

PHYS2063 Wave Physics (Fall 2017)

Class Schedule as of November 27, 2017

Reading assignments from *The Physics of Vibrations and Waves, 6e* (2005) by H.J. Pain

Homework assignments will be posted on the course web site and are due *in class* on the indicated date

Day	Date	Topics	Reading	Homework Due
Mon	28 Aug	The "Equation of motion"; Examples of Simple Harmonic Oscillators	Ch.1	_____
Wed	30 Aug	Displacement, velocity, acceleration, and energy	Ch.1	_____
Fri	1 Sep	MATHEMATICA class: Introduction	_____	Assignment #1
Mon	4 Sep	No Classes: Labor Day	_____	_____
Wed	6 Sep	Superposition in differential equations and of harmonic oscillators	Ch.1	_____
Fri	8 Sep	Using complex numbers to solve the equation of motion	Ch.1	Assignment #2
Mon	11 Sep	The equation of motion of a damped oscillator and its solution	Ch.2	_____
Wed	13 Sep	Energy of a damped oscillator; The Q -value	Ch.2	_____
Fri	15 Sep	MATHEMATICA class: Solving the equation of motion	_____	Assignment #3
Mon	18 Sep	Electrical and mechanical impedance	Ch.3	_____
Wed	20 Sep	Steady state solution of the forced, damped linear oscillator	Ch.3	_____
Fri	22 Sep	Resonance: Velocity and displacement versus driving frequency	Ch.3	Assignment #4
Mon	25 Sep	Linear inhomogeneous differential equations; Transient effects	Ch.3	_____
Wed	27 Sep	MATHEMATICA class: The forced oscillator	_____	_____
Fri	29 Sep	Midterm Examination	Thru Sep 22	_____
Mon	2 Oct	Two equal masses coupled by three identical springs	Ch.4	_____
Wed	4 Oct	Coupled oscillations as an eigenvalue problem; Normal coordinates	Ch.4	_____
Fri	6 Oct	Transverse motion of a stretched string: The Wave Equation	Ch.5	Assignment #5
Mon	9 Oct	Solutions to the wave equation and boundary and initial conditions	Ch.5	_____
Wed	11 Oct	Standing waves on the stretched string	Ch.5	_____
Fri	13 Oct	MATHEMATICA class: Coupled oscillations	_____	Assignment #6

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Mon	16 Oct	Motion of a string with fixed ends and arbitrary initial shape	Ch.10	_____
Wed	18 Oct	Fourier series: The general case	Ch.10	_____
Fri	20 Oct	The Fourier Transform and the Dirac Delta function	Ch.10	Assignment #7
Mon	23 Oct	Review of Maxwell's Equations in integral form; The Divergence Theorem	Ch.8	_____
Wed	25 Oct	Stoke's Theorem; Maxwell's Equations in differential form	Ch.8	_____
Fri	27 Oct	Electromagnetic waves	Ch.8	Assignment #8
Mon	30 Oct	A brief introduction to light, optical media, and optics	Ch.8	_____
Wed	1 Nov	The index of refraction, Fermat's principle, reflection, and refraction	Ch.11	_____
Fri	3 Nov	Midterm Examination	Thru Oct 27	_____
Mon	6 Nov	The spherical mirror, the thin lens, and the prism	Ch.11	_____
Wed	8 Nov	MATHEMATICA class: Vector calculus	_____	_____
Fri	10 Nov	Ray optics and optical systems	Ch.11	Assignment #9
Mon	13 Nov	Interference: Young's experiment and Newton's rings	Ch.12	_____
Wed	15 Nov	The Michelson interferometer and the Fabry-Perot interferometer	Ch.12	_____
Fri	17 Nov	MATHEMATICA class: Nonlinear dynamics	_____	Assignment #10
20-24	Nov	No Classes: Thanksgiving Break		
Mon	27 Nov	Light waves as photons and particles as matter waves	Ch.13	_____
Wed	29 Nov	The Schrödinger Wave Equation; The infinite one dimensional square well	Ch.13	_____
Fri	1 Dec	MATHEMATICA class: The one dimensional square well with finite walls	Ch.13	Assignment #11
Mon	4 Dec	The three dimensional square well with infinite walls; Other 3D problems	Ch.13	_____
Wed	6 Dec	Traveling waves, the potential step, and barrier tunneling	Ch.13	_____
Fri	8 Dec	The one-dimensional harmonic oscillator in wave mechanics	Ch.13	Assignment #12
Mon	11 Dec	Course Review	_____	_____