Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Structure and Curriculum of B.Sc. (Degree) in Electronics Programme with Multiple Entry and Exit Options

Undergraduate Programme of Science and Technology

B.Sc. (Degree) in Electronics

Board of Studies in Electronics
Rajarshi Shahu Mahavidyalaya, Latur
Empowered Autonomous Institution

w.e.f. June, 2026
(In Accordance with NEP-2020)

Academic Year: 2026-27

Review Statement

The NEP Cell reviewed the Curriculum of **B.Sc. (Degree) in Electronics** Programme to be effective from the **Academic Year 2026-27.** It was found that, the structure is as per the NEP-2020 guidelines of Govt. of Maharashtra.

Date: 11/04/2026

Place: Latur

NEP Cell
Rajarshi Shahu Mahavidyalaya, Latur
Empowered Autonomous Institution

CERTIFICATE

I hereby certify that the documents attached are the Bonafide copies of the Curriculum of **B.Sc. (Degree) in Electronics** Programme to be effective from the **Academic Year 2026-27.**

Date: 11/04/2026
Place: Latur

Dr. A. A. Yadav
Chairperson
Board of Studies in Electronics
Rajarshi Shahu Mahavidyalaya, Latur
Empowered Autonomous Institution

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Members of Board of Studies in the Subject Electronics

Under the Faculty of Science and Technology

Sr. No.	Name	Designation	In position
1	Dr A. A. Yadav Head, Department of Physics & Electronics, Rajarshi Shahu Mahavidyalaya, Latur Empowered Autonomous Institution	Chairperson	HoD
2	Dr. P. A. Saudagar Associate Professor, Bajaj College of Science, Wardha Email: saudagar.pa@gmail.com Mob. No.: 9423424803	Member	Academic Council Nominee
3	Dr. Satish Shelke, Department of Physics and Electronics, SMP Mahavidyalaya, Murum Dist. Dharashiv Email: drsbshelke@gmail.com Mob. No.: 8208247076	Member	Academic Council Nominee
4	Dr. P.G.Gawali, Bahirji Smarak Mahavidyalaya, Basmat, Hingoli Email: pggawali_123@rediffmail.com Mob. No.: 9421387622	Member	V.C. Nominee
5	Dr. R.V. Dhekale Perfect Electronics, Behind S.T. Stand, Dattanagar, Wai, Satara, Email: rvdhekale2@gmail.com Mob. No.: 9822241255	Member	Expert from Industry
6	Dr. R.V. Suryawanshi Department of Electronics, Azad Mahavidyalaya, Ausa, Latur Email: sundarvs1095@gmail.com Mob. No.: 8421834701	Member	Alumni
7	Dr. G. N. Shinde, Principal, Yashwant Mahavidyalaya, Nanded Email: shindegn@yahoo.co.in Mob. No.: 9922724788	Member	Expert from outside for Special Course
8	Miss Mayuri Hawaldar	Member	Member from same Faculty
9	Miss Vishakha Patil	Member	Member from same Faculty
10	Miss Harshda Nalage	Member	Member from same Faculty
11	Mr. Harshad Dalve	Member	Member from same Faculty

From the Desk of the Chairperson…

"Electronics is clearly the winner of the day"

- John Ford

We have immense pleasure to share that our department is with the state-of-the-art facilities and has highly qualified and dignified faculty. This specific program is in accordance with NEP 2020 which enables electronics graduates to develop the technological and competitive skills needed in the design and operating modern telecommunication systems and networks. I take great pride in sharing that this programme follows outcome-based education in the teaching learning process. The department strives to provide a favorable environment for the students to develop electronic insights and practical skills and apply them to real world problems. In order to motivate the students, the department organizes regular trainings in various aspects of Electronics and to enrich their knowledge, the department arranges various workshops, national and international conferences every year. Faculty visits to leading universities in the globe are very much encouraged and appreciated. Awards, scholarships and recognitions speak a long way about the quality of faculty and students with the constant support and encouragements of the Management of the College.

Our Electronics curriculum which is in accordance with NEP 2020 integrates the Science and technology of all that makes communication through electronic devices. Electronics students design, build and manage systems that transmit process and store information as electrical or optical signals, addresses the critical challenges to face the society, industry and the academia. It is worthwhile to express our care and commitment to our students, guiding them to learn, grow, develop and achieve their goals in their pursuits so as to excel in their career in a every influencing domain. Let me take the opportunity to thank and wish you all a great success.

Dr. A. A. Yadav
Chairperson
Board of Studies in Electronics

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

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Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

Structure for Undergraduate Degree Programme in Electronics with Multiple Entry and Exit

(In accordance with NEP-2020)

Year & Level	Sem	Major		Minor	GE/OE	VSC/ SEC (VSEC)	AEC/ VEC	OJT, FP, CEP, RP	Credit per Sem.	Cum./Cr. per exit
		DSC	DSE							
1	**2**	**3**		**4**	**5**	**6**	**7**	**8**	**9**	**10**
I 4.5	I	DSC I: 04Cr. DSC II: 04Cr.	NA	NA	GE-I: 04Cr.	VSC-I: 02Cr. SEC-I: 02Cr.	AEC-I MIL: 02Cr. VEC-I: 02Cr.	CC-I: 02 Cr. (NSS, NCC, Sports, Cultural)/ CEP-I: 02Cr. (SES-I)/ OJT: 02Cr. / Mini Project: 02Cr.	22	44Cr. UG Certificate
	II	DSCIII: 04Cr. DSC IV: 04Cr. (IKS)	NA	NA	GE-II: 04Cr.	VSC-II: 02Cr. SEC-II: 02Cr.	AEC-II MIL: 02Cr. VEC-II: 02Cr.	CC-II: 02Cr. (NSS, NCC, Sports, Cultural)/ CEP-II: 02Cr. (SES-II)/ OJT: 02Cr. / Mini Project: 02Cr.	22	
	Cum. Cr.	16	-	-	08	04+04= 08	02+02+ 02+02= 08	04	44	
Exit Option: Award of UG Certificate in Major with 44 Credits and Additional 04 Credits Core NSQF Course/Internship or continue with Major and Minor										

Abbreviations:

1. DSC : Discipline Specific Core (Major)
2. DSE : Discipline Specific Elective (Major)
3. DSM : Discipline Specific Minor
4. GE/OE : Generic/Open Elective
5. VSEC : Vocational Skill and Skill Enhancement Course
6. VSC : Vocational Skill Courses
7. SEC : Skill Enhancement Course
8. AEC : Ability Enhancement Course
9. MIL : Modern Indian Languages
10. IKS : Indian Knowledge System
11. FSRCE : Fostering Social Responsibility & Community Engagement
12. VEC : Value Education Courses
13. OJT : On Job Training
14. FP : Field Projects
15. CEP : Community Engagement and Service
16. CC : Co-Curricular Courses
17. RP : Research Project/Dissertation
18. SES : Shahu Extension Services

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

B.Sc. (Degree) in Electronics

Year & Level	Semester	Course Code	Course Title	Credits	No. of Hrs.
I 4.5	I	101ELE1101 (DSC-I)	AC Fundamentals and Circuit Analysis	03	45
		101ELE1103	Lab Course-I	01	30
		101ELE1102 (DSC-II)	Semiconductor Devices and Instrumentation	03	45
		101ELE1104	Lab Course-II	01	30
		101ELE1501 (VSC-I)	Domestic Electrical Appliances and their Maintenance	02	45
		GE-I	From Basket	04	60
		(SEC-I)	From Basket	02	30
		(AEC-I)	From Basket	02	30
		(VEC-I)	Constitution of India	02	30
		AIPC/OJT-I	Field Project	02	60
	Total Credits			**22**	
	II	101ELE2101 (DSC-III)	Power Supplies and Active Filters	03	45
		101ELE2103	Lab Course-III	01	30
		101ELE2102 (DSC-IV)	Amplifiers and Number Systems	03	45
		101ELE2104	Lab Course-IV	01	30
		101ELE2501 (VSC-II)	Mobile Repairing	02	45
		GE-II	From Basket	04	60
		(SEC-II)	From Basket	02	30
		(AEC-II)	From Basket	02	30
		(VEC-II)	FSRCE (CBPR)	02	30
		AIPC/OJT-II	IKS	02	60
	Total Credits			**22**	
Total Credits (Semester I & II)				**44**	

Programme Outcomes (POs) for B.Sc. Programme	
PO No.	Upon completion of this programme the students will be able to
PO1	Apply foundational principles of AC/DC network theory, semiconductor physics, and digital number systems to understand and analyze complex electronic circuits
PO2	Identify, formulate, and solve complex electrical networks and real-world problems using mathematical models and established circuit theorems, such as Kirchhoff's, Thevenin's, and Superposition
PO3	Utilize modern electronic instrumentation-including Cathode Ray Oscilloscopes (CROs), multimeters, and signal generators-to conduct experiments, measure electrical quantities, and analyze experimental data
PO4	Design, build, and test fundamental electronic subsystems, including regulated power supplies, wave filters, and small-signal/feedback amplifier configurations
PO5	Demonstrate practical vocational skills in the maintenance, testing, and troubleshooting of modern hardware, specifically domestic electrical appliances and mobile devices
PO6	Apply logical tools, number system conversions, and binary arithmetic to address and evaluate digital electronics and computational challenges
PO7	Evaluate the safety, efficiency, and maintenance requirements of electrical systems while adhering strictly to necessary safety precautions, such as the use of proper tools and earthing
PO8	Cultivate technical and professional skills necessary for self-employment, entrepreneurship, and entry-level technician roles in the electronics servicing and repair industry

Programme Specific Outcomes (PSOs) for B.Sc. (Degree) Electronics	
PSO No.	Upon completion of this programme the students will be able to
PSO1	**Foundation for Higher Studies:** Attain a robust foundational knowledge of basic electronics, discrete semiconductor devices (diodes, BJTs, FETs), and network theory to establish a secure foundation for higher studies and academic research
PSO2	**Circuit Analysis and Problem Solving:** Develop strong analytical and problem-solving capabilities to evaluate, design, and troubleshoot complex AC/DC electrical circuits, active filters, and amplifiers using established electrical theorems and AC load lines
PSO3	**Practical Experimentation and Instrumentation:** Gain hands-on experimental and data analysis skills by operating modern electronic testing equipment to measure parameters, extract information, and verify the physical working of analog and digital components
PSO4	**Analog and Digital Systems Integration:** Master core concepts that enable the understanding of both analog device construction and digital computation (number systems, 1's/2's complement representation, binary arithmetic) to build and model electronic equipment
PSO5	**Vocational and Technical Readiness**: Attain specialized, job-ready skills in fault detection, dismantling, assembling, and repairing of domestic electrical appliances (e.g., mixers, heaters) and mobile phones to pursue industry jobs or start an independent repair business
PSO6	**Logical and Systematic Optimization:** Analyze real-life technical situations systematically to formulate logical models and improve system performance, such as applying negative feedback to increase bandwidth and decrease distortion in amplifiers

Semester - I

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Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem I

Course Type : DSC-I

Course Title : AC Fundamentals and Circuit Analysis

Course Code : 101ELE1101

Credits : 03 **Max. Marks: 75** **Lectures: 45 Hrs.**

Learning Objectives:

LO1. To develop understanding about generation of single-phase AC, definitions pertaining to alternating quantities,

LO2. To clear the concepts of average and RMS values, determination of RMS and average value for different types of waveforms,

LO3. To inculcate the knowledge about Kirchhoff's laws, voltage and power using Mesh and nodal analysis,

LO4. To develop the strong foundation for electrical networks,

Course Outcomes:

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

CO 1. Understand and apply fundamental concepts of network theory to analyze electrical circuits.

CO 2. Solve complex electrical networks using various circuit theorems.

CO 3. Analyze AC circuits using impedance, reactance, and phasor techniques.

CO 4. Calculate and interpret key parameters such as power, phase angle, and power factor in RLC circuits with supporting waveform and phasor diagrams.

Unit No.	Title of Unit & Contents	Hrs.
I	**A.C. Fundamentals**	**12**
	1. Introduction, Generation of Alternating Voltage and Currents, 2 Equation of Alternating Voltage and Current, Alternate Method for The Equations of Alternating Voltages and Currents, 3. Simple and Complex Waveforms, Cycle, Time Period, Frequency and Amplitude, 4. Different Forms of Emf Equations, Phase and Phase Difference, Definition of RMS Value, Average Value, Form Factor, Peak Value and Amplitude Factor, AC Through Resistance, Inductance and Capacitance.	
	Unit Outcomes: UO1. Have strong basics for network theory, UO2. Construct experimental AC circuits using schematics and perform tests and measurements with a multimeter and signal generator.	
II	**DC Network Theorems**	**12**
	1. Introduction, Electric Circuits, 2. Kirchhoff's Laws, Determination of Voltage Polarities, Assumed Direction of Current, 3. Ideal Constant Voltage Source, Ideal Constant Current Source, Practical Constant Voltage Source, Practical Constant Current Source,	

	4. Thevnin's Theorem, Norton's Theorem, Superposition Theorem, Maximum Power Transfer Theorem, Duality Theorem, 5. Delta/Star and Star/Delta Transformation. 6. Numerical Problems.	
	Unit Outcome: UO1. Understand the fundamental concepts of electric circuits and apply Kirchhoff's laws to analyze circuit behavior. UO2. Apply network theorems and transformation techniques to simplify and solve electrical circuits effectively.	
III	**Series AC Circuits**	**15**
	1. Introduction, AC Through Resistance, Inductance and Capacitance, AC Through R & L, 2. Power Factor, Active and Reactive Components of Circuit Current (I), 3. Active, Reactive and Apparent Power, Q Factor of Coil, 4. AC Through RC, AC Through R-L And C, Resonance In R-L-C Circuit, 5. Graphical Representation of Series Resonance, Resonance Curve, Half Power Band-Width of A Series LCR Resonant Circuit, 6. Q Factor of a Series LCR Resonant Circuit, 7. Numerical Problems.	
	Unit Outcomes: UO1. Calculate the impedance, phase angle, power, power factor, voltage and/or current in series RLC circuit, UO2. Understand and use the concept of impedance and reactance to analyze simple ac series circuits,	
IV	**Parallel AC Circuits**	**06**
	1. Introduction 2. Resonance in Parallel LCR Circuits, 3. Graphical Representation of Parallel LCR Resonant Circuit, Band Width of a Parallel LCR Resonant Circuit, 4. Q Factor of a Parallel LCR Resonant Circuit, Series-Parallel Circuits. 5. Numerical Problems.	
	Unit Outcomes: UO 1. Draw the relevant phaser diagrams and waveform diagrams of voltage and current, for pure resistance, inductance and capacitance. UO 2. Demonstrate the phase and amplitude information of RLC in frequency domain.	

Learning Resources:

1. A text book of electrical technology Vol-I: B.L. Theraja, A.K. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010)
2. Basic Electronics: Solid State - B.L. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi (2009
3. A text book of electrical technology, by B.L. Theraja Vol. I, Nirja Construction and Development Company
4. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition
5. A Text book applied electronics – R.S. Sedha, S. Chand and Company Ltd. (2004).

6. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI Pvt. Ltd, New Delhi.
7. Electronic Fundamentals and Applications (Integrated and Discrete system), John D. Ryder (1989) Prentice Hall of India, Pvt. Ltd. New Delhi – 110001.
8. Electrical machines and Appliances theory-Tamilnadu Textbook corporation,College Road, Chennai - 600 006
9. Electric Principles, Third Edition, A.P. Malvino, Tata McGraw-Hill Publications
10. Principal of Electronics, V.K.Mehta and Rohit Mehta, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010).

Internal Examination Pattern:

CAT – I: Home Assignment

CAT – II: PPT Presentation/ Open Book Test/ Poster Presentation/ Seminar/ Online Quiz/ Descriptive Test

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	0	0	0	0	0	0	3	3	0	0	0	2
CO2	2	3	0	0	0	0	0	0	2	3	0	0	0	2
CO3	3	3	0	0	0	0	0	0	2	3	0	0	0	2
CO4	2	3	0	0	0	0	0	0	1	3	0	0	0	2

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

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Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem I

Course Type : Lab Course
Course Title : Lab Course –I (Based on DSC-I)
Course Code : 101ELE1103
Credits : 01 **Max. Marks: 50** **Hours: 30**

Leaning Objective

LO1. To develop practical skills in the use of laboratory equipment and experimental techniques for studying basic instruments such as: Voltmeter, Ammeter, Multimeters, Signal generator, CRO, etc.

Course Outcomes

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

CO 1. Understand the working and applications of semiconductor devices such as diodes, LEDs, JFETs, Zener diodes, and photodiodes.

CO 2. Operate and utilize CROs and signal generators for measuring signal parameters like frequency, time, amplitude, and phase.

CO 3. Use digital multimeters for measuring electrical quantities and testing circuit continuity and semiconductor components.

CO 4. Apply circuit theorems to analyze electrical circuits and illustrate the concept of resonance in AC circuits.

Practical No.	Unit
1	Verification of maximum power transfer theorem for DC Circuits.
2	Verification of Thevenin's theorem for DC Circuits
3	Finding Values of registers using color code and multimeter
4	Determination of amplitude, frequency and time period of given signal using CRO.
5	Study of LED Characteristics
6	Study of Zener diode reverse characteristics
7	Study of Photodiode reverse characteristics

8	Study of LCR Series resonance circuit (digital AC current meter)
9	Study of LCR parallel resonance circuit (digital AC current meter)

Learning Resources:

1. A text book of electrical technology Vol-I: B.L. Theraja, A.K. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010)
2. Basic Electronics: Solid State - B.L. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi (2009
3. A text book of electrical technology, by B.L. Theraja Vol. I, Nirja Construction and Development Company
4. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition
5. A Text book applied electronics – R.S. Sedha, S. Chand and Company Ltd. (2004).
6. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI Pvt. Ltd, New Delhi.
7. Electronic Fundamentals and Applications (Integrated and Discrete system), John D. Ryder (1989) Prentice Hall of India, Pvt. Ltd. New Delhi – 110001.
8. Electrical machines and Appliances theory-Tamilnadu Textbook corporation,College Road, Chennai - 600 006
9. Electric Principles, Third Edition, A.P. Malvino, Tata McGraw-Hill Publications
10. Principal of Electronics, V.K.Mehta and Rohit Mehta, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010).

Internal Examination Pattern:

CAT – I: Record Book Submission

CAT – II: Overall performance in the regular practical

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	0	2	1	0	0	0	0	3	0	2	1	0	0
CO2	0	0	3	2	0	0	1	0	0	0	3	0	0	0
CO3	0	0	3	2	0	0	2	0	0	0	3	0	2	0
CO4	0	3	2	2	0	0	0	0	0	3	3	0	0	1

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

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Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem I

Course Type : DSC-II
Course Title : Semiconductor Devices
Course Code : 101ELE1102
Credits: 03 **Max. Marks: 75** **Lectures: 45 Hrs.**

Learning Objectives

LO1. To inculcate the knowledge about the components used in electronics, such as resistances, capacitors, diodes, transistors, UJT, FET, MOSFET and others.

LO2. To develop the measurement ability among the students about the various electronic components.

LO3. To make students familiar about the measurements of voltage, current, resistance, AC as well as DC using multi meters.

LO4. To make students familiar about the measurements of voltage and frequencies of the waves using CRO.

LO5. To develop the measurement ability among the students about the various electronic Instruments like Dual power supply, Function Generators.

LO6. To develop the strong foundation for electrical networks,

Course outcomes

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

CO1. Identify and measure basic electronic components such as resistors, capacitors, diodes, transistors, UJT, FET, and MOSFET.

CO2. Operate electronic instruments like multimeters, CROs, and VTVMs for accurate measurement and testing.

CO3. Analyze the characteristics and working principles of diodes, BJTs, and MOSFETs in different regions of operation.

CO4. Design and implement simple electronic circuits, including BJT biasing and diode-based applications.

Unit No.	Title of Unit & Contents	Hrs.
I	**Semiconductor Diode**	**12**
	1. The Unbiased Diode, Forward Bias, Reverse Bias, 2. V–I Characteristics of Diode, 3. Energy Levels, The Energy Hills, Barrier Potential and Temperature,	

	4. Basic Ideas; Basic Diode Circuit, Forward Region, Knee Voltage, Maximum DC Forward Current, 5. The Ideal Diode, The Second Approximation, The Third Approximation, 6. Bulk Resistance, DC or Static Resistance of Diode, Dynamic or AC Resistance of Diode. Load Lines. 7. Numerical Problems.	
	Unit Outcomes: UO1. Analyze the characteristics and theories in semiconductor materials in terms of crystal structures, charge carriers and energy bands. UO2. Explain how to find the fermi energy level and carrier density in n-type and p-type semiconductors.	
II	**Special Diodes**	**08**
	1. Introduction, 2. Zener Diode, 3. Tunnel Diode, Varactor Diode, 4. PIN Diode, Schottky Diode 5. Light Emitting Diode, Photodiode, 6. Uses of Each Diode (Qualitative Analysis), 7. Optoelectronic Devices. 8. Numerical Problems,	
	Unit Outcomes: UO1. Know the characteristics of various diodes. UO2. Interpret various applications of diode.	
III	**Transistors**	**12**
	1. Introduction, Bipolar Junction Transistor, The Unbiased Transistor, 2. Transistor Biasing, Important Biasing Rules, FF, RR, FR Biasing, Voltage Divider Bias, 3. Transistor Circuit Configurations, CB And CE Configurations, Relation Between A and B, Relation Between Transistor Currents, 4. Transistor Characteristics In C-E, C-B And C-C Configurations, 5. Numerical Problems.	
	Unit Outcomes: UO1. Design a simple BJT bias circuit for a given specification UO2. Identify different models of BJT, regions of operations, and their IV-characteristics	

IV	Field Effect Transistors	13
	1. Introduction, 2. J-FET: Construction, Operation, 3. Static Characteristics of JFET, JFET Drain Characteristics with V_{GS}=0, JFET Characteristics with External Bias, Transfer Characteristics, 4. Small Signal JFET Parameters, Common Source JFET As an Amplifier, Advantages Of JFET, MOSFET Or Insulated Gate FET, Power FET's, 5. Depletion Enhancement -MOSFET, Schematic Symbols for A Depletion Enhancement -MOSFET, 6. Static Characteristics of Depletion Enhancement-MOSFET, Enhancement Only N-Channel MOSFET And Its Transfer Characteristics,	
	Unit Outcomes: UO1. Analyze (calculate voltages and currents) a simple MOSFET (JFET) bias circuit and find its Q-point. UO2 Demonstrate the knowledge of MOSFET (JFET) region models and their IV-characteristics.	

Learning Resources:

1. Electronic Principles, Sixth Edition, A.P. Malvino, Tata McGraw-Hill Publications (Multicolor Illustrative Edition)
2. Basic Electronics Solid State: B.L. Theraja, S. Chand and Company Ltd.
3. A Text Book of Applied Electronics: R. S. Sedha (2004), S. Chand and Company Ltd. Ramnagar, New Delhi.
4. Electronic Fundamentals and Applications (Integrated and Discrete system), John D. Ryder (1989) Prentice Hall of India, Pvt. Ltd. New Delhi – 110001
5. Electric Principles, Third Edition, A.P. Malvino, Tata McGraw-Hill Publications
6. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI P. Ltd, New Delhi
7. Principal of Electronics, V.K. Mehta and Rohit Mehta, S. Chand and Company Ltd.
8. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI P. Ltd, New Delhi.
9. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition
10. Electric Principles, Third Edition, A.P. Malvino, Tata McGraw-Hill Publications

Internal Examination Pattern:

CAT – I: Home Assignment

CAT – II: PPT Presentation/ Open Book Test/ Poster Presentation/ Seminar/ Online Quiz/ Descriptive Test

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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CO2	0	0	3	2	0	0	1	0	0	0	3	0	1	0
CO3	3	2	0	2	0	0	0	0	3	1	0	2	0	2
CO4	2	2	0	3	0	0	0	0	2	2	2	2	0	2

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

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UG I Sem I

Course Type : Lab Course

Course Title : Lab Course –II (Based on DSC-II)

Course Code : 101ELE1104

Credits : 01 **Max. Marks: 50** **Hours: 30**

Learning Objective

LO1. To train the students with the necessary skills to perform experiments on Ohm's law, Kirchhoff's Law, Transistor, etc.

Course outcomes

After completion of the course, the student will be able to

CO1. Verify fundamental network theorems such as Norton's, Kirchhoff's, and Superposition Theorems through practical circuits.

CO2. Analyze the V-I characteristics of semiconductor devices like PN junction diodes, tunnel diodes, transistors, and JFETs.

CO3. Demonstrate the input-output and transfer characteristics of NPN transistors in common emitter configuration.

CO4. Study the behavior of RC and LR circuits during charging/discharging and current growth/decay processes.

Practical No.	Unit
1	Verification of Norton's theorem in DC Circuit
2	Verification of Kirchhoff's Law in DC Circuit.
3	Verification of Superposition Theorem in AC Circuit.
4	Characteristics of Tunnel diode.
5	Input-Output and transfer characteristics of CE mode of NPN Transistor.
6	V-I Characteristics of P-N Junction diode.
7	Study the transfer Characteristics of JFET.

8	Study the RC Circuit for Charging and Discharging of Capacitor through Resistor.
9	Study of Growth and decay of current in L-R Circuit.

Learning Resources:

1. Electronic Principles, Sixth Edition, A.P. Malvino, Tata McGraw-Hill Publications (Multicolor Illustrative Edition)
2. Basic Electronics Solid State: B.L. Theraja, S. Chand and Company Ltd.
3. A Text Book of Applied Electronics: R. S. Sedha (2004), S. Chand and Company Ltd. Ramnagar, New Delhi.
4. Electronic Fundamentals and Applications (Integrated and Discrete system), John D. Ryder (1989) Prentice Hall of India, Pvt. Ltd. New Delhi – 110001
5. Electric Principles, Third Edition, A.P. Malvino, Tata McGraw-Hill Publications
6. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI P. Ltd, New Delhi
7. Principal of Electronics, V.K. Mehta and Rohit Mehta, S. Chand and Company Ltd.
8. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI P. Ltd, New Delhi.
9. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition
10. Electric Principles, Third Edition, A.P. Malvino, Tata McGraw-Hill Publications

Internal Examination Pattern:

CAT – I: Record Book Submission

CAT – II: Overall performance in the regular practical

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	0	3	2	2	0	0	0	0	0	3	3	0	0	0
CO2	3	1	2	0	0	0	0	0	3	1	2	2	0	1
CO3	2	0	2	1	0	0	0	0	2	0	2	2	0	0
CO4	2	2	0	0	0	0	0	0	1	2	1	0	0	1

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem I

Course Type : VSC-I

Course Title : Domestic Electrical Appliances and their Maintenance

Course Code : 101ELE1501

Credits : 02 **Max. Marks: 50** **Lectures: 45 Hrs.**

Learning Objectives:

LO1. To create awareness about types and make of domestic appliances.

LO2. To acquire knowledge about principles of operation, working and application of various domestic appliances

LO3. To acquire skills in assembly, repair, installation, text and maintenance of domestic appliances.

Course Outcomes:

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

CO1. Identify and explain the basic working principles and components of common domestic electric appliances.

CO2. Demonstrate skills in testing, fault detection, and basic maintenance of household electrical devices.

CO3. Apply knowledge to ensure effective servicing of appliances and explore opportunities for self-employment.

CO4. Develop technical proficiency in handling, assembling, and repairing domestic electrical equipment.

Unit No.	Title of Unit & Contents	Hrs.
I	**Basic Electronics**	**05**
	1. Electrical Conductors and Insulators, Voltage, Current, Resistance, Ohm's Law, 2. Capacitance, Inductance, Series and Parallel Combinations of Resistors, Galvanometer, Ammeter, Voltmeter, Multimeter, 3. Transformers, Electrical Energy, Power, Watt, Kilowatt Hour (kWh), Horse Power, Consumption of Electrical Power	
	Unit Outcomes: UO1. Apply the working principles of different household domestic appliances UO2. Acquire working knowledge on multimeters, galvanometers, ammeters, voltmeters, ac/dc generators, transformers.	
II	**Domestic Electric Appliances**	**05**
	1. Construction,	

	2. Working and Types: Electric Iron, Water Heaters, Electric Kittle, Coffee Maker, 3. Working and Types: Electric Mixer, Egg Beaters, Electric Fan, Hair Drier.	
	Unit Outcomes: UO1. Develop detailed knowledge about few Domestic Electric Appliances UO2. Realize basic working principal of home appliances	
III	**Safety Precautions and Maintenance**	**05**
	1. Introduction, 2. Tools for Maintenance: Electric Tester, Screw Driver, Nut Driver, Benches, Wrenches, 3. Tools for Maintenance: Hammers, Pliers, Cutters, Safety Precautions While Handling Tools and Repairing Appliances, Etc. 4. Importance of Earthing.	
	Unit Outcomes: UO1. Identify and demonstrate the use of various tools and safety precautions required for maintenance and repair of electrical appliances. UO2. Explain the significance of earthing and apply basic maintenance practices to ensure safety and functionality of electrical systems.	
IV	**Practical**	**30**
	1. Testing and repair of Electric Kittle. 2. Testing and repair of Electric Fan. 3. Testing and repair of Egg Beater. 4. Testing and repair of Coffee Maker. 5. Testing and repair of Electric Mixer. 6. Testing and repairs of Hair Drier. 7. Testing and repairs of Water Heater. 8. Dismantling and reassembling of Ordinary type and Automatic/Thermostat control type Electric Iron.	

Learning Resources:

1. Troubleshooting and Repair of Appliances-Eric Kleinert, 3rd Edition, 2012, Mc-Graw Hill Publishers
2. Study of Electrical Appliances & Devices-K.B. Bhatia (ISBN: 978-93-87394-22-3)
3. Fundamentals of Maintenance of Electrical Equipments- K.B. Bhatia (ISBN: 978-93-87394-31-5)
4. Electrical Machines and Appliances theory-Tamilnadu Textbook corporation, College Road, Chennai - 600 006.
5. A Text book on Electrical Technology, B.L. Theraja, S. Chand& Co.
6. A Text book on Electrical Technology, A.K. Theraja., S. Chand& Co.
7. Performance and design of AC machines, M.G. Say, ELBS Edn.
8. Consumer Electronics, S.P. Bali, Pearson.
9. Domestic Appliances Servicing, K.P. Anwer, Scholar Institute Publications.
10. Handbook of Repair & Maintenance of domestic electronics appliances; BPB Publications.

Internal Examination Pattern:

CAT – I: Home Assignment

CAT – II: PPT Presentation/ Open Book Test/ Poster Presentation/ Seminar/ Online Quiz/ Descriptive Test

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	1	0	0	0	3	0	2	1	0	0	0	0	3	1
CO2	0	0	2	1	3	0	3	2	0	0	2	0	3	2
CO3	0	0	0	0	3	0	1	3	0	0	0	0	3	1
CO4	0	0	1	2	3	0	3	2	0	0	2	0	3	1

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Semester - II

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem II

Course Type : DSC-III
Course Title : Power Supplies and Active Filters
Course Code : 101ELE1201
Credits: 03 **Max. Marks: 75** **Lectures: 45 Hrs.**

Learning Objectives:

LO1. To develop understanding about the power supplies using AC mains,

LO2. To inculcate the idea about the transformer and its working,

LO3. To develop the skill of design of Regulated power supplies of different ratings and voltage ranges,

LO4. To make students familiar about three terminal regulators and IC regulators of variable power supply voltages,

LO5. To inculcate the idea about various filters like R-L filter, R-C pass band filter, Band reject filters, band stop filters, low pass filters and high pass filters.

Course Outcomes:

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

CO1. Construct the necessary power supplies of different ratings,

CO2. Construct and use transformers,

CO3. Explain usefulness of wave filter and their uses in electronic circuitry.

CO4. Design regulated power supplies

Unit No.	Title of Unit & Contents	Hrs.
I	**Transformers**	**12**
	1. Introduction, 2. Working Principle of a Transformer, 3. Transformer Construction, Elementary Theory of An Ideal Transformer, 4. Emf Equation of a Transformer, Voltage Transformation Ratio 5. Emf Equation of a Transformer, Voltage Transformation Ratio. 6. Condition for Maximum Efficiency, Auto Transformer 7. Numerical Problems.	
	Unit Outcomes: UO1. Learn how to analyses circuits involving linear and ideal transformers.,	

	UO2. Construct the ideal transformer	
II	**Unregulated Power Supplies**	**12**
	1. Introduction, 2. Unregulated Power Supply, 3. Steady & Pulsating DC Voltages, and Rectifiers, 4. Half Wave Rectifier, Full Wave Rectifier, Full Wave Bridge Rectifier, 5. Filters: Series Inductor Filter, Shunt Capacitor Filter, LC Filter, C-L-C (π) Filter 6. Numerical Problems.	
	Unit Outcomes: UO1. Construct the necessary power supplies of different ratings., UO2. Ability to design and analyzes simple rectifiers and understand the operation of rectifier circuit.	
III	**Regulated Power Supplies**	**12**
	1. Introduction, Voltage Regulation, 2. Zener Diode Shunt Regulator, Transistor Series Voltage Regulator, 3. Control Transistor Series Regulator, 4. Transistor Shunt Voltage Regulator, 5. Monolithic or IC Voltage Regulator, Fix Voltage Regulator Using IC 74XX And 79XX, Adjustable Voltage Regulator Using IC LM 317, 6. Numerical Problems.	
	Unit Outcomes: UO1. Draw the static characteristics of a Zener diode., UO2. Construct and test Zener diode as voltage regulator.	
IV	**Wave filters**	**09**
	1. Introduction 2. Applications, 3. Different Types of Wave Filters, Low Pass RC Filter, Low Pass R- L Filter, High Pass R-C Filter, 4. High Pass R-L Filter, R-C Band Pass Filter, R-C Band Stop Filter. 5. Numerical Problems.	
	Unit Outcomes: UO1. Explain usefulness of wave filter and their uses in electronic circuitry. UO2. Emphasize the importance of filter circuits.	

Learning Resources:

1. A Text Book of Electrical Technology (SI Units), Vol II- B.L. Theraja, Publication Division (U-I) of Nirja Construction & Development Company Pvt. Ltd.
2. Basic Electronics Solid State, B.L. Theraja (2009) S. Chand and Company Ltd. Ramnagar, New Delhi
3. A Text Book of Electrical Technology (in SI Units) Vol. I, B.L. Theraja, A.K. Theraja, (2010) S. Chand and Company Ltd. Ramnagar, New Delhi
4. A text book of electrical technology Vol-I: B.L. Theraja, A.K. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010)
5. Basic Electronics: Solid State - B.L. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi (2009
6. A text book of electrical technology, by B.L. Theraja Vol. I, Nirja Construction and Development Company
7. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition
8. A Text book applied electronics – R.S. Sedha, S. Chand and Company Ltd. (2004).
9. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI P. Ltd, New Delhi
10. Principal of Electronics, V.K.Mehta and Rohit Mehta, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010).

Internal Examination Pattern:

CAT – I: Home Assignment

CAT – II: PPT Presentation/ Open Book Test/ Poster Presentation/ Seminar/ Online Quiz/ Descriptive Test

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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CO2	1	0	0	2	0	0	2	0	1	0	2	2	0	1
CO3	3	1	0	1	0	0	0	0	2	2	0	2	0	1
CO4	2	1	0	3	0	0	2	1	2	2	2	3	1	2

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

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Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem II

Course Type : Lab Course

Course Title : Lab Course – III (Based on DSC-III)

Course Code : 101ELE1203

Credits : 01 **Max. Marks: 50** **Hours: 30**

Leaning Objectives

LO1. To equip students with a practical understanding of static AC devices through the experimental study of step-up and step-down transformers.

LO2. To train students in the principles of AC-to-DC conversion by analyzing half-wave and full-wave rectifiers, and to explore the signal-smoothing and frequency-selection capabilities of passive RC low-pass and high-pass filters.

LO3. To develop hands-on proficiency in constructing and evaluating voltage stabilization circuits utilizing Zener diodes, NPN transistor series regulators, and integrated circuits (IC78XX/IC79XX).

LO4. To foster a comprehensive understanding of transistor dynamics, specifically focusing on their operating regions (cut-off, saturation, active) and their fundamental role in amplifying weak electronic signals under CE configuration.

Course outcomes

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

CO1. Analyze the operational principles of step-up and step-down transformers and differentiate between fundamental AC and DC electrical characteristics.

CO2. Evaluate the efficiency of the rectification process by determining the regulation percentage and ripple factor of half-wave and full-wave rectifiers, and assess the impact of passive RC filters on signal conversion.

CO3. Construct and test robust voltage regulation circuits using Zener shunt regulators, NPN transistor series regulators, and IC voltage regulators to maintain a stable DC power supply.

CO4. Examine the behavior of transistors across different operating regions (cut-off, saturation, and active) to effectively utilize them for the amplification of weak electronic signals.

Practical No.	Unit
1	Study of step-up transformer

2	Study of step-down transformer
3	Study of half wave rectifier with and without filter. (% of regulation, Ripple factor)
4	Study of full wave rectifier with and without filter
5	Study of Zener shunt regulator
6	Study of NPN Transistor series regulator
7	Study of passive low pass RC filter
8	Study of passive high pass RC filter
9	Study of Voltage regulation using IC78XX and IC79XX (0-5V, 0-9 V and 0-12 V)

Learning Resources:

1. A Text Book of Electrical Technology (SI Units), Vol II- B.L. Theraja, Publication Division (U-I) of Nirja Construction & Development Company Pvt. Ltd.
2. Basic Electronics Solid State, B.L. Theraja (2009) S. Chand and Company Ltd. Ramnagar, New Delhi
3. A Text Book of Electrical Technology (in SI Units) Vol. I, B.L. Theraja, A.K. Theraja, (2010) S. Chand and Company Ltd. Ramnagar, New Delhi
4. A text book of electrical technology Vol-I: B.L. Theraja, A.K. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010)
5. Basic Electronics: Solid State - B.L. Theraja, S. Chand and Company Ltd. Ramnagar, New Delhi (2009
6. A text book of electrical technology, by B.L. Theraja Vol. I, Nirja Construction and Development Company
7. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition
8. A Text book applied electronics – R.S. Sedha, S. Chand and Company Ltd. (2004).
9. Electronic Devices and Circuits: An Introduction- Allen Mottershead-PHI P. Ltd, New Delhi
10. Principal of Electronics, V.K.Mehta and Rohit Mehta, S. Chand and Company Ltd. Ramnagar, New Delhi. (Reprint 2010).

Internal Examination Pattern:

CAT – I: Record Book Submission

CAT – II: Overall performance in the regular practical

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	2	0	2	2	0	0	1	0	2	2	2	2	0	1
CO2	2	3	2	2	0	0	0	0	1	3	2	2	0	2
CO3	1	0	2	3	0	0	2	0	1	1	3	3	0	2
CO4	3	2	0	2	0	0	0	0	3	2	1	2	0	2

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem II

Course Type : DSC-IV

Course Title : Amplifiers and Number Systems

Course Code : 101ELE1202

Credits : 03 **Max. Marks: 75** **Lectures: 45 Hrs.**

Learning Objectives:

LO1. To develop the concepts about operating point,

LO2. To develop the knowledge about types of biasing and its usefulness,

LO3. To introduce small signal behavior of transistors,

LO4. To inculcate the knowledge about h parameter equivalent circuits for the three transistor configurations CE, CB, CC,

LO5. To familiarize the concepts of feedback amplifiers,

LO6. To familiarize with different number systems and their applications.

Course Outcomes:

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

CO1. Analyze transistor amplifier circuits using AC-DC load lines and evaluate key performance parameters.

CO2. Demonstrate understanding of transistor biasing techniques and small signal amplifier analysis.

CO3. Compare different transistor configurations (CE, CB, CC) and negative feedback topologies based on their characteristics.

CO4. Apply number system conversions and perform binary arithmetic relevant to digital electronics.

Unit No.	Title of Unit & Contents	Hrs.
I	**Transistor Biasing**	**12**
	1. Introduction, 2. DC Load Line, 3. Q Point and Maximum Undistorted Output, 4. AC Load Line, Need for Biasing a Transistor, 5. Factors Affecting Bias Variations, Stability Factor,	

	6. Beta Sensitivity, Stability Factor for CB & CE Circuits, 7. Different Methods for Transistor Biasing: Base Bias with Emitter Feedback, 8. Voltage Divider Bias, 9. Numerical Problems.	
	Unit Outcomes: UO1. Draw AC-DC load line and evaluate different parameters of amplifier, UO2. Explore use of biasing circuits in various applications,	
II	**Small Signal Amplifiers**	**12**
	1. Introduction, 2. Hybrid Parameters, 3. AC Equivalent Circuit Using h-Parameters, 4. Transconductance Model, Analysis of CE Amplifier, 5. CB Amplifier, 6. CC Amplifier Using h Parameters, 7. Numerical Problems.	
	Unit Outcomes: UO1. Solve the problems on small signal amplifiers, UO2. Draw the h parameter equivalent circuits for the transistor configurations CE, CB, CC.	
III	**Feedback Amplifiers**	**12**
	1. Introduction, 2. Principle of Feedback Amplifiers, 3. Advantages of Negative Feedback: Gain Stability, 4. Decreased Distortion, 5. Increased Bandwidth, 6. Forms of Negative Feedback: Current – Series Feedback Amplifier, 7. Voltage Series Negative Feedback Amplifier, 8. Numerical Problems	
	Unit Outcomes: UO1. Compare CC, CE and CB with respect to Ri, Ro, Ai, and Av. UO2. Compare the four negative feedback topologies,	

IV	Number Systems	09
	1. Introduction 2. Digital Representation of Analog Quantities, 3. Types of Number Systems: Binary Number System, 4. Octal Number System, Hexadecimal Number System, 5. Signed Binary Number Representation, 6. 1's Complement Representation, 7. 2's Complement Representation, 8. Binary Arithmetic: Binary Addition and Binary Subtraction, 9. Conversion of Numbers from One System to Another, 10. Numerical Problems.	
	Unit Outcomes: UO1. Represent analog quantities digitally using various number systems including binary, octal, and hexadecimal. UO2. Perform binary arithmetic operations and convert numbers between different number systems using complement methods.	

Learning Resources:

1. Basic Electronics (Solid-state) (Multicolor Illustrative Edition) B.L. Theraja. (S. Chand & Company Ltd)
2. Electric Fundamentals and Applications – John. D. Ryder (Prentice – Hall of India Pvt. Ltd.)
3. Modern Digital Electronics – R.P. Jain, Tata McGraw Hill Pub, Company (3rd edition)
4. Digital fundamental- Floyd (2005) Pearson Education
5. A text book of Applied Electronics- R. S. Sedha. (2008) S. Chand Publishing
6. Digital Electronics with practical Approach, G.N. Shinde, Shivani Publications (2003)
7. Digital Electronics Principle Device and Application, Anil Kumar, Wiley
8. Digital Logic and Computer Design Book by Morris Mano
9. Principal of Electronics, V.K. Mehta and Rohit Mehta, S. Chand and Company Ltd.
10. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition.

Internal Examination Pattern:

CAT – I: Home Assignment

CAT – II: PPT Presentation/ Open Book Test/ Poster Presentation/ Seminar/ Online Quiz/ Descriptive Test

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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CO2	3	2	0	2	0	0	0	0	3	2	0	2	0	2
CO3	2	1	0	1	0	0	0	0	2	1	0	2	0	2
CO4	0	0	0	0	0	3	0	0	1	2	0	3	0	2

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem II

Course Type : Lab Course

Course Title : Lab Course –IV (Based on DSC-IV)

Course Code : 101ELE1104

Credits : 01 **Max. Marks: 50** **Hours: 30**

Learning Objectives

LO1. To inculcate the idea of concepts about operating point.

LO2. To develop the knowledge about types of biasing and its usefulness.

LO3. To introduce small signal behavior of transistors.

LO4. To familiarize the concepts of feedback amplifiers.

LO5. To familiarize with different number systems and their applications.

Course outcomes

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

CO1. Analyze the frequency response of single-stage CE and CC amplifiers and evaluate their voltage gain and input/output characteristics.

CO2. Study and determine the biasing techniques, load-line analysis, and stability of transistor amplifiers.

CO3. Examine the characteristics and working of power amplifiers and transistor configurations.

CO4. Demonstrate binary arithmetic operations and number system conversions using digital circuits like BCD adder, subtractor, and binary-to-decimal converters.

Practical No.	Unit
1	Single stage CE amplifier (Frequency Response)
2	Single stage CC amplifier (Emitter follower)
3	Study of Transistor amplifier (Load, Line Analysis)
4	Study of transistor biasing and stability
5	Study of power amplifier.
6	Study of binary addition (BCD Adder)
7	Study of binary subtraction (BCD Subtractor)
8	Study of Binary to Decimal convertor
9	V-I characteristics CE NPN transistor

Learning Resources:

1. Basic Electronics (Solid-state) (Multicolor Illustrative Edition) B.L. Theraja. (S. Chand & Company Ltd)
2. Electric Fundamentals and Applications – John. D. Ryder (Prentice – Hall of India Pvt. Ltd.)
3. Modern Digital Electronics – R.P. Jain, Tata McGraw Hill Pub, Company (3rd edition)
4. Digital fundamental- Floyd (2005) Pearson Education
5. A text book of Applied Electronics- R. S. Sedha. (2008) S. Chand Publishing
6. Digital Electronics with practical Approach, G.N. Shinde, Shivani Publications (2003)
7. Digital Electronics Principle Device And Application, Anil Kumar, Wiley
8. Digital Logic and Computer Design Book by Morris Mano
9. Principal of Electronics, V.K. Mehta and Rohit Mehta, S. Chand and Company Ltd.
10. Basic Electronics, Bernard Grob, Tata Mc-Graw Hill Publications (2007) Tenth Edition.

Internal Examination Pattern:

CAT – I: Record Book Submission

CAT – II: Overall performance in the regular practical

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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CO2	2	3	2	2	0	0	0	0	2	3	2	2	0	2
CO3	3	2	2	2	0	0	0	0	3	2	2	2	0	1
CO4	0	0	2	3	0	3	0	0	1	0	2	3	0	2

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

UG I Sem II

Course Type : VSC-II

Course Title : Fundamentals of Mobile Repairing

Course Code : 101ELE2501

Credits : 02 **Max. Marks: 50** **Lectures: 45 Hrs.**

Learning Objectives:

LO1. To provide basic knowledge of Mobile Phones hardware.

LO2. To provide hands on training on various identifying issues, troubleshoot issues and techniques.

Course Outcomes:

After successful completion of the course, students will be able to:

CO1. Find the problem and solution of various Mobile Phone Devices.

CO2. Start a mobile repair shop of their own.

CO3. Perform any issue-related tasks such as identifying issues, troubleshoot issues, repairing mobile phones, etc.

CO4. Get entry level (technician) jobs at relevant places, Mobile repair centers, mobile shops, mobile service centers.

Unit No.	Title of Unit & Contents	Hrs.
I	**Introduction to Mobile**	**8**
	1 Information about Mobile 2 Invention of Mobile 3 Information about I-Phone 4 Invention of I Phone 5 Difference between Keypad mobile And Smartphone mobile	
	Unit Outcomes: UO1. Apply the evolution and technological development of mobile phones, including key inventions like the mobile and iPhone. UO2. Differentiate between various types of mobile devices such as keypad phones and smartphones based on their features and functionalities.	
II	**Information About IMEI number and tools for Mobile Repairing**	**7**

	1 Uses of IMEI number 2 Digit of IMEI number 3 Code of IMEI number 4 Information About all full forms 5. Tools for repair: Hot air gun, Shoulder gun, PCB Stand, multi-meter, Kathli, Battery Booster, Screwdriver set, Tweezers, Battery Meter, Brush, Thinner, Paste, Jumper wire, Computer.	
	Unit Outcomes: UO1. Identify the IMEI number UO2. Perform any issue-related tasks such as identifying issues, troubleshoot issues, repairing mobile phones, etc.	
III	**Practical**	**30**
	1. Study of Mobile Phone Dictionary: Full Forms of Terms Used in Mobile Phone. 2. Study of Mobile Phone Repairing Tools and Equipment. 3. Identification of Card Level Parts. 4. Identification of PCB. 5. Identification of Small Parts in a Mobile Phone. 6. Study About IC (Integrated Circuit) and Counting Techniques of Leg Type and Ball-Type IC. 7. Software Problems and Solutions in mobile repairing. 8. Multimedia and Downloading in Mobiles. 9. Study of 5G mobile trainer kit	

Learning Resources:

1. Mobile Repairing Book in Hindi by Nitin Kothari
2. Mastering Mobile Learning by Chad Udell, Gary Woodill
3. Perfect Mobile Repairing Handbook: Smartphones Repairing Handbook Kindle Edition
4. Advance Mobile Repairing: Multicolour Circuits, Service Diagrams & Rep, Sanjib Pandit.
5. Mobile phone repair training course skills and research by MEI XIU JIANg.
6. Mobile Phones and Tablets Repairs: A Complete Guide for Beginners and Professionals, Chukky Oprandu

Internal Examination Pattern:

CAT – I: Home Assignment

CAT – II: PPT Presentation/ Open Book Test/ Poster Presentation/ Seminar/ Online Quiz/ Descriptive Test

Mapping of POs, PSOs and COs:

COs/POs & PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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CO2	0	0	0	0	2	0	0	3	0	0	0	0	3	1
CO3	0	0	3	0	3	0	2	2	0	0	3	0	3	2
CO4	0	0	0	0	3	0	0	3	0	0	0	0	3	1

Scale: 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation

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Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science & Technology

Department of Physics and Electronics

UG First Year

Extra Credit Activities

Sr. No.	Course Title	Course Code	Credits	Hours T/P
1	MOOCs		Min. of 02 credits	Min. of 30 Hrs.
2	Certificate Courses		Min. of 02 credits	Min. of 30 Hrs.
3	IIT, Bombay Spoken Tutorial Courses		Min. of 02 credits	Min. of 30 Hrs.

Guidelines:

Extra -academic activities

1. All extra credits claimed under this heading will require sufficient academic input/ contribution from the students concerned.
2. Maximum 04 extra credits in each academic year will be allotted.
3. These extra academic activity credits will not be considered for calculation of SGPA/CGPA but will be indicated on the grade card.

Additional Credits for Online Courses:

1. Courses only from SWAYAM and NPTEL platform are eligible for claiming credits.
2. Students should get the consent from the concerned subject Teacher/Mentor/Vice Principal and Principal prior to starting of the course.
3. Students who complete such online courses for additional credits will be examined/verified by the concerned mentor/internal faculty member before awarding credits.
4. Credit allotted to the course by SWAYAM and NPTEL platform will be considered as it is.

Additional Credits for Other Academic Activities:

1. One credit for presentation and publication of paper in International/National/State level seminars/workshops.
2. One credit for measurable research work undertaken and field trips amounting to 30 hours of recorded work.
3. One credit for creating models in sponsored exhibitions/other exhibits, which are approved by the concerned department.

4. One credit for any voluntary social service/Nation building exercise which is in collaboration with the outreach center, equivalent to 30 hours
5. All these credits must be approved by the College Committee.

Additional Credits for Certificate Courses:

1. Students can get additional credits (number of credits will depend on the course duration) from certificate courses offered by the college.
2. The student must successfully complete the course. These credits must be approved by the Course Coordinators.
3. Students who undertake summer projects/ internships/ training in institutions of repute through a national selection process, will get 2 credits for each such activity. This must be done under the supervision of the concerned faculty/mentor.

Note:

1. The respective documents should be submitted within 10 days after completion of Semester End Examination.
2. No credits can be granted for organizing or for serving as office bearers/ volunteers for Inter-Class / Associations / Sports / Social Service activities.
3. The office bearers and volunteers may be given a letter of appreciation by the respective staff coordinators. Besides, no credits can be claimed for any services/activities conducted or attended within the college.
4. All claims for the credits by the students should be made and approved by the mentor in the same academic year of completing the activity.
5. Any grievances of denial/rejection of credits should be addressed to Additional Credits Coordinator in the same academic year.
6. Students having a shortage of additional credits at the end of the third year can meet the Additional Credits Coordinator, who will provide the right advice on the activities that can help them earn credits required for graduation.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Faculty of Science and Technology

Department of Physics and Electronics

Examination Framework

Theory:

40% Continuous Assessment Tests (CATs) and 60% Semester End Examination (SEE)

Practical:

50% Continuous Assessment Tests (CATs) and 50% Semester End Examination (SEE)

Course	Marks	CAT & Mid Term Theory				CAT Practical		Best Scored CAT & Mid Term	SEE	Total
1	2	3				4		5	6	5 + 6
		Att.	CAT I	Mid Term	CAT II	Att.	CAT			
DSC/DSE/ GE/OE/Minor	100	10	10	20	10	-	-	40	60	100
DSC	75	05	10	15	10	-	-	30	45	75
Lab Course/AIPC/ OJT/FP	50	-	-	-	-	05	20	-	25	50
VSC/SEC/ AEC/VEC/CC	50	05	05	10	05	-	-	20	30	50

Note:

1. All Internal Exams are compulsory
2. Out of 02 CATs best score will be considered
3. Mid Term Exam will be conducted by the Exam Section
4. Mid Term Exam is of Objective nature (MCQ)
5. Semester End Exam is of descriptive in nature (Long & Short Answer)
6. CAT Practical (20 Marks): Lab Journal (Record Book) 10 Marks, Overall Performance 10 Marks.