Swami Ramanand Teerth Marathwada University, Nanded
B. Sc. Second Year Electronics Syllabus
Semester system
(To be implemented from Academic Year 2010-11)

Paper No.	Name of the Paper	Theory marks	Practical marks	Periods per week
Semester-III				
VI	Amplifiers, Oscillators and Multivibrators	50	----	03
VII	Fundamentals of Microprocessors	50	----	03
Semester-IV				
VIII	Op-Amps and its Applications	50		03
IX	Microprocessor Interfacing	50		03
Semester-III + IV (Annual)				
X	Practicals on paper-VI & VIII	----	50	03
XI	Practicals on paper-VII & IX	----	50	03
		Total=200	Total=100	18

Total Theory marks - 50+50+50+50 = 200
Total Practical marks - 50+50 = 100
Total Theory + Practicals - 300

Scheme of Marking:

Sem.-III	Paper-VI Theory+ MCQ +IE (25+15+10)	Paper-VII Theory+ MCQ +IE (25+15+10)	100 Marks
Sem.-IV	Paper-VIII Theory+ MCQ +IE (25+15+10)	Paper-IX Theory+ MCQ +IE (25+15+10)	100 Marks
Practical(Annual)	Paper- X 50	Paper- XI 50	100 Marks

Paper-VI: Amplifiers, Oscillators and Multivibrators

(**50** Marks, 45 Periods)

Unit I:

Small Signal Amplifiers:

h-parameters, transconductance model, CE amplifier, CB amplifier, CC amplifier. (Formulas for voltage gain Av, current gain Ai, power gain, input impedance R_i and output impedance R_o) (15 periods)

Unit II:

Sine wave Oscillators:

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 (Derivation of frequency and condition for oscillation) (15 periods)

Unit III:

Multivibrators:

Transistor as a switch, Transistorized astable multivibrator, monostable multivibrator and bistable multivibrator (Qualitative and quantitative analysis). (10 periods)

Unit IV:

Sweep circuits:

Introduction, sweep voltage waveforms, exponential sweep, RC ramp generator. (5 periods)

Problems on each unit

References:

1. Introduction to Electronics-K.J.M.Rao, Oxford and IBH Publishing Co.
2. Solid State Pulse Circuits-David A Bell, Fourth edition, Prentice-Hall of India Private Limited.
3. Electronic fundamentals and applications-John D. Ryder, Prentice-Hall of India Private Limited.
4. Electronics and Radio Engineering-M.L.Gupta, Dhanpat Rai and sons.
5. Basic Electronics (Solid State)- B. L. Theraja, S. Chand & Company Ltd.

Paper-VII: Fundamentals of Microprocessor

(**50** marks, 45 periods)

Unit I:

Introduction:

Semiconductor memories (RAM, ROM, PROM, EPROM, EEPROM), Block Diagram of Microcomputer, Software Concepts, Block diagram of Intel 8085, function of each block, Functional pin configuration of Intel 8085, Features of Intel 8085. (12 periods)

Unit II:

Instruction Set of Intel 8085:

Instruction Format (1 byte, 2 byte,3 byte), Addressing Modes, Classification of Instruction set, Instructions of 8085. (12 periods)

Unit III:

Programming of 8085:

Simple Programs based on Data transfer, Arithmetic, Logical, Branch, and I/O Machine Control Group. (12periods)

Unit IV:

Interrupts of 8085 :

Hardware interrupts, software interrupts, priority structure of 8085 interrupts. (09periods)

References:

1. Fundamentals of Microprocessors and Microcomputers-B. Ram, VIth Edition Dhanpat Rai Publications
2. Microprocessor Architecture, Programming and Applications with the 8085 Ramesh S. Gaonkar, third edition, Penram International Publishing.
3. 8085 Assembly language programming – Lance. A. Leventhal McGraw-Hill international editions.
4. Microprocessor-Borole and Vibhute, second edition, Technova Publications.
5. Microprocessor and Interfacing Devices- T. R. Sontakke and U. V. Kulkarni, Sadhusudha Publications.

Paper-VIII: Op-Amps and its Applications

(50 Marks, 45 periods**)**

Unit I:

Operational Amplifiers:

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. (12 periods)

Unit II:

Applications of Op-Amp.:

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. (12 periods)

Unit III:

Active Filters:

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.

(12 periods)

Unit IV:

Specialized IC Applications:

Block diagram of IC555, IC 555 as astable multivibrator, IC555 as monostable multivibrator, IC566 (pin diagram, block diagram and use as VCO). (09 periods)

Problems on each unit.

References:

1. Op-Amps and Linear Integrated Circuits-Ramakant A. 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 Publishin Co.
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:

Introduction, memory mapped I/O scheme, I/O mapped I/O scheme, Data transfer schemes- Synchronous, Asynchronous, Interrupt driver, DMA

(12 periods)

Unit II:

Interfacing Chips:

8253, 8255, 8259, 8279, 8257 Schematic diagram (functional pin diagram), Internal Block diagram & operating modes. **(**18 periods)

Unit III:

Microprocessor Applications

Interfacing Concept of I/O devices using decoder, tristate buffer (74LS244), Latches(74LS373). Interfacing switches, LED, Relay.

(10 periods)

Unit IV:

Data Converters:

Interfacing of A/D and D/A Converters with 8085

(05 periods)

References:

1. Fundamentals of Microprocessors and Microcomputers-B. Ram, Dhanpat Rai Publications
2. Microprocessor Architecture, Programming and Applications with the 8085 Ramesh S. Gaonkar, third edition, Penram International Publishing.
3. Microprocessor and Interfacing Devices- T. R. Sontakke and U. V. Kulkarni, Sadhusudha Publications.
4. Microprocessor-Borole and Vibhute, second edition, Technova Publications.

Paper-X: Electronics Practicals

50 Marks

Note: (i) Every student must perform at least 10 experiments not less than **Five** from each group.
(ii) Use graphs wherever necessary

Group I:

1. Study of transistorized CE amplifier (Frequency response, gain & 3db band width.)
2. Transtorized Hartely oscillator. Measurement of frequency and amplitude of waveforms.
3. Transtorized Colpitt's oscillator. Measurement of frequency and amplitude of waveforms.
4. Transtorized Phase shift oscillator. Measurement of frequency and amplitude of waveforms.
5. Wein Bridge oscillator using Op-Amp.. Measurement of frequency and amplitude of waveforms.
6. Transistorized astable multivibrator.(Measurement of Pulse width, space width, time period, frequency and duty cycle)
7. Transistorized Mono stable multivibrator.(Measurement of gate width)
8. Transistorized Bistable multivibrator.
9. RC ramp generator using transistor. (Measurement of rise time, fall time and frequency)

Group II:

10. Op-Amp as inverting amplifier(Study of DC gain verification)
11. Op-Amp as non-inverting amplifier(Study of DC gain verification)
12. Op-Amp as Inverting amplifier(Study of frequency response, gain & 3db band width)
13. Op-Amp as Non inverting amplifier.(Study of frequency response, gain & 3db band width)
14. Op-Amp as adder
15. Op-amp as subtractor.
16. Op-amp as analog computation
17. Op-amp as integrator
18. Op-amp as Schmitt's trigger
19. IC 555 Timer(Measurement of Pulse width, Space width, Time period, frequency and Mark to Space ratio).
20. VCO using IC566(Measurement of frequency with change in control voltage)

Paper-XI: Electronics Practicals

50 Marks

Note: (i) Every student must perform atleast 10 experiments.
(ii) Use flow chart wherever necessary.

1. Write an ALP to Transfer a block of data from one location to another location.
2. Write an ALP for addition of two byte and result 8-bit
3. Write an ALP for addition of two byte and result 16-bit
4. Write an ALP for subtraction of two bytes.
5. Write an ALP for decimal addition of 8 bit byte
6. Write an ALP for 1's complement of 8-bit and 16-bit numbers.
7. Write an ALP to find 2's complement of 8-bit and 16-bit numbers
8. Write an ALP for shifting of 8-bit number
    a. Left by one bit
    b. Left by two bit
9. Write an ALP for masking of
    a. Four LSB s of 8-bit numbers
    b. Four MSB s of 8-bit numbers
10. Write an ALP to find larger of two numbers.
11. Write an ALP to find smaller of two numbers.
12. Write an ALP to find smallest number from series.
13. Write an ALP to find largest number from series.
14. Write an ALP to find sum of series of 8-bit numbers.
15. Write an ALP to find multiplication of two 8-bit numbers.
16. Write an ALP to find division of two 8-bit numbers.
17. Write an ALP to generate square wave using IC 8255. Determine frequency.
18. Interfacing of 7-segment display with 8085 using IC 8279.