Madanapalle Institute of Technology & Science
Affiliated to JNTUA, Anantapur & Approved by AICTE, New Delhi
(AUTONOMOUS)
Recognised Research Center
Recognised by UGC under the sections 2(f) and 12(B) of the UGC act 1956
Estd 1998

BOS

Board of Studies Meeting

02-09-2014

Department of Physics

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE

(An Autonomous Instititution, affiliated to JNTUA, Anantapur)

Four Year Course-wise Pattern for B.Tech Program

Year	First Semester			Second Semester		
	Course Code	Course Name	Credits	Course Code	Course Name	Credi
I	14ENG11T01	Functional English	4	14ENG12T02	Technical English	3
	14MAT11T01	Advanced Calculus	4	14MAT12T02	Linear Algebra & Complex Analysis	4
	14CHE11T01	Engineering Chemistry	4	14PHY12T01	Engineering Physics	4
	14MEC11T01	Engineering Graphics	4	14CSU12T01	Computer Programming	3
	14CHE11T02	Environmental Science	2	14EEE12T01	Basic Electrical & Electronics Engineering	3
	14CHE11P01	Chemistry Practicals	2	14ME12P01	Workshop Practice	2
	14CSU11P01	Computing Practicals	2	14PHY12P01	Physics Practicals	2
				14CSU12P02	Computer Programming Practicals	2
		Total	**22**		**Total**	**23**
II	Six Theory Courses		18	Six Theory Courses		18
	Two Practical Courses		4	Two Practical Courses		4
		Total	**22**		**Total**	**22**
III	Six Theory Courses		18	Six Theory Courses		18
	Two Practical Courses		4	Two Practical Courses		4
		Total	**22**		**Total**	**22**
IV	Six Theory Courses		18	4 Theory Courses		12
				Seminar		2
	Two Practical Courses		4	Project work/Thesis		11
		Total	**22**		**Total**	**25**

Total Credits 180

MADANAPALLE INSTITUTE OF TECHNOLOGY AND SCIENCE,MADANAPALLE.
AUTONOMOUS

I B.Tech.

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4 1 0 4

(14PHY12T01) Engineering Physics

Course Description: Mechanics, Waves and Oscillations are a basic physics course, which will cover Mechanics, Vibrations and Waves and Optics.

Objective:

There has been an exponential growth of knowledge in the recent past opening up new areas and challenges in the understanding of basic laws of nature. Physics is an exact science which provides the basic logic and structure to build an understanding of other branches of science and engineering. The laws of physics play a key role in the development of science, engineering and technology.

Sound knowledge of physical principles is of paramount importance in understanding new discoveries, recent trends and latest developments in the field of engineering. In this course, the subjects of Mechanics, oscillations, Waves and Optics are covered with the aim to prepare the students for advanced level courses. The objective of this course is to develop problem solving skills.

Text Books:

1. An Introduction to Mechanics, by D. Kleppner and R. Kolenkow, Tata McGraw-Hill Edition, 2007.

2. French, Anthony P, Vibrations and Waves, CBS, 1987.

Reference Books:

1. The Physics of Vibrations & Waves, by H. J. Pain, 6th edition, John Wiley & Sons, Inc., 2005.

2. Physics Vol I & II, Halliday/Resnick/Krane 5th Edition, John Wiley, 2003.

3. Berkeley Physics Course Volume I, Tata-McGraw Hill.

Learning Outcomes

Upon successful completion of this course, Engineering Physics students should be able to:

1. Describe and explain the fundamental physical principles and laws of Mechanics in Physics.
2. Explain the role of the different realms of physics and their applications in both scientific and technological systems.
3. Apply these principles, together with logical and mathematical reasoning, to situations of the physical world.
4. Analyze a problem and develop the problem solving skills.
5. Define and evaluate the fundamentals of mechanical testing of materials.

COURSE SYLLABUS

UNIT 1: VECTORS AND KINEMATICS AND NEWTONIAN MECHANICS [13]

Vectors and Kinematics: Introduction, Vectors, Vector multiplication, Velocity and Acceleration, Motion in Plane, Polar Co-ordinates. {Text Book 1: Section 1.1-1.9}
Newtonian Mechanics: Introduction, Newton's Laws, Applications of Newton's laws and everyday forces of Physics (Self reading), Constraint equations and applications. {Text Book 1: Section 2.4 -2.5}

UNIT 2: MOMENTUM, WORK AND ENERGY [14]

Momentum: Introduction, Dynamics of a system of particles, conservation of momentum, Impulse and restatement of the momentum relation, flow of mass, momentum transport. {Text Book 1: Section 3.1 -3.6}
Work and Energy: Introduction, Equations of motion in one-dimension and several dimensions, work energy theorem and applications, Potential energy, force, small oscillations in bound system, non-conservative forces, power, conservation laws and particle collisions. {Text Book 1: Section 4.1 -4.14}

UNIT 3: ANGULAR MOMENTUM & INTRODUCTION TO SHM [10]

Introduction, Angular momentum of particle, torque, fixed axis rotation. Dynamics of pure rotation about an axis, physical pendulum, motion involving both translation and rotation. {Text Book 1: Section 6.1 -6.7}
Simple Harmonic Motion: Introduction, Displacement, velocity and acceleration in SHM. {Text Book 2: Chapter 1 & 2}

UNIT 4: SIMPLE HARMONIC MOTION & TRANSVERSE WAVE MOTION [16]

Simple Harmonic Motion: Damped Harmonic oscillator, Forced Harmonic oscillations, energy of a simple harmonic oscillator. Superposition of vibrations along same direction and in perpendicular directions, Lissajous figures {Text Book 2: Chapter 1 & 2}
Transverse wave motion: Introduction, Waves, solution of wave equation, reflection and transmission, standing waves, energy of vibrating string, standing wave ratio, wave group and group velocity. {Text Book 2: Chapter 7, pp: 201-213,230}

UNIT 5: PHYSICAL OPTICS [12]

Physical optics:, Introduction - Interference, Newton's rings interference from two and more sources. Diffraction, intensity distribution, Fraunhoffer diffraction, transmission diffraction grating, resolving power. {Text Book 2: Chapter 8, pp:267-293}

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I B.Tech.

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(14PHY12P01) Engineering Physics LAB

List of Experiments

(10 Experiments out of 12)

1. Error Analysis and graph drawing
   To plot the graph for given data assuming certain error and to find the slope and intercept of the best fit graph.

2. Coupled pendulum
   To find the spring constant of the material of the spring.

3. The vibrating string (Melde'sapparatus)
   To determine the frequency of the tuning fork.

4. Stewart Gees' apparatus
   To determine the Magnetic field along the axis of a current carrying coil.

5. Resonance LCR circuit
   To calculate the resonant frequency of the LCR circuit.

6. Newton's rings
   To determine the radius of curvature of the given curved surface.

7. Diffraction due to single slit
   To determine the width of the single slit.

8. Diffraction grating
   To determine the wave lengths of different spectral colors of a white light source.

9. Prism
   To determine the dispersive power of a prism.

10. Diffraction grating – Laser
    To determine the wavelength of a laser source.

11. Wedge method.
    To determine the thickness of a given wire.

12. Energy gap
    To determine the energy gap of a semiconductor p-n junction diode.

Signatures of the BoS Members:

NAMES	DESIGNATION	SIGNATURE
Dr. S. Victor Vedanayakam	Chairman	
Prof. J. Nagaraju	Expert in the subject	
Prof. P. Sreedhar Reddy	Expert in the subject	
Dr. R. Padma Suvarna	Expert nominated by V.C	
Mr. M. Sankaran	Industry Expert	
Dr. M. Chandra Sekhar	Member	
Dr. N. Nanda Kumar Reddy	Member	
Dr. Virendra Kumar Verma	Member	
Dr. G. Gopikrishna	Member	
Mrs. G. Soujanya	Member	
Ms. K. Surekha	Member	
Prof. M. Raja Reddy	Dean Academic ~~Affairs~~	