Clark S23 ⏫

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Physics 276 - Experimental Physics II: Electricity and Magnetism
Prof. Clark – Spring 2023

Course information: Experimental methods and tools related to circuits. Topics include inductance, capacitance, AC circuits, diodes, transistors, and amplifiers.

Instructor: Prof. Brian Clark, PSC 2105, Phone: 301-405-6036, e-mail: **baclark@umd.edu (mailto:baclark@umd.edu)** .

Office Hours: By appointment; feel free to contact me to schedule a meeting.

Schedule:

- Section 0301: Thursday 2:00pm-5:50 in PHYS 3203
- Section 0401: Wednesday 2:00pm-5:50 in PHYS 3203

Please see the schedule in the "Files" area of ELMS for our weekly agenda.

"PHYS 3203" means the Toll Physics Building, Room 3203.

Teaching Assistants (TA):

- Kiet Nguyen (kietln@umd.edu): Wed/Thurs
- Riya Samanta (riya@umd.edu): Mon/Tues

Laboratory Managers:

- Mr. Allen Monroe, rm 3311, John S. Toll building, 5-6002, amonroe@umd.edu
- Mr. Greg Wolter, rm 3202, John S. Toll building, 5-6004, gwolter1@umd.edu

Texts:

The lab instructions will be provided in the Files section of the ELMS area for this course. They will typically become available by Friday afternoon of the preceding week.

Optional Texts:

- Electronic Principles, Malvino
- Practical Electronics for Inventors, Scherz and Monk
- Understanding Basic Electronics, ARRL press
- The Art of Electronics, Horowitz and Hill
- A Practical Guide to Data Analysis for Physical Science Students; Louis Lyons, Cambridge Press
- An Introduction to Error Analysis; J. R. Taylor, University Science Books
- Elements of Style, E.B. White and William Strunk

Copies of these texts have been placed on hold at the STEM Library. You can find more information in the "Course Reserves" tab on ELMS.

Course policies: Students are responsible for notifying the instructor via email within the first two weeks of the semester about projected absences due to religious observances during the semester. Sometimes you can make up the lab during meeting time of one of the other sections.   However, you need explicit permission of the instructor for that section to do this. Only those with a valid written excuse for missing a lab will be considered. If you cannot schedule a makeup time during the same week in one of the existing sessions, you will need to schedule an individual makeup time with your instructor. Late arrival or the making of phone calls during the lab is not allowed.

Course requirements:

Experiments:

During the lab, you will create an excel spreadsheet that will be submitted for grading. Experimental science requires careful, well-documented, accurate data. Your spreadsheet will serve as a poor-man's log book. You need to treat it as such. You must include all information you might possibly need if somebody has a question about your result a year from now. This includes:

- Date
- Drawings and pictures of apparatus (use your cell phone camera) and the model numbers of equipment used
- All numbers must have neat accompanying text describing the number
- Your data, including uncertainties (both statistical and systematic.
- Analysis of data with propagation of errors
- Plots and histograms when appropriate, with intelligible labels

You will not get full credit if this information is missing. The spreadsheet must be uploaded to ELMS by midnight the day after lab (the exact deadline is listed in Canvas). You should seek as much advice as you need during the lab. To get a good grade, you should ask many questions of your instructor, TA, and other classmates.

The in-class spreadsheets will be graded out of 100 points as follows:

- +20 points: the lab is neat, and all information, especially numbers, are well labeled. Partial credit can be assigned at the discretion of the TA.
- The TA will make a list of all quantities that the lab asks to be put into the spreadsheet. The total of +80 points will be divided by this number. If the required information for each item is either missing or incorrect, those points will be deducted.

Laboratory Report: You will write a formal, paper-like report of your results for two of the experiments. The class schedule will indicate for which labs this is required. Lab reports should be submitted as a PDF file. The reports should be submitted electronically using the ELMS system (**http://elms.umd.edu/** ⤷ **(http://elms.umd.edu/)**), and will be due on the date indicated in ELMS. Please contact your instructor as soon as possible if an emergency occurs, delaying your submission. A detailed rubric, describing the lab report requirements and how they will be graded will be linked to ELMS and provided in the first class. **The second lab report will be graded more rigorously than the first.** Please note that the rules regarding plagiarism are relevant to lab reports. Large cut and pastes from the lab manual are not allowed. Any cut and paste of more than a sentence should be formatted following standard rules, to make it very clear which text comes from other's work.

Final exam: The final exam will be based on material covered during the semester. Students are expected to take data following appropriate experimental procedures and explain the underlying physics.   Knowledge of the workings of the instruments used in the lab will be tested. Please note that the use of google or any other external resource during the exam is expressly forbidden. If you have any questions either before or during the exam as to what resources can be used, please raise your hand and ask.

<u>Presentations:</u> Each student will give a 15 minute oral presentation relevant to AM radio and telecommunications. A list of suggested topics will be provided in ELMS. Other topics may also be chosen with permission of the instructor. No two students in the same section can have the same topic. In the provided assignment on ELMS, please upload in order of preference your first three choices for your topic. Most students (but not all) get their first choice. The instructor will notify you your assigned topic a few days after the upload deadline.

The date for the presentations is given in the schedule on ELMS.

The presentation should be accompanied by electronic slides in pdf format   A detailed grading rubric will be linked to the class web site and provided the first day of class.

<u>Late work</u>

Late work will receive a 20% grade reduction. No late work is accepted after reading day (exceptions can be made for severe unexpected emergencies). If you miss a deadline due to an excused absence, you must contact me to schedule a new deadline within a week of missing the work (exceptions can be made for severe emergencies).

Grade: The grade is determined as a weighted average, using the weights given below. The plus/minus grading system is used.

- 50%: In-class Spreadsheet
- 20%: Lab reports
- 15%: Presentation
- 15%: Final Exam

Bad weather: Winter in the Washington Metro area can bring large snowstorms that make travel dangerous. Should this happen, and the University is closed as a result during a scheduled lab, class will be cancelled, and we will most likely reschedule the lab for the following week. Please look at ELMS for this class for details. Closing is announced on the University's homepage: **http://www.umd.edu/** ⊟→ **(http://www.umd.edu/)** .

University policies: An official list of University academic policies can be found at: **http://www.ugst.umd.edu/courserelatedpolicies.html** ⊟→ **(http://www.ugst.umd.edu/courserelatedpolicies.html)** . Please see this list for policies on University-

recognized reasons for missing a class, policies regarding academic integrity including plagiarism, and other matters.

Accessibility and Disabilities: If you have a documented accessibility need, please contact me as soon as possible with your accommodation form from the **Accessibility and Disability Service** ⤷ **(https://www.counseling.umd.edu/ads/)** (ADS) office. This will allow us time to make arrangements.

Disclaimer:

The instructor reserves the right to make minor changes to this syllabus to meet the specific needs of the class during the semester. Any changes will be announced in ELMS.

Course Summary:

Date	Details	Due
Thu Feb 9, 2023	📝 **lab spreadsheet lab 1 (https://umd.instructure.com/courses/1342956/assignments/6219779)** (PHYS276-0401)	due by 11:59pm
Fri Feb 10, 2023	📝 **lab spreadsheet lab 1 (https://umd.instructure.com/courses/1342956/assignments/6219779)** (PHYS276-0301)	due by 11:59pm
	📝 **upload order list of three topics (https://umd.instructure.com/courses/1342956/assignments/6219784)**	due by 11:59pm
Thu Feb 16, 2023	📝 **lab spreadsheet lab 2 (https://umd.instructure.com/courses/1342956/assignments/6219779)** (PHYS276-0401)	due by 11:59pm
Fri Feb 17, 2023	📝 **lab spreadsheet lab 2 (https://umd.instructure.com/courses/1342956/assignments/6219779)** (PHYS276-0301)	due by 11:59pm
Thu Feb 23, 2023	📝 **lab spreadsheet lab 3 (https://umd.instructure.com/courses/1342956/assignments/6219779)** (PHYS276-0401)	due by 11:59pm
	📝 **lab spreadsheet lab 3**	

Fri Feb 24, 2023	[https://umd.instructure.com/courses/1342956/assignments/6...](https://umd.instructure.com/courses/1342956/assignments/6) due by 11:59pm (PHYS276-0301)
Thu Mar 2, 2023	📝 **[formal lab report lab 3](https://umd.instructure.com/courses/1342956/assignments/62t579)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0401)
	📝 **[lab spreadsheet lab 4](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0401)
Fri Mar 3, 2023	📝 **[formal lab report lab 3](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0301)
	📝 **[lab spreadsheet lab 4](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0301)
Thu Mar 9, 2023	📝 **[lab spreadsheet lab 5](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0401)
Fri Mar 10, 2023	📝 **[lab spreadsheet lab 5](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0301)
Wed Mar 15, 2023	📝 **[oral presentation](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0401)
Thu Mar 16, 2023	📝 **[oral presentation](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0301)
Thu Mar 30, 2023	📝 **[lab spreadsheet lab 6](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0401)
Fri Mar 31, 2023	📝 **[lab spreadsheet lab 6](https://umd.instructure.com/courses/1342956/assignments/6)** **(https://umd.instructure.com/courses/1342956/assignments/6...)** due by 11:59pm (PHYS276-0301)

Thu Apr 6, 2023	📝 **lab spreadsheet lab 7 [(https://umd.instructure.com/courses/1342956/assignments/6245789)](https://umd.instructure.com/courses/1342956/assignments/6245789)** (PHYS276-0401)	due by 11:59pm
Fri Apr 7, 2023	📝 **lab spreadsheet lab 7 [(https://umd.instructure.com/courses/1342956/assignments/6245789)](https://umd.instructure.com/courses/1342956/assignments/6245789)** (PHYS276-0301)	due by 11:59pm
Thu Apr 13, 2023	📝 **formal lab report lab 7 [(https://umd.instructure.com/courses/1342956/assignments/6245779)](https://umd.instructure.com/courses/1342956/assignments/6245779)** (PHYS276-0401)	due by 11:59pm
	📝 **lab spreadsheet lab 8 [(https://umd.instructure.com/courses/1342956/assignments/6245789)](https://umd.instructure.com/courses/1342956/assignments/6245789)** (PHYS276-0401)	due by 11:59pm
Fri Apr 14, 2023	📝 **formal lab report lab 7 [(https://umd.instructure.com/courses/1342956/assignments/6245779)](https://umd.instructure.com/courses/1342956/assignments/6245779)** (PHYS276-0301)	due by 11:59pm
	📝 **lab spreadsheet lab 8 [(https://umd.instructure.com/courses/1342956/assignments/6245789)](https://umd.instructure.com/courses/1342956/assignments/6245789)** (PHYS276-0301)	due by 11:59pm
Thu Apr 20, 2023	📝 **lab spreadsheet lab9 [(https://umd.instructure.com/courses/1342956/assignments/6245789)](https://umd.instructure.com/courses/1342956/assignments/6245789)** (PHYS276-0401)	due by 11:59pm
Fri Apr 21, 2023	📝 **lab spreadsheet lab9 [(https://umd.instructure.com/courses/1342956/assignments/6245789)](https://umd.instructure.com/courses/1342956/assignments/6245789)** (PHYS276-0301)	due by 11:59pm
Thu Apr 27, 2023	📝 **lab spreadsheet lab10 [(https://umd.instructure.com/courses/1342956/assignments/6245779)](https://umd.instructure.com/courses/1342956/assignments/6245779)** (PHYS276-0401)	due by 11:59pm
Fri Apr 28, 2023	📝 **lab spreadsheet lab10 [(https://umd.instructure.com/courses/1342956/assignments/6245779)](https://umd.instructure.com/courses/1342956/assignments/6245779)** (PHYS276-0301)	due by 11:59pm

| Wed May 10, 2023 | 📝 **Final Exam [(https://umd.instructure.com/courses/1342956/assignments/6219770)](https://umd.instructure.com/courses/1342956/assignments/6219770)** (PHYS276-0401) | due by 11:59pm |
| Thu May 11, 2023 | 📝 **Final Exam [(https://umd.instructure.com/courses/1342956/assignments/6219779)](https://umd.instructure.com/courses/1342956/assignments/6219779)** (PHYS276-0301) | due by 11:59pm |