Solapur University, Solapur
Syllabus for B.Sc. II Electronics Semester System
To be implemented from Academic Year 2011-12

1) Course Structure: -

Sr. No	Semester	Paper No.	Title	Total Marks
1.	Semester-III	V VI	Electronics Circuits Pulse and Switching circuits	50 50
2.	Semester-IV	VII VIII	Fundamentals of Operational Amplifier Fundamentals of Microcontrollers	50 50
3.	At the end of IV Semester		Practical Examination	100
			Total	300

2) Nature of Theory Question Paper: -

The nature of theory question paper is same as that for B.Sc. – I, Semester System

3) Distribution of Practical Marks (100): -

1) Practical from group – A - 21
2) Practical from group – B - 21
3) Practical from group – C - 21
4) Practical from group – D - 21
5) Journal - 10
6) Seminar or industrial Visit - 6

Break up of 21 marks for each practical

a) Circuit diagram / Flow Charts: 4
b) Connections/Programming: 4
c) Procedure / Observation: 4
d) Graph /Calculations/ Execution: 4
e) Results/Comments: 2
f) Oral: 3

4) Seminar/ Industrial visit: -

A report of seminar/ industrial visit should be submitted at the time of examination.

a) Seminars for students may be organized, so as to develop communication skill, self realization, of concerned topics etc.

OR

b) Industrial visits may be organized to get awareness on current in Electronics Industries.

B.Sc. II Semester – III

Paper – V Electronics Circuits

Total Marks 50

(40 periods)

1) Transistor Amplifier (12)

Basic action of transistor amplifier, D.C. and A.C. analysis of CB, CE, CC Configuration using hybrid model (small signal, low frequency), comparison of CB, CE, CC configuration. FET as CS amplifier (Analysis's and its Applications),

Multistage Transistor Amplifier : Resistance Coupled, Transformer Coupled, Direct Coupled amplifier, (Graphical analysis of amplifiers). Darlington pair amplifier. (Numerical examples)

2) Power Amplifiers (06)

Class A, Class B, Class AB, Class C amplifiers, push pull amplifier, complementary – symmetry amplifier, Distortion in power amplifiers.

3) Feed back circuits (08)

Concept of feedback, Types of feedback, General characteristics of feedback circuits, effect of negative feedback on distortion, noise, gain, band width, input impedance, and output impedance. (Numerical Examples)

4) Oscillators (06)

Barkhusian criterion, RC oscillators - Wien bridge oscillator, Phase shift oscillator (Without Mathematical Analysis), LC oscillator – Hartley and Colpitt's oscillator, quartz crystal and its equivalent circuit, Pierce crystal oscillator (Numerical Examples).

5) Differential Amplifier (08)

Need, Types of Differential Amplifier, Emitter coupled differential amplifier operation, characteristics, common mode gain and differential mode gain, CMRR, derivation of CMRR. Constant current bias, current mirror bias. (Numerical Examples)

References:

1. Electronic fundamentals and applications- John D. Ryder, Prentice-Hall of India Private Limited.
2. Electronics and Radio Engineering- M. L. Gupta, Dhanpat Rai and sons.
3. Basic Electronics (Solid State)- B. L. Theraja, S. Chand & Company Ltd.
4. Operational Amplifier by Ramakant Gaikwad.
5. Linear Integrated circuit by Roy Chaudhari.
6. A text book of Applied Electronics by R. S. Sedha. S. Chand Publication.
7. Basic Electronics and Linear Circuits by N. N. Bhargaya D. C. Kulshreshtha & S. C. Gupta T. M. H. Publication.

B.Sc. II Semester – III

Paper-VI Pulse and Switching circuits

Total Marks 50

(40 periods)

1) Wave Shaping Circuits **(07)**

Need of wave shaping circuit, linear wave shaping circuits-basic principle of (1) Differentiator (2) Integrator (study with step and square input).

Non linear wave shaping - diode clipping & clamping circuits.

2) Time Base Circuits **(08)**

General feature of Time base signals, Concept of RC time base circuit,

UJT (construction, working) UJT as a relaxation oscillator, linearity consideration, constant current charging, Miller integrator.

3) Multivibrators using BJT **(14)**

Transistor as a switch, Switching times, Types of Multivibrator.

Astable Multivibrator – Collector coupled, operation, wave forms, expression of output frequency and duty cycle.

Monostable Multivibrator - Collector coupled, operation, wave forms and expression of gate width.

Bistable Multivibrator - Collector coupled, operation, wave forms.

Schmitt's Trigger - Operation, Hysterises curve (UTP, LTP), wave forms, Application (Numerical Examples)

4) IC 555 Timer **(11)**

Functional Block – diagram of IC 555.

Astable multivibrator – operation, expression for frequency, wave form

Monostable multivibrator – operation, expression of Gate width, wave

forms , Applications of IC 555 as sequentional Timer, Battery charger, Voltage controlled oscillator. (Numerical examples)

Reference books

1) A text book of Applied Electronics by R. S. Sedha. R. S. Chand Publication.
2) Electronic circuits and devices by Allen mottershed P H I publisher
3) Operational Amplifier by Ramakant Gaikwad.
4) Electronic Devices and Circuits by Boylestead
5) Electronic Devices and circuits by Millman and Halkias
6) Pulse and Switching circuits by Millman and Taub
7) Hand book of Electronics by Sony Gupta.
8) Basic Electronics and Linear Circuits by N. N. Bhargaya D. C. Kulshreshtha & S. C. Gupta T. M. H. Publication.

B.Sc. II Semester – IV

Paper-VII Fundamentals of Operational Amplifier

Total Marks 50

(40 periods**)**

1) Operational Amplifiers (12)

Introduction to Op-Amp, Block diagram of Op-Amp, schematic symbol, equivalent circuit of Op-Amp, IC 741 and its specifications, ideal characteristics, open loop and closed loop configuration, need of closed loop configuration, input offset voltage, input offset current, input bias current, input impedance, output impedance, open loop gain, CMRR, slew rate.

2) Operational Amplifier Linear Systems (11)

Inverting amplifier (dc and ac), Concept of virtual ground, Non-inverting amplifier (dc and ac), Differential opamp, Voltage follower, Summing amplifier (adder and subtractor), Current to Voltage converter and Voltage to Current converter, Differentiator and Integrator.

3) Operational Amplifier Non-linear Systems (7)

Precision Rectifier (HW and FW), Peak detector, Clipper, Clamper. Sample and Hold circuit. Basic comparator, Zero-crossing detector, Window detector, Regenerative comparator (Schmitt Trigger).

4) Wave form Generators (10)

Oscillators - Phase shift oscillator, Wien Bridge oscillator. Sawtooth oscillator (without mathematical treatment)

Multivibrators - Astable multivibrator, Monostable multivibrator, Triangular wave generator.

Reference Books:

1. Integrated Electronics – Millman – Halkies (MGH)
2. Op-Amps and Linear circuits – Ramakant A.Gaikwad (PHI)
3. Operational Amplifiers and Linear ICs – Caughlin and Driscoll (PHI)
4. Linear Integrated Circuit – D. Roy Choudhari, Shail Jain (Wiley Eastern Ltd.)
5. Integrated Circuit (New Edition) – K. R. Botkar
6. Design with Operational Amplifiers and Analog ICs – Franco (Mc Graw Hill, 2000)
7. Electronic fundamentals and applications-John D. Ryder, Prentice-Hall of India PrivateLimited.

B.Sc. II Semester – IV

Paper-VIII Fundamentals of Microcontrollers

Total Marks 50
(40 periods)

1)Fundamentals of microprocessor (11)

Introduction to microprocessor, microprocessor based system, general block diagram of 8-bit microprocessor, Functional block diagram of 8085, bus architecture.
Basic concept of interfacing and its requirements, interfacing of RAM, ROM and I/O.

2) Introduction and architecture of microcontroller (12)

Overview and features of MCS-51 Family, comparison of microprocessor and microcontroller, Salient features and block diagram of 8051, Pin description, Internal memory, Registers and SFRs, Port structure, Clock and Reset circuit.
Timer/counter, Serial port, Interrupt structure (in brief).

3) Instruction set of 8051 (10)

Addressing mod es, Instruction set,
Instruction types - Data transfer, Arithmetic, Logical, Boolean Program Branching, instruction execution and timing.

4) Assembly language programming with 8051 (7)

Algorithm, flow chart, structure of Assembly Language programming.
Arithmetic, Logical, Boolean operations programs.
Branching, looping, time delay subroutine programs.
Simple programs based on ports (LED on/off, Square wave generation, on/off switch).

REFERENCE BOOKS

1 Microprocessor Architecture, Programming and Applications by Ramesh Gaonkar (Wiley Ester Ltd publication)
2The 8051 microcontroller and Embedded system M.M. Mazidi, J.C. Mazidi, R.D. Mckinlay (Pearson education Asia publication)
3 8051 microcontroller hardware, software, applications V. Udayshanker, M.S. Mallikarjunswamy.
4The 8051 microcontroller Architecture, programming and application by Kenneth J. Ayala, (Penram International)
5 Fundamentals of microprocessor and microcomputers by B.Ram (Dhanpat Rai Publications)

B.Sc. – II Practicals
List of Experiments

Group A

1) Study of single stage CE/ CB amplifier. (Gain, I/P & O/P impedance)
2) FET CS amplifier (Gain, I/P & O/P impedance)
3) Emitter follower (Gain, I/P & O/P impedance)
4) Negative feed back amplifier. (Frequency response & feed back factor)
5) RC Phase shift oscillator (Design & testing)
6) Wein bridge oscillator (Design & testing)
7) LC Hartley oscillator(Design & testing)
8) Colpitts oscillator (Design & testing)
9) Crystal oscillator (Colpitts / Pierce oscillator)
10) Two stage RC Coupled Amplifier (frequency response)

Group B

1) Clipping circuits / clamper circuits
2) Differentiator/ Integrator using RC network (frequency response)
3) UJT oscillator, with constant current source.
4) Miller integrator.
5) Design of Astable Multivibrator using BJT
6) Design of Monostable Multivibrator using BJT
7) Study of Bistable Multivibrator using BJT (AC & DC) triggering)
8) Schmitt's trigger (hysterysis curve & square wave testing)
9) Study of Astable Multivibrator using IC 555.
10) Study of Monostable Multivibrator Integrator using IC 555

Group – C

1) Study characteristics of Op-Amp (offset null, I/P and O/P Impedance, slew rate)
2) Study of inverting and non inverting amplifier using op-amp
3) Study of adder and subtractor using Op-Amp..
4) Study of Op-AMP as Voltmeter
5) Study of Op-AMP as Ammeter.
6) Study of Op-amp as Schmitt's trigger
7) Study of Wein-bridge oscillator / Phase Shift Oscillator using Op-Amp.
8) Study of Astable Multivibrator / Monostable Multivibrator using Op-AMP
9) Study of integrator using Op-AMP (sine and square wave input)
10) Study of differentiator using Op-AMP (sine and square wave input).

Group – D

1) Addressing modes I (Immediate, Register, Direct, Indirect, Relative)
2) Data transfer (block transfer)
3) Data transfer (block exchange)
4) Arithmetic operations I (Addition/ subtraction)
5) Arithmetic operations II (multiplication/division)
6) Logical operations (ANDing, ORing, EX-ORing COMPLIMENTing)
7) Boolean operation (bit wise instruction)
8) Time delay subroutine program
9) Square wave generator using Timer / using port.
10) LED On/OFF control using Port 1.

N.B.

1)Minimum 32 experiment must be performed out of which at least six from each group.

2) In addition to above experiments the students should be exposed to the details of Laboratory equipments such as CRO, FG, Power supplies, Trainer Kits, PC, Multimeters etc.

3) The student should be exposed to make use of data sheet, specifications, manuals etc.

4) The students should be encouraged for employing innovative ideas in the current trends of Electronics.