**PHYSICS 236**

**VIBRATIONS AND WAVES**

**Second Semester 2019/2020**

**Instructor: Prof. Edward M. Sader**

**Course Description.** This course is an intermediate level presentation of the physics and mathematics of vibrations and waves. The emphasis will be on mechanical systems, but reference will be made to other systems. The course will be presented as a lecture course with discussions, homeworks, and exams. Students are strongly urged to read the material in the textbook before each topic is discussed. Attendance will be taken every session. Students who are absent more than four times without a valid excuse will be withdrawn from the course.

**Textbook:**

H.J. Pain, The Physics of Vibrations and Waves, 6th edition, Wiley.

References:

1-F.S. Crawford, Waves; Berkeley Physics Course Vol 3, Mcgraw-Hill inc.

2-A.P. French, *Vibrations and Waves.*

**Class Schedule.**

Monday, Wednesday, 10:00-11:15.

**Room.** SCI 116.

**Office.** SCI 205.

**Office Hours.**  Monday 11:15-14:00 & Wednezday, 11:15-14:30.

**Grades.** Two monthly exams 50%

Homeworks 10%

Final exam 40%.

**Course Content**

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| # sessions | Chapter/Topics | Homework Problems |
| 2 | Chapter 1. Simple Harmonic Motion. | 1, 2, 3, 4, 6, 10, 13, 18 |
| 2 | Chapter 2. Damped Simple Harmonic Motion. | 2, 5,6, 7, 8 |
| 3 | Chapter 3. The Forced Oscillator. | 1, 3, 5, 8, 11, 13 |
| 3 | Chapter 4. Coupled Oscillations. | 4, 7,10 |
|  | First Hour Exam |  |
| 3 | Chapter 5: Transverse Wave motion. | 1, 5, 9,13,17, 21 |
| 3 | Chapter 6. Longitudinal Waves. | 1, 3, 5, 7, 9, 11 |
| 3 | Chapter 8: Electromagnetic Waves. | 3, 6, 8, 10, 15,21 |
|  | Second Hour Exam |  |
| 4 | Chapter 9: Waves in More than one Dimension. | 1, 5,10,12, 15, 18 |
| 4 | Chapter 12: Interference and Diffraction. | 1, 4, 9, 12,13 |