Syllabus: PHY 2130 Winter 2017

Instructor:

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Office Hours: Anytime you can make me an appointment by Email

This Syllabus covers algebra-based General Physics 2130 and the associated Active Learning Community (ALC) sections. The website for this course is on the WSU Blackboard, *PHY 2130 WIN 2014 Sec 001, 002, 003, and 010*. This section meets on **Monday and Wednesday 8:30 AM – 9:45 AM** for class, in **Room 1117, Science Hall**. Active Learning Community sections are for problem discussion and quizzing, and meet as follows, starting the first week of classes:

Active Learning Community sections:

Quiz Sections		Section	CRN	Instructor	Room
M	10:30 AM ~ 12:20 PM	003	25971	Senanayake	0114 State
Tu	09:30 AM ~ 11:20 AM	004	25969	Gunawardana	0211 State
W	10:30 AM ~ 12:20 PM	009	26970	Senanayake	0114 State
Th	09:30 AM ~ 11:20 AM	010	26513	Launa Asllanai	0064 Mano

NOTE: The Lab course, PHY 2131, is a separate course, with a separate Syllabus, schedule, Instructors, and grades. The content of the labs is consistent with PHY 2130, but the sequence is different. Labs will *probably* begin during the second full week of classes. Please see notice on main door of Physics Bldg. or announcement on Blackboard.

Course Materials:

• Text – **We provide** Reading materials on your black board. Please read a few section before you attend your class.

• **WebAssign** access card. WebAssign is an online homework system, at *www.webassign.net*. Please see below.

Goal:

This class will focus on the physics relevant to living things from molecules to worms to Monmmoth. While physics, chemistry, and biology are well established fields, some of the scientific questions you will explore in this class have only recently been tackled. You will focus on physics at the convergence with biology, where physical, chemical and biological principles all come into play. A primary theme for this first semester is the concept of motion -- and the difference between coherent, directed motion and the random motion that occurs at the molecular level. The goal of this course, which is the traditional goal in Physics, is also that you will be able to apply basic physical laws to analyze real-life or unstructured

situations ("word problems"), both descriptively and numerically, at least for the aspects covered in this course. You should be able to analyze both existing situations and situations that you or someone else may want to construct. Research and experience indicate that, to get to this point, you also need to be able to:

• State and paraphrase definitions and laws, and apply them in simple cases
• Have opportunity to practice, with feedback (e.g. homework) before exams.

Consequently, homework, quiz and conceptual questions will include such questions.

What do I need to do to succeed in this class?

Here is a brief outline of what you will need to do throughout the class.

- ***Do the reading and commentary for each lecture and selected labs***! -- For each lecture and some labs there will be a required reading of a few web pages. You will be asked to summarize the page on your *Webassign* online homework program and ask a question about it. The lecture reading write ups will be due by 10PM the night before the lecture class. You can find the lecture reading assignments on the Schedule Page for your instructor.
- ***Attend and participate in all the lectures, recitations, and labs!*** -- This is a class very much about *doing*, not just about learning facts or equations. In lecture we will be doing very little lecturing but a lot of answering questions, doing group problem solving, and holding class discussions. You will get participation points for some of this stuff, but that's not the point -- the point is that in **the *doing* in lecture and recitation**. A major part of what you will be learning is how to talk about and make sense of physics through problem solving with your classmates and by designing, doing and analyzing experiments in lab.
- ***Do the weekly homework!*** -- While the lecture and recitation is where you will learn to talk about and make sense of physics through problem solving, the homework is where you will get to try it out with your classmates on your own. You are encouraged to work with others. We have a Physics Resource Center (room 172) in Physics Building, where you can find people to work with (and get help when you are stuck). **But be careful!** If you work together DO NOT create a common solution and everyone copy it. Once you have worked out a solution together, each person must write it up separately in your own words. If two solutions are too nearly identical, neither will get credit! Homework assignments themselves are found on our Homework Assignment page.
- ***Keep up!*** -- We know that you're busy, and in many other classes you can let things slide and then catch up for the exam. In this class that will be very difficult. Each lecture builds on the last, and on the homework from previous weeks. If you miss too much you may find yourself lost. In addition, your grade in this class is based on the accumulation of points in many different categories throughout the term.

Homework

Graded credit problems: Each week (except for Exam weeks), five to seven WebAssign problems will be assigned for credit. The problems for each week are due that Sunday at 11:59pm or depend on each chapter. The problems can be discussed in a general way in the ALC Sections, but not worked out to a final numerical answer. You "do" a WebAssign problem by logging in to the WebAssign site (*www.WebAssign.net*), reading the problem, working it out on the side, and entering the answer in the website. I allow you **10 tries** for each problem, to get the answer right. You will lose 5% for each attempt after the first.

Your Webassign account will be set up by the start of classes. Your login information is:

- UserID: First initial and full last name, up to a maximum of seven characters, excluding any special characters such as periods or dashes. For example, my name is Takeshi Sakamoto, so my UserID would be Tsakamoto
- Institution: wayne (just that, not Wayne State University or anything else)
- Password: AccessID, for example ee4243 for me, since my WSU email address is ee4243@wayne.edu.

For additional help with WebAssign, see "Using WebAssign" under "Content" on Blackboard, the non-credit assignment on WebAssign, "Intro to WebAssign 2011-2012," and the online WebAssign help.

NOTE ON HOMEWORK AND EXAM PROBLEMS: The Exams will be mostly problems (plus a few definitions, formula statements and so forth). There is NO WAY that you will be able to do the problems on the Exams without practicing doing problems ON YOUR OWN. You might try to memorize how to do each assigned homework problem but at least some of the Exam problems will be of types that you have not exactly seen before. Your goal should be to understand how to apply the basic theories to solve problems. If you can apply the basic theories, on your own, then you should be able to do all of the Exam problems.

Clicker responses and reading quizzes:

All students will need to bring their own clicker to every lecture. Clickers will be used to answer questions during lecture, and student responses will be recorded. Using another student's clicker, or letting another student use your clicker, is not allowed and is considered cheating. The minimum penalty for clicker misuse is zero credit for clicker responses for the entire semester.

Grading clicker responses: The clicker questions will be worth 5% of the total course grade. There are no make-up opportunities or second chances for missed clicker responses for any reason (absence from class or otherwise). However, only 75% of the total number of clicker questions in all the lectures combined will be counted toward your grade. You do not need to have the correct response to receive credit. Your clicker must be registered via Blackboard to receive credit for your responses.

Reading quizzes: Reading assignments are listed in the course schedule. Students should read the assigned sections before each class. Short quizzes to accompany the reading assignment will be posted on Blackboard. These will consist of three multiple choice questions and one short answer question. You will have 24 hours to take the quizzes but they must be completed by 4 pm on the day of class.

Grading reading quizzes: For each quiz, you will earn 70% of the points for completing and submitting the quiz. For each multiple choice question that you answer correctly, you will earn an additional 10% of the points for that quiz. The reading quizzes will be worth 5% of the total grade for the course. The three lowest reading quiz grades will be dropped at the end of the semester.

Active Learning Community Section (ALC)

The goal of ALCS is to develop thinking pathway (process) for solving problem and making sense of physics. Thus, ALCS gives students opportunity to simply think concepts of each chapter and discuss the solutions. Students will work together in groups to solve problems and get idea how to solve the problem. Attendance will be taken every session and will be worth 5% of the total grade.

Graded worksheets: Attendance and participation in the discussion sections is required and will be recorded. Each student must turn in their own worksheet at the end of each week's discussion section for grading. The discussion section worksheets will be worth a total of 20% of your final grade. The lowest worksheet grade will be dropped.

Materials: Students should bring their textbook, calculator, laptop (if you have one), and pencil and paper every week. Students who don't bring the required materials will not receive attendance and participation points.

EXAMS: There will be three 60-minute exams in class, consisting of multiple choice questions (no partial credit). The lowest exam score may be replaced by half of your earned score on the Final Exam. Therefore, **no makeup exams will be given.** You MUST bring your Wayne State ID to the exam and present it to a proctor when asked during the exam. **A group photograph of the class will be taken during each exam.** No electronic devices (other than a calculator) are allowed in the room during the exam (**no iPods, headphones, cell-phones, Blackberries, etc**.).
You will need a stand-alone calculator ("standalone" excludes calculators on cell phones, for example). Graphing calculators or other calculators with communications capacity will not be allowed.
Mid-exams will held as following dates;

Monday, February 6
Monday, March 6
Monday, April 10
Final, April 28th between 2:45 pm an 4:45 pm.

The Mid-exams will be held in the same room as the lectures. The final exam will be the same for all sections of PHY 2130 and all sections will take the exam at the same times.

Exam grades for Mid-exams: The point of each mid-exam is 12 points. However, the lowest score of Mid-exam will be replaced with 50 % point of the final exam. The point of final exam is 29 points.

GRADING: Your course grade will be determined by your performance on the three hour Exams, Online Homework, ACL section results and the Final Exam. The Final Exam will cover the material presented during the entire semester. The overall course grade will be determined on the basis of the following distribution:

Reading quizzes	5 points
Clicker responses	5 points
Homework	10 points
Active Learning Community Section	15 points
Three Mid-exam 60 Minute Exams (12 points each)	36 points
Final Exam	29 points
Total	**100 points**

Points accumulated Percent Grade

Percent	Grade
90-100	A
85 – 89	A-
80 – 84	B+
75-79	B
70-74	B-
65-69	C+
60-64	C
55-59	C-
50-54	D+
45-49	D
40-44	D-
0-39	F

ADDITIONAL STUDY HELP: If you have difficulty doing homework or lab work, or understanding some of the course material, you can get help from the *Physics Resource Center*, in room 172 Physics Building. The center will open a couple of weeks after the beginning of the semester.

Honors Credit: If you are requiring Honors Credit, please contact the instructor by the end of first week of classes.

Accommodation: If you feel that you may need an accommodation based on the impact of a disability, please feel free to contact me privately to discuss your specific needs. Additionally, Student Disability Services (SDS, formerly the Office of Educational Accessibility Services), coordinates reasonable accommodations for students with documented disabilities. The office is located in 1600 UGL, phone: 313-577-1851 (Voice) / 577-3365(TTY), web site http://studentdisability.wayne.edu/.

Responsibility for Work: Whether on homework or an exam, I will never take seriously a statement such as, "but that's how (another student or someone in the Resource Center or anyone else) told me to do it." Your work is your own, and you should always try to tie the solution back to the fundamental laws. You can always check with me.

Course drops and withdrawals: In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after the end of the tenth week. Students enrolled in the 10th week and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: http://reg.wayne.edu/pdf-policies/students.pdf.

Last day to drop with tuition cancellation: January 23

Last day to withdraw: March 26

Religious holidays: Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.

Studying resources: The Physics Resource Center is in Physics 172 and provides drop-in office hours with graduate teaching assistants. Supplemental Instruction and various workshops are available through the Academic Success Center (www.success.wayne.edu).

Academic dishonesty – cheating and plagiarism:
Academic misbehavior means any activity that tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the Student Code of Conduct (http://www.doso.wayne.edu/student-conduct-services.html). Students who commit or assist in committing dishonest acts are subject to downgrading (to a failing grade for the test, paper, or other course-related activity in question, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct.

Cheating: Intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information or assistance in any academic exercise. Examples include: (a) copying from another student's test paper; (b) allowing another student to copy from a test paper; (c) using unauthorized material such as a "cheat sheet" during an exam.
Fabrication: Intentional and unauthorized falsification of any information or citation. Examples include: (a) citation of information not taken from the source indicated; (b) listing sources in a bibliography not used in a research paper.
Plagiarism: To take and use another's words or ideas as one's own. Examples include: (a) failure to use appropriate referencing when using the words or ideas of other persons; (b) altering the language, paraphrasing, omitting, rearranging, or forming new combinations of words in an attempt to make the thoughts of another appear as your own.

Other forms of academic misbehavior include, but are not limited to: (a) unauthorized use of resources, or any attempt to limit another student's access to educational resources, or any attempt to alter equipment so as to lead to an incorrect answer for subsequent users; (b) enlisting the assistance of a substitute in the taking of examinations; (c) violating course rules as defined in the course syllabus or other written information provided to the student; (d) selling, buying or stealing all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

In this course, the first instance of cheating by a student will result in a grade of 0 for the work in question (homework assignment, quiz, exam, etc.). This 0 grade may not be dropped or replaced like other quizzes or midterm exams may be. Repeated instances of cheating will result in a failing grade for the course. For all instances of cheating, the Department of Physics and Astronomy will be notified to ensure that the procedures described in the Student Code of Conduct are followed.

Final Exam: April 28, 2:45PM – 4:45 PM
Place: TO BE DETERMINED (TBD)

Final Exam Schedule Winter 2017

Final Exam Time	Final Exam Date					
	Wednesday, April 26	Thursday, April 27	Friday, April 28	Saturday, April 29	Monday, May 1	Tuesday, May 2
8:00-10:00 a.m.	Classes that start Monday at 8:30 a.m.	Classes that start Tuesday at 8:30 a.m.	Common Finals: MAT 0900, 0993, 1050, STA 1020	All Saturday classes will hold their final exams during regular meeting period.	Classes that start Monday at 9:30 or 10 a.m.	Classes that start Tuesday at 9:30 or 10 a.m.
10:15-12:15 p.m.	Classes that start Monday at 10:30 a.m.	Classes that start Tuesday at 10:30 a.m.	Common Finals: MAT 1800, 2010		Classes that start Monday at 11:30 a.m.	Classes that start Tuesday at 11:30 a.m.
12:30-2:30 p.m.	Classes that start Monday at 12:30 or 1:00 p.m.	Classes that start Tuesday at 12:30 or 1:00 p.m.	Common Finals: SPA 1010, 1020, 1060, 2010, GER 1010, 1020, 2010 FRE 1010, 1020, 1060, 2010, ITA 1010		Classes that start Monday at 1:30 p.m.	Classes that start Tuesday at 1:30 p.m.
2:45-4:45 p.m.	Classes that start Monday at 2:30 p.m.	Classes that start Tuesday at 2:30 p.m.	Common Finals: PHY 2130, 2140		Classes that start Monday at 3:30 p.m., 4 or 4:30 p.m.	Classes that start Tuesday at 3:30 p.m., 4 or 4:30 p.m.

Schedules:

Wk	#	Date	Day	Topics	Quizzes
1	1	01/9	M	1. Introduction to Class 1.1 The disciplines: Physics, Biology, Chemistry, and Math 1.1.1 Science as Making Models 1.1.4 What Physics can do for Biologists 1.2 Thinking about thinking and knowing 1.2.1 The nature of scientific knowledge 1.2.3 Knowing-how-we-know Icons	
	2	01/11	W	2. Modeling with Mathematics 2.1 Using math in science 2.1.1 How math in science is different from math in math 2.1.2 Measurement 2.1.3 Dimensions and units 2.1.3.1 Complex dimensions and dimensional analysis 2.1.3.2 Changing units 2.1.3.3 Natural scales 2.1.4 Estimation 2.1.4.1 Useful Numbers 2.2.2 Scientific Notation 2.2.3 The idea of algebra: unknowns and relationships 2.2.3.1 Symbols in science	
2	3	01/16	M	NO Classes	
	4	01/18	W	Interlude 1: The Main Question – Motion 3. Kinematics: Where and When? 3.1.1 Coordinates 3.1.2 Vectors 3.1.3 Time 3.1.4 Kinematics Graphs	Quiz
3	5	01/23	M	2.2.5 Values, change, and rates of change 2.2.5.1 Derivatives 2.2.5.1.1 What is a derivative? 3.2 Kinematic Variables 3.2.1 Velocity 3.2.1.1 Average Velocity 3.2.1.2 Instantaneous velocity 3.2.1.3 Calculating with average velocity	Quiz
	6	01/25	W	3.2.2 Acceleration 3.2.2.1 Average acceleration 3.2.2.2 Instantaneous acceleration 3.2.2.3 Calculating with constant acceleration 3.2.3 Kinematics graphs and consistency 3.2.3.1 Reading the content in the kinematic equations	
4	7	01/30	M	4.1 Newton's Laws 4.1.1 Physical content of Newton's Laws 4.1.1.1 Object egotism 4.1.1.2 Inertia 4.1.1.3 Interactions 4.1.1.4 Superposition 4.1.1.5 Mass 4.1.1.6 Reciprocity 4.1.2 Formulation of Newton's Laws as foothold principles 4.1.2.1 Quantifying impulse and force 4.1.2.2 Newton 0	Quiz

				4.1.2.2.1 Free-body diagrams 4.1.2.2.2 System Schema Introduction	
	8	02/01	W	3.1.2.1 Adding Vectors 4.1.2.1.2 Adding forces 4.1.2.3 Newton's 1st law 4.1.2.4 Newton's 2nd law 4.1.2.4.1 Reading the content in Newton's 2nd	
5	9	02/6	M	**Mid-Exam-1 (Ch 1, 2, 3, &4, until Newton's 2nd Law)**	Quiz
	10	02/8	W	4.1.2.5 Newton's 3rd law 4.1.2.5.1 Using System Schemas for Newton's 3rd Law 4.1.2.6 Center of mass	
6	11	02/13	M	4.2 Kinds of Forces 4.2.1 Springs 4.2.1.1 Realistic springs 4.2.1.2 Normal forces 4.2.1.2.1 A simple model of solid matter 4.2.1.3 Tension forces	Quiz
	12	02/15	W	4.2.2 Resistive forces 4.2.2.1 Friction 4.2.2.2 Viscosity 4.2.2.3 Drag	
7	13	02/20	M	4.2.3 Gravity 4.2.3.1 Flat-earth gravity 4.2.3.1.1 Free-fall in flat-earth gravity 4.2.3.3 The gravitational field	Quiz
	14	02/22	W	4.2.4 Electric Forces 4.2.4.1 Charge and the Structure of Matter 4.2.4.2 Polarization 4.2.4.3 Coulomb's Law 4.2.4.3.1 Coulomb's Law – Vector Character 4.2.4.3.2 Reading the Content in Coulomb's Law	
8	15	02/27	M	4.3 Coherent vs. random motion 4.3.1 Linear momentum 4.3.1.1 Restating Newton's 2nd law: Momentum 4.3.1.2 Momentum conservation	Quiz
	16	03/01	W	4.3.2 The role of randomness: Biological implications 4.3.3 Diffusion and random walks 4.3.3.1 Fick's Law 4.3.3.1.1 Reading the content in Fick's law	
9	17	03/06	M	**Exam-2 (Ch 4.1 to 4.3)**	Quiz
	18	03/08	W	5. Models of matter 5.1.1 Density (Solids) 5.1.2 Young's Modulus 5.1.6 Soft matter 5.1.6.1 Mechanical Properties of Cells	
	19	03/13	M	SPRING BREAK (NO CLASS)	
	20	03/15	W	SPRING BREAK (NO CLASS)	
10	21	03/20	M	5.2 Fluids 5.2.1 Pressure 5.2.2 Archimedes' Principle 5.2.3 Buoyancy 5.2.5.2 Internal Cohesion 5.2.5.2.1 Surface Tension	Quiz

	22	03/22	W	5.2.6 Fluid Flow 5.2.6.1 Quantifying Fluid Flow 5.2.6.2 The Continuity Equation 5.2.6.3 Internal Flow – The HP Equation	
11	23	03/27	M	6. Energy 6.1 Kinetic energy and the work-energy theorem 6.1.1 Reading the content in the Work-Energy theorem	Quiz
	24	03/29	W	6.2 Energy of place -- potential energy 6.2.1 Gravitational potential energy 6.2.2 Spring potential energy 6.2.3 Electric potential energy	
12	25	04/03	M	6.3 The conservation of mechanical energy 6.3.1 Interpreting mechanical energy graphs 6.3.2 Mechanical energy loss -- thermal energy 6.3.3 Forces from potential energy	Quiz
	26	04/5	W	6.4.1 Energy at the sub-molecular level 6.4.2 Atomic and molecular forces 6.4.2.1 Interatomic forces 6.4.2.1.1 The Lennard-Jones Potential 6.4.2.2 Chemical bonding	
13	27	04/10	M	**Exam-3 (Ch5 to 6.4)**	Quiz
	28	04/12	W	6.5 Energy in fluid flow 6.5.1 Bernoulli's principle 5.3 Heat and Temperature 5.3.1 Measuring Temperature 5.3.2 Thermal Properties of Matter 5.3.2.1 Thermal energy and specific heat 5.3.2.2 Heat Capacity 5.3.2.3 Heat Transfer	
14	29	04/17	M	Interlude 2: The Micro to Macro Connection 7. Thermodynamics 7.1 Kinetic theory: the ideal gas law 7.2 The 1st law of thermodynamics	Quiz
	30	04/19	W	7.3 The 2nd Law of Thermodynamics 7.3.1 The 2nd Law of Thermodynamics: A probabilistic law 7.3.2 Implications of the Second Law: Entropy	
15	31	4/24	M	**Cumulative Review**	