Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.SU/ Sci./College/NEP-2020/104/2024

It is hereby inform to all concerned that, In continuation circular No.SU./Revised B.Sc./NEP/72/2024/25588-96 dated 29.04.2024, the revised syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technolgy, the Academic Council at its meeting held on 08 April 2024 has accepted **the following Revised B.Sc. Course Structure & Curriculum** as per direction by the State Government dated on 13 March 2024 under the Faculty of Science & Technology (as per National Education Policy – 2020) run at the Affiliated Colleges, Dr.Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1	Physics	Ist and IInd semester
2	Instrumentation Practice	Ist and IInd semester
3	Electronics	Ist and IInd semester
4	Mathematics	Ist and IInd semester
5	Industrial Chemistry	Ist and IInd semester
6	Agrochemical Fertilizer	Ist and IInd semester
7	Horticulture	Ist and IInd semester
8	Biochemistry	Ist and IInd semester
9	Botany	Ist and IInd semester
10	Zoology	Ist and IInd semester
11	Biotechnology	Ist and IInd semester
12	bioinformatics	Ist and IInd semester
13	Microbiology	Ist and IInd semester
14	Dairy Science & TEchnology	Ist and IInd semester
15	Statistics	Ist and IInd semester
16	computer Science	Ist and IInd semester
17	Geology	Ist and IInd semester
18	Chemistry	Ist and IInd semester
19	Analytical Chemistry	Ist and IInd semester
20.	Polymer Chemistry	Ist and IInd semester
21.	Environmental Science	Ist and IInd semester
22.	Fishery Science	Ist and IInd semester

..2..

This is effective from the Academic Year 2024-25 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Chhatrapati Sambhajinagar
-431 004.
REF.NO. SU/SCI./2024/27128-35
Date:-27.05.2024.

★
★
★
★
★
★★★★★
★

Deputy Registrar,
Academic Section.

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

1] The Director, Board of Examinations & Evaluation, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.

2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.

3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.

5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.

6] The Public Relation Officer, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

7] The Record Keeper, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar- 431001

B.Sc. Degree Programme

(Three Year / Four Years (Hons) /Four Years (Hons with Research)

Course Structure and Syllabus for B. Sc. First Year

(AS PER NEP-2020)

Subject (Major): Electronics

Effective from 2024-25

PREFACE

As we stand on the threshold of a new era in education, the dawn of the National Education Policy 2020 illuminates our path toward a holistic, inclusive, and progressive educational landscape. The Bachelor of Science (B. Sc.) curriculum outlined herein reflects the ethos and aspirations of this transformative policy, aiming to equip learners with the knowledge, skills, and values necessary to thrive in the dynamic world of the 21st century.

At its core, the National Education Policy 2020 envisions an educational framework that is learner-centric, multidisciplinary, and geared towards fostering creativity, critical thinking, and innovation. It emphasizes the integration of knowledge across disciplines, breaking down traditional silos to encourage holistic understanding and application of concepts. The Bachelor of Science (B. Sc.) curriculum embodies these principles by offering a diverse array of courses spanning various scientific domains, while also incorporating interdisciplinary studies to nurture well-rounded graduates capable of addressing complex challenges with agility and insight.

Furthermore, the curriculum is designed to promote experiential learning, research, and hands-on exploration, recognizing the importance of practical engagement in deepening understanding and cultivating real-world skills. Through laboratory work, field experiences, internships, and project-based learning opportunities, students will have the chance to apply theoretical knowledge in practical settings, develop problem-solving abilities, and cultivate a spirit of inquiry and discovery.

Integral to the National Education Policy 2020 is the commitment to inclusivity, equity, and access to quality education for all. The Bachelor of Science (B. Sc.) curriculum reflects this commitment by embracing diversity in perspectives, backgrounds, and experiences, and by fostering an inclusive learning environment where every student feels valued, supported, and empowered to succeed.

Moreover, the curriculum emphasizes the cultivation of ethical values, social responsibility, and global citizenship, instilling in students a sense of accountability towards society and the environment. By integrating courses on ethics, sustainability, and social sciences, the Bachelor of Science (B. Sc.) program aims to produce graduates who are not only proficient in their respective fields but also compassionate, ethical leaders committed to making a positive impact on the world.

As we embark on this journey of educational transformation guided by the National Education Policy 2020, the Bachelor of Science (B. Sc.) curriculum stands as a testament to our collective vision of a more equitable, inclusive, and enlightened society. It is our hope that through rigorous academics, innovative pedagogy, and unwavering dedication to excellence, we can inspire the next generation of scientists, scholars, and change-makers to realize their full potential and contribute meaningfully to the advancement of knowledge and the betterment of humanity.

Structure of B. Sc. (Three / Four Years Honours / Honours with Research Degree) Programme with Multiple Entry and Exit Options

Subject (Major): Electronics

BSc First Year: 1st Semester

Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Pract.	Theory	Pract.	
Major (Core) M1 Mandatory **(Electronics)**	DSC-1	**Network Analysis and Semiconductor Devices**	2		2		2+2 = 4
	DSC-2	Practical based on DSC-1		4		2	
Major (Core) M2 Mandatory	DSC-1	-------	2		2		2+2 = 4
	DSC-2	Practical based on DSC-1		4		2	
Major (Core) M3 Mandatory	DSC-1	-------	2		2		2+2 = 4
	DSC-2	Practical based on DSC-1		4		2	
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) **It should be chosen compulsorily from the faculty other than that of Major**	GE/OE-1	To be chosen from other faculty	2		2		2
SEC (Skill Enhancement Courses) (Choose any one from pool of courses)	SEC-1	**i) Consumer Electronics-I ii) Electronic Measurements and Instrumentation-I**	1		1		2
	SEC-2	**i) Practicals based on Consumer Electronics-I ii) Practicals based on Electronic Measurements and Instrumentation-I**		2		1	
AEC, VEC, IKS	AEC-1	English (Common for all the faculty)	2		2		2+2 =4
	IKS-1	Choose any one from pool of courses	2		2		
OJT/ FP/CEP/CC/RP	CC-1	Health and Wellness (Common for all the faculty)		4		2	2
			13	**18**	**13**	**09**	**22**

1) **GE/OE-1 : Electrical Equipment Maintenance-I (This course will be available for the students of other faculty)**

BSc First Year: 2nd Semester

Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Pract.	Theory	Pract.	
Major (Core) M1 Mandatory **(Electronics)**	DSC-3	**Digital Electronics- I**	2		2		2+2 = 4
	DSC-4	Practical based on DSC-3		4		2	
Major (Core) M2 Mandatory	DSC-3	------	2		2		2+2 = 4
	DSC-4	Practical based on DSC-3		4		2	
Major (Core) M3 Mandatory	DSC-3	-----	2		2		2+2 = 4
	DSC-4	Practical based on DSC-3		4		2	
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) **It should be chosen compulsorily from the faculty other than that of Major**	GE/OE-2	To be chosen from other faculty	2		2		2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	VSC-1	**i) PCB Design and Fabrication ii) Power supplies**	1		1		2
	VSC-2	**i) Practicals based on PCB Design and Fabrication ii) Practicals based on Power supplies**		2		1	
AEC, VEC, IKS	AEC-1	English (Common for all the faculty)	2		2		2+2 =4
	VEC-1	Constitution of India (Common for all the faculty)	2		2		
OJT/ FP/CEP/CC/RP	CC-2	Yoga Education / Sports and Fitness (Common for all the faculty)		4		2	2
			13	**18**	**13**	**09**	**22**
Exit Option : Award of UG Certificate in 3 Majors with 44 credits and an additional 4 credits of core NSQF course / Internship OR continue with Major and Minor							

1) **GE/OE-2 : Electrical Equipment Maintenance-II (This course will be available for the students of other faculty)**

Students will have to choose any three subjects as a **Major 1, Major 2, Major 3,** from Basket 1 under the Faculty of Science and Technology.

Students will be having three subject options of equal credits (instead of Major and / or minor verticals) in the first year. Students will have to select / declare choice of one subject **as a major subject** in the beginning of second year **out of three major options M1, M2 and M3 (which were opted in the first year).**

Detailed Illustration of Courses included in 1st and 2nd semester:

1) **Major** (Core) subject are mandatory.

   DSC-1 : This is a 2 credit theory course corresponding to Major (core) subject
   DSC-2 : This is a 2 credit practical course based on DSC-1
   DSC-3 : This is a 2 credit theory course corresponding to Major (core) subject
   DSC-4 : This is a 2 credit practical course based on DSC-3

2) **Generic / Open Elective (GE/OE)**: (Needs to be chosen (any one) from pool of courses available at respective college). **These courses should be chosen compulsorily from faculty other than that of Major.**

   GE/OE -1 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.
   GE/OE -2 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

3) **SEC** (Skill Enhancement Courses) : Choose any one from pool of courses. These courses needs to be designed to enhance the technical skills of the students in specific area.

   SEC-1 : This is a 1 credit theory course to enhance the technical skills of the students in specific area.
   SEC-2 : This is a 1 credit practical course based on SEC-1.

4) **VSC** (Vocational Skill Courses) : Choose any one from pool of courses. These courses should be based on Hands on Training corresponding to Major (core) subject.

   VSC-1 : This is a 1 credit theory course based Hands on Training corresponding to Major (core) subject.
   VSC-2 : This is a 1 credit practical course based on VSC-1

5) **AEC** (Ability Enhancement courses): The focus of these courses should be based on linguistic and communication skills.

   AEC-1 : English
   This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

AEC-2 : English
This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

6) **IKS** (Indian Knowledge System) : The courses related to traditional and ancient culture of India will be included in this section. The respective college will have to choose one of the courses from the pool of courses designed by the University.

IKS-1 : To be chosen from the pool of courses designed by the University
This is a 2 credit theory course based on Indian Knowledge System. It will be common for all the faculty

7) **VEC** (Value Education Courses): The courses such as understanding India, Environmental Science / Education, Digital and Technological solutions etc will be part of Value Education Courses.

VEC-1 : Constitution of India
This is a 2 credit theory course based on value education. It will be common for all the faculty

8) **CC** (Curricular Courses): The courses such as Health and wellness, Yoga education, Sports and Fitness, Cultural activities, NSS/NCC, Preforming Arts.

CC-1 : Health and Wellness
This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

CC-2 : Yoga education / Sports and Fitness
This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

General Guidelines for Course Selection

1) The Major subject is the discipline or course of main focus, bachelors degree shall be awarded in that discipline / subject.
2) Students will have to choose any three subjects as a Major 1, Major 2, Major 3, from **Basket 1** under the Faculty of Science and Technology (based on the available options in the respective college).
3) Students will be having three subject options of equal credits (instead of Major and / or minor verticals) in the first year.
4) In the beginning of second year, students will have to select / declare choice of **one major subject** and **one minor subject** from three major options **M1, M2 and M3 (which were opted in the first year)**
5) Once the students finalize their **Major Subject** and **Minor Subject** in the beginning of the second year of the programme, they shall pursue their further education in that particular subject as their **Major and Minor** subjects. Therefore, from second year onwards curriculum of the Major and Minor subjects shall be different.
6) Students are required to select **Minor subject** from **other discipline of the same faculty**
7) Students are required to select **Generic /Open Elective** (vertical 3 in the credit framework) **compulsorily from the faculty different than that of their Major / Minor subjects.**
8) Vocational Skill Courses and Skill Enhancement Courses (VSC and SEC) shall be related to the Major subject
9) Curriculum of Ability Enhancement Courses (AEC), Value Education Courses (VEC), Indian Knowledge System (IKS), and Co-curricular Courses (CC) will be provided by the University separately.

Programme Educational Objectives (PEOs) :

Programme Educational Objectives (PEOs) for the Bachelor of Science Curriculum under the National Education Policy 2020:

1. **Mastery of Discipline-Specific Knowledge**: Graduates of the Bachelor of Science program will demonstrate a deep understanding of fundamental principles, theories, and methodologies in their chosen scientific discipline, enabling them to analyze complex problems, propose innovative solutions, and contribute to advancements in their field.

2. **Interdisciplinary Proficiency**: Graduates will possess the ability to integrate knowledge and skills from multiple scientific disciplines, fostering a holistic approach to problem-solving and innovation. They will be equipped to address multifaceted challenges by drawing upon diverse perspectives and methodologies.

3. **Critical Thinking and Analytical Skills:** Graduates will develop strong critical thinking abilities, enabling them to evaluate information rigorously, analyze data effectively, and make informed decisions based on evidence. They will demonstrate proficiency in applying logical reasoning and scientific methods to solve problems and generate new knowledge.

4. **Leadership and Innovation:** Graduates will demonstrate leadership qualities and entrepreneurial mindset, capable of initiating and driving positive change in their organizations and communities. They will exhibit creativity, resilience, and adaptability, harnessing innovation to address complex challenges and seize opportunities for growth and advancement.

5. **Global Citizenship and Cultural Sensitivity**: Graduates will possess a global perspective and cultural sensitivity, recognizing the interconnectedness of diverse communities and the importance of collaboration across borders. They will engage in cross-cultural dialogue, embrace diversity, and contribute to the advancement of knowledge and understanding on a global scale.

These Programme Educational Objectives serve as guiding principles for the Bachelor of Science curriculum, reflecting our commitment to nurturing well-rounded graduates who are prepared to excel in their careers, contribute to society, and lead meaningful lives in a rapidly changing world.

Programme Outcomes (POs) :

The National Education Policy (NEP) 2020 for India emphasizes several key aspects for Bachelor of Science (B.Sc.) programs, aiming to produce graduates who are not only well-versed in their respective disciplines but also equipped with skills necessary for holistic development and employability. While specific program outcomes may vary between institutions and disciplines within B.Sc. programs, here are some common outcomes aligned with NEP 2020:

- **PO1. The citizenship and society:** Apply broad understanding of ethical and professional skill in science subjects in the context of global, economic, environmental and societal realities while encompassing relevant contemporary issues.

- **PO2. Environment and sustainability**: Apply broad understanding of impact of science subjects in a global, economic, environmental and societal context and demonstrate the knowledge of, and need for sustainable development.

- **PO3. Ethics:** Apply ability to develop sustainable practical solutions for science subject related problems within positive professional and ethical boundaries.

- **PO4. Individual and team work:** Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments.

- **PO5. Communication:** Communicate effectively on complex science subject related activities with the scientific community in particular and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **PO6. Project management and finance**: Demonstrate knowledge and understanding of the first principles of science and apply these to one's own work as a member and leader in a team, to complete project in any environment.

- **PO7. Life-long learning**: Recognize the need for lifelong learning and have the ability to engage in independent and life-long learning in the broadest context of technological change.

These program outcomes align with the broader goals of NEP 2020 to transform higher education in India and prepare students for the challenges and opportunities of the 21st century. Board of Studies designing B.Sc. curricula are encouraged to incorporate these outcomes into their program objectives and learning outcomes.

Programme Specific Outcomes (PSOs):

PSO1. **Domain knowledge:** Apply the knowledge of electronics fundamental, and advanced areas of Electronics to provide comprehensive solution of problems in complex electronics.

PSO2. **Problem Analysis:** Identify electronics related problems at varied complexity and analyze the same to formulate/ develop substantiated conclusion using first principles of Electronics

PSO3. **Design Development of solutions:** Design/ develop solutions for problems at varied complexity in various areas of Electronics to address changing challenges put forward by market demand/ stakeholder

PSO4. **Conduct Investigation of complex problems:** Use established knowledge and methods to design of experiments, analyze resulting data and interpret the same to provide valid conclusions.

PSO5. **Modern tools:** Create, select, and apply appropriate techniques, resources, and modern electronics and relevant IT tools including prediction and modeling to complex electronics technology related activities with clear understanding of the limitations.

Semester – I

DSC-1: Network Analysis and Semiconductor Devices

Total Credits: 02 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Learning Objectives of the Course:

1. To introduce students to various components, network theorems, diodes, transistors and power supplies
2. To make them understand the concept of network analysis, types of diodes, transistor configuration and various aspects of regulated power supply.
3. To enable students to design and construct circuits based of various network theorems, transistor configurations and half wave rectifiers.

Course Outcomes (COs):

After completion of course, students will be able to--

1. Apply the basic concepts of network theorems, diodes, transistors and power supplies to solve the complex problem in electronic circuits.
2. Analyse various networks, diode and transistors configuration and identify various issues of regulated power supply.
3. Design an electronics circuit using networks, diodes and transistor.
4. Design and develop a low cost power supplies.

Unit-I. **10 Hrs.**

Components and Network Theorems: Electronic passive and active components, Concept of Voltage and Current divider theorem, Ideal constant voltage sources, Ideal constant current sources, Superposition theorem, Thevenin's, Norton's, Maximum Power Transfer theorem.

Unit-II. **10 Hrs.**

Diodes and Transistors: P-N junction diode, Biasing a semiconductor diode, Ideal and practical diodes, Zener diode, Reverse saturation current, Zener and avalanche breakdown. Tunnel diode, Light emitting diode and photo diode. **Transistors:** Transistor, transistor action, characteristics of transistor in common base (CB), Common emitter (CE), Common collector (CC), transistor current gains α and β, relation between α and β.

Unit-III. **10 Hrs.**

Power supplies: Block diagram of Regulated Power supply, half wave and Full wave rectifiers, and their efficiency, bride rectifier, and its efficiency, Zener diode as voltage regulator, transistor series voltage regulator.

Reference Books:

1) Electrical technology – B. L. Theraja (S. Chand 2004)
2) Semiconductor Electronics – A. K. Sharma New age international 1996.
3) Principles of Electronics – V. K. Mehta (S. Chand and Co. 2004)
4) Basic Electronic (Solid state) – B. L. Theraja devices (S. Chand and Co. 2012)
5) Electronic Devices and Circuits- David A. Bell 5th Edition, Oxford Uni. Press, 2015

DSC-2: Practical based on DSC-1

(Network Analysis and Semiconductor Devices)

Total Credits: 02 **Total Contact Hours: 60 Hrs**

Maximum Marks: 50

Minimum of Six Experiments to be perform excluding demonstration experiments

Every candidate appearing for the examination must produce a journal showing that he/ she has completed **06 experiments** during this semester. The journal must be certified at the end of the semester by Head of the Department.

Experiments:

1. Study of PN junction diode characteristics, determination of ac and dc resistance.
2. Study of Zener diode characteristic, determination of VZ, IZ ZZ.
3. Study of transistor characteristics in CE configuration, determination of α.
4. Study of JFET characteristics, determination of parameters.
5. Built and study of Full wave rectifier.
6. Built and study shunt regulator using Zener diode, line and load regulation.
7. Built and study power supply with capacitor filter.
8. Built of study two stage CE amplifier

SEC-1: (i) Consumer Electronics-I

Total Credits: 01 **Total Contact Hours: 15 Hrs**

Maximum Marks: 50

Objectives: In this paper Student will learn basic concepts of sensors, transducers, oscillators, speakers and modern TV.

Course Outcomes (COs):

Upon the completion of this course, students will ability to.

1. Understand various sensors and their application.
2. Understand various parts and their functions of microphone, speakers.
3. Understand working of Amplifier, mp3 players:
4. Understand working of TV.

Unit I: **05 Hrs.**

Sensor and Transducer: Definition, Active and passive sensors, specifications, Types- Temperature, pressure, pH, humidity, optical, displacement, IR, tilt sensor etc. **Amplifiers & Oscillators:** Amplifiers: History, Principle, Types: Power amplifier, operational amplifier, distributed amplifier. Application. Oscillators: Construction & working, Basic types of oscillators.

Unit II: **05 Hrs.**

Speakers & Car mp3 players: Speakers: Introduction, History, Drive design, Driver types: Full range driver, Woofer, Tweeter, specification, electrical characterization, Car mp3 players: Various types of m/c, Various Audio systems e.g. 2.1ch, 5.1 etc, Standard specification of Audio system, mp3 players used in cars.

Unit III: **05 Hrs.**

Black & White TV System : Block Diagram, **Modern Colour TV System:** Colour TV Block diagram, various sections of colour TV-viz -vertical section, various type of Monitor, Various new types (except CRT type) of TV's-plasma, LCD, LED, OLED, QLED, Curved, foldable, 3D, Smart TV.

References:

1. Audels Home appliances servicing – Edwin P. Anderson

2. Micro Electronic Circuit, Oxford University Press VIth Edition –Sedra & Smith

3. Basic electronics – By V. K. Mehate

4. Electronic Devices and Circuits McGraw Hill Millman, Halkias and Jit

5. Electronic Devices & Circuit Pearson Education – Boylestad & Nashelsky

6. Introducing Electronic Devices & Circuit, Pearson Education VIIth Edition – Robert T. Paynter

7. Electronic Devices & Circuit – Tata McGraw Hill-S. Salivahanan, N. Suresh Kr,A.Vallavara

SEC-1: (ii) Electronic Measurements and Instrumentation-I

Total Credits: 01 **Total Contact Hours: 15 Hrs**

Maximum Marks: 50

Objectives: Student will learn basic concepts of units and measurement, errors Ac and DC voltage measurements, frequency measurements. Also study the analogue and digital meters.

Course Outcomes (COs):

Upon the completion of this course, students will have ability to-

1) Understand scientific notations and metric prefixes.
2) Identify the components of a Cathode Ray Oscilloscope (CRO) and understand their functions.
3) Describe the working principles of analogue meters including galvanometer, DC ammeter, DC voltmeter, and series ohm meter.
4) Demonstrate knowledge of time base and dual trace oscilloscope operation.
5) Measure voltage, frequency, and phase using a CRO.
6) Troubleshoot oscilloscope problems and understand delay time-based oscilloscope operation.

Unit I : **3 Hrs.**

Units, dimensions and standards: Scientific notations and metric prefixes. SI electrical units, SI temperature, scales, other unit systems, dimension and standards.

Unit II : **6 Hrs.**

Analog meters: Galvanometer, DC ammeter, DC voltmeter, series ohm meter Transistor voltmeter circuits, AC electronic voltmeter. **Digital meters:** Current measurement with electronic instruments, probes Digital voltmeter systems, digital multimeters, digital frequency meter system.

Unit III : **6 Hrs.**

Study of CRO: CRT, Block diagram, Function of each block, wave form display, time base, and dual trace oscilloscope, measurement of voltage, frequency and phase by CRO, Oscilloscope problem, and delay time based oscilloscope.

Reference Books:

1) Electronic Instrumentation -Kalsi H S, Publisher Mcgraw Higher Ed.
2) Modern Electronic Instrumentation and Measurement- Albert D. Helfrick, William David Cooper, Publisher PHI
3) A Course in Electrical and Electronic Measurements and Instrumentation- A. K. Sawhney, Puneet Sawhney, Publisher, Rai

SEC-2 : Practical Based on SEC-1 (i) (Consumer Electronics-I)

Total Credits: 01 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Minimum of Six Experiments to be perform excluding demonstration experiments

Every candidate appearing for the examination must produce a journal showing that he/ she has completed 06 experiments during this semester. The journal must be certified at the end of the semester by Head of the Department.

Objectives: To enable the students to

1. Understand various sensors and their application
2. Understand various Parts and their functions of microphone, speakers.
3. Understand working of Amplifier, mp3 player.
4. Understand working of TV.

Experiments:

1. Study of Temperature Sensor.
2. Testing & repairing of Amplifier.
3. Testing & repairing of Speaker.
4. Testing & repairing of Microphone.
5. Study of Testing & Repairing of mp3 player.
6. Study of various section of TV.
7. Testing & repairing of Testing & repairing of TV.
8. Testing & repairing of Smart TV. (LED).
9. Visit to Shop & Market Survey.

SEC-2 : Practical Based on SEC-1 (ii)

Electronic Measurements and Instrumentation-I

Total Credits: 01 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Minimum of Six Experiments to be perform excluding demonstration experiments

Every candidate appearing for the examination must produce a journal showing that he/ she has completed 06 experiments during this semester. The journal must be certified at the end of the semester by Head of the Department.

Objectives: In this paper student will be learn the galvanometer, voltmeter, ammeter and CRO.

Experiment

1. Study of semiconductor diode voltmeter. Its use as DC average responding AC voltmeter.
2. Study of construction of L.C.R. Bridge. Determination of the value of the given components using LCR Q meter.
3. Study of the diode testing and determination of the parameters of the given diode.
4. Study of the transistor tester and determination of the parameters of the given transistors.
5. Study of the IC tester and determination of the parameters of the given IC.
6. Use a galvanometer as voltmeter.
7. Use a galvanometer as ammeter.
8. Measurement of voltage using CRO.
9. Measurement of phase difference, and frequency using CRO (Lissajous figure).

This course will be available for the students from other faculty

GE/ OE 1: Electrical Equipment Maintenance-I

Total Credits: 02 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Objectives:

In this paper student will learn basic of Electrical Equipment Maintenance and identification of faults in various instruments.

Course Outcomes (COs):

Upon the completion of this course, students will demonstrate the ability to-

1. Understand the principles and operation of Testing Equipments.
2. Demonstrate proficiency in using series test lamps for single-phase circuits.
3. Explain the functioning and application of overload switches, electromagnetic relays, and Miniature Circuit Breakers (MCBs).
4. Identify different types, specifications, and maintenance procedures for each testing equipment.
5. Analyze common troubleshooting techniques for diagnosing faults in testing equipment.

Unit-I **10 Hrs**

Testing Equipment's: line tester, electronic line tester, series test lamp for single phase, overload switch, electromagnetic relay, MCB (Miniature Circuit Breaker). **Tube Light:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Electric Iron:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting

Unit-II **10 Hrs**

Water Heater & Geyser: Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Room Heater:** Principle, working, various parts and their use, types, specification, maintenance, and trouble shooting. **Hair dryer:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Fan**

Regulator: Principle, working, various parts and their use, types, specification, maintenance and trouble shooting

Unit-III **10 Hrs**

Torch: Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Electric doorbell:** Principle working, various parts and their use, types, specification, maintenance and trouble shooting. **Tea- Coffee maker:** Principle working, various parts and their use, types, specification, maintenance and trouble shooting

References

1. Electronics Instruments and Systems: Principles, Maintenance and Troubleshooting, R.G. Gupta TMH, 2001.

2. Electronics fault diagnosis by G. C. Loveday, A. II. Longman, 4th Edition, 1994.

3. Study of Home Appliances-K.B.Bhatiya

4. Home Appliances-Anwari

5. Home Appliances Services-E.P.Andersons

Semester – II

DSC-3: Digital Electronics – I

Total Credits: 02 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Learning Objectives of the Course:

1. To introduce students to various fundamental concepts of digital electronics.
2. To make them understand the concept of number system, logic gates and combinational logic circuits.
3. To enable students to design and construct circuits based on various logic gates and combinational logic circuits.

Course Outcomes (COs):

After completion of course, students will be able to--

1. Apply the basic concepts of number system logic gates and combinational logic circuits to solve the complex problem in electronics circuits.
2. Analyze various logic gates and combinational logic circuits to identify various issues in digital networking.
3. Design various digital circuits using logical gates and combinational logic circuits.
4. Design and develop a cost effective digital devices based on adder and subtractor.

Unit-I: **10 Hrs.**

Number System: Decimal, Binary, Octal and Hexadecimal number and their conversions, Binary arithmetic; addition, subtraction, Multiplication and division, 1's and 2's complement method for binary subtraction, Gray code, Excess-3 addition.

Unit II: **10 Hrs.**

Logic gates and Boolean algebra: Positive and negative logic gates (AND, OR, NOT, NAND, NOR) using diode & transistor, Ex-OR and Ex-NOR gate. **Boolean algebra:** Boolean laws, De-Morgan's Theorem, SOP and POS form of Boolean expression. Simplification of Boolean Expression, Karnaugh Map (K-map up to four variables only).

Unit III: **10 Hrs**

Combinational logic circuits: NAND and NOR gates Universal building blocks, Half adder, Full adder, Half subtractor, Full subtractor, 4-bit parallel adder and subtractor, 2's complement adder / subtractor.

Reference Books:

1) Digital Fundamentals – Thomas L. Floyd, Universal Book Stall New Delhi.
2) Digital Electronics and Microcomputer -R. K. Gaur.
3) Digital Analog Techniques – Navanath, Kale and Gokhale, Kitab Mahal.
4) Digital Electronics with Practical Approach – G N Shinde, Shivani Publications Nanded.
5) Digital Principal and Circuits – C. B. Agarwal, Himalaya Publishing House.

DSC-4 : Practical Based on DSC-3 : Digital Electronics-1

Total Credits: 02 **Total Contact Hours: 60 Hrs**

Maximum Marks: 50

Minimum of Six Experiments to be perform excluding demonstration experiments

Every candidate appearing for the examination must produce a journal showing that he/ she has completed 06 experiments during the academic year. The journal must be certified at the end of the semester / year by Head of the Department.

Experiments:

1. Built and study NOT, OR & AND gates using Diodes and Transistor/ 74XX.
2. Built and study NAND & NOR gates using Diodes and transistor/ 74XX.
3. Built and study of Ex-OR and Ex-NOR gates using Diodes and Transistor/ 74XX.
4. Built and study universal properties of NAND gate
5. Built and study universal properties of NOR gate
6. Built and study of Half adder using gates.
7. Built and study of Half subtractors using gates.
8. Built and study of full adder using gates.
9. Built and study of full subtractor using gates.

VSC-1: (i) PCB Design and Fabrication

Total Credits: 01 **Total Contact Hours: 15 Hrs**

Maximum Marks: 50

Objectives:

In this paper student will learn basic of PCB designing and tools such as soldering and de-soldering of electrical circuits, to design PCB and identification of faults in various instruments.

Course Outcomes (COs):

Upon the completion of this course, students will demonstrate the ability to-

1) Understand the fundamentals of electronic components commonly used in PCBs.
2) Explain the basic electronic circuits used in PCB designing.
3) Demonstrate proficiency in layout planning for PCBs, considering general rules and parameters.
4) Identify considerations for ground conductors and thermal issues in PCB design.
5) Perform checks and inspections of artwork for PCBs.

Unit I: **05 Hrs.**

Introduction to Printed circuit board: Fundamental of electronic components, basic electronic circuits of printed circuit board designing: Layout planning, general rules and parameters, ground conductor considerations, thermal issues, check and inspection of artwork.

Unit II: **05 Hrs.**

Design rules for PCB: Design rules for Digital circuit PCBs, Analog circuit PCBs, high frequency and fast applications. Power electronics, microwave applications. **Soldering and De Soldering Stations:** Different types of Soldering Guns related to Temperature and wattages, types of tips, Solder materials and their grading. Soldering and De Soldering Stations and their Specifications, Preparing Component for Soldering. De soldering tools-De soldering Basic Components

Unit III: **05 Hrs.**

Identification of Faults: Identification of loose/dry solder, broken tracks on printed wire assemblies & discrete components mounted circuit boards, Join the broken PCB track and test, De soldering using Pump and wick, Introduction of SMD Components.

Reference Books:

1. Printed circuit Board Design, Fabrication Assembly and Resing. R.S Khanpure, TMH-2006.
2. Printed circuit Board Design and Technology, Walter C. Bosshart, TMH-1983.
3. PCB Design for Real-World EMI Control, Bruce R. Archambeault and James Drewniak, Springer Science.
4. Complete PCB Design Using Or Cad Capture and Layout, Kraig Mitzner, Newnes Pub.

VSC-1: (ii) Power Supplies

Total Credits: 01 **Total Contact Hours: 15 Hrs**

Maximum Marks: 50

Learning Objectives: In this paper Student will learn basic concepts of Rectifiers and filters, Regulated power supply, Inverters and UPS.

Course Outcomes (COs):

After completion of this course, student will be able to-

1. Understand various components used in power supply.
2. Understand the specification, use of Inverter and UPS.
3. Analyse various types of power supplies
4. Design and develop a power supply.

Unit I: **05 Hrs.**

Rectifier and filters Circuits: Half wave, Full wave, Bridge, Merits, Demerits. Filters, Reactance, Capacitor, Inductor, RC, RL, RLC and their types. **Regulated Power supply**: Avalanche breakdown, Zener breakdown, Zener Characteristics. Power Supply: Block diagram, line regulation, load regulation, series & shunt regulation.

Unit II: **05 Hrs.**

Stabilizer: Block diagram, Principle, working, specification, maintenance & trouble shooting. **IC 78XX & 79XX regulator:** Block diagram, working and design of series / shunt regulation.

Unit III: **05 Hrs.**

Inverter: Principle & block diagram, working, various parts and their use, types specification, maintenance and trouble shooting. **UPS:** Block diagram, Principle, working, various parts and their use, type's specification, UPS-Online, offline, maintenance and trouble shooting.

References

1. Electrical Engineering – B. L. Theraja P – I, II, III, IV

2. Maintenance of Domestic Appliances – R. B. Lal

3. Basic Electrical Engineering (PHI) – S.N.Singh

4. Electronic Devices and Circuits McGraw Hill Millman, Halkias and Jit

5. Electronic Devices & Circuit – Tata McGraw Hill-S.Salivahanan, N.Suresh Kr,& A.Vallavar

6. Modern Digital Inverter Basic Servicing and Fault finding by Manahar Lotia BPB Publication.

7. Modern UPS Introduction, Servicing and Fault finding by Manahar Lotia BPB Publication.

VSC-2 : Practical Based on VSC-1 (i) (PCB Design and Fabrication)

Total Credits: 01 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Minimum of Six Experiments to be perform excluding demonstration experiments

Every candidate appearing for the examination must produce a journal showing that he/ she has completed 06 experiments during the academic year. The journal must be certified at the end of the semester / year by Head of the Department.

Objectives: In this paper student will learn design and etching of PCB in HCl acid and soldering and de-soldering of components on PCB.

Experiment:

1. To study the basic of PCB and its fabrication method.
2. Etching of various PCB.
3. Soldering and de-soldering of various components on PCB.
4. Study of soldering and de-soldering tools and machinery (any tools)
5. Assemble the components (any 3 components)
6. De-Assembled the components (any 3 components)

VSC-2 : Practical Based on VSC-1: (ii) Power Supplies

Total Credits: 01 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Minimum of Six Experiments to be perform excluding demonstration experiments

Every candidate appearing for the examination must produce a journal showing that he/ she has completed 06 experiments during the academic year. The journal must be certified at the end of the semester / year by Head of the Department.

Objectives: To enable the students to

1. Understand various components used in power supply.
2. Design and develop a power supply.
3. Understand the specification, use of Inverter and UPS.

Experiments:

1. Study of Half wave rectifier
2. Bridge Rectifier
3. Study of passive filters
4. Study of 1) Line Regulation 2) Load Regulation in laboratory power supply
5. Study and testing of laboratory stabilizer.
6. To design, build and test IC regulated power supply
7. Study and testing of Inverter
8. Study and testing of UPS

This course will be available for the students from other faculty

GE/ OE-2: Electrical Equipment Maintenance-II

Total Credits: 02 **Total Contact Hours: 30 Hrs**

Maximum Marks: 50

Objectives:

In this paper student will learn basic of Electrical Equipment Maintenance and identification of faults in various instruments.

Course Outcomes (COs):

Upon the completion of this course, students will demonstrate the ability to.

1) Understand the principle of operation of Electrical appliances.
2) Identify and describe the various aspects of Electrical appliances and their functions.
3) Differentiate between types and specifications of Electrical appliances.
4) Demonstrate knowledge of maintenance practices and troubleshooting methods for Electrical appliances.

Unit I: **10 Hrs**

Water purifiers: Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Water cooler:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Air Cooler:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting

Unit II: **10 Hrs**

Fan: Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Mixer:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Induction stove:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting

Unit III: **10 Hrs**

Microwave Oven: Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. **Washing Machine:** Principle, working, various parts and their use, types, specification, maintenance and trouble shooting. V**acuum Cleaner:** Principle, working, various parts and their use, types, specification, maintenance, and troubleshooting **Drill Machine:** Types-Mechanical, Electrical Principle, working, various parts and their use, specification, maintenance and trouble shooting

References:-

1) Modern Electronics equipment's Troubleshooting, repair and maintenance, R. S. Khandpur. TMH, 1987.
2) Electronics Instruments and Systems: Principles, Maintenance and Troubleshooting, R.G. Gupta TMH, 2001.
3) Electronics fault diagnosis by G. C. Loveday, A. H. Longman, 4th Edition, 1994.
4) Small Appliances Servicing – P.T. Brook Woll Jr.
5) How to repair small Appliances – Jack Darr
6) Audels Home appliances servicing – Edwin P. Anderson
7) Maintenance of Domestic Appliances – R. B. Lal

==========XXXXXXX==========