SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
Semester III
DSC -3S- Electronics (CBCS)
Electronic Devices and Circuits

Unit I : Hybrid Parameters and Cascaded Amplifiers (15L)

Hybrid parameters, transistor equivalent circuits of CE,CB and CC, Analysis of small signal CE amplifier, Concept of cascaded amplifier, Types of coupling, RC coupled amplifier, Singled tuned amplifier.

UNIT II: Power Amplifier : (15L)

Classification of power amplifier, Class A, Class B, Class C and Class AB amplifier, Class A transformer coupled amplifier, Class B Push-Pull amplifier, (Construction, working and efficiency of each), Distortion, Complimentary symmetry Class B Push Pull amplifier.

Unit III : Feedback amplifier and Oscillators: (15L)

Concept of feedback theory, Positive and negative feedback, advantage of negative feedback, Physical idea of feedback(block diagram only), Oscillator- Basic elements of oscillators, Barkhausen criterion of oscillation, Concept of tank circuit, RC oscillator- Phase shift and Wein bridge oscillator, LC oscillator- Colpitts oscillators, Hartley oscillators and Crystal oscillator.

Unit IV : Operational amplifier: (15L)

Difference amplifier (Concept, construction and working),Block diagram of operational amplifier, Characteristics of ideal op amp, concept of virtual ground, Parameters of op amp. Op amp as inverting and non-inverting amplifier, Adder, Subtractor, Differentiator, Integrator, Regenerative comparator.

Unit V : Applications of Op-Amp : (15L)

Solution to simultaneous equation, Astable, Monostable and Bistable multivibrator using Op Amp. Need of A/D and D/A convertor, D/A convertor- R-2R ladder type, Weighted register, Sampled and hold circuit, IC ADC and DAC specifications. A/D convertor- Single slope, Counter type, Successive approximation type.

Unit VI : DSC-3S-SEM (15L)

- Identification of transistor.
- Identification of pnp and npn transistor
- Identification of Op-amp ICs.
- Study of pins of IC 741.
- Study of amplifier.
- Identification of oscillator circuits.
- Use of op-amp as adder.
- Use of op-amp as subtractor.
- Use of op-amp as integrator.
- Use of op-amp as differentiator.

- Study of inverting amplifier on CRO.
- Study of non-inverting amplifier on CRO
- OP-Amp as a Astable Multivibrator
- OP-Amp as a Monostable Multivibrator
- OP-Amp as a Bistable Multivibrator
- Identification of analog IC.
- Identification of digital IC.

PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

DSC-3S

Sr.No.	**Topic**	**What the student will be able to do at the end of Module/Unit (Knowledge/ Skill achieved OR Application of Knowledge /Skill to do what)**
1	**Unit I : Hybrid Parameters and Cascaded Amplifiers** Hybrid parameters, transistor equivalent circuits of CE,CB, Analysis of small signal CE amplifier, Concept of cascaded amplifier, Types of coupling, RC coupled amplifier, Singled tuned amplifier.	At the end of this unit, students will be able to know what is hybrid parameters. What is equivalent circuits of CE,CB and CC . What is concept of coupling? Which are different types of coupling etc.
2	**UNIT II: Power Amplifier** Classification of power amplifier, Class A, Class B, Class C and Class AB amplifier, Class A transformer coupled amplifier, Class B Push-Pull amplifier, (Construction, working and efficiency of each), Distortion, Complimentary symmetry Class B Push Pull amplifier.	At the end of this unit, students will be able to understand which are different types of power amplifier, How transformer is use as a coupling device. How power amplifier is work. Which are different stages of coupling etc.
3	**Unit III : Feedback amplifier and Oscillators:** Concept of feedback theory, Positive and negative feedback, advantage of negative feedback, Physical idea of feedback(block diagram only), Oscillator- Basic elements of oscillators, Barkhausen criterion of oscillation, Concept of tank circuit, RC oscillator- Phase shift and Wein bridge oscillator, LC oscillator- Colpitts oscillators, Hartley oscillators and Crystal oscillator.	At the end of this unit, students will be able to know, what is mean by feedback. Physically how circuits are connected as positive or negative type. What is oscillator, Which are basic elements of oscillator. What is tank circuit, Which are different types of oscillators etc.

4	**Unit IV : Operational amplifier** Difference amplifier (Concept, construction and working),Block diagram of operational amplifier, Characteristics of ideal op amp, concept of virtual ground, Parameters of op amp. Op amp as inverting and non-inverting amplifier, Adder, Subtractor, Differentiator, Integrator, Regenerative comparator.	At the end of this unit, students will be able to know, Block diagram of operational amplifier, Characteristics of ideal op amp, concept of virtual ground, Parameters of op amp. Op amp as inverting and non-inverting amplifier, Adder, Subtractor, Differentiator, Integrator, Regenerative comparator.
5	**Unit V : Applications of Op-Amp :** Solution to simultaneous equation, Astable, Monostable and Bistable multivibrator using Op Amp. Need of A/D and D/A convertor, D/A convertor- R-2R ladder type, Weighted register, Sampled and hold circuit, IC ADC and DAC specifications. A/D convertor- Single slope, Counter type, Successive approximation type.	At the end of this unit, students will be able to know, Solution to simultaneous equation, Astable, Monostable and Bistable multivibrator using Op Amp. Need of A/D and D/A convertor, D/A convertor- R-2R ladder type, Weighted register, Sampled and hold circuit, IC ADC and DAC specifications. A/D convertor- Single slope, Counter type, Successive approximation type.

Books Recommended:

1) Integrated electronics by Millman Halkias
2) Principle of electronics by V.K.Mehta
3) Element of electronics by Bagde and Singh (S.Chand and Company)
4) Liner integrated circuit by Ramakant Gayakwad.
5) Digital principle and application by Malvino and Leach.
6) Op-amp theory and application by Ramakant Gayakwad.
7) Basic electronics by B.L.Thereja.

Practical:

Minimum Ten experiments at least one on each of the following aspects.

1. CE,CB and CC amplifier.
2. Cascaded amplifier.
3. Power amplifier.
4. Oscillators.
5. Op-amp applications.
6. ADC convertor
7. DAC convertor

Semester IV

DSC -4S- Electronics (CBCS)

Course Title – Communication Electronics and Microprocessor 8085

Unit I : Modulation and Demodulation : (15L)

Need for modulation, AM theory, Power relation, Theory of FM, Frequency spectrum of AM and FM, Generation of AM and FM, Difference between AM and FM, Demodulator: Diode detector, slope detector. Transmitter and receiver: Block diagram and working of AM and FM transmitter and receiver.

Unit II : Fiber Optic and Digital Communication: (15L)

Advantages and disadvantages of OFC, Block diagram of OFC, Types of optical fibers, Total internal reflection, Jointer and Coupler, Fiber alignment, joint losses.

Pulse modulation, Sampling theorem, PAM, PWM, PPM, and PCM (Bandwidth of PCM and quantizing noise), Multiplexing principles: TDM and FDM

Unit III : Architecture and timing of 8085: (15L)

Evolution of microprocessor, Microcomputer (Block diagram with function of each block) architecture of Intel 8085 microprocessor, function of each block of 8085, functional pin diagram and function of all pins of 8085, instruction format, Instruction cycle, fetch and execute operation, machine cycle and state, timing diagram of MVI instruction.

UNIT IV: Instruction and programming of 8085: (15L)

Addressing modes, classification of instruction set of 8085 with examples, concept of stack and stack pointer, PUSH and POP instructions, Concept of subroutine: CALL and RET instruction, Delay subroutine.

Programming: Algorithm, Flowchart, Assembly and Machine language, Assembly language programme such as program for Addition, Subtraction, Multiplication, Division, finding maximum and minimum number

Unit V : Interfacing: (15L)

Basic interfacing concept, memory mapped I/O and I/O mapped I/O scheme, Data transfer scheme, 8255 PPI: Block diagram, Function of each block, Functional pin diagram, function of each pin, operating modes of 8255PPI, control word format in I/O and BSR mode.

Unit VI : DSC-4S-SEM (15L)

- Illustrate to practice the digital trainer kit with safety.
- To test IC using digital IC tester.
- To get knowledge to identify modulator circuit.
- To get knowledge to identify demodulator circuit.
- Fabrication of transmitter circuit
- Fabrication of receiver circuit
- Identify couplers
- Identify jointers

- Identify connectors
- Study of microprocessor 8085
- Skill of drawing of flowchart
- Skill of writing algorithm
- Skill of writing program for addition.
- Skill of writing program for Subtraction.
- Skill of writing program for multiplication.
- Skill of writing program for division.
- Study of interfacing 8255

PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

DSC-4S

Sr.No.	Topic	What the student will be able to do at the end of Module/Unit (Knowledge/ Skill achieved OR Application of Knowledge /Skill to do what)
1	**Unit I : Modulation and Demodulation:** Need for modulation, AM theory, Power relation, Theory of FM, Frequency spectrum of AM and FM, Generation of AM and FM, Difference between AM and FM, Demodulator: Diode detector, slope detector. Transmitter and receiver: Block diagram and working of AM and FM transmitter and receiver.	After completion of this unit, students will be able to know Need for modulation, AM theory, Power relation, Theory of FM, Frequency spectrum of AM and FM, Generation of AM and FM, Difference between AM and FM, Demodulator: Diode detector, slope detector. Transmitter and receiver: Block diagram and working of AM and FM transmitter and receiver
2	**Unit II : Fiber Optic and digital Communication:** Advantages and disadvantages of OFC, Block diagram of OFC, Types of optical fibers, Total internal reflection, Jointer and Coupler, Fiber alignment, joint losses. Pulse modulation, Sampling theorem, PAM, PWM, PPM, and PCM (Bandwidth of PCM and quantizing noise), Multiplexing principles: TDM and FDM	After completion of this unit, students will be able to know Advantages and disadvantages of OFC, Block diagram of OFC, Types of optical fibers, Total internal reflection, Jointer and Coupler, Fiber alignment, joint losses. Pulse modulation, Sampling theorem, PAM, PWM, PPM, and PCM (Bandwidth of PCM and quantizing noise), Multiplexing principles: TDM and FDM.
3	**Unit III: Architecture and timing of 8085:** Evolution of microprocessor, Microcomputer (Block diagram with	At the end of this unit, students will be understand what is history of microprocessor, block diagram of microprocessor, how microprocessor work, what is

	function of each block) architecture of Intel 8085 microprocessor, function of each block of 8085, functional pin diagram and function of all pins of 8085, instruction format, Instruction cycle, fetch and execute operation, machine cycle and state, timing diagram of MOV and MVI instruction.	function of each pin, skill of identify the pins and instruction, how to plot timing diagram of instruction etc.
4	**UNIT IV: Instruction and programming of 8085:** Addressing mode, classification of instruction set of 8085 with example, concept of stack and stack pointer, PUSH and POP instruction, Concept of subroutine: CALL and RET instruction, Delay subroutine (using one register and register pair) Programming: Algorithm, Flowchart, Assembly and machine language, Assembly language programme such as program for Addition, Subtraction, Multiplication, Division, finding maximum and minimum number	At the end of this unit, students will be understand what is instruction, skill of development of algorithm and flowchart, identify what is difference between assembly language and machine language, skill of writing programs for Addition, Subtraction, Multiplication, Division, finding maximum and minimum number etc.
5	**Unit V : Interfacing:** Basic interfacing concept, memory mapped I/O and I/O mapped I/O scheme, Data transfer scheme, 8255 PPI: Block diagram, Function of each block, Functional pin diagram, function of each pin, operating modes of 8255PPI, control word format in I/O and BSR mode.	At the end of this unit, students will be understand what is interfacing, which are different types of memory, what is PPI, which ICs are used for PPI , What is block diagram of 8255, what is function of each blocks etc.

Books Recommended:

1. A textbook of communication engineering by A.Kumar
2. Electronics and communication by Roddy and Coolean
3. Telecommunication principles circuit and system by S. Rambhadran
4. Modern digital and analog communication system by B.P.Rathi
5. Communication electronics by N.D..Deshpande
6. Microprocessor and microcontroller by B.Ram
7. Microprocessor architecture programming and application by Ramesh Gaonkar
8. Introduction of microprocessor by A.P.Mathur
9. Advance Digital Electronics, Microprocessor and 8051 Microcontroller by Dr Y.B.Gandole, Dr.D.S.Dhote and Dr.S.P.Yawale (G.C.Publishers, Nagpur)

Practicals:

Minimum Ten experiments at least one on each of the following aspects.

1. AM and FM (Transmitter and receiver)
2. Modulator and Demodulator
3. OFC system
4. Pulse modulation and digital communication
5. Microprocessor 8085 and its study
6. Programming on microprocessor 8085
7. Interfacing techniques.
