Physics 1135 Syllabus Spring 2019 Dr. Agnes Vojta

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Course website: www.mst.edu/~vojtaa/engphys1
Textbook: *University Physics* by H.D. Young & R.A. Freedman
An assignment listed on a given date is due at the beginning of class on that day. Homework assignments are posted on the course website. **Subject to change**. Changes **in RED**. Last updated **1/14/2019**

Lectures	Recitation/Exam	Lab
1. Tuesday, January 22 **Course Orientation. Motion in One Dimension** - Position, velocity and acceleration in 1-D Read 1.1-1.6; 2.1-2.3. Watch *Course Intro Video*. **2. Thurs, Jan 24 - Motion in One Dimension** -Constant acceleration - Free Fall Read *Course Handbook* Read 2.4-2.6, *Litany for Kinematics*	**1. Wednesday, January 23** *Homework #1* **2. Friday, Jan 25** *Homework #2*	No labs
3. Tues, Jan 29 – Vectors - Magnitudes - Unit vectors and vector components - Vector addition Read 1.7-1.9 **4. Thurs, Jan 31 - Motion in Two Dimensions** - Position, displacement, velocity, acceleration - Components of motion in 2-D - Projectile motion Read 3.1-3.3, 3.5	**3. Wed, Jan 30** *Homework #3* **4. Fri, Feb 1** *Homework #4*	Odd O1 Capstone
5. Tues, Feb 5 - Newton's 1st and 2nd Laws of Motion - Force, mass, and acceleration. Weight. Read 4.1-4.4, 4.6, 5.1 [*only Example 5.3*], 5.2 *Litany for Force Problems* **6. Thurs, Feb 7 - Newton's Third Law of Motion** - Action-reaction pairs - Tilted coordinate systems Read 4.5, 5.1 (Examples 5.1, 5.2, 5.4, 5.5)	**5. Wed, Feb 6** *Homework #5* **6. Fri, Feb 8** *Homework #6*	Even E1 Capstone
7. Tues, Feb 12 - Friction - Relationship to normal force and velocity - Applications to physical situations Read 5.3 **8. Thurs, Feb 14 - Circular Dynamics** - Centripetal and tangential acceleration & forces - Force components ‖ & perpendicular to velocity Read 3.4, 5.4	**7. Wed, Feb 13** *Homework #7* **8. Fri, Feb 15** *Homework #8*	Odd O2 Projectile Motion

9. Tues, Feb 19 - Problem Solving Review for Test 1 Review Assigned Reading: Chapters 2, 3, 4, 5 **10. Thurs, Feb 21 - Work** - Vector dot product - Work done by a force, Work-KE theorem - Power Read 1.10 (scalar product only), 6.1-6.4, *Litany for Work-KE Problems*	**9. Wed, Feb 20** *Test 1 Preparation HW* **Test 1 5:00 PM** **(Check Room Assignment)** **Ch. 2 – 5** **10. Fri, Feb 22** *Homework #10*	Even E2 1-d motion
11. Tues, Feb 26 - Mechanical Energy - Conservative and non-conservative forces - Potential energy and mechanical energy - Conservation of mechanical energy Read 7.1-7.3, *Litany for Energy Problems* **12. Thurs, Feb 28 - Energy Methods** - Relationship between force and potential energy - Graphical Analysis of 1-D motion - Nonconservative forces, internal energy, dissipation - Conservation of total energy Read 7.4-7.5	**11. Wed, Feb 27** *Homework #11* **12. Fri, Mar 1** *Homework #12*	Odd O3 Friction
13. Tues, Mar 5 - Universal Gravitation - Kepler's Laws of planetary motion - Universal gravitational force - Satellite motion Review Reading: 5.4 Read 13.1, 13.2, 13.4 (to eq. 13.12), 13.5 (skim 2nd law) **14. Thurs, Mar 7 – Gravitational Potential Energy** - Universal gravitational potential energy - Escape speed Read 13.3, 13.4 (from eq. 13.12), 13.8	**13. Wed, Mar 6** *Homework #13* **14. Fri, Mar 8** *Homework #14*	Even E3 Energy Conservation
15. Tues, Mar 12 - - Static Fluids - Pressure in a static fluid - Buoyancy and Archimedes' Principle Read 12.1 – 12.3 **16. Thurs, Mar 14 – Spring Recess. No class**	**15. Wed, Mar 13** *Homework #15* **16. Fri, Mar 15** **Spring Recess. No class**	No labs

17. Tues, Mar 19 - Linear Momentum - Impulse - Conservation of linear momentum - Explosions and Collisions Read 8.1-8.3, *Litany for Momentum Problems* **18. Thurs, Mar 21 - Linear Momentum of Systems of Particles** - Center of mass motion and rockets Read 8.4-8.6	**17. Wed, Mar 20** *Homework #17* **19. Fri, Mar 22** *Homework #18*	Odd O4 Collision
Spring Break March 25-31 No classes		
19. Tues, Apr 2 - Problem Solving Review for Test 2 Review Assigned Reading: Chs 6, 7, 8, 12, 13 **20. Thurs, Apr 4 Rotational Motion and Energetics** - Rotational kinematics - Moment of inertia & parallel axis theorem - Rotational energy and rolling motion Read 9.1-9.5 (skim proof of eq. 9-19), 10.3 (through Example 10.5)	**19. Wed, Apr 3** *Test 2 Preparation HW* **Test 2 5:00 PM** **(Check Room Assignment)** **Ch. 6, 7, 8, 12, 13** **20. Fri, Apr 5** *Homework #20*	Even E4 Archimedes' Principle
21. Tues, Apr 9 - Torque - Rotating rigid objects, rotational dynamics Read 1.10 (vector product), 10.1-10.2, 10.3 (after Example 10.5) **22. Thurs, Apr 11 - Static Equilibrium** - Conditions for equilibrium - Analysis of equilibrium situations Read 11.1-11.3	**21. Wed, Apr 10** *Homework #21* **22. Fri, Apr 12** *Homework #22*	Odd O5 Rotation
23. Tues, Apr 16 - Angular Momentum - conservation of angular momentum - Interacting rotating objects - projectile collisions with rotating objects Read 10.5-10.7 **24. Thurs, Apr 18 – Periodic Motion** - Simple harmonic motion - Kinematics, dynamics, energetics - Simple and physical pendulum Read 14.1-14.6	**23. Wed, Apr 17** *Homework #23* **24. Fri, Apr 19** *Homework #24*	Even E 5 Rotational Collision

25. Tue, Apr 23 - Problem Solving Review for Test 3 Review Assigned Reading: Chs 9, 10, 11, 14 **26. Thurs, Apr 25 - Wave Motion** - Transverse and longitudinal waves - Mathematical description of traveling waves - Doppler effect Read 15.1-15.5, 16.7- 8	**25. Wed, Apr 24** *Test 3 Preparation HW* **Test 3 5:00 PM** **(Check Room Assignment)** **Ch. 9, 10, 11, 14** **26. Fri, Apr 26** *Homework #26*	Odd O6 Pendulum
27. Tue, Apr 30 - Interference Phenomena - Interference in traveling & standing waves - Standing waves Read 15.6-15.8, 16.6 **28. Thurs, May 2 - Heat Energy and Transport** - Specific heat, Heat conduction Read 17.1-17.3, 17.5- 17.7	**27. Wed, May 1** *Homework #27* **28. Fri, May 3** *Homework #28*	Even E6 Resonance
29. Tues, May 7 - First Law of Thermodynamics - Work by a gas - Energy transformation in thermal processes for ideal gas Read 18.1, 19.1-19.8 **30. Thurs, May 9 - Thermodynamic Cycles** - Heat engines - Entropy and Second Law of Thermodynamics Read 20.1-2, 20.5-20.7 (but just skim Examples)	**29. Wed, May 8** *Homework #29* **30. Fri, May 10** *Homework #30*	No labs

Tuesday, May 14, 10:00am-12:00pm (Check Room Assignment)

End Material Test:
- Chapter 15: Waves
- Chapter 16 (selected): Sound
- Chapter 17-20: Thermodynamics

Final Exam
- Chapters covered in the three regular tests