Course Syllabus

Physics 130: Physics Foundations

Summer Semester, 2023

Instructor:	Dr. Steven Sahyun
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Phone:	Ext. 5113
E-mail:	sahyuns@uww.edu
Class Home page:	http://sahyun.net/courses/physcs130/index.htm
Canvas:	**The Canvas site is linked from the UW-W and class Web sites (www.uww.edu) and select Canvas.**
Class Meetings:	Class: On-line, but plan on spending at least two hours per day for class material, there will be two on-line laboratory activities per week.
Office Hours:	T, W, R 10:00 - 11:45 am Upham Hall Room 157 or other times or WebEx by appointment.
Webex Office:	https://uww.webex.com/meet/sahyuns
Required Text:	Kirkpatrick and Francis: ***Physics: A Conceptual World View*, 7th ed.** (available at the UWW bookstore and as an eBook from Cengage)
Supplemental text:	Kirkpatrick and Francis: ***Physics: A Conceptual World View*, 7th ed. Problem Solving Guide (online); Openstax Physics (free download)** https://openstax.org/details/books/physics
Pre- or Co-requisite:	Math 139 or Math 141 or Math 142.

Course modality:	**On-line**. This course will be offered completely on-line. Although there are no defined lecture times, the course is designed so that there will be two course "lectures" per day, two on-line laboratories per week, and a weekly exam (quiz) due at the end of the week.
Tutor:	There will be a tutor available for the course. Times to be determined.

Please see the COURSE SCHEDULE posted at:
http://sahyun.net/courses/physcs130/schedule_su.pdf for assignment, laboratory, and exam dates. A tentative schedule is attached on the last page of this document.

Other required materials:
You are also expected to have a **notebook** (may be spiral) to record notes and work out calculations during the course and the laboratory activities. You should also have access to paper and a scientific calculator (one with trigonometric and logarithmic functions, scientific notation, etc. These are available as physical object for **less than** $20, but are also available as an app on your computer, tablet or phone).

Course Description: Physics Foundations is a Natural Sciences—Laboratory (GL) course that will explore topics in classical physics (motion, heat, sound, electricity, magnetism, and light) and modern physics (atomic structure, quantum mechanics, and relativity) with an emphasis on exploring phenomena of the natural world in the context of everyday life problems.

This course is a 5-credit course, it will take about 45 hours per week of work. 4 credits are for lecture and 1 credit is for lab. Each lecture credit is defined as 16 "hours" (1 "hour" = 50 min.) of instruction for a total of 64 lecture "hours", and each credit of lab is defined as 32 "hours" for a total of 96 class "hours". For every hour "in-class", expect to spend around 2 hours "out-of-class" for a total of 288 hours over 6 weeks or about 45 hours per week.
https://teachlearn.provost.wisc.edu/course-syllabi/course-credit-information-required-for-syllabi/

Course Learning Objectives and Outcomes:

Throughout this course, students will develop their ability to read and comprehend scientific information, and draw appropriate conclusions. Additionally, this course provides scientific experimentation in which the students will learn about data collection and analysis.

Physics Foundations is a fast-paced course offering a survey of classical and modern physics. Its main goals are:
• To expose its students to the fundamental concepts of physics;
• To demonstrate the application of basic mathematics to solving physics problems;
• To provide experience with measurement collection and analysis.

Course Policies and Expectations:

Assigned reading: You are expected to read the assigned chapter for the day's class activities. **You will be expected to submit a paragraph about the assigned chapter as part of the discussion question posts due for each class. You will provide comments on other's posts as part of providing class interactions.**

Homework: Assigned Homework will be available through the WebAssign systems and linked from Canvas. Since this is my first time using WebAssign for homework, grades may or may-not be automatically transferred back to Canvas. If grades are not automatically listed in Canvas, I will need to manually enter the grades, but WebAssign will have its own listing of homework grades. Since the homework is available on-line and will be open well in advance of the final due date, submit your homework at least a day or two in advance in case any questions arise in the homework problem sets. **Late** homework may be given partial credit so please ask!

Lecture activities: There will usually be some sort of interactive question/quiz for each class to complete as a Canvas Quiz. You are expected to fully participate and complete these activities. Quizzes **are a graded item and are not able to be given late extensions.**

Exams: Since this is a six-week course, there will be six (6) exams. Each exam will be on-line and available at the end of the week.

Laboratory: There will be 11 laboratory experiments, two for each week (one for the last week). Each laboratory will have a report to be submitted. The laboratory reports will be typed and follow a grading rubric style. A template for your laboratory reports is posted on Canvas. Laboratory reports are due two days after the assigned lab date. Reports are to be submitted on Canvas. Reports will be reduced by 2 pts. for each day they are late.

Physics 130: Physics Laboratory Report Guidelines

The purpose of the report is to create a clear communication of your laboratory experience and contains information so that others can reproduce what you have accomplished. Your report must have your name and the experiment title. In addition, your report will have:

(2 pts.) I. Objective/Introduction A sentence or two that provides an explanation about the purpose of the experiment and why it is of interest.
(4 pts.) II. Theory – This section details the physics behind the experiment. Any equations that you will use will be *explained* in the theory section.
(3 pts.) III. Set-up This section describes the equipment or simulator that was used and *diagrams* of any apparatus. This section is NOT a restatement of laboratory instruction handouts.
(4 pts) IV. Data Results This section shows the data from your experiment. Data may be presented in tables, charts, or graphs and is referred to in the analysis section.
(4 pts.) V. Analysis and Interpretation Manipulation of the data and interpretation of what it means. This section shows your theoretical modeling and correlation to data results.
(3 pts.) VI. Conclusion Final statement of what you found and any experimental uncertainties. For example, for part of your conclusion you will state: We determined the electron's mass to be xxxxx with an uncertainty of yyyy. This result differs from the accepted value of aaaaa by zzz%.

A good report has the following items: Your project shows a very good analysis and conclusions. It is a well-written paper with a clear summary of your laboratory experiments.

- The introduction shows why this experiment is of interest and the experimental objective is clearly stated.
- The experimental set-up clearly described and any necessary figures included.
- There is a coherent THEORY section that clearly shows how the theory relates to the experiment. Application of the equations are clearly shown.
- The method of how the data was acquired and results are clearly noted. Graphs of acquired data or other presentation of your work are shown.
- There is a clear and correct analysis and interpretation of what your data indicates and commentary of the results,
- There is a **useful** summary and conclusions of the experiment (including your final results). Your final results are clearly stated as well as a discussion of the implications of your experiment or activity.
- The paper has good grammar, complete sentences and paragraphs, and a logical structure.

Notes:
There will be up to a 2 pt. deduction for a poorly written (grammar/spelling) report.
There is a late fee of 2 pts. per day.

Grading:

Course grades will be determined by the percentage of total points assigned for the course.

93% = A,	80% = B-,	67% = D+,
90% = A-,	77% = C+,	63% = D,
87% = B+,	73% = C,	60% = D-,
83% = B,	70% = C-,	< 60% = F.

The **approximate** assignment of points will be as follows:

Item	Each	Number	Total	~%
Homework	10	28	280	36%
Daily Quiz on Lecture	4	28	112	14%
Reading summary/Discussion Posts	2	28	56	7%
Laboratories	20	11	220	28%
Exams	20	6	120	15%
Total			788	100

I reserve the right to adjust grades slightly based on class participation. There may be occasional opportunities for extra credit.

Inclusive Learning Environment Statement: The University of Wisconsin-Whitewater is dedicated to a safe, supportive, and non-discriminatory learning environment. It is the responsibility of all students to familiarize themselves with UWW policies regarding: Special Accommodations, Academic Misconduct, Religious Beliefs Accommodation, Absence for University Sponsored Events, the "Rights and Responsibilities" section of the Undergraduate Catalog or the “Academic Requirements and Policies” section of the Graduate Catalog, the "Student Academic Disciplinary Procedures” (UWS Chapter 14), and the "Student Non-academic Disciplinary Procedures" (UWS Chapter 17).

Mandatory Reporting Statement: Federal law requires all university employees to report information obtained during the course of their duties regarding sexual misconduct, including domestic and dating violence, unless otherwise exempt by state law. For more information, including on how to report an incident, see http://www.uww.edu/sexual-misconduct-information.

Sahyun **Physics 130 Physics Foundations Tentative Schedule** **Summer 2023**

Text: Kirkpatrick and Francis: Physics: A Conceptual World View, 7th ed. Updated 5/21/2023

Week	Class		Date	Topic	Assignment	Laboratory
1	1	Mon	22-May	01: A World View	S01, Q01	
	2	Tue	23-May	02: Describing Motion	S02, Q02, HW01	Lab 01: Measurements
	3	Wed	24-May	03: Explaining Motion	S03, Q03, HW02	
	4	Thu	25-May	04: Motions in Space	S04, Q04, HW03	Lab 02: Motion
	5	Fri	26-May	05: Gravity	S05, Q05, HW04, HW05	
				Exam 1 (1-5)		
2		Mon	29-May	Memorial Day		
	6	Tue	30-May	06: Momentum	S06, Q06	Lab 03: Momentum
	7	Wed	31-May	07: Energy	S07, Q07, HW06	
	8	Thu	1-Jun	08: Rotation	S08, Q08, HW07	Lab 04: Energy
	9	Fri	2-Jun	09: Classical Relativity	S09, Q09, HW08, HW09	
				Exam 2 (6-9)		
3	10	Mon	5-Jun	10: Einstein's Relativity	S10, Q10	
	11	Tue	6-Jun	11: Structure of Matter	S11, Q11, HW10	Lab 05: Density
	12	Wed	7-Jun	12: States of Matter	S12, Q12, HW11	
	13	Thu	8-Jun	13: Thermal Energy	S13, Q13, HW12	Lab 06: Thermal Energy
	14	Fri	9-Jun	14: Available Energy	S14, Q14, HW13, HW14	
				Exam 3 (10-14)		
4	15	Mon	12-Jun	15: Vibrations and Waves	S15, Q15,	
	16	Tue	13-Jun	16: Sound and Music	S16, Q16, HW15	Lab 07: Waves and Sound
	17	Wed	14-Jun	17: Light	S17, Q17, HW16	
	18	Thu	15-Jun	18: Refraction of Light	S18, Q18, HW17	Lab 08: Light and Refraction
	19	Fri	16-Jun	19: Model of Light	S19, Q19, HW18, HW19	
				Exam 4 (15-19)		
5	20	Mon	19-Jun	20: Electricity	S20, Q20	
	21	Tue	20-Jun	21: Electric Current	S21, Q21, HW20	Lab 09: Electric Fields
	22	Wed	21-Jun	22: Electromagnetism	S22, Q22, HW21	
	23	Thu	22-Jun	23: The Early Atom	S23, Q23, HW22	Lab 10: Magnetic Fields
	24	Fri	23-Jun	24: The Modern Atom	S24, Q24, HW23, HW24	
				Exam 5 (20-24)		
6	25	Mon	26-Jun	25: The Nucleus	S25, Q25	
	26	Tue	27-Jun	26: Nuclear Energy	S26, Q26, HW25	Lab 11: Radioactive Decay
	27	Wed	28-Jun	27: Elementary Particles	S27, Q27, HW26	
	28	Thu	29-Jun	28: Frontiers of Physics	S28, Q28, HW27	No Lab!
	29	Fri	30-Jun	Review	HW28	
				Exam 6 (25-28)		

S = Chapter Reading Summary; Q = Lecture Quiz; HW = Homework