Course Instructions

Location: Room 310, Workman Blg.

Hours: Tu,Th from 9:30 to 10:45 am.

Instructor: Carlos Lopez Carrillo.
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Tel: 835-5047, Office: 111 Workman Blg.

Office hours Wednesday, 13:45–15:45; other times by appointment.

Textbook: *Class notes* by Paul R. Krehbiel; also recommended *Waves and Vibrations in Physics, 3rd Edition*, by Iain G. Main. It is published by Cambridge University Press, 1993, ISBN 0-521-44701 1 (paperback).

Purpose: Vibrations and Waves is a course intended to prepare you for the study of many kinds of oscillating systems that you will encounter later in both experimental and theoretical physics. The emphasis of the course is on solving problems, and a substantial part of the course is spent on problems that will exercise the principles that govern oscillating systems. The lecture course and its associated Laboratory course, Phys242L, are very closely coupled, to the point that the separation between them may become indistinguishable.

Content: The emphasis is on harmonic oscillations and its applications including coupled and forced oscillators, frequency response functions, Fourier Analysis, and one-dimensional waves including standing waves.

Learning Outcomes: Being an introduction to vibrations, this course will touch on various aspects of the subject and will develop your knowledge and confidence in recognizing and dealing with oscillating systems. Nevertheless, the following are key aspects that should be learned by the end of this class.

The distinction between forced and normal oscillations; how the physics of a given system sets its normal oscillation frequencies; the connection between resonance and normal modes; a working knowledge of complex numbers to represent oscillatory systems, including waves; how to interpret and use system response functions, including the response to superimposed inputs using Fourier series; describe the propagation and reflection of one-dimensional waves; understand the distinction between phase and group velocity and their connection to dispersion relationships.

Etiquette: Avoid class disruptions: cell phones should be reserved for emergencies –no text. If you must, please take the call outside. Come prepared and ready to work with questions, and materials needed. Being on time is important. If you are late, please try to keep the disruption to a minimum.

Announcements: Information about the class (dates, homeworks, exams, etc.) will be at a location to be determined.

Homework: It will be assigned during class on Thursdays and it is due at the beginning of the following class; it must be stapled with each page showing the homework number and problem number clearly at the top of the page. Your work should show enough detail, so it is easy to follow. When a numerical or algebraic answer is required, draw a box around it. Answers must be labeled with the proper units. Homework papers which do not meet these guidelines may be rejected with no grade. You are encouraged to discuss homework problems with your classmates, but I expect that the work that you present to me for grading is your own.

Partial Exams: There will be two partial exams: one on simple harmonic oscillators, and damped oscillators. The second will be on Forced Oscillations, Response Functions and Fourier Series; they are to be taken individually. The actual content of each exam may vary as I see fit, but I let you know at least a week in advance.

Final Exam The final exam is also an individual task and will be given at the time and place announced by the Registrar. It will emphasize the later parts of the course (waves), but will be inclusive of the whole course.

Pre and Post Instruction Exams These exams are taken individually, but not graded as regular exams. They will count toward class participation.

Field Trip: (TBA) Also counts toward class participation.

Grading: No grade of "incomplete" will be awarded for any reason. The weighting of your final grade will be as follows :

Class Participation	10%
Homework	20%
Two Partial Exams	40%
Final Exam	30%

POLICES.-

Permissions: Changing due day of a homework or exam day could be granted if the circumstances, in my opinion, warrant such change.

Grading: I will grade your homework and exams as soon as possible. Once I have returned them, you will have a maximum of one week to dispute your grade. There is, however, no time limit to talk to me about them.

Academic Honesty: You may discuss material with each other, and I encourage it, but anything written must be your own work. It is not permissible to give or receive answers in a way that bypasses the need to think on your own about the assignments. Help received from any source must be acknowledged. Omitting proper acknowledgment is a violation of this policy and can have serious consequences. If in doubt, please ask me. Violation of the letter or intent of this policy will result in serious harm to your grade, and may result in recommendation for suspension from the Institute. Note that New Mexico Tech has formal policies regarding academic honesty, please refer to them on the Tech's catalog.

Reasonable Accommodations: New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs known to the Office of Counseling and Disability Services (OCDS) as soon as possible. To schedule an appointment, please call 835-6619.

Counseling Services: New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. The confidential services are provided free of charge by licensed professionals. To schedule an appointment, please call 835-6619. New Mexico Tech offers a variety of services, please refer to **www.nmt.edu**.

Philosophy.-

My philosophy about taking a class is that you should take it in a similar way as you would take a job in physics, or any job for that matter. So, one should show up to work, work diligently in every assignment, and be prepared for the challenges of the job.

Acknowledgments

This course was first developed by Paul R. Krehbiel, Professor of the NMT physics department. It was further refined by Timothy H. Hankins and Barry Sabol also from NMT physics.