

Solapur University, Solapur
Syllabus for B.Sc.-I Electronics
Semester System
To be impleted from Ac.Year 2010-11

1) Course Structure:-

Sr.No.	Semester	Paper	Title	No. of Lectures	Total Marks
1.	Semester-I	I	Electronics Fundamentals	35	50
		II	Digital Fundamentals	35	50
2.	Semester-II	III	Basic Electronics	35	50
		IV	Digital Electronics	35	50
3.	At the end of II semester		Practical		50
				Total	250

2) Distribution of Practical Marks (50):-

Practical examination will be at the end of second semester.

- | | |
|---------------------------|----|
| 1) Practical from Group-A | 21 |
| 2) Practical from Group-B | 21 |
| 3) Journal | 08 |

Break up of 21marks for practical:

- | | |
|--|-----------|
| a) Circuit diagram | : 4 Marks |
| b) Connections | : 4 Marks |
| c) Observations | : 4 Marks |
| d) Calculation and Graphs/Verification
Of Truth table/Trimming diagrams | : 4 Marks |
| e) Result/Comments | : 2 Marks |
| f) Oral | : 3 Marks |

3) Industrial Visit:-

To expose the students to the knowledge other than class-room, it is recommended to arrange industrial visit.

Semister-I

Paper No.-I: Electronics Fundamentals

- 1) **Introduction to circuit components:** (7)
Active and passive elements, Resistors, Capacitors, Inductors, Transformers, Relays and Fuses.
[Classification, specifications and Applications only]
- 2) **Circuit fundamentals:** (6)
 - a) Ohm's Law, Kirchoff's Law.
 - b) Basic voltage and current relations for R,L and C.
 - c) DC sources, Constant voltage and current source.
- 3) **AC Fundamentals:** (9)
 - a) AC sources, sinusoidal and non sinusoidal sources, rms current and voltage, phase relationship of current and voltage with pure resistor, capacitor and inductor.
 - b) Series and parallel RLC circuits [Phase diagram, Impedance, Admittance and Quality factor]
 - c) Series and parallel resonance [Response curve, Band width, Quality factor]
Numerical Examples are expected.
- 4) **Two port Network:** (5)
 - a) Black Box theory, concept of equivalent network, Z, Y & H parameters
 - b) T-network, π -network and their inter conversion expressions only.
- 5) **Network Theorem:** (8)
 - a) Mesh and Nodal analysis.[Only DC resistive circuits]
 - b) Thevenin's Theorem, Norton's Theorem Superposition Theorem, Milman's Theorem [Numerical Examples are expected]

Recommended Books:

- 1) Circuit and Networks: Analysis and Synthesis-A.Sudhakar & S.P. ShamMohan, 2nd Edition (TMH)
- 2) A course in circuit Analysis- M.L. Soni & J.C. Gupta, Dhanpatrai & Sons, New Delhi.
- 3) Network Analysis- M.E. Van. Valkenberg, PHI, New Delhi.
- 4) Electronics components & Materials- Madhuri Joshi, Wheeler pub.

Paper-II (Digital Fundamentals)

- 1) **Numbers systems:** (7)
 - a) Binary number system, 1's compliment, 2's compliment, binary to decimal, decimal to binary conversion .Octal and Hexadecimal number systems, inter-conversions of numbers.
 - b) Signed binary numbers, Arithmetic operations.
- 2) **Binary Codes:** (5)
8421 code, Excess-3 code, Gray code, ASCII code, Parity code.

3) **Logic Gates:** (9)

a) OR, AND, NOT, NAND, NOR, Ex-OR, Ex-NOR gates, positive and negative logic, DeMorgan's Theorems, Universality of NAND and NOR gate, Study of IC 7400, 7402, 7404, 7408, 7432, 7486 etc.

b) Logic families: Introduction to logic families, TTL NAND gate, specifications of TTL logic family.

4) **Boolean Algebra:** (8)

Rules and laws of Boolean algebra, simplification of Boolean Expression, K-Map, K-map for 4 variables, Use of K-map for reduction of Boolean expressions.

5) **Arithmetic Circuits:** (6)

Exclusive OR gate as a Binary to Gray converter, parity checker, controlled inverter, half adder, full adder, parallel binary adder, Half and Full subtractor.

Recommended Books:

- 1) Digital fundamentals- Floyd, Pearson Education.
- 2) Digital Principles & Applications- A.P. Malvino & D.P. Leach (TMH), New Delhi.
- 3) Modern Digital electronics- R.P. Jain
- 4) Digital systems: Principles and applications- Ronald J Tocci, Neat S. Wideman, 8th edition. PEA.
- 5) Digital Electronics, circuits & systems- V.K.Puri, TMH, New Delhi.

Semester-II
Paper-III (Basic Electronics)

- 1) Semiconductor and p-n junction: (08)**
- a) Intrinsic, Extrinsic semiconductor.
 - b) Formation of p-n junction, Barrier potential, junction capacitance, forward and reverse biasing of p-n junction, I-V characteristics, Interpretation of diode equation, static and dynamic resistance.
 - c) Zener diode, Break down mechanism (Zener & avalanche), I-V characteristics.
 - d) LED, Photo diode (working and applications only)
- 2) Rectifiers, Filters and Regulators: (08)**
- a) Half wave, Full wave and Bridge rectifier [Derivation of ripple factor, efficiency and PIV]
 - b) Capacitor and π -filter.
 - c) Zener regulator.
- 3) Bipolar junction transistor (08)**
- a) The junction transistor, n-p-n & p-n-p [Construction and operation]
 - b) CB, CE and CC configuration, I-V characteristics, Graphical determination of α and β , Graphical determination of h-parameters for CE configuration.
[Numerical examples are expected.]
- 4) Transistor Biasing and Thermal Stabilisation: (5)**
- a) Need of transistor biasing, operating point, DC load line, stability factor.
 - b) Types of biasing, Voltage divider biasing.
 - c) Temperature compensation using single diode.
- 5) Field Effect Transistor: (6)**
- a) JFET, structure and operation of n-channel FET, I-V characteristics, Parameters, Applications.[Numerical examples are expected].
 - b) MOSFET, structure and operation, I-V characteristics.

Recommended Books:

- 1) **Electronic devices and circuits- Jacob Milman & Chrstes S Halkias, MGH, Inter National Edition.**
- 2) **Electronic Devices and circuits; An introduction- Allen Mottershed (PHI), New Delhi.**
- 3) **A text book of applied Electronics-R.S.Shedha (S. Chand & Co.)**
- 4) **Basic Electronics & Linear circuits-N.N Bharcava, D.C. Kulshreshta, S.C. Gupta (TMH).**
- 5) **Principles of Electronics- V.K. Mehata (Rev. edition) S. Chand & Co.**
- 6) **Electronic devices and circuit theory-Robert Boylsted, Louis Nashisky-Pearson Education.**

Paper –IV (Digital Electronics)

- 6) Decoder, Encoder, Multiplexer and DeMultiplexer: (7)**
a) Binary decoder: 2-4, 3-8 decoders, BCD –Decimal decoder, BCD-7 segment decoder, using IC-7447/7448.
b) Encoder: Decimal to BCD encoder, Priority encoder using IC-74147.
c) Multiplexer: 4-1,8-1, multiplexer, multiplexer tree using IC-74150.
d) Demultiplexer: 1-4, 1-8, demultiplexer, Demultiplexer tree using IC-74150.
- 7) Flip Flops: (8)**
RS flip flop using NAND gates, D-F/F, Clocked RS & D- F/F, edge triggered D & JK F/F, Master slave JK F/F Block diagram IC-7474 and 7476 [Trimming diagram are expected]
- 8) Shift Registers: (6)**
a) Shift register, types of shift registers, SISO, SIPO, PISO and PIPO.
b) Study of Right shift, Left shift, Ring counter, Johnson counter and parallel loading using IC -7495.
- 9) Counter techniques: (7)**
Basic counter operation, 4-bit asynchronous and synchronous counters, combination of counter, Mod-5 counter, Decade counter using IC-7490.
[Trimming diagrams are expected]
- 10) Computer Organisation: (7)**
a) Architecture of computer.
b) I/O devices: Key board, VDU, Mouse, Printer (concepts only)
c) Memory devices: RAM, EPROM, Hard disks etc.
d) Introduction of operating system.
e) Application.

Recommended Books:

- 1) **Digital fundamental- Floyd, Pearson Education.**
- 2) **Digital principles and applications-A.P.Malvino & D.P. Leach (TMH) ,New Delhi**
- 3) **Modern digital electronics-R.P.Jain.**
- 4) **Fundamentals of computers-V. Rajaraman, PHI New Delhi.**
- 5) **Digital systems: Principle and applications-Ronald J. Tocci, Neat S Widemer, 8th Edition, PEA.**
- 6) **Digital Electronics, Circuits and systems- V.K. Puri, TMH, New Delhi.**
- 7) **Digital computer electronics- Malvino Brown, 3rd Edition, TMH.**

Experiments:

Group-A

- 1) Study of Thevenin's and Superposition Theorem.
- 2) Determination of h-parameter for CE configuration
- 3) Characteristics of Zener diode and voltage regulator
- 4) Characteristics of JFET.
- 5) Study of transistor biasing- Voltage divider biasing.
- 6) Study of Half wave, Full wave, and Bridge Rectifiers at fixed load.
- 7) Study of C and π -filter using Bridge rectifier.
- 8) Study of Maximum Power transfer theorem.
- 9) Series and parallel resonance.
- 10) Measurement of Z, Y, and h-parameters for two port resistive network.

Group-B

- 1) Study of DeMorgan's Theorems.
- 2) Study of Universal gates.
- 3) Study of Half and Full adder.
- 4) Study of RS, D and JK flip flop.
- 5) Study of counters, divided by 2,5 and 10 using IC-7490
- 6) Study of Left & Right shift, Ring counter and Johnson's counter using IC-7495
- 7) Study of Multiplexer and DeMultiplexer
- 8) Study of Encoder and Decoder
- 9) Study of BCD to 7 segment decoder.
- 10) Study of DOS/ Window operating system

N.B.

- 1) Minimum 80% experiments from each group should be completed.
- 2) In addition to above experiments the students should be exposed to the details of Laboratory equipments such as CRO, FG, Power supplies, 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.



Solapur University, Solapur
Nature of Question Paper For Semester Pattern
• **Faculty of Science**
(w.e.f. June 2010)

Time :- 2 hrs.

Total Marks-50

Q. No.1) Multiple choice questions. (10)

- 1) -----
a) b) c) d)
- 2)
3)
4)
5)
6)
7)
8)
9)
10)

Q.No.2) Answer any Five of the following (10)

- i)
ii)
iii)
iv)
v)
vi)

Q.No.3) A) Answer any Two of the following (06)

- i)
ii)
iii)

B) Write the Answer/Solve/Problem/Note (04)

Q.No.4) Answer any Two of the following (10)

- i)
ii)
iii)

Q.No.5) Answer any Two of the following (10)

- i)
ii)
iii)

1. Structure of the courses :-

- A) Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as resolved by the respective faculties and Academic Council.
- B) For Science Faculty subjects each paper shall be of 50 marks and practical for every subject shall be of 50 Marks as resolved in the faculty and Academic Council.
- C) For B. Pharmacy also the paper shall be of 50 marks for University examination. Internal marks will be given in the form of grades.
- D) For courses which were in semester pattern will have their original distribution already of marks for each paper.
- E) For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

2. Nature of question paper:

A) Nature of questions.

“20% Marks - objectives question” **(One mark each and multiple choice questions)**

“40% Marks - Short notes / Short answer type questions / Short Mathematical type questions/ Problems. **(2 to 5 Marks each)**

“40% Marks - Descriptive type questions / Long Mathematical type questions / Problems. **(6 to 10 Marks each)**

- B) Objective type question will be of multiple choice (MCQ) with four alternatives. This answer book will be collected in first 15 minutes for 10 marks and in first 30 minutes for 20 marks. Each objective question will carry one mark **each**.
 - C) Questions on any topic may be set in any type of question. All questions should be set in such a way that there should be permutation and combination of questions on all topics from the syllabus. As far as possible it should cover entire syllabus.
 - D) There will be only five questions in the question paper. All questions will be compulsory. There will be internal option **(30%)** and not overall option. **for questions 2 to 5.**
3. Practical Examination for B. Sc. I. will be conducted at the end of second semester.
4. Examination fees for semester Examination will be decided in the Board of Examinations.

The structures of all courses in all Faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of Question Paper approved by Hon. Vice Chancellor on behalf of the Academic Council.