



**Solapur University, Solapur**

**B.Sc.Part- I (Sem.I &II)  
Electronics**

**Revised Semester Pattern Syllabus**

**(w. e. f. June, 2013)**

## 1) Title of the course: B.Sc. Part- I Electronics

Syllabus for B.Sc.I Electronics

To be implemented from **June 2013**

### Course structure:

Sr. No.	Semester	Paper	Title	No. of Lectures	Total Marks
1.	I	I	Electronics Fundamentals	35	50
	I	II	Digital Fundamentals	35	50
2.	II	III	Electronic Devices	35	50
	II	IV	Digital Electronics	35	50
3.	At the end of II <sup>nd</sup> Semester		Practical	--	50
Total Marks					250

## 2) Introduction:

XII<sup>th</sup> std syllabus is upgraded and also to cope up with the SET/NET examinations syllabus, the B.Sc. I syllabus is changed.

## 3) Objectives of the course:

- 1) To introduce basic knowledge of Electronics.
- 2) To develop the skill and logical thought process among the students.
- 3) To create awareness of basic Electronics devices and digital fundamentals.

## 4) Advantages of course:

- 1) Students will become familiar with electronic components and equipments.
- 2) Students will become familiar with basic devices used in communication system.

## 5) Eligibility of course:

As per University norms recommended for science faculty.

## 6) Duration:

Semester

## 7) Medium of Instruction:

English

## 8) Structure of the course:

Integrated

## 9) Syllabus:

Attached

Contents: 1) List of text Book and Reference Book.

## 10) List of Practical:

Attached

## 11) Question paper nature:

Attached



## Semester- I

### Paper -I Electronics Fundamentals

Marks: 50

**1) Circuit Elements:**

(6)

Active and passive elements,

Resistors, Capacitors, Inductors, Transformers, Relays and Fuses

[Classification, Specifications and Applications only]

**2) Circuit Fundamentals:**

(6)

DC sources, Constant voltage and current sources,

AC sources, Sinusoidal and non sinusoidal sources,

rms current and voltage, Phase relationship of current and voltage with pure resistor, capacitor and inductor.

[Numerical examples are expected]

**3) AC Circuits:**

(9)

Series and Parallel RLC circuits, Phase diagram, Impedance, Admittance

Series and Parallel resonance, Response curve, Band width, Quality factor

[Numerical Examples are expected]

**4) Network Theorem:**

(8)

Kirchhoff's Laws,

Mesh and Nodal analysis [Only DC resistive circuits]

Thevenin's Theorem, Norton's Theorem, Superposition Theorem,

Millman's Theorem, Maximum power transfer theorem

[Numerical examples are expected]

**5) Two Port Network:**

(6)

Black box theory, Concept of equivalent network,

Z, Y, H & Transmission (ABCD) parameters

T-network,  $\pi$ -network and their interconversion expressions only

[Numerical examples are expected]

**Recommended Books:**

1) Circuit and Networks: Analysis and Synthesis by A.Sudhakar & S.P. ShamMohan, (TMH)

2) Network Lines and Fields by J.D. Ryder, Mc Graw Hill.

3) Network Analysis by M.E. Van Valkenberg, PHI, New Delhi.

4) Basic Electronics by Bernord Grob

5) A Text Book of Applied Electronics by R.S. Shedha (S. Chand & Co.)

## **Paper-II Digital Fundamentals**

**Marks- 50**

- 1) Number Systems:** (7)  
Binary, Octal, Decimal, Hexadecimal number system and their interconversions  
1's compliment, 2's compliment, Arithmetic operations, Signed binary numbers
- 2) Binary Codes:** (5)  
8421 code, Excess-3 code, Gray code, ASCII code, Parity
- 3) Logic Gates:** (8)  
OR, AND, NOT, NAND, NOR, Ex-OR, Ex-NOR gates,  
Positive and Negative logic,  
DeMorgan's Theorems, Universality of NAND and NOR gates,  
Study of IC 7400, 7402, 7404, 7408, 7432, 7486
- 4) Boolean Algebra:** (8)  
Rules and laws of Boolean algebra, Simplification of Boolean expression, K-map,  
K-map for 2, 3 and 4 variables, Use of K-map for reduction of Boolean expressions
- 5) Arithmetic Circuits:** (7)  
Exclusive OR gate as a Binary to Gray converter, Parity checker, Controlled  
inverter, Half adder, Full adder, Parallel binary adder, Half and Full subtractor.  
Block diagram of digital computer and its organization.

### ***Recommended Books:***

- 1) Digital Fundamentals by Floyd, Pearson Education.
- 2) Digital Principles & Applications by A.P. Malvino & D.P. Leach (TMH), New Delhi.
- 3) Modern Digital Electronics by R.P. Jain
- 4) Digital Systems: Principles and Applications by Ronald J Tocci, Neat S. Widerman, PEA.
- 5) Digital Electronics, Circuits & Systems by V. K. Puri, TMH, New Delhi.

## Semester-II

### Paper-III Electronic Devices Marks: 50

**1) Semiconductor and p-n Junction (6)**

Intrinsic and extrinsic semiconductors,  
Formation of p-n junction, Barrier potential, I-V characteristics  
Diode equation, Static and dynamic resistance, Junction capacitance

**2) Special Diodes: (10)**

Zener diode, Breakdown mechanism (Zener & avalanche), I-V characteristics,  
LED, Photo diode, Varactor Diode, Tunnel Diode (Construction, working and applications only)

**3) Bipolar junction transistor (BJT): (8)**

BJT construction and operation , Transistor configuration, I/P and O/P characteristics of CE and CB configurations, Graphical determination of  $\alpha$  and  $\beta$ , Graphical determination of h-parameters for CE configuration  
[Numerical examples are expected]

**4) Field Effect Transistor: (5)**

JFET, Structure and operation of n-channel FET, I-V characteristics, Parameters, Applications [Numerical examples are expected]  
Depletion and Enhancement MOSFET, Structure and operation, I-V characteristics

**5) Thyristor and UJT: (6)**

Construction, working of SCR, Diac and Triac,  
Construction and characteristics of UJT

**Recommended Books:**

**1) Electronic Devices and Circuits by Jacob Milman & Chrstes S Halkias, MGH, Inter National Edition**

**2) Electronic Devices and Circuits: An introduction by Allen Mottershed (PHI), New Delhi**

**3) A Text Book of Applied Electronics by R.S. Shedha (S. Chand & Co.)**

**4) Basic Electronics & Linear Circuits by N.N Bhargava, D.C. Kulshreshta, S.C. Gupta (TMH)**

**5) Principles of Electronics- V.K. Mehata (Rev. Edition) S. Chand & Co.**

## Paper – IV      Digital Electronics

Marks- 50

**1) Logic Families:** (7)

Introduction to logic families, TTL NAND gate, Specifications of TTL logic family (Sinking, sourcing current, Input/output voltage limits, Fan-in, Fan-out, Noise margin, Propagation delay, Power dissipation).

**2) Combinational Logic:** (8)

Encoder: Decimal to BCD encoder, Priority encoder (IC-74147)

Decoder: 2-4 and 3-8 decoders (IC 74138), BCD –Decimal decoder, BCD-7 segment decoder (IC-7447)

Multiplexer: 4-1 and 8-1 multiplexer (IC-74153).

Demultiplexer: 1-4 and 1-8 demultiplexer

**3) Flip Flops:** (7)

RS flip flop using NOR gates, Clocked RS F/F,

D- F/F, Edge triggered D F/F,

JK F/F, Master slave JK F/F

T flip-flop,

[Timing diagrams are expected]

**4) Shift Registers:** (6)

Shift register, Types of shift registers, SISO, SIPO, PISO and PIPO,

Serial and parallel loading, Study of Right shift, Left shift, Ring counter, Johnson counter (IC -7495)

[Timing diagrams are expected]

**5) Counter Techniques:** (7)

Basic counter operation, 4-bit asynchronous and synchronous counters, Combination counter, MOD-2, MOD-5 counter, Decade counter ( IC-7490)

[Timing diagrams are expected]

**Recommended Books:**

1) Digital Fundamental by Floyd, Pearson Education.

2) Digital Principles and Applications by A. P. Malvino & D.P. Leach (TMH), New Delhi

3) Modern Digital Electronics by R.P. Jain.

4) Digital Systems: Principle and Applications by Ronald J. Tocci, Neat S Widemer,  
PEA

5) Digital Electronics, Circuits and Systems by V.K. Puri, TMH, New Delhi

6) Digital Computer Electronics by Malvino Brown, 3rd Edition, TMH

# Experiments

## Group-A

- 1) Thevenin's Theorem
- 2) Superposition Theorem.
- 3) Maximum Power Transfer Theorem
- 4) Series Resonance/Parallel Resonance
- 5) Kirchhoff's Laws
- 6) Measurement of Z, Y, and h-parameters for two port resistive network
- 7) Study of Photodiode
- 8) Characteristics of CE/CB configuration
- 9) Characteristics of JFET
- 10) Characteristics of SCR
- 11) Characteristics of UJT

## Group-B

- 1) DeMorgan's Theorems
- 2) Universal Gates
- 3) 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 shift and Johnson counter using IC 7495
- 7) Study Right shift and Ring counter using IC7495
- 8) Study of Multiplexer and Demultiplexer
- 9) Study of Encoder (74148) and Decoder (74138)
- 10) Study of BCD to 7 segment decoder.
- 11) TTL Characteristics (sourcing /sinking)
- 12) TTL Transfer Characteristics

## N.B.

- 1) Minimum **08** experiments from each group should be completed.
- 2) In addition to above experiments the students should be exposed to the laboratory equipments such as, CRO, FG, Power supplies, Multimeters, etc.
- 3) The student should be encouraged to use data sheets, manuals, etc.
- 4) The students should be encouraged for employing innovative ideas in current trends of Electronics.



**Solapur University, Solapur**  
Nature of Question Paper for Semester Pattern  
Faculty of Science  
(w.e.f. June 2013)

Time:- 2 hrs.

Total Marks 50

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

- i) -----  
a)                      b)                      c)                      d)
- ii)  
iii)  
iv)  
v)  
vi)  
vii)  
viii)  
ix)  
x)

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 one of the following (10)

- i)  
ii)