COURSE OUTLINE FOR THE SESSION MAR 24 to JUNE 23

Faculty Name: Mr. Raghavendra R

Course with code: Applied Physics for Civil Stream - BPHYC202

Semester with section: II Sem D Section

MODULE No	Class No	Date planned	Topics proposed to be covered	Portion to be covered in %	Remarks
MODULE 1	1		**Oscillations:** Simple Harmonic motion(SHM), differential equation for SHM	20%	
	2		Sprigs: Stiffness Factor and its Physical Significance, series and parallel combination of springs (Derivation) Types of spring and their applications.		
	3		Damped oscillations and types of damping		
	4		Engineering applications of damped oscillations		
	5		Theory of forced oscillations		
	6		Resonance, Sharpness of resonance.		
	7		Mach number and Mach Angle, Mach Regimes, definition and characteristics of Shock waves		
	8		Construction and working of Reddy shock tube		
	9		Applications		
	10		Numerical problems		
MODULE 2	11		**Elasticity:** Stress-Strain Curve, Stress hardening and softening	40%	
	12		Poisson's ratio,		
	13		Elastic Moduli, relation between them, mention relation between K, Y and σ,		
	14		Mention the expression for bending moment.		
	15		Beams, bending moment (only expression)- cantilever Applications,		
	16		I section girder and their Engineering		
	17		Elastic materials, Failures of engineering materials		
	18		Fatigue failure		
	19		Brief discussion on factors affecting fatigue such as surface effect, design effect and environmental effects		

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	20		Numerical Problems		
MODULE 3	21		**Acoustics:** Introduction to acoustics Types of acoustics	**60%**	
	22		reverberation and reverberation time, absorption power and absorption coefficient		
	23		Requisites for acoustics in auditorium		
	24		Sabine formula, Numerical Problem		
	25		Measurement of absorption coefficient Factors affecting acoustics and remedial measures		
	26		Mention few impacts such as lack of privacy, health issues, annoyance, insufficient sleep, etc.,		
	27		Loudness, echo, echelon, structure borne sound, focusing due to walls and ceiling, reverberation time,		
	28		Definition of photometry, photometric quantities such as luminous energy, luminous power or luminous flux, luminous intensity, luminance,		
	29		Noise and its Measurements, Impact of Noise in Multi-storied buildings		
	30		Definition and equation for both the laws and few relevant points , Numerical Problems		
MODULE 4	31		**LASER:** Basic properties of a LASER beam, Interaction of Radiation with Matter,	**80%**	
	32		Laser Action, Population Inversion, Metastable State, Requisites of a laser system		
	33		Semiconductor LASER, LASER Range Finder, LIDAR,		
	34		Road Profiling, Bridge Deflection, Speed Checker.		
	35		Principle and Construction of Optical Fibers, Acceptance angle and NA, Expression for NA		
	36		Modes of Propagation, Attenuation and Fiber Losses,		
	37		Fiber Optic Displacement Sensor, Fiber Optic Temperature Sensor		
	38		d working of Fiber Optic Displacement Sensor, Fiber Optic Temperature Sensor		
	39		Numerical Problems		

	40		Numerical Problems		
MODULE 5	41		**Natural Hazards:** Introduction,	**100%**	
	42		Earthquake, (general characteristics, Physics of the earthquake		
	43		Richter scale of measurement, and earthquake-resistant measures)		
	44		Types of earthquakes, Richter scale of measurement		
	45		Tsunami (causes for tsunami, characteristics, adverse effects, risk reduction measures,		
	46		engineering structures to withstand tsunami), Landslides (causes such as excess rainfall, geological structure, human excavation, etc,		
	47		n excavation, etc, types of landslides, adverse effects, engineering solution for landslides)		
	48		Types of landslides, adverse effects, engineering solutions for landslide. Forest Fires and detection using remote sensing. Fire hazards and fire protection, fire-proofing materials		
	49		Fire-proofing materials, fire safety regulations and firefighting equipment - Prevention and safety measures		
	50		Numerical Problems		
Lab Experiments	1	Week 1	Wavelength of LASER using Grating	10%	
	2	Week 2	Numerical Aperture using optical fiber	20%	
	3	Week 3	Series and Parallel LCR Circuits	30%	
	4	Week 4	Combination of Springs in Series and Parallel	40%	
	5	Week 5	Young's modulus of the material of the given bar Uniform Bending.	50%	
	6	Week 6	Rigidity modulus of the Material of the wire using Torsional Pendulum.	60%	
	7	Week 7	Forced Mechanical Oscillations and Resonance.	70%	

8	Week 8	Resistivity by Four Probe Method.	80%	
9	Week 9	Young's modulus of the material of the given bar Single Cantilever	90%	
10	Week 10	Curvature of the given Plano Convex Lens by setting Newton's Rings.	100%	

List of Text Books:

Suggested Learning Resources: Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Materials Science and Engineering by R Balasubramaniam, second edition, Wiley India Pvt. Ltd. Ansari Road, Daryaganj, New Delhi-110002.

2. A Textbook of Engineering Physics by M .N. Avadhanulu, P G. Kshirsagar and T V S Arun Murthy, Eleventh edition, S Chand and Company Ltd. New Delhi-110055.

3. Engineering Physics by R. K. Gaur and S. L. Gupta, 2010 edition, Dhanpat Rai Publications Ltd., New Delhi-110002,

4. Building Science: Lighting and Accoustics, B. P. Singh and Devaraj Singh, Dhanpat Rai Publications (P) Ltc.,

5. Building Acoustics : Tor Eric Vigran, Taylor and Francis, 2008 Edition.

6. Photometry Radiometry and Measurements of Optical Losses, Micheal Bukshtab, Springer, 2nd edition.

7. Materials Science for Engineers by James F. Shackelford and Madanapalli K Muralidhara, sixth edition, Pearson Education Asia Pvt. Ltd., New Delhi.

8. Lasers and Non Linear Optics, B B Loud, New Age Internationals, 2011 edition

9. Shock waves made simple by Chintoo S Kumar, K Takayama and K P J Reddy: Willey India Pvt. Ltd, Delhi 2014.

10. An Introduction to Disaster Management, Natural Disastr & Man Made Hazards, S. Vaidyanathan, IKON Books P

11. Natural Hazards, Edward Bryant, Cambridge University, Press, 2nd Edition

12. Natural Hazards by Ramesh .P. Singh, CRC Press, Taylor and Francis group. 13. Disaster Education and Management, Rajendra Kumar Bhandari, Springer, India 2014

14. Principles of Fire Safety Engineering Understanding Fire & Fire Protection, Akhil Kumar Das, PHI Learning , II Edition. 1. A Textbook of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand. & Company Ltd, New Delhi.

Web links and Video Lectures (e-Resources):

Simple Harmonic motion: https://www.youtube.com/watch?v=k2FvSzWeVxQ

Shock waves: https://physics.info/shock/

Shock waves and its applications: https://www.youtube.com/watch?v=tz_3M3v3kxk

Stress-strain curves: https://web.mit.edu/course/3/3.11/www/modules/ss.pdf

Stress curves: https://www.youtube.com/watch?v=f08Y39UiC-o

Oscillations and waves: https://openstax.org › books › college-physics-2e

Earthquakes: www.asc-india.org

Earthquakes and Hazards: http://quake.usgs.gov/tsunami

Landslide hazards: http://landslides.usgs.gov

Acoustics: https://www.youtube.com/watch?v=fHBPvMDFyO8