# Physics 161 - General Physics:

# “Mechanics and Particle Dynamics” Syllabus

## Fall Semester, 2013

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| **Course description:** | General Physics: First semester of a three-semester calculus-based general physics course. Topics to be covered include Kinematics of Motion and Dynamics of Motion, Newton’s Laws of motion, concepts of force, mass and energy; principles of mechanics, collisions, linear and angular momentum, rotation, gravitation, simple harmonic motion, and fluids. |
| **Pre-requisite** | MATH 140 |
| **Co-requisite:** | MATH 141 |
| **Instructor** | Chuan Liu  2313 CSC Building  301 – 405 –8054  csliu@umd.edu;  Office hours: MWF 11-12AM  e-mail is probably the best way to contact me |
| **Lecture** | **MWF 10:00 – 10:50AM, PHYS Bldg. 1410**  **Your TA: TBA**  **TA’s e-mail: TBA**  **TA’s office hours: TBA** |
| **Discussion Sections** | Discussion sections will be conducted by the Teaching Assistant, and are a forum where students can ask questions about the course material and where problems will be worked out with student participation.  **Section 301:**  Thursday 3:00 pm – 3:50pm (Phys Bldg 1204) TA: TBA  **Section 302:**  Tuesday 4:00pm – 4:50pm (Phys Bldg 1219) TA: TBA  **Section 303:**  Wednesday 12:00pm – 12:50pm (Phys Bldg 0405) TA: TBA |
| **Textbook** | Required: **Physics for scientist and engineers** Volume 1, **Third edition**, by Randall D. Knight (Addison Wesley). Although your homework will be assigned on line through Mastering Physics from the third edition of Randall Knight, please note that insofar as the course material is concerned there is very little of any difference between the 2nd edition and the 3rd edition in regard to Vol. 1. There are significant differences in other volumes but not that of Vol. 1. Therefore, if you were to purchase a used 2nd edition of volume 1 you would not be missing out on anything important – the only difference would be that the assigned HW numbers from the 3rd edition on the Mastering Physics probably would not coincide with the HW problems from the second edition. |
| **Lectures** | Students are required to attend lectures, where homework assignments will be given, exams will be announced and administered, and the course material will be presented. |
| **Preparation** | Not all material will be directly covered in lectures. Students are responsible for reading and understanding all material in assigned chapters, whether or not this material is explicitly treated in the lectures. |
| **Lab** | No lab component in Phys 161 |
| **Homework** | Homework will be done through Mastering in Physics. Problems will be assigned from the text by the instructor.  ***You must submit your answers for the homework problems over the internet using the Mastering Physics web site (see below)***.  There are several advantages to electronic homework submission:  (1) You will know right away if your answer is right or wrong  (2) If you give a wrong answer, you can go back and try again to see if you can get the correct solution. You will be allowed 6 attempts for each question, so don’t waste them.  (3) You are graded only on your final answers and get your score when you are done.  (4) The site also has a tutorial capability that you may find helpful.  Note that the software may randomize the numbers each time you make a new attempt on a problem, so be careful and remember that other students working on exactly the same problems are likely to have different numbers. The best way to do physics problems is first to work out carefully a general analytical solution to the problem and then plug in the numbers at the end. This is especially true if the numbers are being randomized each time so everyone has different numbers.  **Why You Need to do the Homework:** One of the main ways you can understand Physics is by doing the homework. Do not wait until the night before it’s due to start working on your homework. The homework can be expected to be difficult and it counts a lot towards your final grade in enabling you to succeed on your exams. A sure way to get an F in this course is to not do the homework or not give yourself enough time to work on it.  **Getting started in electronic homework submission:** To turn in your homework, you need to go to:  http://www.masteringphysics.com/  The site is best accessed with a current version of Windows Explorer or Firefox. If you run into problems, check the system requirements. In the past, there has been major trouble issues working Mastering in Physics through Google Chrome so don’t try using Google Chrome.  **Registering and Gaining Access to Mastering Physics:** In order to turn in your homework, you will need to register at the Mastering Physics website http://www.masteringphysics.com/. To register, you need two things - an access number and the class ID. **When you buy (new or used copy of) your textbook you will need to purchase a Mastering Physics access key number. The easy way to do this is to simply buy it on line from the above MP website.**  **Your class ID is: MPBUEHRLE92856** |
| **Exams** | There will be two mid-term exams and a one 2 Hr. Final exam. You must take the Final exam in order to pass Phys 161.  All exams are closed book and closed note exams. You are responsible for showing up on time with a “simple” scientific working calculator 🡨 Something along the lines of a TI-30. Graphing or programmable calculators are not allowed on the exam. The exam sheets will contain a few numerical / physical constants you will need to solve the problems. |
| **Excuses** | Turning in late homework or missing an exam is not allowed without a valid documented excuse as defined by the University (medical problem, religious holiday, or serious family crisis). In all cases, a makeup assignment or makeup exam must be completed in a reasonable amount of time or you will receive a score of zero for the assignment or exam. |
| **Final Grade** | The final grade will be based on the components with the following weights:  Two mid-term exams: 2 x 20% = 40%  Comprehensive Final Exam = 40%  Homework and Quiz = 20%  The final grade will be set at the end of the semester after all work is completed. In assigning the final grade, I will be guided by the University of Maryland grading policy, quoted below:   * A denotes excellent mastery of the subject and outstanding scholarship. (90-100) * B denotes good mastery of the subject and good scholarship. (80-90) * C denotes acceptable mastery of the subject and the usual achievement expected. (70-79) * D denotes borderline understanding of the subject. It denotes marginal performance, and it does not represent satisfactory progress toward a degree. (60-70) * F denotes failure to understand the subject and unsatisfactory performance. ( < 60 ) |
| **Students with disabilities** | Students with disabilities should meet with the instructor at the beginning of the semester so that appropriate arrangements can be made to accommodate the student's needs. |
| **University Closure** | In the event of a University Closure the department will do its best to accommodate students by scheduling make-up sessions or revision of the lab schedule. |
| **Academic Integrity** | All students will be expected to comply with the University of Maryland's academic integrity policies, including the [code of academic integrity](http://www.shc.umd.edu/code.html) and the [honor pledge](http://www.shc.umd.edu/code.html#honor_pledge). Failure to comply will result in a failing grade and will be reported to the Honor Council. |

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| **Week** | | **Date** | | **Subject** | **Ch Sections** | **HW** | **Quiz** |
| **1** | W | Sep | 4 | Introduction & Terms |  |  |  |
|  | F |  | 6 | Motions | 1 |  |  |
| **2** | M | Sep | 9 | Kinematics of Motion | 2 |  |  |
|  | W |  | 11 | Vectors | 3 | 1 |  |
|  | F |  | 13 | Constant Acceleration in 1-D | 2 |  |  |
| **3** | M | Sep | 16 | 2-D Motion; Projectiles | 4.1-4.3 |  | 1 |
|  | W |  | 18 | Circular Motion & Relative Motion | 4.4-4.7 | 2 |  |
|  | F |  | 20 | Non-Uniform Circular Motion | 4 |  |  |
| **4** | M | Sep | 23 | Forces; Laws of Motion | 5.1-5.6 |  | 2 |
|  | W |  | 25 | Free-Body Diagrams | 5.4-5.7,7.1-7.3 | 3 |  |
|  | F |  | 27 | 1-D Dynamics | 6.1-6.3 |  |  |
| **5** | M | Sep | 30 | Friction & Drag | 6.4-6.5 |  | 3 |
|  | W | Oct | 2 | Statics & Pulleys | 7.4-7.5 | 4 |  |
|  | F |  | 4 | Uniform Circular Motion | 8.1-8.3 |  |  |
| **6** | M | Oct | 7 | 2-D Dynamics | 8.4-8.7 |  | 4 |
|  | W |  | 9 | Kinetic Energy; Gravitational PE | 10.1-10.3 | 5 |  |
|  | F |  | 11 | Energy Conservation; Elastic PE | 10.4-10'5 |  |  |
| **7** | M | Oct | 14 | **EXAM I** | Chap.1-8 and 10 |  |  |
|  | W |  | 16 | Energy and Environment |  | 6 |  |
|  | F |  | 18 | Work & Energy | 11.1-11.5 |  |  |
| **8** | M | Oct | 21 | Power and world energy problem | 11.6-11.8 |  | 5 |
|  | W |  | 23 | Impulse & Momentum | 9.1-9.3 | 7 |  |
|  | F |  | 25 | Inelastic Collisions & Explosions | 9.4-9.5 |  |  |
| **9** | M | Oct | 28 | 2-D Collisions; Elastic Collisions | 9.6, 10.6 |  | 6 |
|  | W |  | 30 | Collision Problem-Solving | 9.2,9.4-9.6,10.6 | 8 |  |
|  | F | Nov | 1 | Rotational Kinematics | 12.1-12.2 |  |  |
| **10** | M | Nov | 4 | Torque and moment of inertia | 12.3-12.4 |  | 7 |
|  | W |  | 6 | Rotational dynamics | 12.5-12.7 | 9 |  |
|  | F |  | 8 | Equilibrium and Angular momentum | 12.8-12.11 |  |  |
| **11** | M | Nov | 11 | Newtonian Law of Gravity | 13.1-13.4 |  | 8 |
|  | W |  | 13 | Kepler's Laws; Gravitational PE | 13.5-13.6 | 10 |  |
|  | F |  | 15 | Gravity problem solving | 13 |  |  |
| **12** | M | Nov | 18 | Review | Chap.9,11-13 |  | 9 |
|  | W |  | 20 | Implications of Newtonian Mechanics |  | 11 |  |
|  | F |  | 22 | **EXAM II** | Chap 9-13 |  |  |
| **13** | M | Nov | 25 | Simple Harmonic Motion | 14.1-14.3 |  | 10+A1 |
|  | W |  | 27 | SHM Dynamics; Vertical Oscillators | 14.4-14.5 | 12 |  |
|  | F |  | 29 | **Thanksgiving Break** |  |  |  |
| **14** | M | Dec | 2 | Pendulum; Damping | 14.6 |  |  |
|  | W |  | 4 | Fluid Density & Pressure | 15.1-15.2 | 13 |  |
|  | F |  | 6 | Fluid Dynamics | 15 |  |  |
| **15** | M | Dec | 9 | Pascal's Principle; Hydraulic Lift | 15.3 |  |  |
|  | W |  | 11 | Archimedes' Principle | 15.4 | 14 |  |
|  | F |  | 13 | Course Review |  |  |  |
|  |  | Dec | 16-21 | **FINAL EXAM** |  |  |  |