

Deccan Education Society's
Kirti M. Doongursee College of Arts,
Science and Commerce
(AUTONOMOUS)



Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for

Program: Bachelor of Science

Course: F.Y.B.Sc

(AS PER NEP 2020)

Subject: Physics

Choice Based Credit System (CBCS)

with effect from

Academic Year 2023-2024

PROGRAM OUTCOMES

PO	Description
A student completing Bachelor's Degree in Science Program will be able to	
PO1	Disciplinary Knowledge: Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate Programme. Execute strong theoretical and practical understanding generated from the specific graduate Programme in the area of work.
PO2	Critical Thinking and Problem solving: Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions.
PO3	Social competence: Display the understanding, behavioral skills needed for successful social adaptation, work in groups, exhibits thoughts and ideas effectively in writing and orally.
PO4	Research-related skills and Scientific temper: Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research.
PO5	Trans-disciplinary knowledge: Integrate different disciplines to uplift the domains of cognitive abilities and transcend beyond discipline-specific approaches to address a common problem.
PO6	Personal and professional competence: Performing dependently and collaboratively as a part of team to meet defined objectives and carry out work across interdisciplinary fields. Execute interpersonal relationships, self-motivation and adaptability skills and commit to professional ethics.
PO7	Effective Citizenship and Ethics: Demonstrate empathetic social concern and equity centered national development and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
PO8	Environment and Sustainability: Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

Deccan Education Society's
Kirti M. Doongursee College(Autonomous)
Proposed Curriculum as per NEP 2020

Year of Implementation- 2023-24

Name of the Department: PHYSICS

Semester	Course Code	Course Title	Vertical	Credit
I	K23USPHYMJ111	Classical Mechanics	Major	2
	K23USPHYMJ112	Modern Physics	Major	2
	K23USPHYMJP11	Practical 1	-----	2
	K23USPHYVC141	Electronic Equipment Maintenance	VSC	2
	K23USPHYSC151	Household repairs	SEC	2
2	K23USPHYMJ211	Optics	Major	2
	K23USPHYMJ212	Electricity and electronics	Major	2
	K23USPHYMJP21	Practical 2	-----	2
	K23USPHYMR221	Basic Concepts In Physics	Minor	2
	K23USPHYOE231	Physics in everyday life	OE	2
	K23USPHYVC241	Mobile Handset Maintenance	VSC	2
	K23USPHYSC251	Computer Simulation	SEC	2

Course Code	MAJOR SEM I	Credits	Lectures/ Week
K23USPHYMJ111	Classical Mechanics	2	2
Course Objectives:			
<p>1. Understand and Apply Newton's laws for the calculations of the motion of simple systems</p> <p>2. Understand and Apply Work and Energy equivalence and its applications through suitable numerical.</p> <p>3. Understand and Apply Elasticity, Viscosity and Fluid dynamics in daily life.</p> <p>4. Demonstrate quantitative problem solving skills in all the topics covered</p>			
Unit	Topics	No of Lectures	
I	<p>1. Newton's Laws of Motion: Newton's first, second and third laws of motion, interpretation and applications, pseudo forces, inertial and non-inertial frames of reference</p> <p>Worked out examples (with friction present) HCV: 5.1 to 5.5</p> <p>2. Friction: Advantages & disadvantages of friction in daily life, Friction as the component of Contact force, Kinetic Friction, Static friction, laws of friction, Understanding friction at Atomic level.</p> <p>HCV: 6.1 to 6.5</p> <p>3. Work and Energy: Kinetic Energy, Work and Work-energy theorem, Potential Energy, Conservative and Non Conservative Forces, Different forms of Energy: Mass Energy Equivalence Worked out Examples</p> <p>HCV: 8.1, 8.2, 8.5, 8.6, 8.11</p>	15	
II	<p>1. Elasticity: An introduction to Elasticity, Stress, Strain, Hooke's Law and Moduli of Elasticity and relation between them</p> <p>HCV: 14.2, 14.3, 14.4, 14.5</p> <p>2. Viscosity: An introduction to Viscosity, Flow through a Narrow Tube: Poiseuille's Equation, Stokes' Law, Terminal velocity, Measuring Coefficient of Viscosity by Stokes' method, Critical velocity and Reynolds number. Worked out Examples</p>	15	

	<p>HCV: 14.15, 14.16, 14.17, 14.18, 14.19, 14.20</p> <p>3. Fluid Mechanics: Streamline and Turbulent flow, Equation of Continuity, Bernoulli's equation, Applications of Bernoulli's equation. Worked out Examples HCV: 13.8, 13.10, 13.11, 13.12</p> <p><i>Note: A good number of numerical examples are expected to be covered during the prescribed lectures.</i></p>	
<p>References: 1.HCV: H. C. Verma, Concepts of Physics – Part I, (Second Reprint of 2020) Bharati Bhavan Publishers and Distributers 2.BSH: BrijLal, Subrahmanyam and Hemne, Heat Thermodynamics and Statistical Physics, S. Chand , Revised, Multi-coloured, (Reprint 2019) Additional References: 1.Halliday, Resnick and Walker, Fundamental of Physics (extended) – (6th Ed.), John Wiley & Sons. 2.D.S Mathur, P.S Hemne, Mechanics, 2012, S. Chand 3.M. W Zemansky and R. H Dittman, Heat and Thermodynamics, McGraw Hill. 4.Thornton and Marion, Classical Dynamics (5th Ed.) 5.D. S Mathur, Element of Properties of Matter, S. Chand & Co. 6.R. Murugesan and K. Shivprasath, Properties of Matter and Acoustics, S. Chand. 7.D. K Chakrabarti, Theory and Experiments on Thermal Physics,(2006 Ed.), Central books. 8.Hans and Puri, Mechanics, (2nd Ed.) Tata McGraw Hill</p>		

Course Code	MAJOR SEM I	Credits	Lectures/Week
K23USPHYMJ112	Modern Physics	2	2

Course Objectives:

After successful completion of this course students will be able to

1. Understand nuclear properties and nuclear behavior.
2. Understand the type isotopes and their applications.
3. Demonstrate and understand the quantum mechanical concepts.
4. Demonstrate quantitative problem solving skills in all the topics covered.

Unit	Topics	No of Lectures
I	Interaction between particles and matter, Ionization chamber, Proportional counter and GM counter, problems Nuclear Reactions: Types of Reactions and Conservation Laws. Concept of Compound and Direct Reaction, Q value equation and solution of the Q equation, problems. Fusion and fission definitions and qualitative discussion with examples.	15
II	Origin of Quantum theory, Black body (definition), Black Body spectrum, Wien's displacement law, Matter waves, wave particle duality, Heisenberg's uncertainty Principle. Davisson-Germer experiment, G. P. Thompson experiment. X-Rays production and properties. Continuous and characteristic X-Ray spectra, X-Ray Diffraction, Bragg's Law, Applications of X-Rays. Compton Effect, Pair production, Photons and Gravity, gravitational Red Shift. Note: A good number of numerical examples are expected to be covered during the prescribed lectures	15

References:

1. BSS: N Subrahmanyam, Brijlal and Seshan, Atomic and Nuclear Physics Revised Ed. Reprint 2012, S. Chand
2. Arthur Beiser, Perspectives of Modern Physics : Tata McGraw Hill
- 3 S N Ghosal, Atomic Physics S Chand
- 4 S N Ghosal, Nuclear Physics 2nd ed. S Chand

Course Code	PRACTICAL SEM I	Credits	Lectures/Week
K23USPHYMJP11	Practical	2	2
<p>Course Objectives: On successful completion of this course students will be able to:</p> <ol style="list-style-type: none"> 1. Understand & practice the skills while performing experiments. 2. Understand the use of apparatus and their use without fear & hesitation. 3. Correlate the physics theory concepts to practical application. 4. Understand the concept of errors and their estimation. 			

Instructions:

1. All the measurements and readings should be written with proper units.
 2. After completing all the required number of experiments in the semester and recording them in journal, student will have to get their journal certified and produce the certified journal at the time of practical examination.
 3. While evaluating practical, weightage should be given to circuit/ray diagram, observations, tabular representation, experimental skills and procedure, graph, calculation and result.
 4. Skill of doing the experiment and understanding physics concepts should be more important than the accuracy of final result.
- For practical examinations, the learner will be examined in two experiments (one from each regular experiment group).
 - Minimum 3 from each regular experiment group and in all minimum 6 regular experiments and 3 skill experiments must be reported in journal.
 - Evaluation in viva voce will be based on regular experiments and skill experiments. A learner will be allowed to appear for the semester and practical examination only if he submits a certified journal of Physics or a certificate that the learner has completed the practical course of Physics Semester I as per the minimum requirements.

Regular and Skill Experiments:

Sr.No.	Name of the Experiment
GROUP A: Regular Experiments	
1	Torsional Oscillation: To determine modulus of rigidity η of a material of wire by Torsional oscillations
2	Bifilar Pendulum: Determination of moment of inertia of rectangular and cylindrical bar about an axis passing through its centre of gravity
3	Moment of inertial of Flywheel
4	Constant volume air thermometer
5	Frequency of AC Mains: To determine frequency of AC mains (Sonometer wire)
6	LDR Characteristics: To study the dependence of LDR resistance on intensity of light
GROUP B: Regular Experiments	
7	Study of Logic gates & To verify De Morgan's Theorems
8	To study EX-OR Gate and verify its truth table
9	To study half adder and full adder and verify their truth table Ex-OR Gate
10	To study load regulation of a Bridge Rectifier
11	To study Zener Diode as Regulator
12	Study of LASER Beam Divergence
GROUP C : Skill Experiments	
1	Use of Vernier Callipers, Micrometer Screw Gauge and Travelling Microscope
2	Graph plotting (Plot BE/A verses A graph for 30 atoms, Plot Packing Fraction graph for 30atoms)
3	Spectrometer: Schuster's Method
4	To determine the Resistance & Capacitance using Color code/Number & verify using Multimeter(Analog/Digital)
5	Use of digital multimeter
6	Absolute and relative error calculation

Course Code	VOCATIONAL SKILL COURSE (VSC) SEM 1	Credits	Lectures/ Week
K23USPHYVC141	Electronic Equipment Maintenance	2	2
Course Objectives: After successful completion of this course students will be able to <ol style="list-style-type: none"> 1. Understand circuits for different types of Electronic Equipments listed below. 2. Understand the type of problems for maintenance. 3. Demonstrate and understand the functioning of .Electronic Equipment 4. Demonstrate quantitative problems and rectify it. 			
Unit	Topics	No of Lectures	
I	Theory part Introduction to basic electronic equipments : resistors , capacitors , diodes , transistors , LEDES. AC and DC power supplies , Construction of TV , LAPTOP , PC and Printers	15	
II	Practical part (30 Hours) i)Display and of internal parts of TV and its Maintenance ii)Display of internal parts of LAPTOP and its Maintenance iii)Display of internal parts of PC and its Maintenance iv)Display of internal parts of Printer and its Maintenance	15	
References : 1. Practical LCD /LED/ TV training course By Imran Ashraf Khan SAZ Publication 2.Laptop Repairing and upgrading Course : Asian Computech Book			

Course Code	SKILL ENHANCEMENT COURSES (SEC) SEM I	Credits	Lectures/ Week
K23USPHYSC151	Household Repairs	2	2
Course Objectives:			
<ol style="list-style-type: none"> 1. To understand the basic principles of electric sources 2. To analyze the working of different types of electrical equipments 3. To analyze the problems and apply the learning to rectify the issues with equipments. 4. To apply the skills acquired in day to day life. 			
Unit	Topics	No of Lectures	
I	THEORY : AC and DC power supplies , Concept of Electric fuse , Concept of Electric meter and Electric Bill, Principle and working of Electric Iron , Principle and working of Table and Ceiling fan , Principle and working of Refrigerator and Air Condition.	15	
II	PRACTICALS <ol style="list-style-type: none"> 1. Repair of Electric Fuse 2. Calculation of Electric Bill as per Electric Units. 3. Repair of Electric Iron. 4. Repairs of Table and Ceiling Fan. 5. Basic Repairs of Refrigerator 	15	
References:			
<ol style="list-style-type: none"> 1. Handbook of Repair and Maintenance of Domestic Electronics Appliances by Shashi Bhushan Sinha BPB publications. 2. A complete guide to Home Appliance Repair by Evan Powell. 3. Electric equipment handbook: trouble shooting and maintenance by Philip kiameh, The McGraw-Hill publications. 			

Course Code	MAJOR SEM II	Credits	Lectures/ Week
K23USPHYMJ211	Optics	2	3
Course Objectives: On completion of this, it is expected that <ol style="list-style-type: none"> 1. Understand and Apply the concept of lens, lens defects and their minimization. 2. Understand and Apply Significance of combination of lenses implied to eyepiece of optical instrument. 3. Understand and Apply interference of light with few well known daily life examples. 4. Understand the principles of various Optical instruments. 			
Unit	Topics	No of Lectures	
I	<p>1. Geometrical Optics Lenses and Lens Maker's Equation: Introduction to lenses, Terminology and sign conventions, Introduction to Thin lenses and Lens equation for single convex lens, Lens maker's equation: Positions of the Principal Foci and Newton's Lens equation. SBA: 4.1, 4.2, 4.3, 4.7, 4.8, 4.9, 4.10, 4.10.1, 4.11</p> <p>2. Magnification by a lens and power of lens: Lateral, Longitudinal and Angular magnification, Deviation by a thin lens and its power, Necessity to combine the lenses & equivalent focal length & power of two thin lenses, Concept of cardinal points and their significance SBA: 4.12, 4.12.1, 4.12.2, 4.12.3, 4.15, 4.16, 4.17, 4.17.1, 4.17.2, 4.17.3, 4.17.4, 5.2</p> <p>3. Introduction to Aberration in lenses: Spherical aberration & reduction, chromatic aberration & reduction (Qualitative) SBA: 9.2, 9.5, 9.5.1, 9.10 Suitable numerical with appropriate difficulty level.</p>	15	
	<p>1. Introduction to Optical Instruments and Interference in Thin Films 1. Optical Instruments and Eyepieces: Human Eye as an optical instrument, Camera and Lenses of Camera, Simple Microscope & Compound Microscope, Concept of eyepiece & its significance: Huygens Eyepiece and Ramsden Eyepiece (Principle, Construction, Expression for Equivalent Focal</p>		

II	<p>Length, Merits and Demerits), Comparison of Huygens Eyepiece and Ramsden Eyepiece, Gauss Eyepiece, Refracting Astronomical Telescope (Construction and Working), Reflecting Telescope (Qualitative)</p> <p>SBA: 10.2, 10.3, 10.3.1, 10.5, 10.8, 10.10, 10.11, 10.12, 10.13, 10.14, 10.15, 10.15.1, 10.16</p> <p>2. Interference in Thin Films: Interference due to reflected and transmitted light in plane thin films, Conditions for Maxima and Minima, Interference pattern in wedge-shaped Film & Newton's rings</p> <p>SBA: 15.1, 15.2, 15.2.1, 15.2.2, 15.5, 15.6</p> <p>Suitable numerical with appropriate difficulty level.</p>	15
<p>References:</p> <p>1. SBA: Dr. N. Subrahmanyam, Brijlal, and Dr. M. N. Avadhanulu, A Textbook of Optics, 25th Revised Edition 2012(Reprint 2016), S. Chand and Company Pvt. Ltd.</p> <p>Additional References:</p> <p>1. Jenkins and White, Fundamentals of Optics by (4th Ed.), McGraw Hill International</p> <p>2. Ajoy Ghatak, Optics, 6th Edition, Mc Graw Hill Education (India) Private Limited</p>		

Course Code	MAJOR SEM II	Credits	Lectures/ Week
K23USPHYMJ212	Electricity and electronics	2	2
<p>Course Objectives: On successful completion of this course students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the basic concepts of Alternating current theory, AC bridges and Circuit Theorems 2. Understand the basics of Analog and Digital Electronics and apply them in real life situations 3. Demonstrate quantitative problem solving skills in all the topics covered 4. Understand and apply Demorgan's theorem. 			
Unit	Topics	No of Lectures	
I	<p>Electricity and Analog Electronics</p> <p>Alternating current theory:(Concept of L, R, and C: Review), AC circuit containing pure R, pure L and pure C, representation of sinusoids by complex numbers, Series L-R, C-R and LCR circuits. Resonance in LCR circuit (both series and parallel), Power in ac circuit. Q-factor.</p> <p>AC bridges: AC-bridges: General AC bridge, Maxwell,de-Sauty, Wien Bridge , Hay Bridge.</p>	15	
II	<p>Digital Electronics</p> <ol style="list-style-type: none"> 1. Transistor as a switch: circuit and working. BN: 4.17, 4,18. 2. Number Systems: Binary number system, decimal number system and Hexadecimal number system. Conversion of decimal number into binary and hexadecimal numbers and vice versa, conversion of binary number into decimal and hexadecimal numbers and vice versa, Conversion of hexadecimal number into decimal and binary numbers and vice versa. LMS: 5.1 to 5.5. Tokheim: 3.6, 3.8, 10.2, 10.3. 3. Derived Gates: NAND and NOR gates as universal building blocks, Ex-OR gate, Parity generator and checker, Half adder and Full adder, De-Morgans theorems. LMS: 2.1, 2.2, 3.1, 3.2. Suitable numerical with appropriate difficulty level. 	15	

References:

1. CR: D. Chattopadhyay, P C Rakshit , Electricity and Magnetism 7th Ed. New Central Book agency.
2. TT: B.L. Theraja and A.K. Theraja, A Textbook of Electrical Technology Vol. I, S. Chand Publication
3. N: R. L. Boylestad and L. Nashelsky, Electronic devices and Circuit Theory - 10th Edition, Pearson
4. LMS: Leach, Malvino, Saha, Digital Principles and Applications – 6 th Edition. Tata McGraw Hill
5. Tokheim: Digital Electronics, Principles and Applications, 6 th Edition, McGraw Hill Edition. 6. AD: Albert Malvino, David Bates, Electronic Principles, 8 th Edition, Tata McGraw Hil

Course Code	PRACTICAL SEM II	Credits	Lectures/ Week
K23USPHYMJP21	Practical	2	2
<p>Course Objectives:</p> <p>On successful completion of this course students will be able to:</p> <ol style="list-style-type: none"> 1. Understand & practice the skills while performing experiments. 2. Understand the use of apparatus and their use without fear & hesitation. 3. Correlate the physics theory concepts to practical application. 4. Understand the concept of errors and their estimation. 			

Instructions:

1. All the measurements and readings should be written with proper units.
 2. After completing all the required number of experiments in the semester and recording them in journal, student will have to get their journal certified and produce the certified journal at the time of practical examination.
 3. While evaluating practical, weightage should be given to circuit/ray diagram, observations, tabular representation, experimental skills and procedure, graph, calculation and result.
 4. Skill of doing the experiment and understanding physics concepts should be more important than the accuracy of final result.
- Minimum 3 from each regular experiment group and in all minimum 6 regular experiments and 3 demonstration experiments must be reported in journal.
 - Evaluation in viva voce will be based on regular experiments and demonstration experiments. A learner will be allowed to appear for the semester and practical examination only if he submits a certified journal of Physics or a certificate that the learner has completed the practical course of Physics Semester II as per the minimum requirements.

Sr.No.	Name of the Experiment
Group A : Regular Experiments	
1	Young's Modulus of a wire material by method of vibrations
2	Spectrometer: To determine of angle of Prism
3	Spectrometer: To determine refractive index of prism material
4	Combination of Lenses: To determine equivalent focal length of a lens system by magnification method

5	Newton's Rings: To determine radius of curvature of a given convex lens using Newton's rings
6	Determination of diameter of thin wire using Wedge Shaped Film
Group B : Regular Experiments	
7	To study NAND/NOR gates as Universal Building Blocks
8	LR Circuit: To determine the value of given inductance and phase angle
9	CR Circuit: To determine value of given capacitor and Phase angle
10	Transistor configurations : CB/CE/CC (study of input-output characteristics)
11	LCR series Resonance: To determine resonance frequency of LCR series circuit
12	To study Thermistor characteristics: Resistance vs. Temperature
Group C: Demonstration Experiments	
1	Radius of ball bearings (single pan balance)
2	Use of Oscilloscope: Wave forms at output of half wave , bridge rectifiers with and without Capacitor filter, Ripple
3	Use of PC for graph plotting
4	I-V Characteristics of LED
5	Testing of components (Resistors , Diode , Transistor , capacitor)
6	Study of I-V characteristics of solar cell

Course Code	MINOR SEM II	Credits	Lectures/Week
K23USPHYMR221	Basic Concepts in Physics	2	2
Course Objectives: On successful completion of this course students will be able to <ol style="list-style-type: none"> Remember, Understand and Apply Newton's laws for the calculations of the motion of simple systems Understand and Apply Work and Energy equivalence and its applications through suitable numerical. Understand the basic concepts of Alternating current theory, AC bridges and Circuit Theorems Understand the basics of Analog and Digital Electronics and apply them in real life situations Demonstrate quantitative problem solving skills in all the topics covered 			
Unit	Topics	No of Lectures	
I	1. Newton's Laws of Motion: Newton's first, second and third laws of motion, interpretation and applications, pseudo forces, inertial and non-inertial frames of reference Worked out examples (with friction present) HCV: 5.1 to 5.5 Friction: Advantages & disadvantages of friction in daily life, Friction as the component of Contact force, Kinetic Friction, Static friction, laws of friction, Understanding friction at Atomic level. HCV: 6.1 to 6.5 3.Work and Energy: Kinetic Energy, Work and Work-energy theorem, Potential Energy, Conservative and Non Conservative Forces, Different forms of Energy: Mass Energy Equivalence Worked out Examples HCV: 8.1, 8.2, 8.5, 8.6, 8.11	15	
II	1. DC Power Supply: Block diagram of a dc power supply – concept of a transformer,(Review: Half wave rectifier, Full wave rectifier) Bridge rectifier, PIV, Efficiency and Ripple factor of full wave rectifier, Capacitor Filter, Need for voltage regulation - Zener diode as voltage stabilizer, Clipper and Clampers (Basic diode based circuits only). BN: 1.15, 2.6, 2.7, 2.8, 2.9, 2.10, 15.2, 15.3 AD: 4.2, 22.1 2. 2.Transistor dc Biasing: (Review: transistor structure and characteristics), Definition of gains α , β (dc and ac) and relation between them, load line analysis, operating point, cut-off and saturation points, Inherent Variations of transistor Parameters, Stabilization, Necessity of a Transistor Biasing Circuit, Stability Factor. BN: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7. 3.Binary number system: Binary to decimal and Decimal to binary conversion. LMS: 5.1 to 5.5.	15	

References

1. HCV: H. C. Verma, Concepts of Physics – Part I, (Second Reprint of 2020) Bharati Bhavan Publishers and Distributers
2. BN: R. L. Boylestad and L. Nashelsky, Electronic devices and Circuit Theory - 10th Edition, Pearson
3. LMS: Leach, Malvino, Saha, Digital Principles and Applications – 6 th Edition. Tata McGraw Hill

Additional References:

1. Halliday, Resnick and Walker, Fundamental of Physics (extended) – (6th Ed.), John Wiley & Sons.
2. D.S Mathur, P.S Hemne, Mechanics, 2012, S. Chand

Course Code	OPEN ELECTIVE (OE) SEM 2	Credits	Lectures/ Week
K23USPHYOE231	Physics in Everyday Life	2	2
Course Objectives: On successful completion of this course students will be able to: <ol style="list-style-type: none"> 1. Analyse the heat engines and calculate thermal efficiency. 2. Analyze the refrigerators, heat pumps and calculate coefficient of performance. 3. Understand the types of thermometers and their usage. 4. To understand the atomic excitation and LASER principles. 5. To demonstrate an understanding of electromagnetic waves and its spectrum. 6. Understand the types and sources of electromagnetic waves and applications. 			
Unit	Topics	No of Lectures	
I	1. Heat transfer mechanisms: Heat Engines: Otto cycle and its efficiency ii. Diesel cycle and its efficiency. Refrigerators: General Principle and Coefficient of performance of refrigerator, simple structure of vapour compression refrigerator. Air conditioning: principle and its applications. Temperature Scales: Centigrade, Fahrenheit and Kelvin scale. 2. LASER: Absorption, Spontaneous Emission, and Stimulated Emission, Population Inversion and Laser Action, Applications of Lasers.	15	
II	1. Electromagnetic Waves: Historical Perspective of Electromagnetic Waves, electromagnetic spectrum, sources of electromagnetic waves : Radio waves, Microwaves, Infrared, Visible light, Ultraviolet, X-rays, Gamma rays, Production of electromagnetic waves (Hertz experiment), Plank hypothesis of photons (concept only). 2. Applications of electromagnetic waves: Microwave oven, RADAR , Pyro electric thermometer, X-ray radiography and CT Scan, solar cell.	15	
Reference book: Unit I: 1. Heat and Thermodynamics: Brijlal, N. Subrahmanyam, S. Chand & Company Ltd, New Delhi 2. Heat and Thermodynamics: Mark. W. Zemansky, Richard H. Dittman, Seventh Edition, McGraw-Hill International Editions 3. Thermodynamics and Statistical Physics: J.K. Sharma, K.K. Sarkar, Himalaya Publishing House 4. Thermal Physics (Heat & Thermodynamics): A.B. Gupta, H.P. Roy Books and Allied (P) Ltd, Calcutta. 5. Concepts of Modern Physics: A Beiser (6th ed., McGraw Hill, 2003). 6. Modern Physics: Raymond A. Serway, Clement J. Moses, Curt A. Moyer Unit II:			

1. Sears and Zemansky's University Physics: H.D. Young R. A. Freedman, Sandin (11th Ed. Pearson Education)
2. Nanotechnology : Principles and Practices: S. K. Kulkarni, Capital Publishing Company.

Course Code	VOCATIONAL SKILL COURSE (VSC) SEM II	Credits	Lectures/ Week
K23USPHYVC241	Mobile Handset Maintenance	2	2
Course Objectives:			
<ol style="list-style-type: none"> 1. Identify different types of mobile cell phones 2. Recognise potential hazards in the repair of mobile cell phones 3. Identify the parts of a mobile cell phone 4. Use the correct hardware tools to repair mobile cell phones 5. Assembly and disassembly a mobile cell phone 6. Identify mobile cell phone faults and solve them 			
Unit	Topics	No of Lectures	
I	Theory part Introduction, what is a mobile phone?, types of mobile phones, what is form factor.PARTS OF A CONVENTIONAL MOBILE PHONE,MOBILE PHONE REPAIR TOOLS: Factors to Consider When Choosing Mobile Phone Repair tools, tools for Mobile Phone Repair	15	
II	Practical (30 Hours) 1. Disassembling A Mobile Phone. 2. Assembling a Mobile Phone. 3. Mobile Phone Diagnosis. 4. Repair of common mobile phone faults. (Software faults).	15	
Referen:			
<ol style="list-style-type: none"> 1.Mobile Phones and Tablets repairs By Chukky Oparandu , 2.Advance Mobile Repairing By Sanjeev Pandit 1st Edition BPB Publications 3.Smartphones and Tablet Repairs : By Chukky Oparandu 			

Course Code	SKILL ENHANCEMENT COURSES (SEC) SEM II	Credits	Lectures/ Week
K23USPHYSC251	Computer Simulation	2	2

Course Objectives:

1. Understanding basic concepts of simulation.
2. Learning different ways and tools for simulation.
3. Understanding techniques of graph plotting and it's analysis.
4. Using simulation techniques for basic experimental data collection and measurements.

Unit	Topics	No of Lectures
I	THEORY Introduction to simulation , ,General principles, Simulation examples, Statistical models , Queuing models.	15
II	PRACTICALS (30 HOURS) 1. Input modeling and parameter estimation 2. 2d, 3d graph plotting 3. Creating simulated experimental models 4. Random number generation	15

References:

1. **Basics of modelling and simulation by Lari and Singh, S.K Kataria and sons Publications**
2. **Introduction to computer simulations for integrated stem college education by Mohamed M Hafez, William E Tavernetti.**

Evaluation Scheme for First Year (UG) under NEP (2 credits)

I. Internal Evaluation for Theory Courses – 20 Marks

1) Continuous Internal Assessment(CIA) Assignment - Tutorial/ Case Study/Project / Presentations/ Group Discussion / Ind. Visit. – 10 marks

2) Continuous Internal Assessment(CIA) ONLINE Unit Test – 10 marksII.

External Examination for Theory Courses – 30 Marks

Duration: 1 Hours

Theory question paper pattern: All questions are compulsory.

Question	Based on	Marks
Q.1	Unit I	15
Q.2	Unit II	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination

- Each core subject carries 50 Marks.
- Duration: 2 Hours for each practical course.
- Minimum 80% practical from each core subjects are required to be completed.
- Certified Journal is compulsory for appearing at the time of Practical Exam NOTE:

To pass the examination, attendance is compulsory in both Internal & External (Theory + Practical) Examinations.