			Leo	cture Plan						
Name of the College: Government College of Arts, Science and Commerce. Sanquelim - Goa										
Name of Faculty: Suvarna Patil			ubject: Physics							
Paper code: PYC1	10 ELECTROMAGN	ETIC THEORY II & THEO	RY OF							
RELATIVITY				Program: T.Y.B.Sc		Division:				
Academic year: 2	024-25			Semester: VI		Total Lecture	es: 60			
Course Objective	es: .		•							
Course Outcome: 1. Describe the magnetic field of steady currents using the appropriate laws and explain the magnetic field in a different media. 2. Discuss the Microscopic theory of magnetism and determine the magnetic energy of magnetic circuits, Energy density in magnetic field and Hysteresis loss. 3. Explain Maxwell's Equation with respect to electromagnetic energy. 4. Discuss and defend the theory of relativity.										
Student Learning solve Electromag	gOutcome: Stud gnetic Equations a	ent will be able to use r nd understand how ele	nathemati ctromagn	ics to etic theory is used in solv	ving the equation	ions.				
Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books			
December	9-12-2024	14-12-2024	4L+1P	Steady currents and their magnetic fields	Solving Problems	Digital Board	<ol> <li>Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).</li> </ol>			
				Steady currents, current density, Biot-						

				savart"s law and its applications,			
	16-12-2024	21-12-2024		Ampere"s circuital law,		Digital Board	1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).
			4L+				
			1P	Practical-Introduction			
January	2/01/2025	4/01/2025	2L	magnetic vector potential, magnetic field of a distant circuit, magnetic dipoles	Solving Problems	Digital Board	1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).
	6/1/2025	11/01/2025	4L+1P	dipole moment and the field of a point magnetic dipole, magnetic scalar potential. Practical-Mutual inductance by ballistic galvanometer.	Solving Problems	Digital Board	1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).
	13/11/2025	18/01/2025		Revision of 1 <sup>st</sup> lesson +Magnetic Field in material media [12]			
			4L+1P	Magnetization, magnetic field produced by magnetized material,. Practical-Helmholtz coil & measurement of Faraday"s number	Solving Problems	Digital Board	1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).

20/01/2025	25/01/2025	4L+1P	magnetic pole density, sources of the magnetic field, magnetic intensity H (Auxiliary magnetic field), The field equations, magnetic susceptibility and permeability, Practical-Magnetic susceptibility of paramagnetic substances by Guoy"s Balance	Solving Problems	Digital Board	1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).
27/01/2025	01/02/2025	4L+1P	Hysteresis, Boundary conditions on B and H vectors, current circuits containing magnetic media, Magnetic circuits, Magnetic circuits containing permanent magnets Practical To study Hall effect, measurement of hall coefficient and its application as a transducer	Solving Problems	Digital Board	1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).

				Molecular field inside matter, Origin of Diamagnetism, Origin of Paramagnetism, Practical-Hysteresis by magnetometer		Digital Board	Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).
February	03/02/2025	8/02/2025	4L+1P	theory of Ferromagnetism, Ferromagnetic domains, ferrites. <b>Magnetic Energy-</b> Magnetic energy of coupled circuits, <b>Practical-</b> <b>Measurement of</b> <b>Hysteresis loss using</b> <b>CRO</b> .	Solving Problems	Digital Board	1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).
	10/02/2025	15/02/2025	4L+1P	Energy density in the magnetic field, Hysteresis Loss. <b>Practical-Repeat</b>	Solving Problems		1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).
	17/02/2025	22/02/2025	4L+1P	Maxwell's Equations Faraday <sup>*</sup> s Law of electromagnetic induction, Generalization of Ampere <sup>*</sup> s Law- Displacement current,	Solving Problems		1. Reitz and Milford, Foundations of Electromagnetic Theory, Addision- Wesley Publishing Company (2008).

				Maxwell <sup>%</sup> c equations			
				waxwell's equations			
				and their empirical			
				basis			
				Repeat-Practical.			
				, Electromagnetic			
				energy-Poyntings			
				theorem.			
				Experimental			
				Background of the			
				Theory of Special			
				Relativity Galilean			
				Transformations.			1. Reitz and Milford. Foundations of Electromagnetic Theory.
				Tutorial1-, Problems			Addision- Wesley Publishing Company (2008)
				on length contraction/	Solving	Digital	Robert Resnik, Introduction to Special Relativity Wiley(1968)
			∕II +1P	time dilation	Problems	Board	N C Garach Understanding Relativity Vol L Sheth Publishers
			46,11		TTODICITIS	Doard	
	2 4 /22 /2225						
	24/02/2025	01/03/2025		Newtonian Relativity,			
				Michelson Morley			
				Experiment, Attempts			
				to preserve the			
				concept of a preferred			
				Ether frame, (Lorentz-			
				Fitzgerald Hypothesis),			
				Einstein <sup>w</sup> s Postulates of			
				Special Relativity.			
				Tutorial2-Problems on			
				relativistic velocity	Solving	Digital	Robert Resnik, Introduction to Special Relativity Wiley(1968), 7, N.C.
February/March			4L+1P	addition	Problems	Board	Garach, Understanding Relativity, Vol. I. Sheth Publishers
	03/02/2025	8/03/2025		Relativistic Kinematics			
	,	0,00,2020		Relativity of			
				Simultaneity			
				Dractical Papart and	Solving	Digital	Pohart Posnik Introduction to Special Polativity Wiley/1969) 7 N C
March			41.10	complete icurrele	Droblomo	Poord	Carach Understanding Bolativity Vol. 1. Choth Dublishers
warch			4L+1P	complete journals	Proplems	воаго	Garach, Understanding Relativity, Vol. I, Sheth Publishers

	10/03/2025	15/03/2025	Derivation of the		
	10/03/2023	13/03/2023	Lorontz		
			derivation of its		
			consequences such as		
			Length Contraction and		
			Time dilation,		
			Relativistic Addition of		
			velocities, Aberration		
			and Doppler Effect.		
			Practical:Journal	Digital	Robert Resnik, Introduction to Special Relativity Wiley(1968). 7. N.C.
			signing	Board	Garach, Understanding Relativity, Vol. I, Sheth Publishers
	17/03/2025	22/03/2025	Relativistic Dynamics		
	, ,		Dynamics and		
			relativity. Need to		
			redefine momentum.		
			Relativistic	Digital	Robert Resnik Introduction to Special Relativity Wiley(1968) 7 N C
			Momentum	Board	Garach Understanding Polativity Vol 1 Shoth Publishers
			womentum,	Board	
	24/03/2025	29/03/2025	Relativistic Force law		
	24/03/2023	29/03/2023	and dynamics of a		
			single particle,	<b>D</b> · · · · ·	
			Longitudinal and	Digital	Robert Resnik, Introduction to Special Relativity Wiley(1968). 7. N.C.
			transverse mass,	Board	Garach, Understanding Relativity, Vol. I, Sheth Publishers
		_ / /			
	31/03/2025	5/04/2025	Equivalence of mass		
			and energy E= Mc2,		
			Lorentz transformation		
			of Momentum, Energy,		
			Mass and Force, Twin		
			Paradox (qualitative	Digital	Robert Resnik, Introduction to Special Relativity Wiley(1968). 7. N.C.
March/April			approach).	Board	Garach, Understanding Relativity, Vol. I, Sheth Publishers

	07/04/2025	11/04/2025		Digital	
			Revision	Board	
	Component	Max Marks			
	ISA 1	10			
Assessment					
Rubrics	ISA 2	10			
	Practical	50			
	Semester End Exam	80			