I/O Port Programming and Timer Programming	I/O Port Programming: 8051 I/O Programming, I/O Bit Manipulation Programming, Programming Examples, Timer Programming: Programming 8051 Timers, Counter programming, Programming Examples	Majority students passed
II	Serial Port Programming	Basics of Serial Communication, 8051 Connection to RS232, 8051 Serial Port Programming, Programming Examples	Majority students passed
III	Interrupt Programming	8051 Interrupts, Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupt, Interrupt priority in 8051, Programming Examples.	Majority students passed
IV	Interfacing	Interfacing of Switches, Relays, LEDs, LCDs, Stepper Motor, DAC 0808, ADC 0808, External Memory and IC8255 with Microcontroller 8051	Majority students passed

Specify Course outcome: All students acquired fundamental knowledge and are ready to acquire advance knowledge necessary for research skill development

Specify Program outcome: Program gave good platform to face challenges while studying skill development programs like EMBEDDED SYSTEM DESIGN, AUTAMATION & SKDA etc

Signature of Teacher

Dr Tak A S