	PVKN Govt. College (Autonomous) Chittoor			Program I B.Sc. Physics Hons.		
Course Code 23-PHY-2C4	TITLE OF THE COURSE Course - 4: WAVES AND OSCILLATIONS			Semester-II		
Teaching	Hours Allocated: 45 Hrs (**Theory**) (**3 Hrs./wk.**)	L	T	P		C
Pre-requisites	Basic knowledge about Motion,Oscillations and Sound	3	-	-		3

Syllabus:

UNIT -I : Simple Harmonic oscillations (9 h)

Simple harmonic motion, Simple harmonic oscillator and solution of the differential equation-Physical characteristics of SHM, torsion pendulum-measurements of rigidity modulus, compound pendulum- measurement of 'g', Principle of superposition, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures - definition and applications.

UNIT -II: Damped and forced oscillations (9 h)

Damped harmonic oscillator , solution of the differential equation of damped oscillator. Energy

considerations, Power dissipation in damped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance.

UNIT- III: Complex vibrations (9 h)

Fourier theorem, **limitations of Fourier theorem,** evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave, simple problems on evolution of Fourier coefficients.

UNIT-III: Vibrating Strings and Bars (9 h)

Transverse wave propagation a long a stretched string, general solution of wave equation and its

significance, modes of vibration of stretched string clamped at ends, overtones and harmonics. Energy transport and transverse impedance. Longitudinal vibrations in bars - wave equation and its general solution. Special cases (i) bar **Fixed at one end. Tunings fork**

UNIT-V: Ultrasonics

(9h)

Ultrasonics', properties of ultrasonic waves, production of ultrasonics' by piezoelectric and magnetostricton methods, detection of ultrasonics', determination of wavelength of ultrasonic waves by **sear's method**. Applications and uses of ultrasonic waves.

List of Reference Books:

1.BScPhysicsVol.1,TeluguAcademy,Hyderabad.

2. Fundamentals of physics. Holliday / Redneck/ Walker, Wileydition2007

3.Waves& Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.

4.College Physics-I. T. Bhima sankram and G. Prasad. Himalaya Publishing House.

5.Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi,2004

6. Introduction to Physics for Scientists and Engineers. F.J. Buche. McGraw Hill.