Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
[Autonomous]
Department of Electronics
B.Sc.-I
Electronics Basket (NEP-2020)
2023-24

Subject	Semester- I	Semester-II
Major Course	P-I: Fundamentals of Electronics and Network Analysis	P-I: Semiconductor Devices
	P-II: Fundamentals of Digital Electronics	P-II: Digital Electronics
Minor Course	P-III: Linear Electronics (VSC Practical)	P-III: Basic Digital Electronics (VSC Practical)
OE	P-IV: Electronics for Everyone	P-IV: Domestic Electronics
SEC	P-V: LED bulb Production-I	P-V: LED bulb Production-II
IKS	P-VI: Contribution of Electronics in Indian Knowledge System	
VEC		P-VI: Electronic(e) Waste Management

B.Sc.-I Electronics
Sem.- I
Course Code & Credit Structure
NEP 2020
2023-24

Year	Sem.	Course Type	Course Code	Course Title	Remarks	Credits	No of Lecture (hrs.)	No of Practical's (hrs.)	College Assessment Marks	Internal Assessment Mark	Total Marks
I	I	Major	ELE-101-MJ	Fundamental of Electronics and Network Analysis	Theory	2	30L		40	10	50
			ELE-102-MJ	Fundamentals of Digital Electronics	Theory	2	30L		40	10	50
		Major	ELE-103-MJP	Electronics Practical-I	Practical	2		60L	40	10	50
		Minor	ELE-104-MN	Linear Electronics	Theory	2	30L		40	10	50
		OE	ELE-105-OE	Electronics for Everyone	Theory	4	60L		80	20	100
		VSC	ELE-106-VSC	VSC (Linear Electronics Practical)	Practical	2		60L	40	10	50
		SEC	ELE-107-SEC	LED bulb Production-I	Theory	1	15L		25	-	25
		SEC	ELE-108-SECP	LED bulb Production Practical -I	Practical	1		30L	25	-	25
		IKS	ELE-109-IKS	Contribution of Electronics in Indian Knowledge System	Theory	2	30L		25	25	50
		AEC		English	Theory	2	30L		40	10	50
		CC		NCC/NSS/Culture		2					50
					Total	**22**					**550**

*ELE-Electronics, MJ-Major Course, MN-Minor Course, OE-Open Elective, VSC-Vocational Skill Course , SEC-Skill enhancement Course ,IKS-IndianKnowledge System, VEC-Value Education Courses

B.Sc.-I Electronics
Sem. - II
Course Code & Credit Structure
NEP 2020
2023-24

Year	Sem	Course Type	Course Code	Course Title	Remarks	Credits	No of Lecture (hrs.)	No of Practical's (hrs.)	College Assessment Marks	Internal Assessment Mark	Total Marks
I	II	Major	ELE-201-MJ	Semiconductor Devices	Theory	2	30L		40	10	50
			ELE-202-MJ	Digital Electronics	Theory	2	30L		40	10	50
		Major	ELE-203-MJP	Electronics Practical-II	Practical	2		60L	40	10	50
		Minor	ELE-204-MN	Basic Digital Electronics	Theory	2	30L		40	10	50
		OE	ELE-205-OE	Domestic Electronics	Theory	4	60L		80	20	100
		VSC	ELE-206-VSC	VSC (Basic Digital Electronics Practical)	Practical	2		60L	40	10	50
		SEC	ELE-207-SEC	LED bulb Production-II	Theory	1	15L		25	-	25
		SEC	ELE-208-SECP	LED bulb Production Practical -II	Practical	1		30L	25	-	25
		VEC	ELE-209-VEC	Electronics(e) Waste Management	Theory	2	30L		40	10	50
		AEC		English	Theory	2	30L		40	10	50
		CC		NCC/NSS/Culture		2					50
					Total	**22**					**550**

*ELE-Electronics, MJ-Major Course, MN-Minor Course, OE-Open Elective, VSC-Vocational Skill Course , SEC-Skill enhancement Course , SECP-Skill Enhancement Course Practical, IKS-IndianKnowledge System, VEC-Value Education Courses

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur

(Autonomous)

First Year Syllabus under Autonomy

NAAC Reaccredited 'A^{+}' grade, CGPA: 3.51
Granted under FIST-DST and The Best College

Affiliated to the

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Program: B.Sc. I

Subject: Electronics

Semester: I and II

Syllabus to be implemented from w.e.f June, 2023

NEP 2020

PREAMBLE:

Bachelor of Science is an integrated academic degree in the faculty of Science. The faculty is not ignoring the developments in the field of Electronics. The students from science faculty should also be competent for this change in technology. The Programme will helpful to make students aware of professional ethics of the Industry, prepare them with basic soft skills essential for working in community, professional teams and prepare them for competitive examinations, enabling them to reach higher echelons of excellence and Exploring world with Entrepreneurship approach. The competitive curriculum has prepared at par as per needs of industries and research fields. The topics of the curriculum are well defined, taking into consideration the level and capacity of students. The revision of the existing curriculum of the Electronics subject in science faculty is essential. This is a humble endeavor to initiate the process towards an era of knowledge.

General Objectives of the Program:

1. To nurture academics with a focus commitment to higher subjects.
2. To shape good and informed citizens from the students entering into Programme
3. To create a skilled workforce to match the requirements of the society
4. To impart knowledge of science is the basic objective of this Programme
5. To develop scientific attitude is the major objective so as to make the students openminded, critical and curious.
6. To develop skill in practical work, experiments and laboratory materials and equipment's along with the collection and interpretation of scientific data to contribute to science

Program Outcomes:

1.The students will graduate with proficiency in the subject of their choice2.The students will be eligible to continue higher studies in their subject 3.The students will be eligible to pursue higher studies abroad

4.The students will be eligible to appear for the examinations for job in governmentorganizations and cope up with industry, research fields.

5. The students will be eligible to apply for jobs with minimum requirements of B.Sc.Programme.

Program Specific Objectives

1.To create graduates with sound knowledge of fundamentals of Electronics, who can contribute towards advancing science and technology and make them ready for life- long learning process.

2.To create graduates with sufficient capabilities in Electronics who can become researchersand developers to satisfy the needs of the core Electronics industry.

3.To develop ability among students to formulate, analyze and solve real life problems faced in Electronics industry as well as prepare students for graduate studies through competitive examinations, enabling them to reach higher echelons of excellence

4.To make the students aware of professional ethics of the Industry, and prepare

them with basic soft skills essential for working in community and professional teams.

5. To produce electronic professionals who can be directly employed or start his/her own work as Electronic circuit Designer, Electronics consultant, testing professional, Service engineer and even an entrepreneur in the electronic industry.

Program specific Outcomes:

After completing this courses students shall be expert in following things:

1. To prepare students to excel in postgraduate programs or to succeed in industry/technical profession through global and comprehensive education.
2. To provide students with a solid foundation in scientific and quantitative electronics fundamentals required to solve technical problems and also to pursue higher studies.
3. To train students with good technical and scientific breadth so as to comprehend, analyze, design and create novel products and solutions for real life problems.
4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate Science and engineering issues to broader social context.
5. To prepare student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

Programme Outcomes (Subject)

The Undergraduate Students will reveal...

1. Knowledge of differential equations, vector calculus, complex variables, matrix theory, probability theory, physio-chemical study of device properties and network analysis, EM field analysis of electrical and electronics objects.
2. An ability to identify, formulate and solve electrical and electronics problems as well as conduct experiments on electrical and electronics systems, analyze and interpret data.
3. An ability to design electronics systems skills, Critical and analytical thinking skills, Simulating skills, Knowledge on computer hardware and maintenance skills.
4. Skills to use modern industrial tools, software and equipment to analyze and synthesize problems.
5. An ability to visualize and work on laboratory and multidisciplinary tasks.
6. An ability to participate and succeed in competitive examinations and/or seek employment in the industry as well as develop entrepreneurship skills to form a startup.
7. An ability to communicate effectively in both verbal and written form
8. Knowledge of professional and ethical responsibilities.
9. The understanding of the impact of industrial solutions on society and will also be aware of contemporary issues.
10. Confidence for self-education and ability for life-long learning.

Rayat Shikshan Sanstha's

Karmaveer Bahurao Patil Mahavidayalaya, Pandharpur

Department of Electronics

Syllabus for Bachelor of Science (Electronics) Part I

SUBJECT: Electronics

YEAR OF IMPLEMENTATION: New Syllabi for the B.Sc. I Electronics will be implemented from 2023-24 onwards.

1. PREAMBLE:

Bachelor of Science is an integrated academic degree in the faculty of Science. The faculty is not ignoring the developments in the field of Electronics. The students from science faculty should also be competent for this change in technology. The Programme will help to make students aware of professional ethics of the Industry, prepare them with basic soft skills essential for working in community, professional teams and prepare them for competitive examinations, enabling them to reach higher echelons of excellence and explore the world with an Entrepreneurship approach. The competitive curriculum has prepared at par as per needs of industries and research fields. The topics of the curriculum are well defined, taking into consideration the level and capacity of students. The revision of the existing curriculum of the Electronics subject in science faculty is essential. This is a humble endeavor to initiate the process towards an era of knowledge.

2. GENERAL OBJECTIVES OF THE COURSE:

1. To create graduates with sound knowledge of fundamentals of Electronics, who can contribute towards advancing science and technology?
2. To create graduates with sufficient capabilities in Electronics who can become researchers and developers to satisfy the needs of the core Electronics industry.
3. To develop the ability among students to formulate, analyze and solve real life problems faced in the Electronics industry.
4. To provide opportunity to students to learn the latest trends in Electronics and make them ready for a life-long learning process.
5. To make the students aware of professional ethics of the Industry, and prepare them with basic soft skills essential for working in community and professional teams.
6. To prepare the students for graduate studies through competitive examinations, enabling them to reach higher echelons of excellence
7. To produce electronic professionals who can be directly employed or start his/her own work as Electronic circuit Designer, Electronics consultant, testing professional, Service engineer and even an entrepreneur in the electronic industry.

1. **Title: Electronics**
2. **Year of Implementation: The syllabus will be implemented from June, 2023 onwards.**
3. **Duration: The course shall be a full time.**
4. **Pattern: Semester examination.**
5. **Medium of Instruction: English.**

B.Sc. Sem. - I (Electronics)

Sr.no.	Course Category	Name of Course	Credits		Total credits
			TH	PR	
1	Major -I	Fundamental of Electronics and Network Analysis	2	1	3
2	Major -II	Fundamentals of Digital Electronics	2	1	3
3	Minor-I	Linear Electronics	2	2 (VSC)	4
4	OE	Electronics for Everyone	4	-	4
5	SEC	LED Bulb Production-I	1	1	2
6	IKS	Contribution of Electronics in Indian Knowledge System	2	-	2
			13	5	18

B.Sc. Sem. - II (Electronics)

Sr.no.	Course Category	Name of Course	Credits		Total credits
			TH	PR	
1	Major -I	Semiconductor Devices	2	1	3
2	Major -II	Digital Electronics	2	1	3
3	Minor-I	Basic's of Digital Electronics	2	2 (VSC)	4
4	OE	Domestic Electronics	4	-	4
5	SEC	LED Bulb Production-II	1	1	2
6	VEC	Electronic(e) Waste Management	2	-	2
			13	5	18

Abbreviations:

OE: Generic/ Open Electives
VSEC: Vocational Skill and Skill Enhancement Courses;
VSC: Vocational Skill Courses;
SEC: Skill Enhancement Courses;
AEC: Ability Enhancement Courses;
IKS: Indian Knowledge System;
VEC: Value Education Courses; FP: Field projects;
CC: Co-curricular Courses; RM: Research Methodology; RP: Research Project;
CEP: Community engagement and service; OJT: On Job Training: Internship/ Apprenticeship;

Major:

Course Structure for B.Sc. I (Semester- I)

Theory				Practical				
Course Title	**Course Code**	**Lecture per week**	**Credits**	**Course**	**Course Title**	**Course Code**	**Lecture per week**	**Credits**
Fundamental of Electronics and Network Analysis	ELE-101-MJ	4	2	Practical-I	Fundamental ofElectronics and Network Analysis and Fundamentals of Digital Electronics Lab-I	ELE-103-MJP	4	2
Fundamentals of Digital Electronics	ELE-102-MJ		2					

Course Structure for B.Sc. I. (Semester- II)

Theory				Practical				
Paper Title	**Paper Code**	**Lecture per week**	**Credits**	**Course**	**Paper Title**	**Paper Code**	**Lecture per week**	**Credits**
Semiconductor Devices	ELE-201-MJ	4	2	Practical-II	Semiconductor Devices and Digital Electronics Lab-II	ELE-203-MJP	4	2
Digital Electronics	ELE-202-MJ		2					

Note: ELE-Electronics, **MJ**-Major

Structure and Title of Courses of B. Sc. Course:

* **B. Sc. I Semester I ***

Course Number	Course Code	Course Name
I	ELE-101-MJ	Fundamental of Electronics and Network Analysis
II	ELE-102-MJ	Fundamentals of Digital Electronics
III	ELE-103-MJP	Fundamental of Electronics, Network Analysis and Fundamentals of Digital Electronics Lab- I

* **B. Sc. I Semester II***

Course Number	Course Code	Course Name
I	ELE-201-MJ	Semiconductor Devices
II	ELE-202-MJ	Digital Electronics
III	ELE-203-MJP	Semiconductor Devices and Digital Electronics- Lab II

Semester I
Course I
ELE-101-MJ: Fundamental of Electronics and Network Analysis

Course Objectives: Students should be able to …

1. Learn the fundamentals of electronic circuits.
2. Study and verify different and theorems
3. Summarize Two Port Networks.
4. Understand dc and ac circuits

(Total Credits 2)	SEMESTER-I Course: I Fundamental of Electronics and Network Analysis	No. of Lectures per unit
UNIT - I	**Circuit Elements**	(08)
	• Introduction, Classification • Resistors, Capacitor, Inductor: Introduction, Classification, Application's, Color coding, series and parallel Connections, Numerical problems. • Transformer and Relays: Principle and construction, Types, Applications • Switches: SPDT, DPDT etc. (Explanation using Symbols) • Introduction to SMD component.	
UNIT - II	**Network Theorems**	(07)
	• Ohm's Law, Kirchhoff's Laws (KCL and KVL), and Numerical problems. • Theorems: Thevenin's Theorem, Norton's Theorem, Superposition Theorem, Maximum Power Transfer Theorem, Numerical problems based on these network theorems and Numerical problems.	
UNIT - III	**Network Analysis**	(08)
	• Two Port Networks: z, y and h parameters and their conversion, Numerical problems • Star and Delta network, Star to Delta Conversion, and Delta to Star Conversion, Numerical problems,	
UNIT - IV	**Fundamental of AC Circuits**	(07)
	• Introduction AC, DC Sources, Voltage and Current Sources, Direction of current and voltage, Comparison AC and DC Sources • Concept of Power, Root Mean Square and Average Values Instantaneous value , Peak to Peak, , Phase Difference, • Voltage-Current Relationship: Resistor, Inductor and Capacitor, Sinusoidal Circuit Analysis for RC circuit.	

	• Resonance: Series and Parallel RLC Circuits, Frequency Response, Quality (Q) Factor and Bandwidth,	

Course Outcome: Students will be able to…

1 Identify active and passive components and understand basic circuit theory

2 Evaluate mesh and nodal analysis of ac and dc circuits.

3 Solve & minimize complex electronic circuits.

4 Design a resonance circuit.

Reference Books:

1. R. S. Sedha, A Textbook of applied electronics, S. Chand Publication, (2003).
2. Sudhkar and S. P. Shyammohan, Circuits and Networks Analysis and Synthesis, Tata McGraw-Hill Publishing Company Limited, 3rd Edition, (2006).
3. B. L. Thereja, Basic Electronics Solid State, S. Chand & Company LTD, 4th Edition,(2004)
4. M. L. Soni & J. C. Gupta, A course in Electrical Circuits Analysis, Delhi Dhanpat Rai & Sons, (1979)
5. Charles K. Alexander, Matthew N. O. Sadiku, Fundamentals of Electric Circuits, McGraw-Hill Education (INDIA) PVT. LTD, (2008)
6. B. L.Thereja, A. K. Thereja, A Textbook of Electrical Technology Volume 1 Basic Electrical Engineering, S. Chand & Company LTD,1st Multicolor Edition, (2005)
7. M. Nahvi and J. Edminister, Theory and Problems of Electric Circuits, Schaum's outline series, McGraw-Hill Book Company,1st Edition, (2005)

Semester I

Course II:

ELE-102-MJ: Fundamentals of Digital Electronics

Course Objectives: Students should be able to…

1. Learn and verify various number systems.
2. Study logic gates and Boolean algebra.
3. Classify different logic families.
4. Understand the concept of combinational logic circuits.

(Total Credits 2)	Semester I Course II: Fundamentals of Digital Electronics	No. of Lectures per unit
UNIT - I	**Number System and Binary Codes**	(07)
	• Number System: Introduction, Decimal, Binary, Octal and Hexadecimal number systems, and there inter conversion, One's and two's complements, Rules of Binary Addition, Subtraction. Signed and Unsigned numbers, • Binary Codes: BCD, Excess-3 Code, Gray, ASCII code, Parity Code, Hamming Code.	
UNIT - II	**Logic Gates and Boolean Algebra**	(07)
	• Study of Basic Gates, Study of Derived Gates, Universal gates (NOR and NAND),De-Morgan's Theorems • Boolean algebra and Logic Gates: Introduction to Boolean Algebra and Boolean operators, Standard representation of logic functions (SOP and POS), simplification of logic equation using Boolean algebra. • Karnaugh map Techniques	
UNIT - III	**Digital Logic Families**	(08)
	• Bipolar and MOS Integrated circuits: Characteristics, limitations and applications. • Analysis of digital logic families: TTL, MOS, CMOS Inverters. • Interfacing between logic families; various logic functions and their implementation. • Comparison of CMOS and TTL logic families.	
UNIT - IV	**Combinational Logic Design**	(08)
	• Multiplexers: Introduction, 4 to 1, 8 to1, Study of IC 74151/74153,Application • Demultiplexer: Introduction, 1 to 4, 1 to 8, Study of IC 74139, Application • Code Convertor: Introduction, Encoder, Decimal to Binary/BCD encoder, Octal to Binary/BCD encoder, Decoder,	

	BCD to 7 Segment decoder, Study of IC 7446/47 Application • Arithmetic Circuits: Adder, Subtractor, ALU.	

Course Outcomes: The students will be able to…

1 Solve the problems related to interconversion of number system and design

2 Develop logic circuits using logic gates and Boolean algebra.

3 Analyze different logic families.

4 Design combinational logic circuits

Reference Books:

1. M. Morris Mano, Digital System Design, Pearson Education Asia, 4th Edition, (2001)

2. Thomas L. Flyod, Digital Fundamentals, Pearson Education Asia, 5th Edition, (1994)

3. W. H. Gothmann,Digital Electronics: An Introduction to Theory and Practice, Prentice Hall of India, (2000).

4. S Salivahan, S Arivazhagan, Digital Circuit and Design, Vikas publishing house PVT Limited, (2000)

Semester I

Practical I: ELE-103-MJP

Fundamental of Electronics and Network Analysis and

Fundamentals of Digital Electronics Lab-ICourse

Objectives: Students should be able to…

1. Identify basic electronics components and circuits.
2. verify different laws and theorem for solving complex circuit to simplified circuit
3. .Simplify the expressions using Boolean algebra and learn logic gates.
4. Construct sequential and combinational logic circuits.

Total Credits 2	Semester I Practical I: ELE-103-MJP (based on ELE-101-MJ and ELE-102-MJ) Fundamental of Electronics and Network Analysis and Fundamentals of Digital Electronics Lab-I		No. of Lectures (60)
	Group A		
	1	Study of Electronics components and tools.	4
	2	Study of Voltage sources in series and parallel	4
	3	Study of Series Resonance	4
	4	Study of CRO: Measurement of Amplitude, frequency, and phase Difference.	4
	5	To verify Kirchhoff's Voltage and Current law.	4
	6	To study and verification Thevenin's Theorem.	4
	7	To study and verification Superposition Theorem.	4
	8	To study and Maximum Power transfer Theorem.	4
	Group B		
	1	Study of Logic gates. (IC 7400,7402,7404,7408,7432,7486)	4
	2	Verify the NAND and NOR gates as universal logic gates.	4
	3	Study of Demorgan's Theorem-I using gates.	4
	4	Study of Demorgan's Theorem-II using gates.	4
	5	To study of Half and Full addercircuits	4
	6	Verification of the truth table of the Multiplexer 74150.	4
	7	Verification of the truth table of the De-Multiplexer 74154.	4
	8	Study of BCD to 7 Segment Decoder	4

Course Outcome: Students will be able to…

1 Utilize basic electronics components and circuits.

2 Apply the basic theory & mathematical relationships in electronic circuits.

3 Design, construct and verify logic circuits.

4 develop combinational and sequential logic circuits

Reference Books:

1. R. S. Sedha, Textbook of Applied Electronics, S. Chand Publication, (2003)
2. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley India edition, 2nd Edition, (2002)
3. Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education, 6th Edition, (2006).
4. M. Morris Mano, Digital System Design, Pearson Education Asia, 4th Edition, (2001)
5. Thomas L. Flyod, Digital Fundamentals, Pearson Education Asia, 5th Edition, (1994)
6. W. H. Gothmann,Digital Electronics: An Introduction to Theory and Practice, Prentice Hall of India, (2000).
7. S. Salivahan, S Arivazhagan, Digital Circuit and Design, Vikas publishing house PVT Limited, (2000)

Semester II
Course I
ELE-201-MJ: Semiconductor Devices

Course Objectives: Students should be able to ....

1. learn the basics of a semiconductor materials
2. Interpret rectifiers and regulators.
3. Understand the basics of transistors and various configurations.
4. Explain the field effect transistor.

(Total Credits 2)	Semester II Course I: Semiconductor Devices	No. of Lectures per unit
UNIT - I	**Fundamentals of Semiconductor**	**(08)**
	• Introduction, Types of material, Energy Band diagram, Fermi Level, Types of Semiconductors, Intrinsic & Extrinsic Semiconductors, • Constructions and working of PN junction diode, Formation of Depletion Layer, I-V characteristics, Applications • Zener and avalanche breakdown mechanism, Zener diode • I-V characteristics, Applications • Photo diode. Light Emitting Diode (LED), 7-segment display, Organic LED. Applications	
UNIT - II	**Unit II: Rectifiers and Regulators**	**(08)**
	• Half wave rectifier, Full wave rectifiers (center tapped and bridge), circuit diagrams, working and waveforms, ripple factor and efficiency. • Filters: Types, C, L, LC, RC filters (Qualitative analysis) • Fixed and variable regulators: Zener diode as voltage regulator, IC 78xx and IC 79xx, IC LM 317	
UNIT - III	**Bipolar Junction Transistors (BJT)**	**(07)**
	• Introduction, Types, Transistor working , CE, CB, CC configurations, Characteristics of CE configurations,Regions of operation (active, cut off and saturation) • Current gains α and β. Relations between α and β. dc load line and Q point. • Applications: Transistor as Amplifier, Transistor as a switch.	

UNIT - IV	Field Effect Transistors	(07)
	• JFET: Type of FET, Symbol, Construction, working and I-V characteristics (output and transfer), Pinch-Off and Saturation Voltage • MOSFET: Terminals, Symbol, Basic operation, characteristics and MOSFET as switch	

Course Outcome: Students will be able to…

1 verify and interpret basics of semiconductor materials

2 Inspect rectifiers and regulators.

3 analyze and interpret the characteristics of transistors

4 Determine characteristics and performance of field effect transistor.

Reference Books:

1. R.S. Sedha, Textbook of Applied Electronics, S. Chand Publication, (2003)
2. Robert Boylestad and Louis Nashelsky, Electronics Devices and Circuits Theory, PHI 9th Edition, (2013)
3. Allen Mottershead, Electronic Devices and Circuits, Goodyear Publishing Corporation, (1973)
4. Donald Neamen, Electronic Circuit Analysis and Design, Tata McGraw Hill, 3rd Edition, (2002)
5. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill, (2001)

Semester II

Course I

ELE-202-MJ: Digital Electronics

Course Objectives: Students should be able to …

1. Learn sequential logic circuits.
2. Study counter circuits.
3. Understand the concept of Shift register and Programmable Logic Device.
4. Explain computer memory organization.

(Total Credits 2)	Semester II Course IV: Digital Electronics	No. of Lectures per unit
UNIT - I	**Sequential Logic Design**	**(07)**
	• Latches and Flip flops, Edge triggered and Level triggered Flipflops, • S-R Flip flop, J-K Flip flop, J-K Master Slave flip flop, T and D type Flip flop,	
UNIT - II	**Counters**	**(08)**
	• Introduction, Classification, • Synchronous and Asynchronous Counter, Up/down counter, Decade Counter, Ring Counter, Johnson Counter, Modulo-N Counter, • Study of IC 7490, Application of counter	
UNIT - III	**Shift Register**	**(07)**
	• Introduction of Shift registers, Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel- in-Parallel-out Shift Registers, • Study of IC 7495.Applications of Shift Register	
UNIT - IV	**Computer Memory Organization**	**(08)**
	• Introduction, Classification of Memory, Memory Characteristics • RAM, SRAM, DRAM, ROM, PROM, EPROM, UV-EPROM,EEPROM, FLASH, • Introduction to cache memory, Memory Hierarchy	

Course Outcomes: The students will be able to…

1 Design sequential logic circuits

2 Develop a counter circuit.

3 Demonstrate shift register circuit.

4 Describe computer memory organization.

Reference Books:

1. M. Morris Mano, Digital System Design, Pearson Education Asia, 4th Edition,(2001)

2. Thomas L. Flyod, Digital Fundamentals, Pearson Education Asia ,5th Edition,(1994)

3. W. H. Gothmann,Digital Electronics: An Introduction to Theory and Practice, Prentice Hall of India, (2000).

4. S Salivahan, S Arivazhagan, Digital Circuit and Design, Vikas publishing house PVT Limited, (2000)

Semester II

Practical II: ELE-203-MJP

Semiconductor Devices and Digital Electronics Lab-II

Course Objectives: Students should be able to…

1. Learn half wave and full wave rectifier circuits.
2. Study fixed and variable IC regulators.
3. Understand Flip-flop circuits.
4. Contrast the counter and shift register circuit.

Total Credits 2	Semester II Practical II: ELE-203-MJP: (Based on ELE-201-MJ& ELE-202-MJ) Semiconductor Devices and Digital Electronics Lab-II		No. of Lectures (60)
	Group A		
	1	Study of I-V Characteristics of PN Junction Diode	4
	2	Study of I-V Characteristics of Zener Diode.	4
	3	Transistor as a switch (LED ON/OFF)	4
	4	Study of Three terminal voltage regulators.	4
	5	Study of Half Wave Rectifier	4
	6	Study of Full Wave Rectifier	4
	7	Study of CE Configuration of BJT	4
	8	Study of Characteristics of FET	4
	Group B		
	1	Study of an S-R flip-flop using NOR/NAND gates.	4
	2	Verify the truth table of a J-K flip-flop (7476)	4
	3	Verify the truth table of a D flip-flop (7474)	4
	4	Study of up-down counter.	4
	5	Study of Binary counter.	4
	6	Study of Right shift register.	4
	7	Study of Left shift register	4
	8	Study of email	4

Course Outcome: Students will be able to…

1 Design and verify half wave and full wave rectifier circuit.

2 Develop fixed and variable ic regulators.

3 Construct flip flop circuits.

4 Utilize the counter and shift register circuit.

Reference Books:

1. Robert Boylestad and Louis Nashelsky,Electronic Devices and Circuit Theory, PHI,9th Edition, (2013)
2. L. Schilling and C. Belove, Electronic Circuits: Discrete and Integrated, Tata McGraw Hill, (2002).
3. Donald A. Neamen, Electronic Circuit Analysis and Design, Tata McGraw Hill,3rdEdition, (2002)
4. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill, (2001)
5. R. C. Jaegar and T. N. Blalock, Microelectronic Circuit Design, Tata McGraw Hill 4th Edition, (2010)
6. J. J. Cathey, 2000 Solved Problems in Electronics, Schaum's outline Series, TataMcGraw Hill, (1991)

1. Title: **Electronics (Minor)**

2. Year of Implementation: The syllabus will be implemented from June, 2023 onwards.

3. Duration: The course shall be full time.

4. Pattern: Semester examination.

5. Medium of Instruction: English.

Course Structure for B.Sc. I (Semester- I)

Theory				Practical				
Course Title	**CourseCode**	**Lecture per week**	**Credits**	**Course**	**Course Title**	**CourseCode**	**Lecture per week**	**Credits**
Linear Electronics	ELE-104-MN	2	2	Practical-I	Linear Electronics (VSC)	ELE-106-VSC	4	2

Course Structure for B.Sc. I. (Semester- II)

Theory				Practical				
Paper Title	**PaperCode**	**Lecture per week**	**Credits**	**Course**	**Paper Title**	**PaperCode**	**Lecture per week**	**Credits**
Basics of Digital Electronics	ELE-204-MN	2	2	Practical-II	Basics of Digital Electronics (VSC)	ELE-206-VSC	4	2

Note: ELE-Electronics, MN-Minor, VSC-Vocational Skill Course

Structure and Title of Courses of B. Sc. Course: Minor

* **B. Sc. I Semester I ***

Course Number	Course Code	Course Name
IV	ELE-104-MN	Linear Electronics
V	ELE-106-VSC	Linear Electronics Lab-I (VSC)

* **B. Sc. I Semester II***

Course Number	CourseCode	Course Name
IV	ELE-204-MN	Basics of Digital Electronics
V	ELE-206-VSC	Basics of Digital Electronics Lab-II (VSC)

Semester I
Minor
Course IV
ELE-104-MN: Linear Electronics

Course Objectives: Students should be able to...

1. Learn the fundamentals of electronic components.
2. Understand circuit Fundamentals.
3. Study various Semiconductor Devices.
4. Illustrate different Rectifiers and Regulators

(Total Credits 2)	SEMESTER-I Course IV:: Linear Electronics	No. of Lectures per unit
UNIT - I	**Circuit Elements**	(08)
	• Resistors, Capacitor, Inductor: Introduction, Classification, Application's, Color coding, series and parallel Connections • Transformer and Relays: Types, Principle and construction, Applications • Switches, Cables.	
UNIT - II	**Circuit Fundamental**	(07)
	• Zero reference level, Kirchhoff's Current and Voltage Law, Ohm's Law, Graphical representation of Ohm's Law • Primary and secondary cell, Cell and Battery, Voltage and current of cell, Battery rating.	
UNIT - III	**Fundamentals of Semiconductor**	(08)
	• Introduction, Types of material, types of Semiconductors, Intrinsic & Extrinsic Semiconductors. • Constructions and working of PN junction diode, Biasing of diode, I-V characteristics. • Zener diode, Photo diode, Light Emitting Diode (LED	
UNIT - IV	**Rectifiers, Regulators and Applications**	(07)
	• Half wave rectifier, Full wave rectifiers (center tapped and bridge), circuit diagrams, working and waveforms, ripple factor and efficiency. • Fixed regulators: Zener diode as voltage regulator, IC 78xx and IC 79xx, Adjustable voltage regulator (LM 317) • Applications of Rectifier and Regulators	

Course Outcomes: The students will be able to...

1 Identify active and passive components

2 Illustrate KCL, KVL and Ohms Law.

3 Evaluate different Semiconductor Devices

4 Understand different Rectifiers ,Regulators and their Applications

Reference Books:

1. R. S. Sedha, A Textbook of applied electronics, S. Chand Publication, (2003).
2. Sudhkar and S. P. Shyammohan, Circuits and Networks Analysis and Synthesis, Tata McGraw-Hill Publishing Company Limited, 3rd Edition, (2006).
3. B. L. Thereja, Basic Electronics Solid State, S. Chand & Company LTD, 4th Edition,(2004)
4. M. L. Soni & J. C. Gupta, A course in Electrical Circuits Analysis, Delhi Dhanpat Rai & Sons, (1979)
5. Charles K. Alexander, Matthew N. O. Sadiku, Fundamentals of Electric Circuits, McGraw-Hill Education (INDIA) PVT. LTD, (2008)
6. B. L.Thereja, A. K. Thereja, A Textbook of Electrical Technology Volume 1 Basic Electrical Engineering, S. Chand & Company LTD,1st Multicolor Edition, (2005)
7. M. Nahvi and J. Edminister, Theory and Problems of Electric Circuits, Schaum's outline series, McGraw-Hill Book Company,1st Edition, (2005)

Semester I
Minor

Practical I: ELE-106-VSC (Based on ELE-104-MN)

Linear Electronics (VSC) Lab-I

Course Objectives: Students should be able to …

1. Learn the fundamentals of electronic components.
2. Understand circuit Fundamentals.
3. Study various Semiconductor Devices.
4. Illustrate different Rectifiers and Regulators

Total Credits 2	Semester I Practical I Linear Electronics (VSC) Lab-I		No. of Lectures (60)
	Group A		
	1	Study of Electronics components and tools.	4
	2	Study of Voltage sources in series and parallel	4
	3	Study of Voltage and Current dividers.	4
	4	Study of CRO.	4
	5	To verify Kirchhoff's Voltage Law	4
	6	To verify . Kirchhoff's Current law.	4
	7	To verify Ohms Law.	4
	8	Study and Identification of different Switches .	4
	Group B		
	1	Study of IV Characteristics of Semiconductor Diode	4
	2	Study of IV Characteristics of Photo Diode	4
	3	Study of half wave rectifier	4
	4	Study of full wave rectifier	4
	5	Study of Zener diode as voltage regulator	4
	6	Study of Positive (78XX) voltage regulator	4
	7	Study of Negative (79XX) voltage regulator	4
	8	Study of Adjustable voltage regulator (LM 317)	4

Course Outcomes: The students will be able to…

1 Identify active and passive components

2 Illustrate KCL, KVL and Ohms Law.

3 Evaluate different Semiconductor Devices

4 Understand different Rectifiers ,Regulators and their Applications

Reference Books:

1. R. S. Sedha, Textbook of Applied Electronics, S. Chand Publication, (2003)
2. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley India edition, 2nd Edition, (2002)
3. Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education, 6th Edition, (2006).
4. M. Morris Mano, Digital System Design, Pearson Education Asia, 4th Edition, (2001)
5. W. H. Gothmann,Digital Electronics: An Introduction to Theory and Practice, Prentice Hall of India, (2000).

Semester II
Minor
Course IV:
ELE-204-MN: Basics of Digital Electronics

Course Objectives: Student should be able to…

1. Learn and verify various number systems.
2. Study logic gates and Boolean algebra.
3. Classify different logic families.
4. Understand the concept of combinational logic circuits.

(Total Credits 2)	Semester II Course IV: ELE-204-MN Basics of Digital Electronics	No. of Lectures 30
UNIT - I	**Number System and Binary Codes**	**(08)**
	• Number System: Introduction, Decimal, Binary, Octal and Hexadecimal number systems, and there inter conversion, One's and two's complements, Rules of Binary Addition, Subtraction. Signed and Unsigned numbers, • Binary Codes: BCD, Excess-3 Code, Gray, ASCII code,	
UNIT - II	**Logic Gates and Boolean Algebra**	**(08)**
	• Study of Basic Gates, Study of Derived Gates, Universal gates(NOR and NAND),De-Morgan's Theorems • Boolean algebra and Logic Gates: Introduction to Boolean Algebra and Boolean operators, Standard representation oflogic functions (SOP and POS), simplification of logic equation using Boolean algebra. • Applications of Logic Gates: Half Adder, Full Adder	
UNIT - III	**Digital Logic Families**	**(07)**
	• Bipolar and MOS Integrated circuits: Characteristics,limitations and applications. • Analysis of digital logic families: TTL, MOS, CMOS Inverters. • Interfacing between logic families; various logic functionsand their implementation. • Comparison of CMOS and TTL logic families.	
UNIT - IV	**Combinational Logic Design**	**(07)**
	• Multiplexers: Introduction, 4 to 1, 8 to1, Study of IC 74151/74153,Application • De-multiplexer : Introduction, 1 to 4, 1 to 8, Study of IC74139, Application • Code Convertor :Introduction, Encoder, Decimal to	

	Binary/BCD encoder, Octal to Binary/BCD encoder, Decoder,	

Course Outcomes: The students will be able to…

1 Solve the problems related to interconversion of number system and design

2 Develop logic circuits using logic gates and Boolean algebra.

3 Analyze different logic families.

4 Design combinational logic circuits

5

Reference Books:

1. R.S. Sedha, Textbook of Applied Electronics, S. Chand Publication, (2003)
2. Robert Boylestad and Louis Nashelsky, Electronics Devices and Circuits Theory, PHI 9th Edition, (2013)
3. Allen Mottershead, Electronic Devices and Circuits, Goodyear Publishing Corporation, (1973)
4. Donald Neamen, Electronic Circuit Analysis and Design, Tata McGraw Hill, 3rd Edition, (2002)
5. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill, (2001)

Semester II
Minor
Practical II
ELE-206-VSC :(Based on ELE-204-MN)

Basics of Digital Electronics Lab-II

Course Objectives: Student should be able to…

1. Learn Basic Logic gates
2. Study of universal logic gates.
3. Know about Multiplexer circuit.
4. Understand the Encoder and Decoder circuit.

(Total Credits 2)	Semester II Practical II Basics of Digital Electronics Lab-II		No. of Lectures (60 hr.)
	Group A		
	1	Study of Basic Logic gates. (7408,7432,7402)	4
	2	Study of Derived Logic gates. (7404,7486)	4
	3	Study of universal logic gates using NAND Gate.	4
	4	Study of universal logic gates using NOR Gate .	4
	5	Study of Demorgan's Theorem-I using gates.	4
	6	Study of Demorgan's Theorem-II using gates.	4
	7	Study of Half adder circuits	4
	8	Study of Full adder circuits	4
	Group B		
	1	Study of 4 to 1 Multiplexer .	4
	2	Study of 8 to 1 Multiplexer .	4
	3	Study of 1 to 4 De-Multiplexer .	4
	4	Study of 1 to 8 De-Multiplexer ..	4
	5	Study of Encoder	4
	6	Study of BCD to 7 Segment Decoder	4
	7	Study of Internet	4
	8	Study of Email	4

Course Outcomes: The students will be able to...

1 Verify Basic Logic gates circuit.

2 Verify De-Morgan's Theorem.

3 Analyze different Multiplexer and De-Multiplexer.

4 Utilize Encoding and Decoding Techniques

Reference Books:

1. Robert Boylestad and Louis Nashelsky,Electronic Devices and Circuit Theory, PHI,9th Edition, (2013)
2. L. Schilling and C. Belove, Electronic Circuits: Discrete and Integrated, Tata McGraw Hill,(2002).
3. Donald A. Neamen, Electronic Circuit Analysis and Design, Tata McGraw Hill,3rdEdition, (2002)
4. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill, (2001)
5. R. C. Jaegar and T. N. Blalock, Microelectronic Circuit Design, Tata McGraw Hill4th Edition, (2010)
6. J. J. Cathey, 2000 Solved Problems in Electronics, Schaum's outline Series, TataMcGraw Hill, (1991)

1. Title: Electronics (OPEN ELECTIVE)

2. Year of Implementation: The syllabus will be implemented from June, 2023 onwards.

3. Duration: The course shall be a full time.

4. Pattern: Semester examination.

5. Medium of Instruction: English.

Course Structure for B.Sc. I (Semester- I)

Course Title	CourseCode	Lecture per week	Credits
Electronics for Everyone	ELE-105-OE	4	4

Course Structure for B.Sc. I (Semester- II)

Course Title	CourseCode	Lecture per week	Credits
Domestic Electronics	ELE-205-OE	4	4

Structure and Title of Courses of B. Sc. Course:

B. Sc. I Semester I

Course Number	CourseCode	Course Name
V	ELE-105-OE	Electronics for Everyone

B. Sc. I Semester II

Course Number	CourseCode	Course Name
V	ELE-205-OE	Domestic Electronics

Semester I
Course V:
ELE-105-OE: Electronics for Everyone

Course Objectives:

1. Acquire knowledge and skills about safety precautions while working.
2. Identify and to use different tools used in wiring.
3. Understand the general concept of Generation of electrical power.
4. Know about electrical symbols used in electrical parts.

(Total Credits 4)	SEMESTER-I Course V Electronics for Everyone	No. of Lectures (60)
UNIT - I	**Safety Precautions and use of Electronics tools**	(15)
	• Electrical shocks and procedure for separating person from contact with live wire • First Aid different methods of artificial respiration • Electric fire and Fire Extinguishers • Electronics tools Pliers, Combination, side cutting, round nose, long nose Neon tester, Screw drivers, test lamp, series test lamp • Symbols uses in Electronics technology	
UNIT - II	**Electricity and Energy Sources**	(15)
	• Introduction, Generation of electricity, Types of electricity, Effect of electricity and appliances, Different energy sources, EMF, potential difference, current, voltage, resistance, conductance, • Power, energy, specific resistance, energy billing for a month, direct current and alternating current	
UNIT - III	**AC and DC Circuits**	(15)
	• Ohm's law, Series CKT, Parallel ckt, series and parallel combination, types of electronics ckt. • Introduction importance, star delta, capacitor, Fundamentals of AC circuits, Introduction of different ckt, power factor, classification of materials, cables, wires, and insulation low, medium, high voltage	
UNIT - IV	**Electronics soldering and wiring techniques**	(15)
	• Introduction, common fusing material, miniature circuit breaker, (MCB), molded case circuit breakers (MCCB), earth leakage ckt breaker (ELCB), Soldering equipment's, precautions • Wiring accessories, lamp holders, other accessories, distribution boards, types of wirings • Introduction and necessity of wiring, selection of wiring.	

Course Outcomes: The students will be able to...

1. Develop skills about safety precautions while working.
2. Identify the use of different tools used in wiring.
3. Evaluate general concept of Generation of electrical power.
4. Verify the different electronics symbols.

Reference Book:

1. Electrical Technology - Edward Hughes
2. Electrical Technology - H. Cotton
3. Study of Electrical Appliances and devices - K.B.Bhatia
4. Elements of Electrical Gadgets - K.B.Bhatia
5. Small Appliances Servicing - P.T. Brook Woll Jr.
6. How to repair small Appliances - Jack Darr
7. Electrical Wiring Estimating & Costing - J. D. Gupta

Semester II
Course V
ELE-205-OE: Domestic Electronics

Course Objectives: Student should be able to…

1. Learn knowledge for various electronics appliances
2. Study of different electronic systems and their specification.
3. Learn a comprehensive overview of Domestic appliances
4. Understand different maintenance techniques of home appliances..

(Total Credits 4)	SEMESTER-II Course V Domestic Electronics	No. of Lectures (60)
UNIT - I	**Power supply and Systems**	(15)
	• Rectifiers and filter: ckt Rectifier, P type N type, Half wave, full wave, bridge rectifier • Filter ckt and voltage regulator IC • Battery charger ckt and different components • Cells & batteries : Types of secondary cells, cell in series and parallel, lead acid battery,	
UNIT - II	**Domestic Equipment's**	(15)
	• Electric induction cooker: Electric induction plate cooker, simple rice maker • Washing Machine: Ordinary Semi auto, Agitor, Drum, Pulsator, Side loading, Timer & value • Water purifier: UV/RO, UV light effect on bacteria, reverses osmosis membrane process. • Microwave Oven	
UNIT -III	**Fundamentals of cooling system**	(15)
	• Refrigerator and Deep Freezers • Room Cooler Pillar, Window mounting table mounting semi-auto • Air Conditioners Functioning & Installation	
UNIT -IV	**Maintenance of Domestic Equipment**	(15)
	• Air Conditioner • Electric induction cooker/ Microwave Oven • Washing Machine • Water purifier • Refrigerator	

Course Outcomes: The students will be able to...

1. Apply logic thinking and basic electronics knowledge various fields of electronics appliances.
2. Develop skill of sophisticated electronic systems.
3. Infer the concepts of different configurations domestic applications. .
4. Identify the problems in Domestic Equipment.

Reference Books:

1. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting, R. G. Gupta TMH, 2001.
2. Modern Electronic Equipment: Troubleshooting, Repair and Maintenance, R S Khandpur, TMH, 1987.
3. Electronic fault diagnosis by G. C. Loveday, A. H.., Longman, 4th Edition, 1994.
4. Maintenance of Domestic Appliances - R. B. Lal

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Department of Electronics

Skill Enhancement Course

Semester –I

Theory				Practical				
Course Title	**CourseCode**	**Lecture per week**	**Credits**	**Course**	**Course Title**	**CourseCode**	**Lecture per week**	**Credits**
LED Bulb Production-I	ELE-107-SEC	1	1	Practical -I	LED Bulb Production-I	ELE-108-SECP	1	1

Semester –II

Theory				Practical				
Course Title	**CourseCode**	**Lecture per week**	**Credits**	**Course**	**Course Title**	**CourseCode**	**Lecture per week**	**Credits**
LED Bulb Production-II	ELE-207-SEC	1	1	Practical -II	LED Bulb Production-II	ELE-208-SECP	1	1

Semester –I

ELE-107-SEC: Skill Enhancement Course
Course Name: LED Bulb Production

- **Learning Objectives:-**
  1. To learn the LEDs and their types
  2. To study components and parameters of LED.
  3. To study the techniques of LED manufacturing.

(15Lectures)

Unit I: Introduction to LED **8 L**

Introduction to LED, Types of LED, Basic Structure of LED, Working, I-V characteristics of LED, Need of LED bulb

Unit II: Components of LED **7 L**

Study of components used for manufacturing of LED Panel, LED bulb, LED Tube, PCB making for LED panel.

References:

1. Bergh, A. A. and P. J Dean, Light-Emitting Diodes. Clarendon Press, 1976.
2. Gillessen, Klaus. Light-Emitting Diodes: An Introduction, Prentice Hall, 1987.
3. Optoelectronics/Fiber-Optics Applications Manual, McGraw-Hill, 1981.
4. Understanding Solid State Electronics, Radio Shack/Texas Instruments Learning Center, 1978.
5. Williams, E. W. and R. Hall, Luminescence and the Light-Emitting Diode. Pergamon Press, 1978

- **Learning outcomes:-**

Students will be able to:

1. understand various types of LEDs
2. design the LED devices.
3. assemble the LED devices.

Semester –II

ELE-207-SEC: Skill Enhancement Course
Course Name: LED Bulb Production

- **Learning Objectives:-**
  1. To learn the LEDs and their types
  2. To study components and parameters of LED.
  3. To study the techniques of LED manufacturing.

(15Lectures)

Unit I: Parameters of LED **8 L**

Parameters:- Color, efficiency, energy usage, power cost, purchase cost, life time, eco friendly, quickness of light, emission, Dimming capability, Power calculation in LED , Lumens

Unit II: LED Manufacturing **7 L**

Techniques used in LED manufacturing, Construction of LED Panel, Mounting of components, soldering, testing of LED Panel

References:

1. Bergh, A. A. and P. J Dean, Light-Emitting Diodes. Clarendon Press, 1976.
2. Gillessen, Klaus. Light-Emitting Diodes: An Introduction, Prentice Hall, 1987.
3. Optoelectronics/Fiber-Optics Applications Manual, McGraw-Hill, 1981.
4. Understanding Solid State Electronics, Radio Shack/Texas Instruments Learning Center, 1978.
5. Williams, E. W. and R. Hall, Luminescence and the Light-Emitting Diode. Pergamon Press, 1978

- **Learning outcomes:-**

Students will be able to:

1. understand various types of LEDs
2. design the LED devices.
3. assemble the LED devices.

Semester –I
ELE-108-SECP: Skill Enhancement Course
Course Name: LED Bulb Production
Practical (Total Periods = 15)

List of Experiments

1. **Introduction to LEDs.**
2. **Study of analog and digital Multimeter.**
3. **Testing of LED.**
4. **Design circuit for LED bulb (for different Watts).**
5. **Soldering and de soldering techniques.**

Semester –I
ELE-208-SECP: Skill Enhancement Course
Course Name: LED Bulb Production
Practical (Total Periods = 15)

List of Experiments

1. **Soldering and de soldering techniques.**
2. **Power supply for LED Panel.**
3. **PCB making for LED panel.**
4. **Assembling of LED Bulb.**
5. **Assembling of LED Tube.**

- **Evaluation Pattern**

A) Distribution of Theory paper (Marks 50)

i) College Assessment : 30 Marks

ii) Internal (Dept.) Assessment : 20 Marks

i) Semester End Written Examination (Summative Assessment) : 30 Marks
ii) Scheme of Internal (Dept.) Assessment : 20 Marks

Presentation, GD, Seminar, Unit test, H.A., Viva Voce

B) Distribution of Practical (Marks 50)

Practical Examination will be at the end of the course.

i) College Practical Examination (30 Marks)

a) One experiment : 20 Marks

b) Report : 10 Marks

- **Break up of 20 Marks for each experiment**

i) Circuit Diagram 05

ii) Assembly of the circuit 05

iii) Demonstration 05

iv) Oral 05

ii) Internal (Dept.) Practical Examination (20 Marks)

- Identification and testing of components 20

Reference Book

1. Mark.D.Birnbaum , Essential Electronic Design Automation (EDA), Prentice Hall, 2004
2. Muhammad H. Rashid, Introduction ToPSpice Using OrCADfor Circuits and Electronics, Paperback – Import, 3rd Edition, 2003.
3. Walter C. Bosshart, Printed circuit Board – Design & Technology , TMH. 2004.
4. R.S. Khandpur, Printed Circuit Board –Design, Fabrication, Assembly & Testing, TMH,3rd Edition,2017.
5. Robert Boylstead and Louis Nashelsky, Electronic Devices and circuit theory, PHI, 10th Edition, 2009.
6. Paul B. Zbar,Electronics text lab manual, 1989
7. D.C. Kulshresta& D.C Gupta,Basic Electronics & Linear circuits, N.N. Bhargava, TMH, 51 reprint,2008.
8. David A Bell, Electronic devices, Reston Publishing Company, 4th Edition, 2009.
9. Clyde F. Coombs, Printed circuits Handbook McGraw Hill, 3rd Edition,2015

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Department of Electronics

Value Education Course

Syllabus

w.e.f. 2023

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Department of Electronics

Sem.-II

Value Education Course (VEC)

Course Name: Electronics (e) – Waste Management

Credits	Course Code	Course Name	Theory Lectures
2	ELE-209-VEC	Electronics (e) – Waste Management	30

Department of Electronics

Sem.-II

Value Education Course (VEC)

ELE-209-VEC: Electronics (e) – Waste Management

Electronics (e) – Waste Management		
Learning objectives: 1. Understand the principles associated with effective energy management and to apply these principles in the day to day life. 2. Classify the different types of waste 3. Develop insight into the collection, transfer and transport e waste. 4. Evaluate the main operational challenges in e waste facilities And device key processes involved in recovering energy from wastes.		
Unit	**Title**	**No. of Lectures (30)**
Unit I	**Introduction to Waste and Waste Processing:** Solid waste sources, types, composition, properties, global warming, managing waste, status of technologies for generation of energy from waste treatment and disposal aerobic composting, incineration, furnace type and design.	8
Unit II	**Introduction to E-waste:** E-waste in the global context: Growth of electrical and electronics industry in India, environmental concerns and health hazards. Recycling e-waste: A thriving economy of the unorganized sector, global trade in hazardous waste, impact of hazardous e-waste in India	7
Unit III	**Management of e-waste:** Management of e-waste: E-waste legislation, government regulations on e-waste management, international experience, need for stringent health safeguards and environmental protection laws of India.	7
Unit IV	**Innovative ways of e-Waste Management** Innovative waste management technologies: reusing, recycling, or reduce (RRR). Industrial-scale waste management, necessitates. Sophisticated technology: Robotic e-waste Monitoring Systems, Robotic Processes for e-Waste sorting, e-Waste to Energy Concept, e-Waste management to achieve climate sustainability goals.	8
Learning outcomes: After completion of the course , students will be able to 1. Identify different sources of solid waste and characteristics of e- waste. 2. Classify the types of e- waste. 3. Understand conversion techniques of e- waste.. 4. Illustrate sources of e- waste. 5. Impact on global scenario of environmental concerns and health hazards by the generation of E-waste		

References:

- 1. Nicholas P Cheremisinoff, —Handbook of Solid Waste Management and Waste Minimization Technologiesl, An Imprint of Elsevier, New Delhi, 2003.
- 2. P AarneVesilind, William A Worrell and Debra R Reinhart, —Solid Waste Engineeringl, 2nd edition 2002.
- 3. M Dutta , B P Parida, B K Guha and T R Surkrishnan, —Industrial Solid Waste Management and
- Landfilling practicel, Reprint Edition New Delhi, 1999.
- 4. RajyaSabha Secretariat, —E-waste in India: Research unitl, Reprint Edition, June, 2011.
- 5. AmalenduBagchi Design, —Construction and Monitoring of Landfillsl, John Wiley and Sons, New York

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Department of Electronics

Indian Knowledge System

Syllabus

w.e.f. 2023

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Department of Electronics

Sem.-II

Indian Knowledge System (IKS)

Course Name: Contribution of Electronics in Indian knowledge System

Credits	Course Code	Course Name	Theory Lectures
2	ELE-109-IKS	Contribution of Electronics in Indian knowledge System	30

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Department of Electronics

Sem.-I

Indian Knowledge System (IKS)

ELE-109-IKS: Contribution of Electronics in Indian knowledge System

Course Objectives: Students will be able to,

1. Understand role of traditional Indian Knowledge system.
2. Learn need to protect traditional Indian Knowledge
3. Study roll of Electronics in Indian Knowledge system.
4. Understand Future of Electronics in India

Credits (Total Credits 2)	Semester – I Contribution of Electronics in Indian knowledge System	No. of Lectures (30)
Unit – I	**Introduction to Traditional Knowledge**	**6**
	Define traditional knowledge, nature and characteristics, scope and importance, kinds of, traditional knowledge, Indigenous, Knowledge (IK), characteristics, traditional knowledge Vs western knowledge	
Unit – II	**Protection of Traditional knowledge**	**8**
	The need for protecting traditional knowledge Significance of TK Protection, the value of TK in the global economy, Role of Government to harness TK.	
Unit – III	**Introduction to Electronics Knowledge System**	**8**
	Introduction of Indian Electronics,Contribution of Jagdish Chandra Bose in Electronic, Satellite communication in India, Param Computer	
Unit – IV	**Future Prospects**	**8**
	Enhancing Access and Availability of Resources ,Impact of New Technologies and Applications , Technology Trends , Innovative Approaches, Digital Transformation	

Course Outcomes: Students should be able to,

1. Describe the traditional Indian knowledge system.
2. Analyze the need to protect traditional Indian knowledge system.
3. Understand the contribution of Electronics in Indian Knowledge system.
4. Assess the rapidly changing technology landscape and its implications for electronics in India.

Reference Book

1. A.K. Maini and J. Ramamurthy, Making sense of electronics: Understanding discreet components and their applications, , Tata McGraw-Hill Education, 2008.
2. NitinGautam , Handbook of Electronics Manufacturing Engineering– CRC Press, 2016
3. Charles Harrell, Designing Electronics for Manufacturing and Testability: A Guide to Designing Automated, Cost-Effective Manufacturing and Test Systems, by Wiley, 2015.
4. Hamid R. Arabnia, Embedded Systems Design Challenges in the Electronic InTech, 2013.
5. Muhammad H. Rashid et al , RF and Microwave Circuit Design Challenges in System Integration and Miniaturization edited by. –CRC Press, 2012.
6. Asok Kumar Das and Chandra Shekhar Bose , Artificial Intelligence in Electronics and Communication, , Cambridge University Press, 2004.