FOUR YEAR UNDERGRADUATE PROGRAM (NEP- 2020) PROGRAM: BACHELOR IN SCIENCE (2024 – 28) DISCIPLINE – PHYSICS

SESSION - 2024 - 25

)N - 2024 – 25	DOE	01 to 02
DSC	C- 01 to 08	D	SE- 01 to 12	DGE- 01 to 02	
	Course Title	Code	Course Title	Code	Course Title
Code	Mechanics	Code	Introduction to Statistical	PHGE- 01 T	Mechanics
PHSC- 01 T	Lab Course	PHSE- 01	Mechanics	PHGE- 01 P	Lab Course
PHSC-01P		-70		PHGE- 02 T	Electricity &
PHSC- 02 T	Electricity & Magnetism	PHSE- 02	Mathematical Physics-I		Magnetism
HSC- 02 P	Lab Course	THSE- 02	1121111	PHGE- 02 P	Lab Course
	Heat &	7			
PHSC- 03 T	Thermodynamics	PHSE- 03	Nuclear Physics		
PHSC- 03 P	Lab Course				
PHSC-04 T	Waves & Optics	PHSE- 04 T	Numerical Methods &C		VAC
1130-041	77.47.55 57.57		Programming	-	VAC
PHSC-04P	Lab Course	PHSE- 04 P	Lab Course		Renewable
PHSC- 05 T	Introduction to	4			Energy and
	Quantum Mechanics	PHSE- 05	Mathematical Physics-II	PHVAC- 01	Energy
PHSC- 05 P	Lab Course		Wathemater		Harvesting
`HSC- 06 T	Solid State Physics				
	&SolidStateDevices	PHSE- 06	Classical Electrodynamics		
PHSC-06P	Lab Course	PHSE-00	& Electromagnetic theory	SEC	
	Page 1			4	
		PHSE- 07 T	Digital Electronics	_	
PHSC- 07	Classical Mechanics	PHSE- 07 P	Lab Course		BasicElectrical
2		PHSE- 08 T	Operational Amplifier&	PHSEC- 01	Skill
PHSC- 08	Quantum Mechanics		Its Applications		OKIII
		PHSE- 08 P			
- C.		PHSE- 09 T		4	
1		PHSE- 09 P		_	
B.		PHSE- 10	Atomic and Molecular		
		DITCE 11	Physics Statistical Mechanics		
		PHSE-11		-	
1 - 8		PHSE- 12 T			
		PHSE- 12 I	Lab Course		. ,

Signature of Convener & Members (CBoS):

John Dung

need Wandkumar Patel

vavidyalaya, Raigarh (C.G.)

Officer-la-Charge (Academic)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

rogram Outcomes (PO):

The learning outcomes of the undergraduate degree course in physics are as follows:

- In-depth disciplinary knowledge: The student will acquire comprehensive knowledge and understanding of the fundamental concepts, theoretical principles and processes in the main and allied branches of physics.
- Hands-on/ Laboratory Skills: Comprehensive hands-on/ laboratory exercises will impart analytical, computational and instrumentation skills. The students will be able to demonstrate mature skills for the collation, evaluation, analysis and presentation of information, ideas, concepts as well as quantitative and/or qualitative data.
- · Role of Physics: The students will develop awareness and appreciation for the significant role played by physics in current societal and global issues. They will be able to address and contribute to such issues through the skills and knowledge acquired during the programme
- Communication and Skills: Various DSCs, DSEs, SECs, and GEs have been designed to enhance student's ability to write methodical, logical and precise reports. The courses will, in addition, guide the student to communicate effectively through presentations, writing laboratory/ project reports and dissertations.
- Critical and Lateral Thinking: The programme will develop the ability to apply the underlying concepts and principles of physics and allied fields beyond the classrooms to real life applications, innovation and creativity.
- Research skills: The course provides an opportunity to students to hone their research and innovation skills through assignment/internship/dissertation. It will enable the students to demonstrate mature skills in literature survey, information management skills, data analysis and research ethics.

Signature of Convener & Members (CBoS): wet w 15/6/14

andkumar Patel

idyalaya, Raigarh (C.G.)

Officer-In-Charge (Academic) Shaheed Nandkumar Patel ishwavidyalaya, Raigarh (C.G.)

71(1.	- A: INTRODUCTION	ON				
P	Program: Bachelor in ificate/ Diploma/ Deg	Science	Semeste		Session: 2024-2	.5
		3100/ 110/10/10/		SC-01T		
1	Course Code		Mo	echanics		
2	Course Title	Discipline Specific Con-				
3	Course Type	Jourse Type As per Program				
4	Pre-requisite (if any)	After going through	the course, the	student sh	ould be able to:	216
5	Course Learning Outcomes (CLO)	 ➢ Analyze and apply and define and an and an analyze ➢ Evaluate and an analyze ➢ Analyze flow of a pescribe specifies 	monstrate the produing their app lenergy transfor calculate momen how these proper fifuids.	rinciple of lication in mation. It of inertion erties affections	arious dynamical situation conservation of momentum real-world scenario sure the motion of rotating between the motion of rotating between the motion of the materials. The motion of the materials arning & Observation	shapes odies.
6	Credit Value	03 Credits 1 C	redit= 15 Hot	Minimu	m Pass Marks: 40	
7	Total Marks	Maximum Mar	ks: 100	WITHIT	111 1 1100 1111	
PART		HE COURSE			Durinda (AE Hours)	
	TotalNo.of Teachir	g-learning Periods	(01 Hr. per pe	riod) - 45	Periods (45 Hours)	No. of
Unit		Topics (Co	urse contents)			Period
11	Historical Background: biography of Vikram Sara Scalar & Vector products physical significance.Lav system of particles, Conc momentum, Motion of R Force as a gradient of Pot Rotational Dynamics: A	of two vectors, Derive of Motion: Revious of Motion: Revious ept of Center of Masocket. Work and Engential Energy, Consendual Engular momentum, T	ivatives of a vecew of Newton's, Motion of ceergy: Work-Enervation of energy or	ctor, Gradi s Laws of nter of ma rgy theore y, Elastic a ution of any	ent of scalar field and its motion, Dynamics of a ss, Conservation of linea m for conservative forces and in-elastic Collisions gular momentum, Momen Calculation of Moment of	nt 12
1	Rotational Dynamics: Angular momentum, Torque, Conservation of angular moment of of Inertia, Theorem of parallel and perpendicular axes(statements only), Calculation of Moment of Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid Cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid Cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid Cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid Cylinder, solid Inertia of discrete and continuous objects (Rectangular lamina, disc, solid Cylinder, solid Inertia of discrete and con					
	sphere).Elasticity: Stres between various elastic Dynamics : Flow of fluid spherical body falling in	s & Strain, Hooke's modulii (without dods, Coefficient of vis a viscous fluid, Stoke	law, Elastic co erivation), Work cosity, Derivation e's law, Express	nstants, Po done in n of Poise ion for terr	visson's Ratio,Relationsh twisting a cylinder.Fluulli's formula, Motion of minal velocity.	ip id a
ш	sphere).Elasticity: Stres between various elastic Dynamics: Flow of fluid spherical body falling in Gravitation: Newton's in a plane, angular more only), Satellite in circula Oscillations: Simple ha Potential Energy, Tota	s & Strain, Hooke's modulii (without do do, Coefficient of vis a viscous fluid, Stoke Law of Gravitation, I lentum is conserved, ur orbit and application monic motion, Differ and Energy and their	law, Elastic co- erivation), Worl- erivation), Worl- erivation, Worl- erivation, Express Motion of a part areal velocity is ons, Geosynchro erintal equation or time averages	nstants, Pook done in of Poise ion for terricle in a constant), nous orbits of SHM as, Compouncentual or	visson's Ratio, Relationsh twisting a cylinder. Fluulli's formula, Motion of minal velocity. Entral force field (motion Kepler's Laws (stateme). Ind its solutions, Kinetic and pendulum, Differently).	is 1 nnts and tial
III	sphere).Elasticity: Stres between various elastic Dynamics: Flow of fluid spherical body falling in Gravitation: Newton's in a plane, angular more only), Satellite in circula Oscillations: Simple hat Potential Energy, Total equations of damped os Special Theory of Relationerial frames, Outcome	s & Strain, Hooke's modulii (without dods, Coefficient of visa viscous fluid, Stoke Law of Gravitation, Internal is conserved, ar orbit and application remonic motion, Differ all Energy and their cillations and forced activity: Frame of referes of Michelson Mornal	law, Elastic co erivation), Work cosity, Derivation e's law, Express Motion of a part areal velocity is ons, Geosynchro crential equation time averages oscillations (Contrence, Galilean reley's Experiment	nstants, Pox done in of Poise ion for terricle in a constant), nous orbits of SHM as, Compounceptual or Transform	visson's Ratio, Relationsh twisting a cylinder. Fluulli's formula, Motion of minal velocity. Entral force field (motion Kepler's Laws (statement of the solutions, Kinetic and pendulum, Different	id ip id is a list of a li

Signature of Convener & Members (CBoS):

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Signature of Convener & Members (CBoS):

Chairman

ed Nandkumar Patel dyalaya, Raigarh (C.G Officer-In-Charge (Acadamic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

		- A: INTRODU		Semester: I	Session: 202	4-25
10		icate/ Diploma/ D		Semesteri		
1		rse Code	egree Honors)	PHSC-01P		
2		rse Title		Mechanics		
3		rse Type		Discipline Specific C	ourse	
				As per Program		
4		requisite (if any)	After the comm	oletion of the course, S	tudents are expe	ected to
5	Course Learning Outcomes (CLO) After the complete understand works The Students will Assemble requestrements. Record/ obsobjectives. Analyze record			cing mechanism and law ll be able to equired parts/devices and serve data as required orded data and formulate	arrange them to go by the experit to get desired reattainment of p	perform rimental sults.
			objectives re	elated to laws of mechanic	es and its applicati	0115
6	Cre	edit Value	01 Credit 1 Cr	redit = 30 HoursLabora	tory Work	
7		tal Marks	Maximum Mar		Pass Marks: 20	
PA	RT	- B: CONTEN	T OF THE CO	OURSE		
		TotalNo.of lea	rning-Training/pe	rformance Periods-30 Per	riods (30 Hours)	No. of
	r.	Objects (A	at least 10 of the f	ollowing or related Expo	erments)	
						Period
	0.	Managements of				
N	o. I	Measurements of	length (or diamete	r) using vernier caliper, se		Period 30
]	l	travelling microso	length (or diamete	r) using vernier caliper, so	crew gauge and	
	2	To study the moti	length (or diamete cope. om error in observ	r) using vernier caliper, so ations. ad calculate (a) Spring cor	crew gauge and	
2	2 3	To study the rand To study the moti	length (or diamete cope. om error in observe on of the spring and Moment of Inertial	r) using vernier caliper, so ations. ad calculate (a) Spring cor	nstant and, (b) g.	
3	2	To study the rand To study the moti	length (or diamete cope. om error in observe on of the spring and Moment of Inertial	r) using vernier caliper, so ations. ad calculate (a) Spring cor	nstant and, (b) g.	
3	2 3 4	To study the rand To study the moti To determine the To determine g ar	length (or diamete cope. om error in observe on of the spring and Moment of Inertiand velocity for a free	r) using vernier caliper, so ations. ad calculate (a) Spring cor of a Flywheel. eely falling body using D	nstant and, (b) g.	
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2 3 3 4 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1 2 3 4 5 5 5 6 7 8 9 0 1 2 3 words	To study the rand To study the moti To study the moti To determine the To determine g ar Technique. To determine Coe (Poiseuille's meth To determine the Study of bending To determine Mo	length (or diamete cope. om error in observe on of the spring and Moment of Inertiand velocity for a free fficient of Viscosition). Young's Modulus Modulus of Rigidicelastic constants of value of gusing Benedic value of gusing Kof a beam/ cantilement of Inertia of Pendulum, Vernier Call	ations. ad calculate (a) Spring corof a Flywheel. eely falling body using Dety of a Wire by Capillary For a Wire by Maxwell fa wire by Searle's mether ar Pendulum. Eater's Pendulum. Eater's Pendulum. Ver an irregular body by Inergipers, Screw Gauge, Travelling Rise Method, Viscosity, Sur	nstant and, (b) g. igital Timing Flow Method er Method. 's needle. od tia Table	30

Chairman

of Studies Andkumar Patel Idyalaya, Raigarh (C.G.)

Officer-In-Charge (Actionalis) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

Text Books, Reference Books Recommended and Others

Text Books Recommended-

- 1. Mechanics & Properties of matter, D.C. Tayal & P. Tayal, 2023, Pub. By Authors.
- 2. Unified Physics I -R.P.Goyal, Shivlal Agrawal Publication
- 3. Unified Physics I, Navbodh Publication

Reference Books Recommended-

- 1. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
- 2. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
- 3. Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.

Online Resources (e-books/learning portals/other e-resources)

- 1. All e-books of physics https://www.e-booksdirectory.com/listing.php?category=2
- 2. Free physics text book in PDF
- 3. https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Km $a 0 VR0AWG lich RwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE$
- 4. Cambridge University Books for Physics https://www.cambridgeindia.org/
- 5. Books for solving physics problems https://bookboon.com/en/physics-ebooks
- 6. NPTEL Online courses https://nptel.ac.in/courses/115105098; https://archive.nptel.ac.in/courses/115/106/115106123/;
- 7. BSc Lectures by Prof. H C Verma: https://bsc.hcverma.in/index.php/course/relativity; https://bsc.hcverma.in/index.php/course/cml

PART - D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 100Marks

Continuous Internal Assessment (CIA):30 Marks

Continuous Internal As	350551110111 ()	
End Semester Examina	tion (ESE): 70 Marks	Better marks out of the two Test / Quiz
Assessment (CIA):	Internal Test/ Quiz (2): 20 20 Assignment/ Seminar (1):10	t terinod in Assignment shall
` '	Total Marks: 30 Two section – A & B	5×4 =20Marks

End Semester Exam (ESE):

Two section - A & B

Section A: Q1. Objective – 10 x1 = 10 Mark; Q2. Short answer type- 5x4 = 20 MarksSection B: Descriptive answer type, 1 out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBC

aya, Raigarh (C.G.)

Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

PART - C: Learning Resources

Text Books, Reference Books and others

Text Books Recommended-

- 1. Advanced Practical Physics for students, B.L.Flint&H.T.Worsnop, 1971, Asia Publishing House.
- 2. Engineering Practical Physics, S.Panigrahi& B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
- 3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
- 4. Practical Physics B.Sc. I: R P Goyal, Shivlal Publications

Reference Books Recommended-

- 1. Advanced Practical Physics for Students by B.L. Worsnop and H.T. Flint
- 2. Practical Physics by G.L. Squires
- 3. An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements by John R. Taylor
- 4. Mechanics and Properties of Matter by J.C. Upadhyaya

Online Resources (e-books/learning portals/other e-resources)

- 1. Link for e-Books for Physics: Physics Practical:
 - https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf
- 2. Virtual Lab: https://vlab.amrita.edu/?sub=1&brch=74
- 3. https://vlab.amrita.edu/?sub=1&brch=74&sim=571&cnt=1
- 4. https://www.ae.msstate.edu/vlsm/

PART - D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks:

50 Marks

Continuous Internal Assessment(CIA):15 Marks

EndSemester Exam(ESE):35 Marks

Continuous	Internal Test / Quiz - (2): 10		arks out of the two
InternalAssessment(CI		Test/Quiz	+Marks obtained in
(By Course Teacher)	Assignment/Seminar +Attendance -	05 Assignmer	nt shall be considered
	1 Otal Walks -	15 against 15	Marks
End Semester	Laboratory Performance: On spot Ass	sessment	Managed by Course
	Performed the Task based on lab. wor	k -20	teacher as per lab.
Exam (ESE):	Marks	status	
	Spotting based on tools & technology (written) – 10	
	Marks	ngv) - 05	
	Viva-voce (based on principle/technology	ogy) - 05	
	Marks		

Name and Signature of Convener & Members of CBoS.

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eed Nandkumar Patel Idyalaya, Raigarh (C.G

Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

			COURSE CUI	ddconom		CONTRACTOR OF THE PARTY OF THE
AR	-T	A: INTRODUC	CTION			
		ogram: Bachelor ii		Semester: II	Session: 2024	25
(C		icate/ Diploma/ De				
1	Cou	rse Code		PHSC-02T		
2	Cou	rse Title		ELECTRICITY AND MAC	ENETISM	
3		rse Type		Discipline Specific (Course	
4		requisite (if any)		As per Progra		
5	Course Learning Outcomes (CLO) After going through the course, the student should be able to: State various laws related with electrostatics, dielectric, current, magnetism and electromagnetic induction. Apply vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics. Compare rise and decay of current in LR, CR, LCR circuits. Apply Biot-Savart law for calculation of magnetic field in geographic situations.			electric		
			Derive and a	nalyze Maxwell's equations	3.	
6		edit Value		edit= 15 Hours for Lea		
7		tal Marks	Maximum Mark		n Pass Marks: 40	
PA	RT -	- B: CONTENT				
		TotalNo.of Teachir	ng-learning Periods	(01 Hr. per period) - 45	Periods (45 Hours)	
Ur	ıit		Topics (C	ourse contents)		No. o Perio
I		in Chhattisgarh. Vector Analysis: E of Vector fields, application in election in election flux, Gaussi	Divergence & Curl of Gauss-divergence the trostatics and magnet s's theorem of electro	rview of thermal and hydroverous fields, Line, surface corem and Stoke's theorem ostatics. Electrostatics field estatics, Applications of Geocharge, plane charged sheet	and volume integrals n of vectors and its d: Electrostatic Field, auss theorem- Electric	12
I	II Electrostatic potential: Electrostatic potential: Electrostatic potential: Electrostation capacitor, Energy per unit Dielectric & Electric Cu Gauss's theorem in dielectric. Steady current, of the control of the co		ntial:Electric potentia lculation of electric f per unit volume in elec tric Currents: Diele in dielectrics, Par	I as line integral of electric ield from potential, Capaci etrostatic field. etric medium, Polarisation, allel plate capacitor co J, non – steady current an	field, potential due to tance of Parallel plate Displacement vector, mpletely filled with	13
III Magnetism: Magnetism: Magnetism circular coil, solen vector potential, A Magnetic propertie		Magnetism: Magnetircular coil, solen vector potential, A Magnetic propertionagnetic susceptil	netostatics: Biot-Sava noid carrying current, mpere's circuital law, es of materials: Mag pility, Brief introducti	ort's law and its application Divergence and curl of manetic intensity, magnetic intensity on of dia, para and ferro-manetic in	agnetic field, Magnetic aduction, permeability, agnetic materials.	
]	magnetic susceptibility, Brief introduction of dia, para and ferro-magnetic materials. IV Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field. Maxwell's equations and Electromagnetic wave propagation: Equation of continuity					
		of current Displac	cement current Mayu	ell's equations, Wave equat	tion in free space	

Chairman of Studies

Officer-In-Charge (Assolution) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

Text Books, Reference Books and Others

Text Books

- 1. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
- 2. Unified Physics Part II, R. P. Goyal, Shivlal Agrawal and Sons
- 3. Unified Physics Navbodh Publications
- 4. Introduction to Electrodynamics and Electromagnetism, H.C. Verma,

Reference Books

- 1. Vector analysis Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw- Hill Education.
- 2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Online Resources (e-books/learning portals/other e-resources)

- I. All e-books of physics https://www.e-booksdirectory.com/listing.php?category=2
- 2. Free physics text book in PDF https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Kma0 VROAWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
- 3. Cambridge University Books for Physics https://www.cambridgeindla.org/
- 4. Books for solving physics problems https://bookboon.com/en/physics-ebooks
- 5. NPTEL Online courses: https://onlinecourses.nptel.ac.in/noc21_ph05/preview
- 6. https://archive.nptel.ac.in/courses/115/104/115104088/
- 7. Classical Electromagnetism 1 (Electrostatics) https://bsc.hcverma.in/course/cee1
- 8. Classical Electromagnetism 2 (Electrostatics) <u>https://bsc.hcverma.in/course/cee2</u>

PART – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100Marks

Continuous Internal Assessment (CIA):30 Marks End Semester Examination (ESE): 70 Marks

Continuous Internal	Internal Test/ Quiz (2):	Better marks out of the two Test / Quiz			
Assessment (CIA):	20+20Assignment/ Seminar (1): 10	+ marks obtained in Assignment shall			
(By course teacher)	Total Marks: 30	be considered against 30 Marks			
End Semester	Two section - A & B				
Examination (ESE):	Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 = 20Mar				
Section B: Descriptive answer type,1out of 2 from each unit-4x10=40 N					

Name and Signature of Convener & Members of CBoS:

idkumar Patel

iyalaya, Raigarh (C.G

Officer-In-Charge (AL Shaheed Nandkumar Patel /ishwavidyalaya, Raigarh (C.G.)

PAR	RT - A: 1	INTRODUC	CTION	CORRICOLOM		
		n:Bachelor in		Semester: 11	Session: 2024-2	5
(Cc	rtificate/	Diploma/ Deg	gree/ Honors)			
1	Course Co	ode		PHSC-	02P	
_	Course Ti			Electricity & f	Angnetism	and the second second second
	Course Ty	•		Discipline Spec		
		site (if any)		As per pr	ogram	
5	Course L			ipletion of the course, S	tudents are expected to un	
		After the completion of the course, Students are expected to under working laws of Electricity, Magnetism and EMIVs. The students will a able to > Verify various circuit laws, network theorems, using simple experiments. > Verify various laws in electricity and magnetism such as Lenz Faraday's law and learn about the construction, working of y measuring instruments > Record/observe data as required by the experimental objectives. A recorded data and formulate it to get desired results. > Interpret results and check for attainment of proposed objectives to laws of Electricity, Magnetism and its applications				
6	Credit V	17.20 YE 10.00		1 Credit = 30 Hours La		
7	Total Ma		Maximum N	The state of the s	m Pass Marks: 20	
PA	RT - B	CONTEN	T OF THE O	COURSE		
		TotalNo.of le	earning-Trainir	ng/performance Periods	-30 Perlods (30 Hours)	
Sr	1	Objects ((At least 10 of	the following or related	Experiments)	No. of
No						Periods
1				g (a) Resistances, (b) AC	and DCVoltages,(c) DC	
<u>_</u>			ecking electrica			30
2				e'Sauty's bridge.		
3					noid Determine (dB/dx).	
4				Series RC Circuit.		
5			CK circuit and	determine its (a) Resona	nt Frequency, (b) Quality	
 	Facto		r op ' '			1
6		tudy a parallel ity factor Q.	LCK circuit ar	ia determine its (a) Anti-	esonant frequency and(b)	
7			w Resistance h	y Carey Foster's Bridge.		1
			enin and Norto			1
				Maximum Power Transfe	r Theorem	+
_				and study magnetic field		- 1
			field due to a			-
		·		eflection Magnetometer		1
-			_	y of Solenoid and measure	ment of its magnetic field	-
	eywords:	Multimeter,	Capacitance C		eld, RC Circuit, Series LC	R Circui
L		1	/ / / /		1	A

SignatureofConvener&Members (CBoS):

d Nandkumar Patel dyalaya, Raigarh (C.G.)

Officer-In-Charge (Marchand)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

Text Books, Reference Books and Others

Text Books Recommended-

- 1. Engineering Practical Physics, S.Panigrahl&B.Mallick,2015, Cengage Learning India Pvt. Ltd.
- 2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
- 3. Unified Practical Physics: R P Goyal, Shivlal Agrawal & Sons
- 4. Unified Practical Physics: YugbodhPrakashan
- 5. Unified Practical Physics: NavbodhPrakashan

Reference Books Recommended-

- 1. Basic Electrical and Electronics Engineering by S. K. Bhattacharya
- 2. A Textbook of Electrical Technology by B.L. Theraja and A.K. Theraja (Volumes 1 and 2)
- 3. Engineering Circuit Analysis by William H. Hayt, Jack E. Kemmerly, and Steven M. Durbin
- 4. Practical Physics by G.L. Squires

Online Resources (e-books/ learning portals/ other e-resources)

- 1. Link for e-Books for Physics: Physics Practical: https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf
- 2. Virtual Lab: https://vlab.amrita.edu/index.php?sub=1&brch=192
- 3. http://emv-au.vlabs.ac.in/#
- 4. https://www.ae.msstate.edu/vlsm/
- 5. https://nationalmaglab.org/magnet-academy/watch-play/interactive-tutorials
- 6. https://jigyasa-csir.in/cgcri/n12-t4-a3/

PART - D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks:

50 Marks

Continuous Internal Assessment(CIA):15 Marks

EndSemester Exam(ESE):35 Marks

Continuous InternalAssessment(CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar + Attendance - 05 Total Marks - 15	Test / Quiz +	out of the two Marks obtained in shall be considered arks
End Semester Exam (ESE):	Spotting based on tools & technology (written)	20 Marks –10 Marks – 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Chairman

of Studiesed Nandyumar Patel

idyalaya, Baigarh (C.G.)

Officer-In-Charge (Alexandra)
Shaheed Nandkumar Patel
Shwavidyalaya, Raigarh (C.G.)

	Program: Bachelor i tificate/ Diploma/ De		Semes		Session: 2024	1-25
1	Course Code			HGE-01 T		
2	Course Title			Mechanics		
3	Course Type	Generic Elective Course				
4	Pre-requisite (if any)	1 H (Asj	per Prograi	n	
5	Course Learning Outcomes (CLO)	➤ Explain and den energy includ collision and co Evaluate and co and analyze h Analyze flow of Describe specie	oly the laws of nonstrate the pling their appenergy transford deulate mome ow these propenal relativistic	motion to va principle of colication in rmation, nt of inertia erties affect t effects and t	onservation of moment real-world scenario s for objects of different he motion of rotating be heir effects on the ma	shape odies. uss and
6	Credit Value	03 Credits 1 Cr	edit= 15 Hou	irs for Lear	ning & Observation	A
7	Total Marks	Maximum Marks	s: 100	Minimum	Pass Marks: 40	1 1 1 1
AK	T – B: CONTENT OF TI Total No. of Teachin	g-learning Periods (eriods (45 Hours)	No.
Unit		Topics (Cour	rse contents)			Perio
I	Historical Background: Company of Vikram Sarab Scalar & Vector products of physical significance. Laws of particles, Concept of Commotion of Rocket. Work a	of two vectors, Deriva of Motion: Review of ter of Mass, Motion of	tives of a vect Newton's Lav center of mass,	or, Gradient vs of motion, Conservatio for conservat	of scalar field and its Dynamics of a system n of linear momentum, ive forces, Force as a	
II	of particles, Concept of Center of Mass, Motion of center of mass, Conservative forces, Force as a Motion of Rocket. Work and Energy: Work-Energy theorem for conservative forces, Force as a gradient of Potential Energy, Conservation of energy, Elastic and in-clastic Collisions Rotational Dynamics: Angular momentum, Torque, Conservation of angular momentum, Moment of Inertia, Theorem of parallel and perpendicular axes (statements only), Calculation of Moment of Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere).					
			velocity is co	nstant), Kepl	orce field (motion is in er's Laws (statements	11
III	Gravitation: Newton's Lara plane, angular momentu only), Satellite in circular o Oscillations: Simple harm Potential Energy, Total Engof damped oscillations and Special Theory of Relative	m is conserved, areal orbit and applications, Conic motion, Differentions and their time aver	ial equation of rages, Compou	SHM and its nd pendulum	solutions, Kinetic and Differential equations	10

Signature of Convener & Members (CBoS) :

of Stadies.... Ped Nandkumar Patel Idyalaya, Raigarh (C.G.

Officer-In-Charge (Ac. W. 1945) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

5 John

Text Books, Reference Books Recommended and Others

Text Books Recommended-

- 1. Mechanics & Properties of matter, D.C. Tayal & P. Tayal, 2023, Pub. By Authors.
- 2. Unified Physics 1 -R. P. Goyal, Shivlal Agrawal Publication
- 3. Unified Physics I, Navbodh Publication

Reference Books Recommended-

- 1. Mechanics, Berkeley Physics, vol.1, C. Kittel, W. Knight, et.al. 2007, Tata McGraw-Hill.
- 2. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
- 3. Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.

Online Resources (e-books/learning portals/other e-resources)

- 1. All e-books of physics https://www.e-booksdirectory.com/listing.php?category=2
- 2. Free physics text book in PDF
- 3. https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoClLsQAvD_BwE
- 4. Cambridge University Books for Physics https://www.cambridgeindia.org/
- 5. Books for solving physics problems https://bookboon.com/en/physics-cbooks
- 6. NPTEL Online courses https://archive.nptel.ac.in/courses/115/106/115106123/;
- 7. BSc Lectures by Prof. H C Verma: https://bsc.hcverma.in/index.php/course/relativity; https://bsc.hcverma.in/index.php/course/cm1

PART - D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods: Maximum Marks: Continuous Internal Assessment (CIA):		30	Marks Marks
End Semester Examina	ation (ESE):		Marks Test / Ouiz
Continuous Internal	Internal Test/ Quiz (2):	20 + 20	Better marks out of the two Test / Quiz
Assessment (CIA):	Assignment/ Seminar (1):	10	+ marks obtained in Assignment shall be
(By course teacher)	Total Marks:	30	considered against 30 Marks

Exam (ESE): Section A: Q1. Objective = Reserved Section B: Descriptive answer

End Semester

Two section -A & BSection A: Q1. Objective -10 x1 = 10 Mark; Q2. Short answer type-5x4 = 20 Marks Section B: Descriptive answer type,1 out of 2 from each unit-4 x 10=40 Marks

Name and Signature of Convener & Members of CBoS:

Chairman

eed Nandkumar Patel idyalaya, Raigarh (C.G.

> Officer-In-Charge (Audicardic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

		COURSEC	URRICULUM				
PA	RT – A: INTROD	UCTION		the ball of the second state of the second sta			
	Program: Bachelor	· in Science	Semester: I	Session: 20	124-25		
(C	ertificate/ Diploma/ I		otilitate 1				
1	Course Code		PHGE-01 P				
2	Course Title		Mechanics				
3	Course Type		Generic Elective Cou	rse .			
4	Pre-requisite (if any)		As per Program				
5	Course Learning	After the compl	etion of the course, Stu	idents are exp	ected to		
	Outcomes (CLO)	understand worki	ing mechanism and laws	of classical me	echanics.		
		The Candonio will	he able to				
		> Assemble req	uired parts/devices and a	rrange them to	pertorm		
		AC 4000 N					
		> D 1/-b	ve data as required by the	experimental of	gectives.		
			1. 1 date and formulate II	to agracan	000		
		► Interpret resul	is and check for attainmen	t of brobosed o	ojectives		
		related to laws	s of mechanics and its app	Ilcations			
6	Credit Value	01 Credit 1 Cre	dit = 30 Hours Laborate	ry work			
7	Total Marks	Maximum Marks	:: 50 Minimum P	ass Marks: 20			
PΔ	DT P. CONTEN	T OF THE COL	JRSE				
	Tatal No. of loar	ning-Training/perfo	ormance Periods- 30 Perio	ds (30 Hours)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
Sr	Objects (A	t least 10 of the foll	lowing or related Experi	ments)	No. of Period		
No.					renou		
1	Measurements of l	ength (or diameter)	using vernier caliper, scre	w gauge and	30		
	travelling microsco	pe.	ons				
2	To study the rando	m error in observati	calculate (a) Spring const	ant and, (b) g.	1		
3	To study the motio	n of the spring and Ioment of Inertia of	a Flywheel.				
<u>4</u> 5	To determine g and	velocity for a freel	y falling body using Digi	tal Timing	1		
3	Tachnique						
6	To determine Coef	ficient of Viscosity	of water by Capillary Flo	w Method			
	(Poiseuille's metho	d).					
7	To determine the Y	oung's Modulus of	a Wire by Optical Lever	pedle			
8	To determine the M	lodulus of Kigidity	of a Wire by Maxwell's r	iccure.			
9	To determine the el	asuc constants of a	wire by Searle's method	· · · · · · · · · · · · · · · · · · ·			
10	To determine the va			,0			
11	Study of bending of			1	1		
$\frac{12}{13}$			irregular body by Inertia	Table	4		
	Moment of Inertia, Pen	dulum, Vernier Callipe	rs, Screw Gauge, Travelling m	icroscope, Elastic	Constant,		
ey wor	Searle's Method, Stoke	's Method, Cappilary R	lise Method, Viscosity, Surfac-	e Tension			
ignat	ure of Convener & Me	mbers (CBoS) :	angom / 1	b SV	11_		
(21/ 1/2	Jud	Dangow Made				

eed Nandkumar Patel idyalaya, Raigarh (C.G. Officer-In-Charge (All Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

PART - C: Learning Resources

Text Books, Reference Books and others

Text Books Recommended-

- 1. Advanced Practical Physics for students, B.L.Flint&H.T.Worsnop, 1971, Asia Publishing House.
- 2. Engineering Practical Physics, S. Panigrahi& B. Mallick, 2015, Cengage Learning India Pvt. Ltd. 3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
- 4. Practical Physics B.Sc. I: R P Goyal, Shivlal Publications

Reference Books Recommended-

- 1. Advanced Practical Physics for Students by B.L. Worsnop and H.T. Flint
- 2. Practical Physics by G.L. Squires
- 3. An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements by John R. Taylor
- 4. Mechanics and Properties of Matter by J.C. Upadhyaya

Online Resources (e-books/ learning portals/ other e-resources)

1. Link for e-Books for Physics: Physics Practical:

https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf

- 2. Virtual Lab : https://vlab.amrita.edu/?sub=1&brch=74
- 3. https://vlab.amrita.edu/?sub=1&brch=74&sim=571&cnt=1
- 4. https://www.ae.msstate.edu/vlsm/

PART - D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks:

50 Marks

Continuous Internal Assessment (CIA):

15 Marks

End Semester Exam (ESE):

35 Marks

Continuous Internal Assessment (CIA):

Internal Test / Quiz - (2): 10 & 10 Assignment/Seminar +Attendance -05

Better marks

out of Test/Quiz +Marks obtained in

Total Marks -15

Assignment shall be considered against 15 Marks

End Semester Exam (ESE):

(By Course Teacher)

Laboratory Performance: On spot Assessment Performed the Task based on lab. work

-20 Marks

Spotting based on tools & technology (written) - 10 Marks

Managed by Course teacher as per lab.

Viva-voce (based on principle/technology)

status

Name and Signature of Convener & Members of CBoS:

eed Nandkumar Patet dyalaya, n

> Officer-In-Charge (Cardanic) Shaheed Nandkumar Patel /shwavidyalaya, Raigarh (C.G.)

ificate/ Diploma/ De ourse Code ourse Title ourse Type e-requisite (if any)	gree/ Honors)	PI	HCE 02 T		
ourse Title ourse Type e-requisite (if any)		PI	HCE OF T		
ourse Type e-requisite (if any)			PHGE-02 T		
e-requisite (if any)		ELECTRICITY AND MAGNETISM			
	Generic Elective Course				
-	As per Program				
Course Learning Outcomes (CLO) After going through the course, the student should be able to: State various laws related with electrostatics, dielectric, electromagnetism and electromagnetic induction. Apply vector (electric fields, Coulomb's law) and scala potential, electric potential energy) formalisms of electrostatics.			s, dielectric, electric s law) and scalar	(electric	
	 Compare rise and decay of current in LR, CR, LCR circuits. Apply Biot-Savart law for calculation of magnetic field i geographic situations. Derive and analyze Maxwell's equations. 				ı simplo
7 20 10 10 10 10 10 10 10 10 10 10 10 10 10			rs for Learn	ing & Observation	
otal Marks	Maximum Marks	: 100	Minimum P	ass Marks. 40	
- B: CONTENT (OF THE COURS	O1 Hr. per pe	eriod) - 45 Pe	riods (45 Hours)	
	Topics (Cou	urse contents	3)		No. o Perioc
Chhattisgarh. Vector Analysis: Di of Vector fields, G application in electro	vergence & Curl of Vauss-divergence theorestatics and magnetosis theorem of electrosts	ector fields, Li rem and Stok tatics. Electros atics. Applicat	ne, surface an e's theorem of statics field: ions of Gauss	d volume integrals of vectors and its Electrostatic Field, theorem- Electric	
Electrostatic potential: Electric potential as line integral of electric field, potential due to a point charge, Calculation of electric field from potential, Capacitance of Parallel plate capacitor, Energy per unit volume in electrostatic field. Dielectric & Electric Currents: Dielectric medium, Polarisation, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric. Steady current, current density J, non – steady current and Continuity equation, Rise and				13	
Magnetism: Magnetostatics: Biot-Savart's law and its applications- straight conduction circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetor potential, Ampere's circuital law, Magnetic properties of materials: Magnetic intensity, magnetic induction, permeabi			etic field, Magnetic etion, permeability, tic materials.	10	
Electromagnetic In and mutual inductan Maxwell's equation	duction: Faraday's lav ce, L of single coil, N s and Electromagnet	vs of electroms I of two coils, ic wave propa	agnetic inducti Energy stored agation: Equat	on, Lenz's law, self in magnetic field.	10
C	Power plants in Chil Chhattisgarh. Vector Analysis: Di of Vector fields, G application in electro electric flux, Gauss's field due to point char Electrostatic potent a point charge, Calc capacitor, Energy pe Dielectric & Electr Gauss's theorem in Steady current, curre decay of current in L Magnetism: Magnetic properties magnetic properties magnetic properties magnetic susceptibil Electromagnetic In and mutual inductan Maxwell's equation current, Displacement	geographic site Pedit Value Otal Marks B: CONTENT OF THE COURS Total No. of Teaching-learning Periods Topics (Content of Vector Analysis: Divergence & Curl of Vof Vector fields, Gauss-divergence theo application in electrostatics and magnetos electric flux, Gauss's theorem of electrost field due to point charge, infinite line of che Electrostatic potential: Electric potential a point charge, Calculation of electric field capacitor, Energy per unit volume in electrostatics and magnetos of the Electric & Electric Currents: Dielectrostatic potential: Electric potential a point charge, Calculation of electric field capacitor, Energy per unit volume in electrostatic your in dielectrics, Parallel places of Causs's theorem in dielectrics, Parallel places of current in LR, CR, LCR circuits. Magnetism: Magnetostatics: Biot-Savart circular coil, solenoid carrying current, Divector potential, Ampere's circuital law, Magnetic properties of materials: Magnetic magnetic susceptibility, Brief introduction Electromagnetic Induction: Faraday's law and mutual inductance, L of single coil, Maxwell's equations and Electromagnetic current, Displacement current, Maxwell's equations and Electromagnetic current, Displacement current, Maxwell's equations and Electromagnetic current, Displacement current, Maxwell's equations and Electromagnetic current.	geographic situations. Derive and analyze Maxwell redit Value Otal Marks Maximum Marks: 100 B: CONTENT OF THE COURSE Total No. of Teaching-learning Periods (01 Hr. per periods) Topics (Course contents) Power plants in Chhattisgarh: An overview of thermal and Chhattisgarh. Vector Analysis: Divergence & Curl of Vector fields, Linguistion in electrostatics and magnetostatics. Electrostatics field due to point charge, infinite line of charge, plane charge application, Energy per unit volume in electrostatic field. Dielectric & Electric Currents: Dielectric medium, Periodic of Current, current density J, non — steady current and decay of current in LR, CR, LCR circuits. Magnetism: Magnetostatics: Biot-Savart's law and its circular coil, solenoid carrying current, Divergence and vector potential, Ampere's circuital law, Magnetic properties of materials: Magnetic intensity, magnetic susceptibility, Brief introduction of dia, para and Electromagnetic Induction: Faraday's laws of electromagnetic	geographic situations. Derive and analyze Maxwell's equations. Detail Marks Maximum Marks: 100 Minimum P B: CONTENT OF THE COURSE Total No. of Teaching—learning Periods (01 Hr. per period) - 45 Periods (Course contents) Power plants in Chhattisgarh: An overview of thermal and hydroelect Chhattisgarh. Vector Analysis: Divergence & Curl of Vector fields, Line, surface an of Vector fields, Gauss-divergence theorem and Stoke's theorem of application in electrostatics and magnetostatics. Electrostatics field: lelectric flux, Gauss's theorem of electrostatics, Applications of Gauss field due to point charge, infinite line of charge, plane charged sheet, che a point charge, Calculation of electric field from potential, Capacitance capacitor, Energy per unit volume in electrostatic field. Dielectric & Electric Currents: Dielectric medium, Polarisation, Die Gauss's theorem in dielectrics, Parallel plate capacitor completely fill Steady current, current density J, non — steady current and Continuity decay of current in LR, CR, LCR circuits. Magnetism: Magnetostatics: Biot-Savart's law and its applications-circular coil, solenoid carrying current, Divergence and curl of magnetic vector potential, Ampere's circuital law, Magnetic properties of materials: Magnetic intensity, magnetic induction and mutual inductance, L of single coil, M of two coils, Energy stored Maxwell's equations and Electromagnetic wave propagation: Equationer, Displacement current, Maxwell's equations, Wave equation in	geographic situations. Derive and analyze Maxwell's equations. Detail Value O3 Credits I Credit= 15 Hours for Learning & Observation Datal Marks Maximum Marks: 100 Minimum Pass Marks: 40 — B: CONTENT OF THE COURSE Total No. of Teaching—learning Periods (01 Hr. per period) - 45 Periods (45 Hours) Topics (Course contents) Power plants in Chhattisgarh: An overview of thermal and hydroelectric power plants in Chhattisgarh. Vector Analysis: Divergence & Curl of Vector fields, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magnetostatics. Electrostatics field: Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Applications of Gauss theorem—Electric field due to point charge, infinite line of charge, plane charged sheet, charged conductor. Electrostatic potential: Electric potential as line integral of electric field, potential due to a point charge, Calculation of electric field from potential, Capacitance of Parallel plate capacitor, Energy per unit volume in electrostatic field. Dielectric & Electric Currents: Dielectric medium, Polarisation, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric. Steady current, current density J, non — steady current and Continuity equation, Rise and decay of current in LR, CR, LCR circuits. Magnetism: Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic

Signature of Convener & Members (CBoS):

Chairman \

eed Nandkumar Patel idyalaya, Raigarh (C.G.) Officer-In-Charge (Acceptable)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

Text Books, Reference Books and Others

Text Books

- 1. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
- 2. Unified Physics Part II, R. P. Goyal, Shivlal Agrawal and Sons
- 3. Unified Physics Navbodh Publications
- 4. Introduction to Electrodynamics and Electromagnetism, H. C. Verma,

Reference Books

- 1. Vector analysis Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw-Hill Education.
- 2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Online Resources (e-books/learning portals/other e-resources)

- I. All e-books of physics https://www.e-booksdirectory.com/listing.php?category=2
- 2. Free physics text book in PDF https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yv6xK1s0Kma0 VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
- 3. Cambridge University Books for Physics https://www.cambridgeindia.org/
- 4. Books for solving physics problems https://bookboon.com/en/physics-ebooks
- 5. NPTEL Online courses: https://onlinecourses.nptel.ac.in/noc21_ph05/preview
- 6. https://archive.nptel.ac.in/courses/115/104/115104088/
- 7. Classical Electromagnetism 1 (Electrostatics) https://bsc.hcverma.in/course/cee1
- 8. Classical Electromagnetism 2 (Electrostatics) https://bsc.hcverma.in/course/cee2

PART – D: Assessment and Evaluation

Continuous Internal		
End Semester Examin		
Continuous Internal	Internal Test/ Quiz (2): $20 + 20$	Better marks out of the two Test / Quiz
Assessment (CIA):	Assignment/ Seminar (1): 10	+ marks obtained in Assignment shall be
(By course teacher)	Total Marks: 30	considered against 30 Marks
End Semester Examination (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 1 Section B: Descriptive answer type, 1	0 Mark; Q2. Short answer type- 5x4 =20 Marks out of 2 from each unit- 4 x 10=40 Marks
Name and Signature of C	Convener & Members of CBoS:	16 W 10/6/24 S. De

Chairman

of Studies eed Nandkumar Patel

vidyalaya, Raigarh (C.G.)

Officer-In-Charge (Academic) Shaheed Nandkumar Patel /ishwavidyalaya, Raigarh (C.G.)

PA	RT – A: INTROD	UCTION	OKKICOLOWI		
	Program: Bachelor	in Science	Semester: II	0 1 202	105
(0	Certificate/ Diploma/ D	Ocarce/ Honore)	Semester: 11	Session: 202	4-25
1	Course Code	The state of the s	PHGE- 02	D	
2	Course Title		Electricity & Ma		
3	Course Type		Generic Elective		
4	Pre-requisite (if any)				
5	Course Learning	After the complete	As per progr on of the course, Students a		and working
	Outcomes (CLO)	laws of Electricity Verify vario circuits. Ass. experiments. Verify varios Faraday's le measuring in Record/ obse recorded date Interpret ress	o, Magnetism and EMWs. To ous circuit laws, network emble required parts/devic us laws in electricity and aw and learn about the c	the students will also be theorems, using simples and arrange them magnetism such as honstruction, working experimental objectivitied results.	e able to ple electric to perform Lenz's law, of various es Analyze
6	Credit Value	01 Credit 1 Cre	edit = 30 Hours Labora	tory Work	
7	Total Marks	Maximum Marks		ss Marks: 20	
PA	RT – B: CONTENT			17-1-1	71. 4
			rformance Periods - 30 P	eriods (30 Hours)	
Sr.			ollowing or related Expe		No. of
No.			in the same of the		Periods
1	To use a Multimeter	for measuring (a) R	esistances, (b) AC and D	C Voltages,(c) DC	7
	Current, and (d) chec			and a second	30
2	To compare capacitat			10.01	
3			variation in a Solenoid I	Determine (dB/dx).	
4	To study the Characte				
5	Factor.	circuit and determ	nine its (a) Resonant Freq	uency, (b) Quality	1
6		CR circuit and deter	mine its (a) Anti-resonan	t frequency and	
7	To determine a Low I	Resistance by Carey	Foster's Bridge.	Market State of State	1
8	To verify the Theveni			1	. 777 1 1
9	To verify the Superpo	sition, and Maximu	ım Power Transfer Theor	em.	rie , , ,
10	To use a vibration ma				
11	Study of magnetic fiel		•	14	
12	Study of magnetic fiel	ds using Deflection	Magnetometer		
13	Mini Project: Constructi	on and Study of Sole	noid and measurement of in	s magnetic field	1
Keyw	Multimeter, Cap	acitance Comparis	on, Magnetic Field, RC ce Measurement, Electric	Circuit, Series LCR	Circuit,

Signature of Convener & Members (CBoS)

Chairman

d of Studies heed Narry dimar Patel avidyalaya, Raigarh (C.G.)

Officer-In-Charge (Consense) Shaheed Nandkumar Patel Shwavidyalaya, Raigarh (C.G.)

Text Books, Reference Books and Others

Text Books Recommended-

- 1. Engineering Practical Physics, S. Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt.
- 2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
- 3. Unified Practical Physics: R P Goyal, Shivlal Agrawal & Sons
- 4. Unified Practical Physics: Yugbodh Prakashan
- 5. Unified Practical Physics: Navbodh Prakashan

Reference Books Recommended-

- 1. Basic Electrical and Electronics Engineering by S. K. Bhattacharya
- 2. A Textbook of Electrical Technology by B.L. Theraja and A.K. Theraja (Volumes 1 and 2)
- 3. Engineering Circuit Analysis by William H. Hayt, Jack E. Kemmerly, and Steven M. Durbin
- 4. Practical Physics by G.L. Squires

Online Resources (e-books/ learning portals/ other e-resources)

- 1. Link for e-Books for Physics: Physics Practical:
 - https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf
- 2. Virtual Lab : https://vlab.amrita.edu/index.php?sub=1&brch=192
- 3. http://emv-au.vlabs.ac.in/#
- 4. https://www.ae.msstate.edu/vlsm/
- 5. https://nationalmaglab.org/magnet-academy/watch-play/interactive-tutorials
- 6. https://jigyasa-csir.in/cgcri/n12-t4-a3/

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods: 50 Marks Maximum Marks: 15 Marks Continuous Internal Assessment (CIA): 35 Marks End Samaster Evam(ESE)

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): Assignment/Seminar +Attendance – Total Marks -	10 & 10 05 15	Test / Quiz +	out of the two Marks obtained nt shall be gainst 15 Marks
End Semester Exam (ESE):	Laboratory Performance: On spot A Performed the Task based on lab. w Spotting based on tools & technolog	ork -	20 Marks	Managed by Course teacher as per lab. status

Viva-voce (based on principle/technology) Name and Signature of Convener & Members of CBoS:

ndkumar Patel

ridyalaya, Raigarh (C.G

Officer-In-Charge (Academie) Shaheed Nandkumar Patel Ashwavidyalaya, Raigarh (C.G.)

	Program: Bac	helor in Science	Semester: I/ III/ V	Session: 2024-25
	(Certificate/ Diplo	ma/ Degree/ Honors)		
1	Course Code		PHVAC-01	
2	Course Title	Renewable	Energy and Energy Harvo	esting
3	Course Type	V	alue Addition Course	
4	Pre-requisite (if any)		As per Program	- C - wahla
5	Course Learning Outcomes (CLO)	Renewable sources ofAvailability of renewa	d to learn about: al and international scenarion energy and their importance ble energy resources in Ind	o. e. ia.
6	Credit Value	02 Credits 1 Credit		ass Marks: 20
7	Total Marks	Maximum Marks: 50	IVIIIIIII 2	

Τ	otal No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)	No. of
Unit	Topics	Period 07
ľ	Fossil fuels and Alternate Sources of energy: Fossil fuels and nuclear energy, their limitation, need of renewable energy, non-conventional energy sources. Limitations of non-conventional energy resources. Environmental aspect of energy, World energy status, Energy scenario in India.	07
II	aspect of energy, World energy status, Energy Geo thermal Energy: Geothermal Resources, Geo thermal Technologies. Solar energy: Solar energy, its importance, storage of solar energy, solar pond, non-convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, sun tracking systems. Hydro Energy: Hydro power resources, hydro power technologies, environmental impact of hydro power sources.	08
III	Biomass energy: Biomass resources, Biomass conversion technology, biogas generation, factors affecting bio-digestion, working of biogas plant (with block diagram), biogas from plant waste, biomass energy programme in India, Biodiesel production from non-edible oil seeds. Ocean Energy: Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices.	08
IV	Wind Energy harvesting: Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines. grid interconnection topologies. Piezoelectric Energy harvesting: Introduction, Physics and characteristics of piezoelectric effect, piezoelectric materials, Piezoelectric Energy harvesting applications.	07
(eywords:	Fossil fuel, Renewable energy sources, Solar energy, Biomass energy, Electro Energy Harvesting, Piezoelectric Energy harvesting.	magneti

Signature of Convener & Members (CBoS):

Officer-In-Charge And Market Shaheed Nandkumar Patel Shaheed Nandkumar Patel Shaheed Nandkumar Patel (C.G.)

PART - C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

- 1. Non-conventional energy sources G.D Rai Khanna Publishers, New Delhi
- Solar energy M P Agarwal S Chand and Co. Ltd.
- Solar energy Suhas P Sukhative Tata McGraw Hill Publishing Company Ltd.
- 4. Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004, Oxford University Press, in association with The Open University.
- 5. Dr. P Jayakumar, Solar Energy: Resource Assesment Handbook, 2009
- 6. J. Balfour, M. Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich (USA).

Reference Books Recommended-

- 1. Non-Conventional Energy Resources by B.H. Khan
- 2. Renewable Energy Sources and Emerging Technologies by D.P. Kothari, K.C. Singal, and Rakesh Ranjan
- 3. Solar Energy: Fundamentals, Design, Modelling and Applications by G.N. Tiwari
- 4. Hydropower Development in India: A Sector Assessment by Pradeep Chaturvedi
- 5. Biomass Conversion: The Interface of Biotechnology, Chemistry and Materials Science by Samir K. Khanal, edited by B.C. Meikap and P.K. Bhattacharya
- 6. Ocean Energy: Technology, Environmental Impact and Renewable Energy by Pranav Kumar and T.
- 7. Wind Energy: Theory and Practice by S. Rao and Dr. B.B. Parulekar
- 8. Piezzelectric Materials and Devices: Applications in Engineering and Medical Sciences by Arun Ghosh

Online Resources (e-books/learning portals/other e-resources)

- 1. http://en.wikipedia.org/wiki/Renewable_energy
- 2. Renewable Energy Engineering: Solar, Wind And Biomass Energy Systems Course (nptel.ac.in)
- 3. Technologies For Clean And Renewable Energy Production NPTEL+
- 4. NPTEL:: Mechanical Engineering NOC:Selection Of Nanomaterials For Energy Harvesting And Storage Application
- 5. Wind energy Labs: Mechanical Engineering: Amrita Vishwa Vidyapeetham Virtual Lab
- 6. Virtual Labs (vlabs.ac.in)
- 7. https://youtu.be/uY3x7Tycyp2

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuou	us Evaluation Method	ls:	
Maximum Marks:		50 Marks	
Continuous Internal	Assessment (CIA):	15 Marks	
End Semester Exam		35 Marks	
Continuous Internal	Internal Test/ Quiz- (2	2): 10 + 10	Better marks out of the two Test / Quiz
Assessment (CIA):	Assignment/ Seminar	+ Attendance- 05	+ marks obtained in Assignment shall
(By course teacher)	Total Marks-	15	be considered against 15 Marks.
End Semester	Two section - A & I	3	
Examination (ESE):	Section A: Q1. Object	ivc - 05 x1 = 05 Marl	k; Q2. Short answer type- 5x2 = 10Marks
,	Section B: Descriptive	answer type qts.,1 o	out of 2 from each unit- 4x05 =20 Marks

Signature of Convener & Members (CBoS).

of Studies eed Nandkumar Patel idyalaya, Raigarh (C.G.)

Officer-In-Charge (Malakanic) Shaheed Nandkumar Patel rishwavidyalaya, Raigarh (C.G.)

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icate/ Dipl se Code se Title se Type requisite (if rse Learnin comes (CLC) dit Value al Marks - B: CON	Fany) g D)	On successful celectrical skill the Understandie Using basic Using various Fault finding O2 Credits (1C+1C) Maximum Matter CO Total No.	Basi Skill E A completion of the hrough: ing importance of mechanical too us measuring in g and repairing 1 Credit= 1: 30 Hours Laarks: 50 DURSE	PHSEC- 01 c Electrical Skill Chancement Cours As per Program The course, student is exposed accuracy in measurables. The simple domestic applies to the course for Theore aboratory or Field 1	pected to enhaning physical quances tical Learnin	nce his antities.
se Code se Title se Type requisite (if rse Learnin comes (CLC dit Value al Marks - B: CON	TENT	On successful c electrical skill tl > Understandi > Using basic > Using vario > Fault finding 02 Credits (1C+1C) Maximum Material No. Total No.	Basi Skill E A completion of the hrough: ing importance is mechanical too us measuring in g and repairing 1 Credit= 1: 30 Hours La arks: 50 DURSE	c Electrical Skill Chhancement Cours As per Program the course, student is extended of accuracy in measurables. Instruments. In simple domestic applies to the core aboratory or Field I	pected to enhaning physical quantum ances tical Learnin learning/ Tra	antities. $g &=$
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dit Value Al Marks B: CON Theory – 1	g O)	electrical skill the Understanding Varing basic Varing various Fault finding O2 Credits (1C+1C) Maximum Ma OF THE CO	ompletion of the hrough: ing importance of mechanical too us measuring in g and repairing 1 Credit= 19 30 Hours Laarks: 50 DURSE	of accuracy in measuringles. Istruments. Simple domestic applications for Theore aboratory or Field I	ing physical qua ances tical Learnin learning/ Tra	antities. $g &=$
dit Value al Marks - B: CON	TENT	electrical skill the Understanding Varing basic Varing various Fault finding O2 Credits (1C+1C) Maximum Ma OF THE CO	hrough: ing importance imechanical too us measuring in g and repairing 1 Credit= 1: 30 Hours La arks: 50 DURSE	of accuracy in measuriols. Istruments. simple domestic applic 5 Hours for Theore aboratory or Field l	ing physical qua ances tical Learnin learning/ Tra	antities. $g &=$
al Marks - B: CON Theory - 1	TENT	02 Credits (1C+1C) Maximum Ma OF THE CO	1 Credit= 1: 30 Hours La arks: 50 OURSE	5 Hours for Theore aboratory or Field	tical Learnin learning/ Tra	g & = ining
al Marks - B: CON Theory - 1	TENT	(1C+1C) Maximum Ma OF THE CO	30 Hours La arks: 50 OURSE	aboratory or Field I	learning/ Tra	ining
- B: CON Theory - 1	TENT	Maximum Ma OF THE CO	arks: 50 OURSE	Minimum Pass	Marks: 20	
- B: CON Theory - 1	TENT	OF THE CO	OURSE			
Theory – 1		Total No.				
used phy Voltage, F D.C. Circ applicatio A.C. Cir- instantane Heating & applicatio Working: Inverters.	sical qual Resistance, euit: Ohms n, Primary cuits: Ger ous & RM & Lighting ns, idea of Working Mixer, Eld	a about accuracy intities (Length, c, capacitance, inc s law, Series and y and secondary of the secondary is a boundary of the secondary is a boundary of the secondary in the secondary is a boundary of the secondary in the secondary is a boundary of the secondary in the secondary in the secondary is a boundary of the secondary in the secondary in the secondary is a boundary of the secondary in the secondary in the secondary is a boundary of the secondary in the	Mass, Densit ductance, freque d parallel resista cells, maintenan voltage, wave bout R, L, C circent: Joule's law d lighting bulb, t Domestic app	nt, measuring devices fity, Temperature, Powency etc). Temperature, Powency etc). Temperature, Powency etc. Temperature, First State of Secondary cells. The shape, frequency, powency of electric heating and tube, CFL, LED. Temperature of the state of t	eak, average, d its domestic fan, Cooler,	Period
Safety mo	asuremen	nts- Salety meas pair of electrical	annliances	rking with mechanical	and electrical	
tools, testing and repair of electrical appliances. Laboratory Work: (i) Use of basic tools: Screwdriver, Pliers, Wrench, Hacksaw, Spanner, Hand and electric drill, Soldering iron etc. (ii) Use of Voltmeter, Current meter, electronic balance. (iii) Use of Multimeter, CRO. (iv) Design & Construction of extension board (v) Fan repairing and its study (vi) Mixer repairing and its study (vii) Electric kettle repairing and its study (viii) Electric press repairing and its study				30		
	(ii) (iii) (iv) (v) (vi) (vii)	and election and election described and election described are also also also also also also also also	and electric drill, Solder (ii) Use of Voltmeter, Curre (iii) Use of Multimeter, CRC (iv) Design & Construction (v) Fan repairing and its stu (vi) Mixer repairing and its stu (vii) Electric kettle repairing (viii) Electric press repairing (ix) Cooler repairing and its (x) Geezer repairing and its	and electric drill, Soldering iron etc. (ii) Use of Voltmeter, Current meter, electron (iii) Use of Multimeter, CRO. (iv) Design & Construction of extension box (v) Fan repairing and its study (vi) Mixer repairing and its study (vii) Electric kettle repairing and its study (viii) Electric press repairing and its study (ix) Cooler repairing and its study (x) Geezer repairing and its study	and electric drill, Soldering iron etc. (ii) Use of Voltmeter, Current meter, electronic balance. (iii) Use of Multimeter, CRO. (iv) Design & Construction of extension board (v) Fan repairing and its study (vi) Mixer repairing and its study (vii) Electric kettle repairing and its study (viii) Electric press repairing and its study (ix) Cooler repairing and its study	and electric drill, Soldering iron etc. (ii) Use of Voltmeter, Current meter, electronic balance. (iii) Use of Multimeter, CRO. (iv) Design & Construction of extension board (v) Fan repairing and its study (vi) Mixer repairing and its study (vii) Electric kettle repairing and its study (viii) Electric press repairing and its study (ix) Cooler repairing and its study (x) Geezer repairing and its study

Signature of Convener & Members (CBQS):

Chairman

of Studies Theed Nandkumar Patel Vidyalaya, Raigarh (C.G.)

Shaheed Nandkumar Patel Shwavidyalaya, Raigarh (C.G.)

Text Books, Reference Books and Others

Text Books Recommended-

- 1. A text book in Electrical Technology B L Theraja S Chand and Co.
- 2. Electrical circuits, M Nahvi and J Edminister, Schaum's outline series, Tata McGraw 2005
- 3. Circuit Theory, A Chakraborti, Dhanpat Rai & Co.
- 4. A Text book of electrical technology, Vol.1, B L Thereja, S. Chand & Co, Delhi
- 5. A text book of electrical technology- J B Gupta, SK Kalaria & Sons,
- 6. Principle of electrical engineering- V K Mehta, Rohit Mehta, S. Chand & Co, Delhi Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India

Reference Books Recommended

- 1. Electrical and Electronic Measurements and Instrumentation by R.K. Rajput
- 2. Electrical Workshop: Safety, Commissioning, Maintenance & Testing of Electrical Equipment by R.P. Singh
- 3. Electricity and Magnetism by D.N. Vasudeva

Online Resources (e-books/ learning portals/ other e-resources)

- 1. National Digital Library- https://ndl.iitkgp.ac.in/
- 2. https://nptel.ac.in/courses/108/108/108 108076/
- 3. Basic Instrumentation Skills Selfstudy Institute
- 4. physics iisuniv ac.in
- 5. https://www.sathyabama.ac.in/sites/default/files/course-material/2020-10/note 1469078786.PDF

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

35 Marks End Semester Exam (ESE):

Internal Test / Quiz-(2): 10 & 10 Continuous Internal Assignment/Seminar + Attendance -Assessment (CIA): (By Course Coordinator)

Better marks out of the two Test / Quiz + marks obtained in Assignment shall be considered Total Marks-15 against 15 Marks

End Semester Examination (ESE)

Laboratory /Skill Performance: On spot Assessment A. Performed the Task based on learned skill - 20 Marks

10 Marks B. Spotting based on tools (written)

C. Viva-voce (based on principle/technology) - 05 Marks

Evaluation by Coordinator

Signature of Convener & Members (CBoS):

ed Nandkumar Patel widyalaya, Raigarh (C.G.)

> Officer-In-Charge (Apartle Mile) Shaheed Nandkumar Patel /ishwavidyalaya, Raigarh (C.G.)