PHYSICS 311 – OSCILLATIONS AND WAVES        Autumn
                       Semester 2018

LECTURES
   Tue. & Thu.  11:00 – 11:50 a.m., CHCB 231

INSTRUCTOR
   Eijiro ('Ebo') Uchimoto
   Office:  CHCB 127 (Tel. No. 243-6223)
   Email:  eijiro.uchimoto@umontana.edu
   Office Hours:  Mon. 10 – 11 a.m., Tue. 2 – 3 p.m., Wed. 3 – 4 p.m., Thu. 1 – 2 p.m.,
                 Fri. 11 a.m. – 12 noon (and by appointment)

SCOPE
   • Development of physical intuition and mathematical skills necessary for analyzing a wide range
     of periodic phenomena
   • Detailed studies of oscillations and waves in preparation for advanced study in physics

OUTCOME
   • Will have acquired thorough and coherent understanding of periodic phenomena for a wide
     range of physical situations
   • Will have acquired basic mathematical skills of solving ordinary and partial differential equations
     for oscillations and waves
   • Will have acquired solid physical and mathematical foundations for advanced study in classical
     mechanics, electrodynamics, quantum mechanics, and optics

NUMBER OF CREDITS
   2 credits

PREREQUISITES
   Fundamentals of Physics (with Calculus) I and II or College Physics I and II

PRE/COREQUISITE
   Multivariable Calculus (Calculus III)

TEXTBOOK
   None. My personal manuscripts will be posted on Moodle.

HOMEWORK
   Reading assignments and problem sets to be posted on Moodle.

EXAMS
   Three midterm exams (Thu. 9/20, Tue. 10/23, Thu. 11/29)
   Final exam (10:10 a.m. – 12:10 p.m. on Fri. 12/14)
COURSE GUIDELINES AND POLICIES

Student Conduct Code
The Student Conduct Code at the University of Montana embodies and promotes honesty, integrity, accountability, rights, and responsibilities associated with constructive citizenship in our academic community. This Code describes expected standards of behavior for all students, including academic conduct and general conduct, and it outlines students' rights, responsibilities, and the campus processes for adjudicating alleged violations. Full student conduct code. http://www.umt.edu/vpsa/policies/student_conduct.php

Course Withdrawal
Students may use Cyberbear to drop courses through the first 15 instructional days of the semester. Beginning the 16th instructional day of the semester through the 45th instructional day, students use paper forms to drop, add and make changes of section, grading option or credit. PHSX 311 may not be taken as credit/no-credit.

Disability Modifications
The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Grading Policy
Your grade will be based on the following:

- Problem sets: 25%
- Midterm exams: 45% (15% each)
- Final exam: 30%

Typical cutoffs for the final course grade:

- A-/B+: 83%
- B-/C+: 72%
- C-/D+: 58%
- D-/F: 45%
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<th>Date</th>
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| Week 1: Aug 28, 30 | Introduction  
Simple harmonic motion (SHM)  
Addition of sinusoidal functions |
| Week 2: Sept 4, 6 | Complex numbers  
Linear ordinary equations (ODE’s) with constant coefficients |
| Week 3: Sept 11, 13 | Pendulums  
Damped oscillators |
| Week 4: Sept 18 | More on damped oscillators |
| Sept 20 | Exam #1 |
| Week 5: Sept 25, 27 | Oscillatory circuits  
Forced oscillators |
| Week 6: Oct 2, 4 | Non-homogeneous linear ODE’s  
More on forced oscillators |
| Week 7: Oct 9, 11 | Spring combinations  
Coupled oscillators |
| Week 8: Oct 16, 18 | More on coupled oscillators  
Partial differentiation |
| Week 9: Oct 23 | Exam #2 |
| Oct 25 | Transvers waves on a taut string  
Wave equation |
| Week 10: Oct 30, Nov 1 | Superposition principle, interference  
Standing waves |
| Week 11: Nov 8 | Energy and momentum transport associated with wave propagation  
(Nov 6 – No class, Election Day) |
| Week 12: Nov 13, 15 | Electromagnetic waves  
Phase and group velocities |
| Week 13: Nov 20 | Fourier series  
THANKSGIVING BREAK (Nov. 22 – 24) |
| Week 14: Nov 27 | More on Fourier series  
Exam #3 |
| Nov 29 | |
| Week 15: Dec 4, Dec 6 | Fourier transform  
Review |
| Week 16: Dec 14 | FINAL EXAM |