Swami Ramanand Teerth Marathwada University, Nanded

Syllabus

B. Sc. Second Year

ELECTRONICS

Semester System (MCQ Pattern)

(To Be Implemented From Academic Year 2014-2015)

Theory /Practical	Semester /Annual	Semester No.	Paper No.	Title of Paper	MARKS						Min. Lectures / Week
					MCQ	Internal	Experiment	Oral	Record Book	Total	
Theory	Semester	III	VI	Amplifiers, Oscillators And Multivibrators	40	10	---	---	---	50	03
			VII	Fundamentals Of Microprocessors	40	10	---	---	---	50	03
		IV	VIII	Op-Amp, Its Applications And Some Specialized ICs	40	10	---	---	---	50	03
			IX	Microprocessor Interfacing	40	10	---	---	---	50	03
Practical	Annual	---	X	**LAB-II**	---	---	35	10	05	50	03
			XI	**LAB-III**	---	---	35	10	05	50	03
TOTAL					**160**	**40**	**70**	**20**	**10**	**300**	**---**

Total Marks for Theory = 50+50+50+50 = **200**	Total Marks for Practical = 50+50 = **100**
Total Marks for SY = 200+100 = **300**	Total Lectures / Week /Division for Theory = **06**
Total Lectures / Week / Batch for Practical = **06**	Minimum Lectures / Week for SY = **12**
LAB-II: Practical Based On Papers VI And VIII	**LAB-III:** Practical Based On Papers VII And IX

Paper-VI
Amplifiers, Oscillators And Multivibrators

(50 Marks, 45 Periods)

Unit I: Load Lines And DC Bias Circuits (14 Periods)

DC Load line, Q-Point and Maximum Undistorted Output, Need for Biasing a Transistor, Factors Affecting Bias Variations, Stability factor, Beta Sensitivity, Stability Factor for CB and CE Circuits, Base Bias with Emitter Feedback, Base Bias with Collector Feedback, Base Bias with Collector and Emitter Feedback, Voltage Divider Bias, Load Line and output Characteristics, AC Load line,

(Numerical Problems) (Book-5)

Unit II: Small Signal Amplifiers (11 Periods)

h-parameters, An equivalent circuit for the BJT, Transconductance Model, Analysis of CE Amplifier, CB Amplifier, CC Amplifier using h-parameters, Gain in decibels

(Numerical Problems)

Unit III: Sine Wave Oscillators (10Periods)

Introduction to Positive and Negative Feedback, Requirement of an Oscillator, Barkhausen Criterion, Hartley Oscillator, Colpitt's Oscillator, R-C Network, Phase Shift Oscillator, Wien Bridge Oscillator (Circuit diagram, Working, Expression of Frequency and Condition for Oscillations)

(Numerical Problems)

Unit IV: Multivibrators And Sweep Circuits (10 Periods)

Transistor as a Switch, Transistorized Astable Multivibrator, Transistorized Monostable Multivibrator, Transistorized Bistable Multivibrator (working and waveforms), Introduction to Sweep Circuits, Sweep Voltage Waveforms, Exponential Sweep, RC Ramp Generator, (Numerical Problems)

References:

1. Introduction To Electronics
   -K. J. M. Rao (Oxford and IBH Publishing Company).
2. Solid State Pulse Circuits
   -David A. Bell (4/e, Prentice-Hall of India Private Ltd.)
3. Electronic Fundamentals And Applications
   -John D. Ryder (Prentice-Hall of India Private Ltd.)
4. Electronics And Radio Engineering
   -M.L.Gupta (Dhanpat Rai and Sons)
5. Basic Electronics (Solid State) [Multicolour Illustrative Edition]
   - B. L. Theraja (S. Chand & Company Ltd)
6. Electronic Principles
   – A.P. Malvino (TMH Publishing Company) Third Edition
7. Principles of Electronics (Vol. II)
   - B.V. Narayanarao (Second Edition) Published by New Age International (P) Ltd.

Paper-VII
Fundamentals Of Microprocessors

(50 Marks, 45 Periods)

Unit I: Introduction To Microprocessor Intel 8085 (12 Periods)

Semiconductor Memories (RAM, ROM, PROM, EPROM, EEPROM), Block Diagram of Microcomputer (Microprocessor Based System), Block Diagram of Intel 8085, Function of Each Block, Functional Pin Diagram of Intel 8085, Features of Intel 8085

Unit II: Instruction Set Of Intel 8085 (12 Periods)

Instruction Format (1 byte, 2 byte, 3 byte), Addressing Modes, Classification of Instructions, Instruction Set of 8085

Unit III: Programming And Interrupts of 8085 (13 Periods)

Simple Programs Based on Data Transfer, Arithmetic, Logical, Branching and Machine Control Instructions, Interrupts:-Hardware Interrupts, Software Interrupts, Priority Structure of 8085 Interrupts

Unit IV: Introduction To Microprocessor Intel 8086 (08 Periods)

Block Diagram of Intel 8086, Function of Each Block, Functional Pin Diagram of Intel 8086, Features of Intel 8086

References:

1. Fundamentals Of Microprocessors And Microcomputers
   -B. Ram (6/e, Dhanpat Rai, Publications)
2. Microprocessor
   -Borole and Vibhute (2/e, Technova Publications)
3. Microprocessor Architecture, Programming And Applications With The 8085
   -Ramesh S. Gaonkar (3/e, Penram International Publishing)
4. 8085 Assembly Language Programming
   -Lance A. Leventhal (McGraw Hill International Editions)
5. Advanced Microprocessor
   -Ajay K. Ray & Kishor M. Bhurchandi (TMH Publication, 7th Revised Edition)
6. Microprocessors & Interfacing
   -Douglas V. Hall & S S S P Rao (TMH Publication, 3rd Edition,2012)

Paper-VIII
Operational Amplifier, Its Applications And Some Specialized ICs

(50 Marks, 45 Periods)

Unit I: Operational Amplifier (13 Periods)

Theory of Differential Amplifier, Block Diagram of Op-Amp, Schematic Symbol, Ideal Characteristics, Input Offset Voltage, Input Offset Current, Input Bias Current, Input Impedance, Output Impedance, Open Loop Gain, CMRR, Slew Rate, Numerical Problems

Unit II: Applications of Operational Amplifier (13 Periods)

Inverting Amplifier, Non-inverting Amplifier, Op-Amp as Adder, Op-amp as Subtractor, Op-Amp as Integrator, Op-Amp as Differentiator, Op-Amp as Comparator, Op-Amp as Schmitt's Trigger, Solving Differential Equation, Numerical Problems

Unit III: Active Filters (13 Periods)

Introduction, First Order Low-Pass Butterworth Filter, Second Order Low-Pass Butterworth Filter, First Order High-Pass Butterworth Filter, Second Order High-Pass Butterworth Filter, Numerical Problems

Unit IV: Specialized ICs (06 Periods)

Block Diagram of IC555, IC 555 as Astable Multivibrator, IC555 as Monostable Multivibrator, IC566 (Pin Diagram, Block Diagram and Use as VCO), Numerical Problems

References:

1. Op-Amps And Linear Integrated Circuits
   `-Ramakant Gayakwad (Prentice Hall of India Private Limited)
2. Electronic Fundamentals And Applications
   -John D. Ryder (Prentice Hall of India Private Limited)
3. Electronic Principles
   -A. P. Malvino (TMH Publishing Company)
4. Electronics and Radio Engineering
   -M.L.Gupta (Dhanpat Rai and Sons)

Paper-IX
Microprocessor Interfacing

(50 Marks, 45 Periods)

Unit I: Basic Interfacing Concepts (10 Periods)

Introduction, memory mapped I/O scheme, I/O mapped I/O scheme, Data Transfer Schemes:- Synchronous, Asynchronous, Interrupt Driven and DMA

Unit II: Interfacing Chips (15 Periods)

Schematic Diagram (Functional Pin Diagram), Block diagram and Operating modes of the ICs- 8253, 8255, 8259, 8257, Control registers of 8255 and 8253

Unit III: Microprocessor Applications (10 Periods)

Demultiplexing of AD_7-AD_0 bus, Interfacing concepts of I/O devices using decoder (74LS138), Chip Select logic, Generation of $\overline{MEMR}$, $\overline{MEMW}$, $\overline{IOR}$ and $\overline{IOW}$ signals, Tristate buffer (74LS244), Latches (74LS373), Interfacing switches, LED, relays

Unit IV: Data Converters (10 Periods)

Interfacing of ADC 0808 & DAC 0808 using 8255

References:

1. Fundamentals Of Microprocessors and Microcomputers:
   - B. Ram (Dhanpat Rai Publications)
2. Microprocessor Architecture, Programming And Applications With 8085:
   - Ramesh S. Gaonker (3/e, Penram International Publishing)
3. Introduction to 8085, 8086 Microprocessors And Peripherals
   - K. M. Bakwad & A. K. Deshmane (Nikita Publcations, Latur)
4. Microprocessor:
   - Borole and Vibhute (2/e, Technova Publications)

Paper-X

LAB-II

(Practical Based On Papers **VI** And **VIII)**

(50 Marks)

Note:

1. Every student must perform at least TEN experiments (At least FIVE from each group)
2. Use graphs wherever necessary

List of Experiments:

Group I:

1. Op-Amp as Inverting Amplifier (DC Gain Verification)
2. Op-Amp as Non-inverting Amplifier(DC Gain Verification)
3. Op-Amp as Inverting Amplifier (Study of Frequency Response, Gain & -3db Band Width)
4. Op-Amp as Non-inverting Amplifier (Study of Frequency Response, Gain & -3db Band Width)
5. Op-Amp as Adder
6. Op-Amp as Subtractor
7. Op-Amp as Integrator
8. Op-Amp as Schmitt's Trigger
9. Op-Amp as Comparator
10. Op-amp as Analog Computer
11. IC555 Timer as Astable Multivibrator (Measurement of Pulse Width , Space Width, Time Period, Frequency and Mark to Space Ratio)
12. VCO using IC566 (Measurement of Frequency with Change in Control Voltage)

Group II:

13. Study of Transistorized CE Amplifier (Frequency Response, Gain & -3db Band Width)
14. Transtorized Hartely oscillator (Measurement of Frequency and Amplitude of Waveforms)
15. Transtorized Colpitt's Oscillator (Measurement of Frequency and Amplitude of Waveforms)
16. Transtorized Phase Shift Oscillator (Measurement of Frequency and Amplitude of Waveforms)
17. Wein Bridge Oscillator using Op-Amp (Measurement of Frequency and Amplitude of Waveforms)
18. Transistorized Astable Multivibrator.(Measurement of Pulse Width, Space Width, Time Period, Frequency and Duty Cycle)
19. Transistorized Mono stable multivibrator (Measurement of Gate Width)
20. Transistorized Bistable Multivibrator
21. RC Ramp Generator using Transistor. (Measurement of Rise Time, Fall Time and Frequency)

Paper-XI

LAB-III

(Practical Based On Papers **VII** And **IX)**

(50 Marks)

Note:

1. Every student must perform at least 10 experiments.
2. Use flow-chart wherever necessary.

List of Experiments:

1. ALP to Transfer a block of data from one location to another location
2. ALP for addition of two byte and result 8-bit
3. ALP for addition of two byte and result 16-bit numbers
4. ALP for subtraction of two bytes
5. ALP for decimal addition of 8 bit numbers
6. ALP for 1's complement of 8-bit and 16-bit numbers
7. ALP to find 2's complement of 8-bit and 16-bit numbers
8. ALP for shifting of 8-bit number:
    a. Left by one bit position
    b. Left by two bit position
9. ALP to find sum of series of 8-bit numbers
10. ALP to find multiplication of two 8-bit numbers
11. ALP to find division of two 8-bit numbers
12. ALP for masking off:
    a. Four LSBs of 8-bit numbers
    b. Four MSBs of 8-bit numbers
13. ALP to find smallest number of the series
14. ALP to find largest number of the series
15. ALP to generate square wave using IC 8255. Determine frequency
16. Interfacing of 7-segment display with 8085 using IC 8255