Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structure and Curriculum of Four-Year Multidisciplinary Degree (Honors/Research) Programme with Multiple Entry and Exit option

Undergraduate Programme of Science and Technology

B.Sc. (Honors/Research) in Physics

Board of Studies

in

Physics

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

w.e.f. June, 2023

(In Accordance with NEP-2020)

Academic Year 2023-24

Review Statement

The NEP Cell reviewed the Curriculum of **B.Sc. (Honors/Research) in Physics** Programme to be effective from the **Academic Year 2023-24.** It was found that, the structure is as per the NEP-2020 guidelines of Govt. of Maharashtra.

Date: 09/08/2023

Place: Latur

NEP Cell
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)

CERTIFICATE

I hereby certify that the documents attached are the Bonafide copies of the Curriculum of **B.Sc. (Honors/Research) in Physics** Programme to be effective from the **Academic Year 2023-24.**

Date: 14/07/2023

Place: Latur

(Dr A. A. Yadav)
Chairperson
Board of Studies in Physics
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Members of Board of Studies in the Subject Physics

Under the Faculty of Science and Technology

Department of Physics and Electronics

Sr. No.	Name	Designation	In position
1	**Dr A. A. Yadav** Head, Department of Physics & Electronics Rajarshi Shahu Mahavidyalaya (Autonomous), Latur	Chairperson	HoD
2	**Prof. Dr. V. P. Pawar,** Head, Department of Physics, Maharashtra Udayagiri Mahavidyalaya, Udgir Dist: Latur	Member	V.C. Nominee
3	**Dr R. H. Kadam,** Shrikrishna Mahavidyalaya, Gunjoti, Omerga	Member	Academic Council Nominee
4	**Mrs Shyamala Bodhane** Head, Department of Physics, Xt. Xaviers College, Mumbai	Member	Expert from outside for Special Course
5	**Shri Gundu Sabde** Relyon Industries, Pune	Member	Expert from Industry
6	**Dr K. N. Shivalkar** Head, Department of physics, Mahatma Gandhi Mahavidyalaya, Ahmedpur Dist. Latur	Member	P.G. Alumni
7	**Dr D. G. Palke** Head, Department of Chemistry,	Member	Faculty Member
8	**Dr Dayanand Raje**	Member	Member from same Faculty
9	**Mr Swapnil Undalkar**	Member	Member from same Faculty
10	**Mr Atul More**	Member	Member from same Faculty
11	**Miss Mayuri Hawaldar**	Member	Member from same Faculty
12	**Miss Vishakha Patil**	Member	Member from same Faculty
13	**Mr. Suraj Gund**	Member	Member from same Faculty

From the Desk of the Chairperson…

"Creativity is intelligence having fun" – Albert Einstein

I welcome you all. We have immense pleasure to share that our department is one of the star departments with the state-of-the-art facilities and has highly qualified and dignified faculty. The department addresses the critical challenges to face the society, industry and the academia. I take great pride in sharing that from the academic year 2023-24, development of our Physics curriculum is with the objectives and guidelines as per the National Education Policy 2020. National Education Policy 2020 is a comprehensive framework for education in India that aims to transform the existing education system. The NEP 2020 emphasizes a holistic and multidisciplinary approach to education, focusing on the overall development of students.

Our curriculum as per NEP 2020 reflects: A balanced mix of theoretical concepts, practical applications, and problem-solving skills. Incorporate interdisciplinary connections and encourage the integration of Physics with other subjects where appropriate. Inclusion of emerging topics and advancements in Physics, such as Quantum mechanics, Astrophysics, Nuclear Physics, Renewable Energy, etc. Design learning outcomes that emphasize conceptual understanding, critical thinking, analytical skills, and practical applications. Encourage project-based learning, hands-on experiments, and inquiry-based activities to foster active student engagement and exploration. Explore the integration of technology tools and resources. Promotes inclusivity, gender sensitivity, and addresses the needs of students with diverse backgrounds and abilities.

Our department organizes workshops, training programs, and seminars to update physics teachers about the revised curriculum, instructional strategies, and assessment methods. Encourage teachers to engage in professional development activities, research, and collaboration to enhance their pedagogical skills. Provide support and resources for teachers to integrate technology effectively into their teaching practices.

Our assessment methods are innovative, such as project portfolios, oral presentations, demonstrations, and performance-based assessments in addition to traditional written exams. Facilitate collaborations with research institutions, industries, and organizations to provide students with real-world exposure and opportunities for internships or mentor-ship programs.

Let me take the opportunity to thank and wish you all a great success.

(Dr A.A. Yadav)
Chairperson
Board of Studies in Physics

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Department of Physics and Electronics

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Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Faculty of Science and Technology

Department of Physics and Electronics

Structure for Four Year Multidisciplinary Undergraduate Degree Programme in Physics 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: 04 Cr. DSC II: 04 Cr.	NA	NA	GE-I: 04 Cr.	VSC-I: 02 Cr. SEC-I: 02 Cr.	AEC-I MIL: 02 Cr. VEC-I: 02 Cr.	CC-I: 02 Cr. (NSS, NCC, Sports, Cultural)/ CEP-I: 02 Cr. (SES-I)/ OJT: 02 Cr. / Mini Project: 02 Cr.	22	44 Cr. UG Certificate
	II	DSC III: 04 Cr. DSC IV: 04 Cr.	NA	NA	GE-II: 04 Cr.	VSC-II: 02 Cr. SEC-II: 02 Cr.	AEC-II MIL: 02 Cr. VEC-II: 02 Cr.	Generic IKS: 02 Cr.	22	
	Cum. Cr.	16	-	-	08	04+04 = 08	04+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

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Faculty of Science and Technology

Department of Physics and Electronics

B.Sc. (Honors/Research) in Physics

Year & Level	Semester	Course Code	Course Title	Credits	No. of Hrs.
I 4.5	I	101PHY1101 (DSC-I)	Mechanics and Properties of Matter-I	03	45
		101PHY1103	Lab Course-I	01	30
		101PHY1102 (DSC-II)	Heat and thermodynamics-II	03	45
		101PHY1104	Lab Course-II	01	30
		101PHY1501 (VSC-I)	Domestic Electrical Wiring	02	45
		GE-I	From Basket	04	60
		(SEC-I)	From Basket	02	30
		(AEC-I)	From Basket	02	30
		(VEC-I)	The Constitution of India	02	30
		AIPC/OJT-I	Field Project	02	60
	Total Credits			**22**	
	II	101PHY2101 (DSC-III)	Electricity and Magnetism-III	03	45
		101PHY2103	Lab Course-III	01	30
		101PHY2102 (DSC-IV)	Basic Electronics-IV	03	45
		101PHY2104	Lab Course-IV	01	30
		101PHY2501 (VSC-II)	Weather Forecasting	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
		Generic IKS	Introduction to Indian Knowledge System	02	60
	Total Credits			**22**	
Total Credits (Semester I & II)				**44**	

Programme Outcomes (POs) for B.Sc. Programme	
PO1	**Disciplinary Knowledge:** Comprehensive knowledge of science subjects which constitute the graduate programme and execution of scientific knowledge in the specific area.
PO2	**Scientific Outlook:** The qualities of a science graduate such as observation, precision, analytical mind, logical thinking, clarity of thought and expression and systematic approach.
PO3	**Self-Directed Life-long Learning:** Ability to appear for various competitive examinations or choose the post graduate programme or other related programme of their choice.
PO4	**Research Skills:** Functional knowledge and applications of instrumentation and laboratory techniques to do independent experiments, interpret the results and develop research ethos.
PO5	**Problem Solving Skills:** Analytical and logical skills and critical thinking to extract information from qualitative and quantitative data, formulate and solve problems in a systematic and rational manner.
PO6	**Professional Competence and Ethics:** Aptitude and skills to perform the jobs in diverse fields such as science, engineering, industries, survey, education, banking, development and planning, business, public service, self-business etc. with human rationale and moral values.

Programme Specific Outcomes (PSOs) for B.Sc. Physics (Honors/Research)	
PSO No.	Upon completion of this programme the students will be able to
PSO1	**Academic Competence:** Get knowledge of various concepts of Fundamentals of Physics, Mechanics and Properties of Matter, Heat and Thermodynamics, Electricity and Magnetism, Basic Electronics, Optics and Lasers, Mathematical Physics and Transducers, Nuclear Physics and Relativity, Waves, Oscillations and Acoustics, Radiation Safety, Quantum Mechanics, Solid State Physics, Nano Materials and Applications, Atomic, Molecular Physics and Statistical Physics, Fundamentals of Digital Electronics, Astronomy and Astrophysics, Renewable Energy Harvesting Skill.
PSO2	**Scientific Outlook:** Perform and demonstrate experiments in Physics to study the phenomena related to thermal conductivity, Phototransistor, Series Resonance in LCR circuit, Current and Voltage Sensitivity, calculation of radiation material process, electronic and electric applications. Classify, calculate and solve problems using knowledge in Physics.
PSO3	**Personal and Professional Competence:** Make the people aware about radiation hazards and safety, handling of electronic devices and solar equipment, repair electronic devices with minor faults. Use mathematical methods for calculations in classical mechanics and quantum mechanics.
PSO4	**Entrepreneurial Competence:** Work at solar service centres, electronics and electric service centers. Start his own workshop for repairing solar, electronic and electric devices.
PSO5	**Research Competence:** Integrate and explore characterization of different materials. Apply the knowledge in Physics to solve problems in various branches of knowledge and day-to-day human affairs. Create, follow, use and apply advanced tools and techniques for research material science and electronic.

Semester-I

Course Type: DSC-I

Course Title: Mechanics and Properties of Matter-I

Course Code: 101PHY1101

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

Learning Objectives:

LO1. To make students familiar about the relation between gravitation, mass, gravitational energy and potential energy,

LO2. To enrich students with the knowledge of properties of fluids,

LO3. To develop understanding of elastic nature of materials,

LO4. To build up an understanding of fundamental physical principles,

LO5. To build up basic skills necessary for solving problems with practical applications by using physical principles,

LO6. To equip students with the skills required for understanding of physical principles in terms of multiple representations: graphs, diagrams, equations,

LO7. To familiarize students with the basic data analysis skills.

Course Outcomes:

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

CO1. Apply Kepler's law to describe the motion of planets and satellite in elliptical orbit, through the study of law of Gravitation.

CO2. Explain the phenomena of simple harmonic motion and the properties of systems executing such motions.

CO3. Explain various forms of potential energy,

CO4. Use kinematic equations to describe non-accelerated and accelerated motions of an object, Apply Newton's laws of motion to solve linear dynamic problems,

CO5. Apply Newton's laws of motion to solve linear dynamic problems,

CO6. Use the work-energy approach to solve dynamic problems involving conservative and non-conservative forces,

CO7. Apply rotational analogs of Newton's laws of motion to solve dynamics problems involving rotational motion.

Unit No.	Title of Unit & Contents	Hrs.
I	**Gravitation**	**11**
	1. Introduction, Kepler's Laws: Newton's Law of Gravitation, Newton's Deductions from Kepler's Laws. 2. Gravitational Potential: PE, Gravitational Potential at Point Distant R From a Body of Mass M. 3. Gravitational Potential Due to A Spherical Shell: A) At A Point Outside the Shell, B) At A Point on The Surface of The Shell, C) At A Point Inside the Shell, Gravitational Potential Due to A Solid Sphere. 4. Density of the Earth, Mass of The Earth, Gravitational Field. 5. Numerical Problems.	
	Unit Outcomes: UO1. Understand that all objects, irrespective of their mass, experience the same acceleration 'g' when falling freely under the influence of gravity at the same point on the Earth. UO2. Understand that if gravity is the only force acting on an object, the sum of kinetic energy and gravitational energy is constant.	
II	**Elasticity**	**12**
	1. Introduction to Elasticity 2. Load, Stress and Strain, Hooke's Law, Factors Affecting on Elasticity 3. Three Types of Elasticity (Introduction) 4. Twisting Couple on A Cylinder, Torsional Pendulum, 5. Determination of Coefficient of Modulus of Rigidity of a Wire: Statistical Method, Dynamical Method Maxwell's Needle, 6. Bending of Beams, Bending Moment, Cantilever Loaded at Free End: When the Weight of The Beam is Ineffective and Effective, Beam Loaded at The Center, 7. Numerical Problems.	
	Unit Outcome: UO1. Understand the principles of Elasticity through the study of Young modulus and Modulus of rigidity.	
III	**Surface Tension**	**11**
	1. Introduction 2. Explanation of Surface Tension, Surface Film and Surface Energy, Units and Dimensions of Surface Tension. 3. Shape of Meniscus in Capillary Tube, Angle of Contact, Pressure Difference Across A Liquid Surface (Case of Drops and	

Unit No.	Title of Unit & Contents	Hrs.
	Bubbles). 4. Rise of Liquid in A Capillary Tube. 5. Experimental Determination of Surface Tension By I) Jaeger's Method and II) Ferguson Method, 6. Factors Affecting Surface Tension. 7. Numerical Problems.	
	Unit Outcomes: UO1. Explain certain properties of water using the concept of cohesive forces and surface tension. UO2. Describe how surface tension encourages liquid droplets and soap films to minimize their surface areas.	
IV	**Viscosity**	**11**
	1. Introduction to Viscosity 2. Rate of Flow of Fluid, Lines and Tubes of Flow, Critical Velocity 3. Reynolds Number, Significance of Reynolds Number, Reynolds Equation of Continuity of Flow 4. Energy of Liquid, Coefficient of Viscosity 5. Poiseuille's Equation for Flow of Liquid Through a Horizontal Capillary Tube, H By Poiseuille's Method 6. Stoke's Law (Statement Only), Rotational Viscometer, Searle's Viscometer. 7. Variation of Viscosity of a Liquid With Temperature and Pressure, 8. Numerical Problems	
	Unit Outcomes: UO1. Understand simple principles of fluid flow and the equations governing fluid dynamics. UO2. Recognize that when there is an increase in temperature, the viscosity of liquids decreases. Whereas the viscosity of gases increases with the rise in temperature.	

Learning Resources: -

1. Elements of Properties of Matter- D.S Mathur, Shyamlal charitable trust, New Delhi.
2. General Properties of Matter-J. C. Upadhyaya, Ram Prasad and Sons publishers.
3. Properties of Matter- Brijlal and Subramanyam, S. Chand and Co.
4. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker, Wiley India Pvt. Ltd (2016) Tenth Edition

5. University Physics with Modern Physics, Hugh D. Young, Roger A. Freedman, Pearson (2016) Fourteenth Edition
6. A Text Book of Mechanics and Properties of Matter, B. S. Agarwal and Dr R.N. Mishra, Kedar Nath Ram Nath (S.J Publications) Meerut
7. Concepts of Physics, H.C. Verma, Bharati Bhawan (Publishers & Distributors); Noida
8. Introduction to Classical Mechanics: With Problems and Solutions, David Morin (Publisher: Cambridge University Press).

Shiv Chhatrapati Shikshan Sanstha's

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(Autonomous)

Faculty of Science & Technology

Department of Physics and Electronics

Course Type: Lab Course
Course Title: Lab Course –I (Based on DSC-I)
Course Code: 101PHY1103
Credits: 01 **Max. Marks: 50** **Hours: 30**

Leaning Objectives

LO1. Learning by doing' is the experimental work,

LO2. To expose U.G. Students to the techniques of handling simple instruments and also make use of them in determining certain mechanical and thermal properties of matter.

Course Outcomes

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

CO1. Determine acceleration due to gravity of earth,

CO2. Determine elastic properties (Young's modulus and Modulus of rigidity) of material,

CO3. Determine and know the properties of liquid like Viscosity, Surface tension,

CO4. Determine thermal conductivity of bad conductor.

Practical No.	Unit
1	Determination of acceleration due to gravity by bar pendulum.
2	Y - by Flat Spiral Spring.
3	Determination of η by Static torsion method.
4	Viscosity of liquid by Poiseuille's method.
5	Surface tension of liquid by Jaeger's method.
6	Y-by bending of beam loaded at middle.
7	Angle of the prism using Spectrometer
8	Calibration of Spectrometer
9	'η' by Maxwell's needle
10	Surface tension by Ferguson's method.

N.B.: At least six experiments should be performed from above.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Faculty of Science & Technology

Department of Physics and Electronics

Course Type: DSC-II

Course Title: Heat and Thermodynamics-II

Course Code: 101PHY1102

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

Learning Objectives

LO1. Develop understanding of nature of heat transfer; transport Phenomena in gases, behavior of gases at different temperatures.
LO2. Create awareness among students about laws of Thermodynamics,
LO3. Familiarize students about entropy, heat engines, refrigerators, etc;
LO4. Adapting the gained knowledge about thermodynamic system using thermodynamic potentials.

Course Outcomes

After completion of course, the student will be able to-
CO1. Know the Zeroth law, First Law, Second law and Third law of Thermodynamics.

CO2. Define heat, work, efficiency and the difference between various forms of energy.

CO3. Explain entropy changes of the thermodynamic system.

CO4. Describe energy exchange processes.

Unit No.	Title of Unit & Contents	Hrs.
I	**Transport Phenomena in Gases**	**11**
	1. Introduction to Thermodynamics, 2. Molecular Collision, Mean Free Path, Sphere of Influence, Collision Cross-Section, 3. Expression for Mean Free Path, Maxwell's Formula, Three Transport Phenomena in Gases, 4. Viscosity, Effect of Temperature and Pressure on Coefficient of Viscosity, 5. Thermal Conductivity and Self-Diffusion of Gases, 6. Effect of Temperature and Pressure on Mean Free Path, 7. Relation Between Coefficient of Viscosity and Coefficient of Thermal Conductivity, 8. Relation Between Three Transport Coefficients, Numerical Problems.	

Unit No.	Title of Unit & Contents	Hrs.
	Unit Outcome: UO1. State the nature of heat transfer, transport phenomena in gases, behavior of various gases at different temperatures.	
II	**Behavior of Real Gases**	**11**
	1. Introduction, Change of State, Continuity of State, 2. Andrew's Experiment on CO_2, 3. Critical Constants, Behavior of Gases at High Pressure, Boyle's Temperature, 4. Reasons for Modification of Gas Equation, Vander Wall's Equation of State, Comparison of Experimental P-V Curves, Estimation of Critical Constants, Constants for Vander Walls Equation, 5. Critical Coefficients, Reduced Equation of State, 6. Joule-Thomson Porous Plug Experiment & Its Applications 7. Relation Between the Boyle Temperature, Inversion Temperature and Critical Temperature, 8. Relation Between T_B, Ti And T_C, Numerical Problems.	
	Unit Outcome: UO1. Learn about the real gas equations, Van der Waal equation of state, the Joule- Thompson effect & its applications.	
III	**Thermodynamics**	**12**
	1. Introduction, Zeroth Law of Thermodynamics, Concept of Heat, 2. Thermodynamic Equilibrium, Work: A) A Path Dependent Function, B) Internal Energy, First Law of Thermodynamics, 3. Internal Energy as A State Function, Specific Heats of a Gas, Slopes of Adiabatic and Isothermal, Reversible and Irreversible Process, 3. Second Law of Thermodynamics, Work Done During Adiabatic and Isothermal Process, 4. Carnot's Ideal Heat Engine and The Efficiency of Carnot's Cycle, Carnot's Theorem and Its Proof, Refrigerator, 5. Entropy, Entropy of Reversible and Irreversible Process, Third Law of Thermodynamics, 6. Numerical Problems.	
	Unit Outcome: UO1. Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics, zeroth law of thermodynamics, the concept of entropy and the associated theorems.	

Unit No.	Title of Unit & Contents	Hrs.
IV	**Thermodynamical Relations**	**11**
	1. Introduction, Extensive and Intensive Variables, 2. Maxwell's Thermodynamical Relations, 3. Applications of Thermodynamical Relations: A) Specific Heat Equation B) Joule-Thomson's Cooling, 4. T-Ds Equations, Claussius-Clapeyron's Latent Heat Equation Using Thermodynamical Relations, 5. Internal Energy, Helmholtz's Function, Enthalpy, Gibb's Function.	
	Unit Outcomes: UO1. Learn about Maxwell's thermodynamic relations. UO2. Comprehend the thermodynamic potentials and their physical interpretations.	

Learning Resources: -

1. Heat, Thermodynamics and Statistical Physics- Brijlal, Dr. N. Subrahmanyam, P. S. Hemne, S. Chand and Co. Ltd.
2. Heat, Thermodynamics & Statistical Physics, S.L. Kakani, Sultan Chand & Sons. Publishing (2009) Revised Edition
3. Heat and Thermodynamics -Brijlal, N. Subrahmanyam, S. Chand and Co. Ltd.
4. Textbook of Heat and thermodynamics- D. S. Mathur.
5. Thermal and Statistical Physics- Brijlal & N. Subrahmanyam, S. Chand and Co. Ltd.
6. Thermal Physics: with Kinetic Theory, Thermodynamics and Statistical Mechanics, S.C. Garg, R.M. Bansal, C.K. Ghosh Tata Mcgraw Hill Education Private Limited (2017) Second Edition.
7. Engineering Thermodynamics, P.K. Nag (Publisher: McGraw-Hill Education)
8. A Textbook of Thermal Physics, R.K. Rajput (Publisher: S. Chand Publishing)
9. Introduction to Thermodynamics, Y.V.C. Rao (Publisher: Universities Press)
10. Thermodynamics and Statistical Physics, B.B. Laud (Publisher: New Age International Publishers)

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Rajarshi Shahu Mahavidyalaya, Latur

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Faculty of Science & Technology

Department of Physics and Electronics

Course Type: Lab Course

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

Course Code: 101PHY1104

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

Learning Objectives

LO 1. Learning by doing' is the experimental work,

LO 2. To expose Students to the techniques of handling simple instruments and also make use of them in determining certain thermal properties of matter.

Course Outcomes

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

CO 1. Determine Mechanical Equivalent of Heat

CO 2. Measure the Planck's constant

CO 3. Determine the coefficient of thermal conductivity

Practical No.	Unit
1	Determination of thermal conductivity of bad conductor by Lee's disc method
2	Determination of thermal conductivity by Forbes method
3	To determine the coefficient of thermal conductivity of copper by Searle's Apparatus.
4	To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
5	To study the variation of thermos emf across two junctions of a thermocouple with temperature.
6	Thermal conductivity of rubber tube
7	To record and analyze the cooling temperature of a hot object as a function of time using a thermocouple
8	Coefficient of Viscosity by Searle's viscometer at particular temperature
9	To determine Mechanical Equivalent of Heat
10	Measurement of Planck's constant by using solar cell

N.B.: At least six experiments should be performed from above.

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Faculty of Science & Technology

Department of Physics and Electronics

Course Type: VSC-I

Course Title: Domestic Electrical Wiring

Course Code: 101PHY1501

Credits: 02 **Max. Marks: 50** **Lectures: 30 Hrs.**

Learning Objectives:

LO1. To provide knowledge about the electrical gadgets and their working principles.

LO2. To introduce about the electrical wiring systems at domestic and household appliances.

LO3. To provide hand on experiments for electrical installations, maintenance and wiring repairs.

Course Outcomes:

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

CO1. Gain knowledge of various electrical gadget installations at domestic levels.

CO2. Understand wiring systems and electrical connections of different phases at household appliances.

CO3. Perform electrical installations, maintenance and wiring repairs.

CO4. Take assignments of domestic electrical wirings and thereby it may generate the employment for them.

Unit No.	Title of Unit & Contents	Hrs.
I	**Study & Use of Wiring Accessories**	**6**
	1. P.V.C Wire, Grade of Wire, Size of Wire, 2. Main Switch (ICDP, ICTP&N), Solid & Stranded Conductor, Single Pole & Double Pole Switch, 3. Different Types of Switches, Miniature Circuit Breaker (M.C.B) 4. Different Types of Fuses, Cut-Out, Fuse-Grip, Ceiling Rose, Lamp Holder, Different Types of Plugs, 5 Live Wire, Neutral Wire, Earth Wire, Switchboard, Various Symbols Associated with Various Components of Wiring.	
	Unit Outcomes: UO1. Apply knowledge for the household or industrial wiring and what materials are essential for household or industrial wiring. UO2. Study of different types of switches, wiring and how it is done.	
II	**Testing of Electrical Installation**	**5**
	1. Continuity Test of Wiring, Continuity Test of Conduit,	

	2. Polarity Test of Single Pole Switch by Test Lamp, Polarity Test of Single Pole Switch, Earth Continuity Test, 3. Insulation Resistance Test Between Conductors, Insulation Resistance Test Between Conductor and Earth by Megger, 4. Study the Necessary I.E. Rules for Domestic Wiring and Earthing.	
	Unit Outcomes: UO1. Identify operations of wiring as continuity, UO2. Testing of Polarity, Analysis of Single-phase AC circuits, Representation of alternating quantities and examine the power in circuits.	
III	**To make Domestic Wiring**	**5**
	1. To make a wiring circuit using PVC wire and Conduit for one Lamp point, 2. One Fan point with regulator and one 3-pin plug point. 3. The wiring includes Main switch & Switchboard. 4. Prepare a chart for listing of the materials used with their specification and symbols.	
	Unit Outcome: UO1. Use appropriate electrician tools, wires, protective devices and wiring accessories. UO2. Prepare different types of wiring joints.	
IV`	**Application of different types of switch connections**	**6**
	1. Control of a light/fan point using one switch, 2. Control of a light point from two different places, Control of a light point from more than two different places, 3. Switching of two or more lamps by a single switch, 4. Connection of bed switch, Series & Parallel connection of lamps.	
	Unit Outcomes: UO1. Rig up a circuit to control one lamp from two place using two-way switches. UO2. Rig up calling bell circuit with indicator to operate from three different places using push button switches.	
V	**Practical (Included in above 04 units)**	**8**
	1. To determine Gauge, Size of wire, grade of wire and Size of PVC pipe. 2. To determine Live wire, Neutral wire, Earth wire 3. To use appropriate electrician tools, wires, protective devices and wiring accessories. 4. To make Fan point with regulator 5. Make 3-pin plug point.	

	6. Control of a light/fan point using one switch, 7. The wiring of Main switch & Switchboard 8. Control of a light point from two different places	

Learning Resources:-

1. Electrical Installation Estimating & Costing – J.B. Gupta – S.K. Kataria Publication.

2. Electrical Installation Estimating & Costing – S. Singh – Dhanpat Rai Publication.

3. Basic Electrical Engineering (Vol-I) – P.S. Dhogal, S.K. Mandal – Tata McGraw Hill Publication.

4. Electric Wiring – S. Samaddar – New Central Book Agency (P) Ltd.

5. Electrical Installation: Estimating and Costing, S.L. Uppal (Publisher: Khanna Publishers)

6. Electrical Wiring: Residential and Commercial, Sunita Halder (Publisher: Satya Prakashan)

7. Electrical Installation and Wiring, Sudhir Choudhary (Publisher: Firewall Media)

8. Domestic Wiring: Design, Installation, and Maintenance, S.K. Mandal (Publisher: S. Chand Publishing)

9. A Course in Electrical Installation Estimating and Costing, J.B. Gupta (Publisher: S.K. Kataria & Sons)

10. Domestic and Industrial Electrical Wiring, H.P. Garg (Publisher: Khanna Publishers)

11. Domestic Electric Wiring" by R.P. Singh (Publisher: Firewall Media)

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Basket I: Generic/Open Elective (GE/OE)

(GEs offered to the Science & Technology students in Sem.-I)

Sr. No.	BoS Proposing GE/OE	Code	Course Title	Credits	Hrs.
1	Commerce	101AAF1401	Mutual Fund Management	04	60
2	Commerce	101MAE1401	Fundamentals of Statistics	04	60
3	English	101ENG1402	English for Science and Technology	04	60
4	Geography	101GEO1401	General Geography	04	60
5	Commerce	101BAI1401	Personal Financial Management	04	60
6	Marathi	101MAR1401	स्पर्धा परीक्षा आणि मराठी भाषा	04	60
7	Political Science	101POL1401	Human Rights	04	60
8	Biotechnology	101BIO1401	Nutrition, Health and Hygiene	04	60
9	Music	101MUS1401	Indian Vocal Classical & Light Music	04	60
10	NCC Studies	101NCC1401	Introduction to NCC	04	60
11	Sports	101SPO1401	Counseling and Psychotherapy	04	60

Note: Student can choose any one GE from the basket.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Basket II: Skill Enhancement Courses (SEC)

(SEC offered to the Science & Technology students in Sem.-I)

Sr. No.	BoS Proposing SEC	Code	Course Title	Credits	Hrs.
1	Chemistry	101CHE1601	Pesticides and Green Chemistry	02	30-45
2	Information Technology	101COM1601	Basics of Python Programming	02	30-45
3	Physics	101PHY1601	Physics Workshop Skills	02	30-45
4	Biotechnology	101BIO1601	Food Processing Technology	02	30-45
5	Botany	101BOT1601	Mushroom Cultivation Technology	02	30-45
6	English	101ENG1601	Proof Reading and Editing	02	30
7	Information Technology	101COA1601	PC Assemble and Installation	02	30-45
8	Marathi	101MAR1601	कथा/पटकथालेखन	02	30
9	Zoology	101ZOO1601	Bee Keeping	02	30-45

Note: Student can choose any one SEC from the basket.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year Sem I

Basket III: Ability Enhancement Courses (AEC)

(AEC offered to the Science & Technology students in Sem.-I)

Sr. No.	BoS Proposing AEC	Code	Course Title	Credits	Hrs.
1	Marathi	101MAR1701	भाषिक कौशल्य भाग – १	02	30
2	Hindi	101HIN1701	हिंदी भाषा शिक्षण भाग – १	02	30
3	Sanskrit	101SAN1701	व्यावहारीक व्याकरण व नितिसुभाषिते	02	30
4	Pali	101PAL1701	उपयोजित व्याकरण	02	30

Semester-II

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Faculty of Science & Technology

Department of Physics and Electronics

Course Type: DSC-III

Course Title: Electricity and Magnetism III

Course Code: 101PHY2101

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

Learning Objectives

LO1. To expose the undergraduate students to the fundamental laws of electricity, magnetism and their applications in day-to-day life,

LO2. To make aware students about Gauss's and Coulomb's Law,

LO3. To develop understanding among the students about principles of electromagnetic induction,

LO4. Acquaint students with basics of magnetostatics.

Course Outcomes

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

CO1. State Coulomb's Law and use it to solve for E above a line of charge, a loop of charge, and a circular disk of charge.

CO2. Recognize when Gauss' Law is the appropriate way to solve a problem.

CO3. Calculate the torque on a magnetic dipole in a magnetic field.

CO4. Compare similarities and differences between the Biot-Savart law and Coulomb's Law.

CO5. Use Biot-Savart Law versus Ampere's Law to calculate B fields,

CO6. Determine Ballistic constant by steady deflection method.

CO7 Explain the logarithmic decrement for a Ballistic Galvanometer.

Unit No.	Title of Unit & Contents	Hrs.
I	**Electrostatics**	**11**
	1. Introduction 2. Flux of Electric Field 3. Statement & Proof of Gauss's Law 4. Differential Form of Gauss's Law, Application of Gauss Law to Uniformly Charged Conducting Sphere 5. Coulombs Law, Coulombs Theorem 6. Derivation of Coulombs Law from Gauss's Law 7. Numerical Problems.	

Unit No.	Title of Unit & Contents	Hrs.
	Unit Outcomes: UO1: Define electric flux and its significance in electromagnetism. UO2: Explain the concept of Gauss's law in relation to electric flux. UO3: Evaluate the limitations and applicability of Gauss's law and Coulomb's law in different situations.	
II	**Electromagnetic Induction**	**11**
	1.Introduction, Faraday's Laws of Electromagnetic Induction in Vector Form 2. Self-Induction, Self-Inductance of Long Solenoid 3. Self-Inductance by Anderson's Bridge 4. Mutual Induction, Experimental Determination of Mutual Inductance 5. Transformer: Principle with Current and Voltage Ratios, 6. Efficiency of Transformer, Power Loss in Transformer, 7. Numerical Problems.	
	Unit Outcomes: UO1: Interpret the Faraday's laws of electromagnetic induction and apply them to various scenarios. UO2: Analyze the factors influencing mutual inductance. UO3: Quantify power loss and analyze its impact on transformer performance	
III	**Ballistic Galvanometer**	**12**
	1. Introduction, 2. Moving Coil Type Ballistic Galvanometer: Construction & Theory, 3. Logarithmic Decrement, 4. Damping Correction, 5. Charge and Current Sensitivity, 6. Uses Of B.G: Absolute Capacity of Condenser, 7. Comparison of Two Capacities, 8. Numerical Problems	
	Unit Outcomes: UO1: Explain the constructional details and the role of each component in the galvanometer UO2: Understand the relationship between charge sensitivity and galvanometer performance. UO3: Describe the procedure for comparing the capacities of two capacitors using a ballistic galvanometer	
IV	**Magnetostatics**	**11**
	1. Introduction, Magnetic Induction, Magnetization	

Unit No.	Title of Unit & Contents	Hrs.
	2. Relation Between B, H & M, 3. Magnetic Susceptibility and Permeability, 4. Hysteresis Curve, Experiment to Draw B-H Curve, Energy Loss Due to Hysteresis. 5. Force on Current Carrying Conductor, Lorentz Force, 6. Biot and Savart's Law & Its Applications to Straight Conductor and Circular Coil, 7. Amperes Law, 8.Numerical Problems.	
	Unit Outcomes: UO1: Understand how magnetic materials respond to external magnetic fields. UO2: Define hysteresis and its manifestation in a hysteresis curve. UO3: Apply Biot and Savart's law to calculate the magnetic field around a straight conductor and to determine the magnetic field at the center of a circular coil.	

Learning Resources: -

1. Electricity and Magnetism- R. Murugeshan, S.Chand & Company Ltd.
2. Foundations of Electromagnetic theory- John R. Reitz, Milford & R.W. Christy, IVth Edition
3. Fundamentals of Magnetism & Electricity-D.N.Vasudeva, S.Chand & Company Ltd.
4. Electricity and Magnetism-D.C.Tayal, Himalaya Publishing House
5. A text book of Electricity and Magnetism-Brijlal & Subrahmanyam
6. Electricity and Magnetism-A. S. Mahajan, A. A. Rangwala
7. Electricity and Magnetism- Navina Wadhwani
8. Electricity and Magnetism- D.L. Sehgal, K.L. Chopra, N.K. Sehgal.
9. Electricity and Magnetism with Electronics-K K Tewari.
10. Electricity and Magnetism- Edward M. Purcell.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Faculty of Science & Technology

Department of Physics and Electronics

Course Type: Lab Course

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

Course Code: 101PHY2103

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

Leaning Objectives

LO1. To handle and make use of simple equipment's in electricity for making error free measurements and to determine some unknown quantities

LO2. To study the magnetic field produced during flow of current through the conducting wire.

Course Outcomes

After completion of course, students will be able to-

CO1. Determine the resistance of given metal wire, frequency of ac flowing through it,

CO2. Study the characteristics of Zener diode, PN junction diode, CE transistor,

CO3. Determine the magnetic field produced along the axis of circular coil,

CO4. Estimate the figure of merit (i/d) of B.G.

Practical No.	Unit
1	Determination of low resistance by Potentiometer.
2	Zener diode Characteristics.
3	Field along the axis of a circular coil.
4	B.G.-Figure of Merit.
5	Comparison of capacities by De-Sauty's method.
6	Frequency of A.C. by Sonometer.
7	Electrical conductivity of Graphite rod.
8	I-H curve by magnetometer method.
9	Absolute capacity of condenser.
10	Study of C.R.O. front panel board.

N.B.: At least six experiments should be performed from above.

Learning Resources:-

1.B.Sc. Practical Physics--- Harnam Singh, S. Chand comp.
2.Practical physics--- Gupta Kumar, Pragati Prakashan.
3.A Laboratory Course in Physics, D.P. Khandelwal.

4.Practical Physics, Dr. H.C. Verma.
5.Laboratory Manual in Physics, Dr. N. D. Joshi.
6.Experiments in Physics, B. Biswas and Arun Kumar.
7.Laboratory Manual of Physics, A. K. Singh

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Faculty of Science & Technology

Department of Physics and Electronics

Course Type: DSC-IV

Course Title: Basic Electronics-IV

Course Code: 101PHY2102

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

Learning Objectives

LO1. Develop understanding about basic electronic components and devices,

LO2. Equip students with simple electrical circuits and application of semiconductor components in these electrical circuits,

LO3. Enrich measuring ability semiconductor components,

LO4. Empower the students to design, working and analysis of BJT amplifiers using appropriate equivalent models.

Course Outcomes

After completion of course, students will be able to-

CO1. Characterize Semiconductors, Diodes, Transistors and Oscillators,

CO2. Specify electronic components,

CO3. Identify functions of Digital Multimeter, Cathode Ray Oscilloscope in the measurement of physical variables,

CO4. Demonstrate proficiency in the use of electronic equipment and devices,

CO5. Identify the importance of negative feedback in amplifiers,

CO6. Design Sinusoidal oscillators for different frequencies,

CO7. Solve electronic devices and systems using mathematical concepts,

CO8. Design, construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical analysis.

Unit No.	Title of Unit & Contents	Hrs.
I	**Electronic Components and Instruments**	**11**
	1. Introduction, 2. Brief Idea of Resistor and Its Types, 3. Resistor Color Code, 4. Inductor and Its Types, 5. Inductance of An Inductor, Reactance of An Inductance, 6. Capacitor and Its Types, Reactance of Capacitor.	

Unit No.	Title of Unit & Contents	Hrs.
	7. The Multimeter and Its Applications, 8. C.R.O. Block Diagram and Its Applications, 9. Numerical Problems.	
	Unit Outcomes: UO1. Specify electronic components, UO2. Identify functions of Digital Multimeter, Cathode Ray Oscilloscope in the measurement of physical variables,	
II	**Semiconductor Devices**	**11**
	1. Introduction, 2. P-N Junction Diode: Construction, Working and Characteristics, 3. Half Wave Rectifier, 4. Centre Tap Full Wave Rectifier, 5. Full Wave Bridge Rectifier (Qualitative Analysis) 6. Special Purpose Diodes: Zener Diode, 7. LED, 8. Photodiode and Their Characteristics, 9. Zener Diode as A Voltage Regulator, 10. Numerical Problems.	
	Unit Outcomes: UO1. Identify the diodes. UO2. Use special purpose diodes in various applications.	
III	**Transistors**	**12**
	1. Introduction, 2. PNP And NPN Transistors and Their Symbols, 3. Action of Transistor, 4. C-B, C-E And C-C Transistor Configurations and Their Characteristics, 5. Transistor Biasing, 6. Hybrid Parameters of Transistor in C-E Mode, 7. Single Stage C-E Amplifier and Its Equivalent Circuit (Calculation of Gains), 8.Numerical Problems.	
	Unit Outcomes: UO1. Design, construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical analysis. UO2. Use the transistor as an amplifier	
IV	**Sinusoidal Oscillators**	**11**
	1. Introduction, 2. Positive and Negative Feedback, 3. Requirement of An Oscillator,	

Unit No.	Title of Unit & Contents	Hrs.
	4. Block Diagram of An Oscillator, 5. Barkhausen Criterion, 6. Hartley and Colpitts Oscillator, 7. RC Phase Shift Oscillator (Qualitative Analysis), 8. Numerical Problems.	
	Unit Outcomes: UO1. Identify the importance of negative feedback in amplifiers UO2. Design Sinusoidal oscillators for different frequencies,	

Learning Resources: -

1. Basic Electronics solid state (Multi color illustrative edition)- B. L. Thereja, S. Chand and Company, 5th Edition.
2. Principles of Electronics (Multi color illustrative edition)-V. K. Mehta, Rohit Mehta, S. Chand and Company Ltd, 9th Edition
3. Electronic Principles- Albert Malvino, David J. Bates, 7th Edition
4. A text book of Applied Electronics-R.S. Sedha, S. Chand and Company Ltd.
5. Basic Electronics- Bernard Grob, 9th Edition
6. Electronic Fundamentals and Applications- John D. Ryder, 5th edition
7. Electronic Devices and Circuit Theory, Robert L. Boylestad, Louis Nashelsky, Pearson (2016) Eleventh Edition
8. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker, Wiley India Pvt. Ltd (2016) Tenth Edition
9. University Physics with Modern Physics, Hugh D. Young, Roger A. Freedman, Pearson (2016) Fourteenth Edition

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Faculty of Science & Technology

Department of Physics and Electronics

Course Type: Lab Course
Course Title: Lab Course –IV
Course Code: 101PHY2104
Credits: 01 **Max. Marks: 50** **Hours: 30**

Leaning Objectives

LO1. To handle and make use of simple equipment's in Basic electronics for making error free measurements and to determine some unknown quantities
LO2. To study Semiconductor devices and Oscillators.

Course Outcomes

After completion of course, students will be able to-
CO1. Determine Line and load regulation of Zener diode
CO2. Study the characteristics of PN junction diode, CE transistor
CO3. Study the characteristics of phototransistors and output waveforms of oscillators
List of Experiments

Practical No.	Unit
1	Zener diode as a Voltage Regulator.
2	PN junction diode Characteristics.
3	Study of CE amplifier.
4	Photodiode Characteristics.
5	Characteristics of Photo Transistor.
6	BJT transistor characteristics (CE mode)
7	Study of Hartley Oscillator
8	Study of Colpitts Oscillator
9	Study of RC phase shift Oscillator
10	Study of L-C-R circuit

N.B.: At least six experiments should be performed from above.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Faculty of Science & Technology

Department of Physics and Electronics

Course Type: VSC-II

Course Title: Weather Forecasting

Course Code: 101PHY2501

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

Learning Objectives:

LO1. To impart theoretical knowledge to the students and enable them to develop awareness and understanding regarding the causes and effects of different weather phenomenon.

LO2. Study of synoptic charts and weather reports.

Course Outcomes:

After completion of course, students will be able to:

CO1. Acquire basic knowledge of the elements of the atmosphere, its composition at various heights, variation of pressure and temperature with height.

CO2. Know simple techniques to measure wind speed and its directions, humidity and Rainfall.

CO3. Knowledge of changes in climate.

Unit No.	Title of Unit & Contents	Hrs.
I	**Introduction to Atmosphere**	**08**
	1. Elementary Idea of Atmosphere: Physical Structure and Composition; 2. Compositional Layering of the Atmosphere; 3. Variation of Pressure and Temperature with Height; Air Temperature; 4. Requirements to Measure Air Temperature; 5. Temperature Sensors and Its Types.	
	Unit Outcomes: UO1. Understand Atmosphere and Its Composition UO2. Understand That Temperature of Surroundings Changes with Variation in Atmospheric Conditions	
II	**Climate and Climate Change**	**07**
	1. Climate: Its Classification; 2. Causes of Climate Change; 3. Global Warming and Its Outcomes; 4. Air Pollution; Aerosols, Ozone Depletion, Acid Rain, Environmental Issues Related to Climate.	

	Unit Outcomes: UO1.Understand the effect of Global warming UO2. Understand the causes of air pollution	
III	**Practical**	**30**
	1. Study of Synoptic Charts and Weather Reports, Working Principle of Weather Station. 2. To Calculate the Sunniest Time of The Year. 3. To Study the Variation of Rainfall Amount and Intensity by Wind Direction. 4. To Observe the Sunniest/Driest Day of The Week. 5. To Examine the Maximum and Minimum Temperature throughout The Year. 6. To Evaluate the Relative Humidity of The Day. 7. To Examine the Rainfall Amount Month Wise.	

Learning Resources:

1. Aviation Meteorology, by I.C. Joshi, 3rd Edition (2014), Himalayan Books.

2. The Weather Observers Hand Book, by Stephen Burt, (2012), Cambridge University Press.

3. Meteorology, by S.R. Ghadekar, (2001), Agromet Publishers, Nagpur.

4. Text Book of Agrometeorology, by S.R. Ghadekar, (2005), Agromet Publishers, Nagpur.

5. Why the Weather, by Charles Franklin Brooks, (1924), Chapraman & Hall, London.

6. Atmosphere and Ocean, John G. Harvey, 1995, the Artemis Press.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Basket IV: Generic/Open Elective (GE/OE)

(GEs offered to the Science & Technology students in Sem.-II)

Sr. No.	BoS Proposing GE/OE	Code	Course Title	Credits	Hrs.
1	Commerce	101AAF2401	Mutual Fund Management	04	60
2	Commerce	101MAE2401	Fundamentals of Statistics	04	60
3	English	101ENG2402	English for Science and Technology	04	60
4	Geography	101GEO2401	General Geography	04	60
5	Commerce	101BAI2401	Personal Financial Management	04	60
6	Marathi	101MAR2401	स्पर्धा परीक्षा आणि मराठी भाषा	04	60
7	Political Science	101POL2401	Human Rights	04	60
8	Biotechnology	101BIO2401	Nutrition, Health and Hygiene	04	60
9	Music	101MUS2401	Indian Vocal Classical & Light Music	04	60
10	NCC Studies	101NCC2401	Introduction to NCC	04	60
11	Sports	101SPO2401	Counseling and Psychotherapy	04	60

Note: Student can choose any one GE from the basket.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Basket V: Skill Enhancement Courses (SEC)

(SEC offered to the Science & Technology students in Sem.-II)

Sr. No.	BoS Proposing SEC	Code	Course Title	Credits	Hrs.
1	Chemistry	101CHE2601	Pesticides and Green Chemistry	02	30-45
2	Information Technology	101COM2601	Basics of Python Programming	02	30-45
3	Physics	101PHY2601	Physics Workshop Skills	02	30-45
4	Biotechnology	101BIO2601	Food Processing Technology	02	30-45
5	Botany	101BOT2601	Mushroom Cultivation Technology	02	30-45
6	English	101ENG2601	Proof Reading and Editing	02	30
7	Information Technology	101COA2601	PC Assemble and Installation	02	30-45
8	Marathi	101MAR2601	कथा/पटकथालेखन	02	30
9	Zoology	101ZOO2601	Bee Keeping	02	30-45

Note: Student can choose any one SEC from the basket.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year Sem II

Basket VI: Ability Enhancement Courses (AEC)

(AEC offered to the Science & Technology students in Sem.-II)

Sr. No.	BoS Proposing AEC	Code	Course Title	Credits	Hrs.
1	Marathi	101MAR2701	ललित वाङ्मय	02	30
2	Hindi	101HIN2701	हिंदी भाषा शिक्षण एवं अनुवाद	02	30
3	Sanskrit	101SAN2701	व्यावहारीक व्याकरण व नितिसुभाषिते भाग – २	02	30
4	Pali	101PAL2701	निवडक गद्य व पद्य	02	30

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Extra Credit Activities

Sr. No.	Course Title	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 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

(Autonomous)

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.