### WEEK 1
- **Monday**: Complex Notation
- **Wednesday**: Superposition and Beats
- **Friday**: Harmonic Motion With Decay
- **Lab**: None
- **Reading**: T
- **Homework**: T1: 1, 2, 5, 6

### WEEK 2
- **Monday**: Driven Oscillators & Resonance
- **Wednesday**: Coupled Oscillators and Normal Modes
- **Friday**: Driven Coupled Oscillators
- **Lab**: None
- **Reading**: T
- **Homework**: T4: 1, 3, 8ab

### WEEK 3
- **Monday**: Waves as normal modes
- **Wednesday**: More about Waves
- **Friday**: Travelling Waves
- **Lab**: None
- **Reading**: T
- **Homework**: T5: 1, 6, 7, 9, 10

### WEEK 4
- **Monday**: Music, Timbre Musical Instruments
- **Wednesday**: Phase and Group Velocity Wave Packets
- **Friday**: Speed of Sound
- **Lab**: None
- **Reading**: T
- **Homework**: T6: 1, 2, 3, 9

### WEEK 5
- **Monday**: Electromagnetic Wave Equation
- **Wednesday**: Phase & Grp Vel Fields and Waves Polarization
- **Friday**: Jones Matrices
- **Lab**: None
- **Reading**: F
- **Homework**: F1: 1, 2, 3, 5, 6, 8, 10, 12

### WEEK 6
- **Monday**: Interference Interferometers
- **Wednesday**: Michelson Int. Fourier Transform Spectroscopy
- **Friday**: Fabry-Perot in great detail
- **Lab**: None
- **Reading**: F
- **Homework**: F3: 2, 3, 6, 10, 12

### WEEK 7
- **Monday**: Thin Films, Other Wave Phenomena
- **Wednesday**: Diffraction ripple tank
- **Friday**: Fresnel zones Arago’s spot
- **Lab**: None
- **Reading**: F
- **Homework**: F5: 7, 8, 12, 13

### WEEK 8
- **Monday**: Ray Optics Ray Vectors
- **Wednesday**: Ray Vectors again Ray Matrices Magnifying Glass
- **Friday**: Optical Instruments Tele- & Micro scope
- **Lab**: None
- **Reading**: F
- **Homework**: F20 - 305 handout

### WEEK 9
- **Monday**: Lens Aberrations
- **Wednesday**: Paraxial Wave Eq. Review
- **Friday**: None
- **Lab**: TBA
- **Reading**: TBA

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**Everything below here is just a space holder. It will be changed.**

### WEEK 10
- **Monday**: Gaussian Beam Optics
- **Wednesday**: More Gaussian Beam Optics
- **Friday**: Gaussian Optics yet again
- **Lab**: None
- **Reading**: T
- **Homework**: T10: 2, 7*

### WEEK 11
- **Monday**: Nonlinear Optics Freq. Doubling
- **Wednesday**: Nonlinear Optics 2 Phase Matching
- **Friday**: Freq. Chain Self Phase Modulation
- **Lab**: None
- **Reading**: T
- **Homework**: F9: 6

### WEEK 12
- **Monday**: Intro. to Lasers!
- **Wednesday**: Intro. to Lasers again
- **Friday**: More Lasers! Locking Schemes
- **Lab**: None
- **Reading**: T
- **Homework**: F8: 1, 2, 3

### WEEK 13
- **Monday**: Detectors and Fibers Waveguides
- **Wednesday**: deB. Waves Bohr View
- **Friday**: Gaussian beam optics
- **Lab**: None
- **Reading**: T
- **Homework**: Make up Missed Labs

### WEEK 14
- **Monday**: Symposium on human vision
- **Wednesday**: Symposium on human vision
- **Friday**: Symposium on human vision
- **Lab**: None
- **Reading**: T
- **Homework**: TBA
This course is a sequel to your introductory sequence of two or three courses. The purpose of its first part is to amplify and expand on the ideas of vibrations and resonance that were introduced in your previous courses. This topic is chosen because it is so very fundamental to all the physics that follows in your future education. Perhaps the most important example is the physics of wave motion that follows naturally from vibrations and resonance. Understanding wave motion is vital for several areas of advanced physics, including optics and quantum mechanics. Thus the second part of the course is devoted to optics, and culminates with one of the most spectacular applications of modern optics, the invention of the laser. Of course, you need to know some quantum mechanics for this, and it is also introduced where needed, in the context of what you have already been taught about waves.

The assignments for each week constitute both reading and homework problems from the assigned texts, and are designated in the rightmost columns of the assignment sheet as French [T] and Fowles [F]. In addition to the contents of each chapter, ALL the problems are REQUIRED reading. Furthermore, the problems that are not assigned are also not forbidden! You can always gain some new insights and understanding by working extra problems. If you choose to simply do the assignments and keep up with the reading, you may very well earn an honor grade, but the true rewards come from deep investigation stimulated by a healthy skepticism. We can’t “assign” enthusiasm!

- **CLASSES** We are scheduled to meet for five hours each week. Three hours will be devoted to class where the main material of the course will be presented. Your ability to understand many of these classes will depend on your familiarity with the subjects, so come prepared. This means do the reading ahead of time. The lab periods are each two hours and are held in Rm. A-124.

- **GRADES** The grades will be based on credit given approximately as follows: 25% for lab, 25% for homework, 50% for the short quizzes that will be given almost every week. There is no final exam (tentatively), but you MUST pass the lab or you will NOT pass the course. Be aware that these percentages are both flexible and subject to change. It’s your responsibility to be aware of announced changes.

1. **Laboratory** You are expected to perform all of the experiments described in the lab manual available on Blackboard with sufficient grades to pass the lab. You will need a quality lab notebook with fixed, bound, numbered pages, and with each topic clearly marked and dated, and with a table of contents in front. You should number the pages and leave a few in front for the contents.

   Prior to your lab period you should read the writeup carefully to fully understand the experiment to be done. Before you can begin each experiment, you must provide a preliminary writeup for the TA’s inspection and signature, and it will count at least 20% of your eventual lab grade (maybe more, TBA). A copy must be submitted with your lab writeup the following week. It should NOT just repeat the material in your lab manual, but should contain enough information so that we can see that you have studied and understood the contents of the material. It should be written neatly in your lab book to be submitted with your report, according to instructions from your TA. It is to be prepared well before the lab period, not during its early minutes.

   In the lab book, neatly record your raw data and measurements along with a description of them, including diagrams and your estimates of the errors. Your TA will sign your data page(s) at the end of the period. You need to prepare a writeup of the experiment, accompanied by a copy of your signed prelab and your separately signed raw data page(s), and it must be submitted at the start of the subsequent lab period. That is, you have one week to complete it. You will need to analyze your data and write a conclusion that should summarize your results and compare with previous expectations. If any analysis is done with a computer program, any graphs or tables that are relevant to your discussion should be printed and stapled into the lab book and a copy placed in your writeup. The writeup, i.e., how well you perform and report on your work, will be the basis for your grade, which will NOT depend on whether you got agreement.

   In the lab book, neatly record your raw data and measurements along with a description of them, including diagrams and your estimates of the errors. Your TA will sign your data page(s) at the end of the period. You need to prepare a writeup of the experiment, accompanied by a copy of your signed prelab and your separately signed raw data page(s), and it must be submitted at the start of the subsequent lab period. That is, you have one week to complete it. You will need to analyze your data and write a conclusion that should summarize your results and compare with previous expectations. If any analysis is done with a computer program, any graphs or tables that are relevant to your discussion should be printed and stapled into the lab book and a copy placed in your writeup. The writeup, i.e., how well you perform and report on your work, will be the basis for your grade, which will NOT depend on whether you got agreement.

2. **Homework** The homework will be submitted on lie on Monday following the week in which it is assigned. It will be graded, and late assignments will be severely penalized. You may work together on solving the problems, but cannot hand in the same solutions. We have a small class, and we’ll be on the watch for this kind of problem.

3. **Quizzes** To be defined in detail later. These are “closed book”, but formulae will be given. We are allowed to ask anything that is in the reading, the lectures, the homework problems, and the labs. You are always responsible for all the previous course material.

SPECIAL NEEDS If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and will work with you and your instructors to implement them. If you need assistance in making your accommodations known to your instructors, please contact Disability Support Services. Students are required to notify Disability Support Services and instructors of any special needs.

(Please note - this syllabus is a work in progress)