PHOOL SING	PHOOL SINGH BISHT RAJKIYA MAHAVIDYALAYA NAUGHAR, LAMBGAON, TEHRI				
	GARHWAL				
B.SC. I SEWI [PHYSICS, MECHANICS PAPEK-1] TEACHING DI AN EOD ACADEMIC SESSION 2022-24					
COURSE TEACHER: Dr. VIIAV SINCH RANA					
COURSE TEACHER. DI. VIJAT BINGH KANA COURSE TITLE AND OTHERS SPECIFICATION					
Course Title:		Me	echanics		
Course No.:		PAPER-I			
Maximum Marks:	100	External Exam+ Internal Assessment:			
Total No. of Lect	Total No. of Lectures-Tutorials-Practical (in hours nor weak): 4.0.0				
Course Descriptio	n	This course is ve	erv beneficial for		
Course Descriptio		students. This course contains basic			
		knowledge of Mechanics and applied approaches in mechanical			
	monto	applications.			
UNIT	TOPIC	Number of	Name of the		
Unit I: Vectors	Vector algebra Scalar and vector	3	Dr Vijav S Rana		
Algebra	products scalar and vector triple products	5			
8	Derivative of a vector with respect to a				
	parameter				
	Del operator, gradient	2	-		
	divergence and curl				
	Gauss divergence theorem and	3			
	applications, Stokes curl				
	theorem and applications; and Green's				
	theorem				
	Line, surface and volume	2			
	integral of a vector function.				
Unit: II	Gravitational field and potential,	2	Dr. Vijay S Rana		
Gravitation	Gravitational potential energy		-		
field and	Gravitational	4			
potential	field Intensity and potential due to a ring,				
	a spherical shell, solid sphere and				
	circular disc				
	Gravitational self-energy, Inverse square	2			
	law of forces	2	-		
	Laws of planetary motion	2			
Unit: III	Frames of reference. Concept of inertial	2	Dr. Vijav S Rana		
Conservation	and Non-inertial frames of references	2	Di. vijay 5 Kalla		
Laws	Work energy theorem Conservative and	3	4		
24115	non-conservative forces Linear				
	restoring force				
	Gradient of potential Conservation of	3	-		
	energy for the particle				
		l			

	Energy function			
	Concept of Centre of mass, Angular	7		
	momentum and torque,			
	Laws of conservation of total energy, total			
	linear momentum and total angular			
	momentum along with their examples.			
Unit: IV	Translatory and Rotatory motion,	2	Dr. Vijay S Rana	
Dynamics of	Equation of motion for Rotating rigid			
Rigid Body	body, angular momentum vector and			
and Moment	moment of inertia,			
of Inertia	Theorem of parallel and	1		
	perpendicular axes			
	Moment of inertia of a cylinder, rod,	5		
	lamina, ring, disc,			
	spherical shell, solid sphere			
	Kinetic energy of rotation, rolling along a	2		
	slope,			
	Application to compound pendulum.			
UNIT V:	Basic concept Elastic constants and their	4	Dr. Vijav S Rana	
Properties of	Interrelations		Di. Vijuy 5 Kullu	
Matter	torsion of cylinder, bending of beam, bending	3		
	moment			
	Cantilever, shape of Girders/ rail tracks.	2		
	Viscosity, Stokes's law, Posieuille's formula	2		
	Equation of continuity, Bernoulli's theorem	2		
	Surface tension and its molecular	2		
	interpretation.			
1 .Berkeley Physic	cs Course : Mechanics Vol-I	· DI ·		
2 R.P. Feynman, I	K.B.Lightan and M.Sand : The Feynman Lectures	s in Physics		
5. D.S. Malnur : Mechanics 4. D.S. Mathur : Elements of Properties of Matter				
5 Murray Spiegel Seymour Linschutz Dennis Spellman "Schaum's Outline Series"				
Vector Analysis", McGraw Hill, 2017.				
Suggested Online Link:				
1. MIT Open Learning - Massachusetts Institute of Technology,				
https://openlearning.mit.edu/				
2. National Programme on Technology Enhanced Learning (NPTEL),				
3. Swavam Prabha - DTH Channel.				
https://www.swayamprabha.gov.in/index.php/program/current_he/8				
This course can be opted as an elective by the students of following subjects: The				
course can be opte	ed as an elective, which is open to all students.			
Suggested Contin	nuous Evaluation (25 Marks):			
Continuous intern	al evaluation shall be based on allotted assignment	nt and class tests.	Гће	

marks shall be as follows: Class Test/Assignment/ attendance- (10+10+5) Course Prerequisites: Physics and Mathematics in 12th

Countersigned [Principal]

Sig. [Head]

Sig. [Course teacher

PHOOL SING	H BISHT RAJKIYA MAHAVIDYALAYA NA	AUGHAR, LAM	BGAON, TEHRI		
GARHWAL					
B.Sc. II SEM [PHYSICS, ELECTRICITY AND MAGNETISM PAPER-I]					
TEACHING PLAN FOR ACADEMIC SESSION 2023-24					
COURSE TEACHER: Dr. VIJAY SINGH RANA					
Course Titler	COURSE IIILE AND OTHERS PECI				
Course Little:		ELECTRICITY AND MAGNETISM			
Course No.: Movimum Morkey	100	FAFEK-1 External Exam+ Internal Assessment:			
Waximum Warks.	100	,	75+25		
Total No. of Lectu	res-Tutorials-Practical (in hours per week): 4	-0-0			
Course Description	1	This course con	This course contains basic		
		knowledge about Electricity and			
		Magnetism and applied approach			
	- TO DEC	related with applications.			
UNIT	TOPIC	Number of	Name of the		
	Coulomb law, Couge? the area its interest and	Lectures	Dr. Viiou S. Dara		
UNII I: Electric field	differential forma line integral of Electric	3	Dr. Vijay S Kana		
end notantial	field				
anu potentiai	Electric field and potential due to an arbitrary	2			
	charge distribution	2			
	Electrostatic energy, energy stored in an	2			
	Electric field.				
	Electric field and potential due to long	8			
	charged wire, Spherical shell, sphere, disc,				
	dipole.				
UNIT II:	Moments of charge distributions, Polar and	2	Dr. Vijay S Rana		
Electric and	non-polar molecule				
Magnetic fields	Polarization vector, electric displacement	3			
in Matter	vector, three electric vectors				
	Dielectric susceptibility and permittivity,	3			
	polarizability				
	Clausius-Mossotti relation Magnetization,	2			
	magnetic susceptibility	-			
	Diamagnetic, paramagnetic and	5			
	rerromagnetic substances, Hysteresis and B-				
	п curve, Langevin s incorres of Diamagnetism and paramagnetism Weige				
	theory of ferromagnetism				
	along of fortomagnotion.				
UNIT III:	Current density, Equation of Continuity	2	Dr. Vijay S Rana		
Electric	Ohme's law and also this law has the task	4			
Currents	Unit s law and electrical conductivity,	4			
(Steady and	Lorentz Drude theory, Wiedmann-Frenz law,				
Varying)	Kırchhoff's				
• 6/	Laws and their applications,				
	Transient current, Growth and decay of D. C.	4			
	in L - R and L - C circuits, charging and				
	discharging of a capacitor through a				

UNIT IV: Magnetostatics Lorentz force, Bio-Savert's law, Ampere's law, Application of Biot-Saver law 3 Dr. Vijay S Rana Magnetostatics Magnetic field due steady current in a long straight wire, Interaction between two wires 2 5 International current loop, magnetic vector potential, permeability, Energy stored in Magnetic field. 5 5 UNIT V: Electromagnetic Induction and Alternating Faraday's laws of induction, Lenz's law, Electromotive force, Measurement of magnetic field 2 Dr. Vijay S Rana Current Electromotive force, Measurement of reactance, R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness 2 2 Quality factor, Power in A. C. circuits, Choke coil. 2 2 2 Suggested Reading 1.Edward M. Purcell : Electricity and Magnetism 2.J.H. Fewkes & J. Yarwood : Electricity & Magnetism, J.D. C Taya! Electricity and Magnetism 6.H. K. Malk and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 20.18. 7.Richard P, Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. 2 National Programme on Technology Enhanced Learning (NPTEL), https://openlearning.mit.edu/ 2. 3. SwayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 This course can be opted as an elective by the students of following subj		resistance.			
Magnetostatics Iaw. Application of Biot-Saver law Iaw. Magnetostatics Magnetic field due steady current in a long straight wire, Interaction between two wires 2 field due a Helmholtz coil, solenoid and current loop, magnetic vector potential, permeability, Energy stored in Magnetic field. 5 UNIT V: Faraday's laws of induction, Lenz's law, Electromagnetic Induction and Alternating 2 Dr. Vijay S Rana Current Faraday's laws of inductance, Self- inductance. Impedance admittance and reactance, 2 Dr. Vijay S Rana R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness 2 2 Quality factor, Power in A. C. circuits, Choke 2 2 2 Suggested Reading 1 2 2 2 1.Edward M. Purcell : Electricity and Magnetism 2 2 2 2.J.H, Fewkes & J.Yarwood : Electricity & Magnetism, Vol.1 3.D C Taya! : Electricity and Magnetism 3 2 2 2.Lal and Ahmed : Electricity and Magnetism 5 4 4 2 3.L.J.Griffiths : Introduction to Electrodynamics : .Lal and Ahmed : Electricity and Magnetism 5 5 2 2	UNIT IV:	Lorentz force, Bio-Savert's law, Ampere's	3	Dr. Vijay S Rana	
Magnetic field due steady current in a long 2 ifield due a Helmholtz coil, solenoid and 5 current loop, magnetic vector potential, permeability, Energy stored in Magnetic 5 ifield. Faraday's laws of induction, Lenz's law, 2 Dr. Vijay S Rana Electromagnetic Faraday's laws of induction, Lenz's law, 2 Dr. Vijay S Rana Electromagnetic Faraday's laws of inductance, Self- 2 Internating Current Electromotive force, Measurement of reactance, 1 Internating R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R 1 Internation, force, series and parallel L-C-R 1 Quality factor, Power in A. C. circuits, Choke 2 1 1 1 J.D C Tayal : Electricity and Magnetism 2.J.J.Griffiths : Introduction to Electrodynamics . 5 5.Lal and Ahmed : Electricity and Magnetism 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 2.N.Griffiths : 1 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. 2.N.Griffiths : 2.N.Matthed A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 3.WayamPrabha - DTH Channel, https://www.s	Magnetostatics	law, Application of Biot-Saver law			
straight wire, Interaction between two wires		Magnetic field due steady current in a long	2		
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current loop, magnetic vector potential, permeability, Energy stored in Magnetic field. Imagnetic field. UNIT V: Faraday's laws of induction, Lenz's law, Electromotive force, Measurement of magnetic field 2 Dr. Vijay S Rana Alternating Current Edectromotive force, Measurement of magnetic field 2 Imagenetic field Alternating Current Edectromotive force, Measurement of magnetic field 2 Imagenetic field Suggested Reading 1.Edward M. Purcell : Electricity swith alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness 2 Imagenetic field Suggested Reading 1.Edward M. Purcell : Electricity and Magnetism 2.J.H. Fewkes & J.Yarwood : Electricity & Magnetism 2.J.H. Fewkes & J.Yarwood : Electricity and Magnetism 5.Lal and Ahmed : Electricity and Magnetism 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 2". 7. Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. Suggested Online Link: 1. MIT Open Learning - Massachusetts Institute of Technology, https://openlearning.mit.edu/ 2. National Programme on Technology Enhanced Learning (NPTEL), https://www.youtube.com/user/nptelhrd 3. SwayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 This course can be opted as an elective by the students of		field due a Helmholtz coil, solenoid and	5		
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Initial constraints Ferdady's laws of induction, Lenz's law, Electromagnetic Electromotive force, Measurement of magnetic field Dr. Vijay S Rana Induction and Alternating Current Electromotive force, Measurement of magnetic field Dr. Vijay S Rana Current Eddy current, Mutual inductance, Self-inductance, Impedance admittance and reactance, R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R 2 circuits, resonance and sharpness Quality factor, Power in A. C. circuits, Choke 2 2 Suggested Reading Electricity and Magnetism 2 1.J.H. Fewkes & J.Yarwood : Electricity & Magnetism, Vol. I 3.D C Tayal : Electricity and Magnetism 2.J.H. Fewkes & J.Yarwood : Electricity & Magnetism, Vol. I 3.D C Tayal : Electricity and Magnetism 3.D.C Tayal : Electricity and Magnetism 4 4.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. Suggested Online Link: 1.MIT Open Learning - Massachusetts Institute of Technology, https://openlearning.mit.edu/ 2. National Programme on Technology Enhanced Learning (NPTEL), https://www.youtube.com/user/nptelhrd 3. swayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 <t< th=""><th></th><th>permeability, Energy stored in Magnetic</th><th></th><th></th></t<>		permeability, Energy stored in Magnetic			
UNIT V: Faraday's laws of induction, Lenz's law, 2 Dr. Vijay'S Rana Electromagnetic Induction and Alternating Electromotive force, Measurement of magnetic field 2 Dr. Vijay'S Rana Current Electromotive force, Measurement of inductance. Impedance admittance and reactance, circuits, resonance and sharpness 2 1 Quality factor, Power in A. C. circuits, Choke coil. 2 1 1 Suggested Reading 1 2 1 1.Edward M. Purcell : Electricity and Magnetism 2 1 2 2.D.T. Tay and Alternation of Electrodynamics . 2 1 2 3.D C Tayal : Electricity and Magnetism 2 1 2 1 4.D.J.Griffiths : Introduction to Electrodynamics . 5 2 1 2 5.Lal and Ahmed : Electricity and Magnetism 4 2 2 2 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 2 2 2 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. 2 2 2 Suggested Online Link: 1. MIT Open Learning - Massachusetts Institute of Technology, https://open		field.			
Electromagnetic Electromotive force, Measurement of magnetic field Induction and Alternating Eddy current, Mutual inductance, Self-inductance. Impedance admittance and reactance, R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness 4 Quality factor, Power in A. C. circuits, Choke 2 2 Suggested Reading 1 1. Edward M. Purcell : Electricity and Magnetism 2.J.H. Fewkes & J. Yarwood : Electricity & Magnetism, Vol. I 3. D C Tayal : Electricity and Magnetism 3.J. C Tayal : Electricity and Magnetism . J.J.Griffiths : Introduction to Electrodynamics . 5.Lal and Ahmed : Electricity and Magnetism . 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 2018. 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. 2018. 1. MIT Open Learning - Massachusetts Institute of Technology, https://openlearning.mit.edu/ 2. National Programme on Technology Enhanced Learning (NPTEL), https://www.youtube.com/user/nptelhrd 3. SwayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 This course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the students of following subjects: The course can be opted as an elective which is open to all students. Sugg	UNIT V:	Faraday's laws of induction, Lenz's law,	2	Dr. Vijay S Rana	
Induction and Alternating Current Imagnetic field Eddy current, Mutual inductance, Self- inductance. Impedance admittance and reactance, R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness 2 Quality factor, Power in A. C. circuits, Choke 2 Suggested Reading 1 1.Edward M. Purcell : Electricity and Magnetism 2.J.H. Fewkes & J.Yarwood : Electricity & Magnetism, Vol. I 3.D C Tayal : Electricity and Magnetism 3.J.J.Griffiths : Introduction to Electrodynamics . 5.Lal and Ahmed : Electricity and Magnetism 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. Suggested Online Link: 1. MIT Open Learning - Massachusetts Institute of Technology, https://openlearning.mit.edu/ 2. National Programme on Technology Enhanced Learning (NPTEL), https://www.youtube.com/user/nptelhrd 3. SwayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 This course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the stu	Electromagnetic	Electromotive force, Measurement of			
Alternating Current Eddy current, Mutual inductance, Self- inductance. Impedance admittance and reactance. 2 R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness 4 Quality factor, Power in A. C. circuits, Choke 2 Suggested Reading 2 1.Edward M. Purcell : Electricity and Magnetism 2 2.J.H. Fewkes & J.Yarwood : Electricity & Magnetism, Vol. I 3.D C Tayal : Electricity and Magnetism ", Himalaya Publishing House Pvt. Ltd., 2019. 4.D.J.Griffiths : Introduction to Electrodynamics . 5.Lal and Ahmed : Electricity and Magnetism 5.Lal and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. Suggested Online Link: 1. MIT Open Learning - Massachusetts Institute of Technology, https://openlearning.mit.edu/ 2. National Programme on Technology Enhanced Learning (NPTEL), https://www.youtube.com/user/nptelhrd 3. SwayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 This course can be opted as an elective by the students of following subjects: The course can be opted as an elective which is open to all students. Suggested Continuous Evaluation (25 Marks): Continuous internal evaluation shall be based on allotted assig	Induction and	Eddu aurrent Mutual in ductor of Solf	2		
Current Inductance. Injectance and market and meature and meatance. R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness 4 Quality factor, Power in A. C. circuits, Choke 2 2 coil. 3 Suggested Reading 1 1.Edward M. Purcell : Electricity and Magnetism 2 2.J.H. Fewkes & J.Yarwood : Electricity & Magnetism, Vol. I 3.D C Tayal : Electricity and Magnetism ", Himalaya Publishing House Pvt. Ltd., 2019. 4.D.J.Griffiths : Introduction to Electrodynamics . 5 5.Lal and Ahmed : Electricity and Magnetism 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. 2 Suggested Online Link: 1. MIT Open Learning - Massachusetts Institute of Technology, https://openlearning.mit.edu/ 2. National Programme on Technology Enhanced Learning (NPTEL), https://www.youtube.com/user/nptelhrd 3. SwayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 This course can be opted as an elective by the students of following subjects: The course can be opted as an elective, which is open to all students. Suggested Continuous Evaluation (25 Marks): Continuous internal evaluation shall be based on allott	Alternating	Eddy current, Mutual Inductance, Sell-	Z		
R-C, R-L and L-C circuits with alternating 4 R-C, R-L and L-C circuits with alternating 4 e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness Quality factor, Power in A. C. circuits, Choke 2 coil. 2 Suggested Reading 1 1.Edward M. Purcell : Electricity and Magnetism 2.1.1 3.D C Tayal : Electricity and Magnetism, Vol. I 3.D C Tayal : Electricity and Magnetism, 'Himalaya Publishing House Pvt. Ltd., 2019. 4.D.J.Griffiths : Introduction to Electrodynamics . 5 5.Lal and Ahmed : Electricity and Magnetism 6.H. K. Malik and A.K. Singh "Engineering Physics", McGraw Hill Education (India) Private Limited, 2018. 7.Richard P. Feynman, Robert B. Leighton, Matthew Sands, "The Feynman Lectures on Physics Vol. 2", Pearson Education Limited, 2012. Suggested Online Link: 1. MIT Open Learning - Massachusetts Institute of Technology, https://openlearning.mit.edu/ 2. National Programme on Technology Enhanced Learning (NPTEL), https://www.youtube.com/user/nptelhrd 3. SwayamPrabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8 This course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the students of following subjects: The course can be opted as an elective by the students.	Current	reactance			
Image: Provide the original parallel L-C-R circuits, resonance and sharpness Image: Provide the original parallel L-C-R circuits, resonance and sharpness Quality factor, Power in A. C. circuits, Choke 2 Image: Provide the original parallel L-C-R circuits, resonance and sharpness Suggested Reading Image: Provide the original parallel L-C-R circuits, resonance and sharpness Image: Provide the original parallel L-C-R circuits, Choke 2 Suggested Reading Image: Provide the original parallel L-C-R circuits, resonance and sharpness Image: Provide the original parallel L-C-R circuits, Choke 2 J. Griffiths : Electricity and Magnetism Image: Provide the original parallel L-C-R circuits, Choke 2 Image: Provide the original parallel L-C-R circuits, Choke 2 J. J. Griffiths : Introduction to Electricity & Magnetism Image: Provide the original provide		R-C R-L and L-C circuits with alternating	4		
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