

**Anekant Education Society's
Tuljaram Chaturchand College of Arts, Science and
Commerce, Baramati**

Autonomous

**Course Structure For F. Y. B. Sc.
(2022-23)**

Electronic Science (Sem I)

Semester	Paper Code	Title of Paper	No. of Credits
I	USEL 111	Basic Electronics and Network Theorems	2
	USEL 112	Fundamentals of Digital Electronics	2
	USEL 113	Electronics Practical's	2

SYLLABUS (CBCS) FOR F. Y. B. Sc. (Electronic Science)
(w.e.f. June, 2022)

Class : F.Y. B. Sc. (Electronic Science)
Semester I
Paper Code : USEL 111
Paper : I
Title of Paper : **Basic Electronics and Network Theorems**
Credit : 2 **No. of lectures** : 36

● **Learning Objectives:**

1. To get familiar with basic electronics components.
2. To understand DC circuit theorems and their use in circuit analysis.
3. To know the AC circuits and related terminologies.
4. To study elementary electronic circuits and applications.

● **Learning Outcomes:**

At the end of this course, students should be able to:

1. To identify different parameters, specifications of passive components used in electronics.
2. To solve problem based on network theorems.
3. Compare DC, AC signals & circuit application.

Unit 1: Basic Elements: **(12L)**

Electronics components: Resistors, capacitors, Inductors, Transformer, Switches, Relays, Fuses, Batteries, Cables, Connectors (with reference to circuit symbol, working principle, types, specifications and applications). Color coding of resistors, series and parallel combinations of resistors, capacitors & Inductors.

Unit 2: Basic Electric Circuits **(12L)**

Concept of Ideal & Real voltage and current source, internal resistance, DC source, AC source (amplitude, wavelength, period, frequency, peak value, peak to peak values, RMS values), Charging and discharging of a capacitor, Resonance, LCR series resonance circuits, concept of impedance, quality factor, bandwidth
RC Filters (First order low pass & high pass only)

Unit 3: Network Theorems **(12L)**

Network terminology (Active & passive elements, Node, Branch, loop, mesh), Ohms law, voltage and current dividers, Kirchhoff's Laws (KCL, KVL), Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Superposition theorem, numerical problems related to all theorems

Reference Books:

1. Basic Electronics: Bernard Grob, McGraw Hill Publication, 8th Revised Edition, 2010
2. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition. 2012
4. Circuits and Networks Analysis and Synthesis: Sudhkar and S. P. Shyammoan, Tata McGraw-Hill Publishing Company Limited, 3rd Edition, (2006).

Unit III: Boolean algebra and Karnaugh Map

(12L)

Boolean Laws – Insertion, union, Tautology, Complement, Double Negation, Commutation, Association, Distribution, Absorption.

Boolean Expressions in SOP and POS Form, Conversion of SOP and POS into their standard form, Minimization of Complex Boolean Expression using Boolean Algebraic Techniques.

DeMorgan's Theorems, Introduction to k-map, Minimization Techniques using K-map (2 , 3 and 4 Variables).

Unit IV: Arithmetical Operations and Arithmetical Circuits

(8L)

Basic Binary Rules for addition and subtraction, 1's and 2's complement of binary numbers, Subtraction of binary numbers using 1's and 2's complement, Half adder, Full adder, Half Subtractor, Parallel Adder, Universal Adder/Subtractor. Study of IC 7483, IC4008.

Reference Books:

- 1. Digital Electronics : Principles, Devices and Applications - Anil K. Maini (Wiley)**
- 2. Digital Fundamentals - Floyd T.N. and Jain R.P. (Pearson Education)**
- 3. Digital system Design – M. Morris Mano(Pearson Education)**
- 4. Digital Principles and Applications –Leach, Malvino, Saha (TMH)**

SYLLABUS (CBCS) FOR F. Y. B. Sc. (Electronic Science) (w.e.f. June, 2022)

Class : F.Y. B. Sc. (Electronic Science)

Semester I

Paper Code : USEL 113

Paper : III

Title of Paper : Electronics Practical's

Credit 2

● **Learning Objectives:**

1. To teach students how to draw different symbols, logic diagrams and circuit diagrams.
2. To develop skill of circuit connections.
3. To train them to design and analyse circuits for specific purpose.
4. To motivate them to work on different mini projects.

● **Learning Outcomes:**

At the end of this course, students should be able to:

1. To identify different components, devices, IC's, as well as their types.
2. To understand basic parameters.
3. To know operation of different instruments used in the laboratory.
4. To connect circuit and do required performance analysis.

Group A : Demonstration (Any Two)

1. Study of electronic components (Resistor, Capacitor, inductor, Transformer, Switches, Fuses, Connectors, Cables, Diodes, Transistors, IC's)
2. Use of measuring electronic Instruments (Multimeter, Signal Generators, CRO, DSO, Power supply)
3. Demonstration of various IC's
4. Hand's on training- soldering /desoldring techniques

Group B : Analog Electronics (Any Four)

1. Measurement of signal parameters (amplitude, period, frequency, peak voltage, peak to peak voltage, RMS value)
2. Verification of Kirchhoff's Current Law (KCL)
3. Verification of Kirchhoff's Voltage Law (KVL)
4. Verification of Thevenin theorem

5. Verification of Maximum power transfer theorem
6. Study of filters (First order passive Low pass & High pass filter)
7. LCR series resonance

Group C : Digital Electronics (Any Four)

1. Verification of logic gates using IC's (7400, 7402, 7408, 7404, 7432)
 2. Realization of basic gates using universal gates (NAND, NOR)
 3. Study of Half & Full adder using gates.
 4. Code converter : Binary to Gray and Gray to Binary
 5. Design of Parity checker/ Generator using XOR gates.
 6. Verification of DE Morgan's theorem
 7. To study Universal adder & Subtractor
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