Syllabus PHYS 449, 479 and 489

Instructor:
Dr. Lilian Childress (lilian.childress@mcgill.ca).

Communication: Please contact me via email – I will not have access to my office phone. I will respond to email within one business day.

Prerequisites for registration: Permission from me and the project supervisor.

Overview: In these project courses, each student or pair of students will have the opportunity to complete a research project related to physics or computational physics supervised by a faculty member (either in physics or another department). The ultimate goal of the project is to investigate or build something new, to present the results to peers for feedback and discussion, and to write a concise and high-quality report that will be useful to the research supervisor and group.

Students are responsible for finding a supervisor, a partner, and a project before the course begins; note that working with a partner is highly recommended, but not strictly required. Note that to ensure impartiality the course instructor will not supervise any projects. All projects must be approved by the course instructor and supervisor prior to the start of the course.

Expectations of ongoing research work: You are expected to establish a research schedule with the project supervisor at the outset; this should be equivalent to at least 9 hours per week of work. You (and your partner, if applicable) should set up regular (weekly or bi-weekly) meetings with your supervisor or another member of the supervisor's research team.

Requirement submissions and deadlines:

All submissions should be made via MyCourses in .pdf format, with the filename PHYS4X9_StudentLastName(s)_SupervisorLastName_Submission (where Submission describes what you are submitting, e.g. "Proposal" "Outline" or "Final Report"). In addition to submitting via MyCourses, you must also send a copy to your supervisor via email, with your partner (if applicable) and the course instructor in cc.

1. **Initial project proposal (due January 25, 2021)**. A 1- page outline of the project and confirmation of your supervisor and partner. The students must discuss and refine their projects with the supervisors, prior to submission. The proposal document should include: Project title, students' names, supervisor's name, and a half-page project description that motivates the project and describes its goal, in complete sentences. It should be comprehensible to a non-expert (e.g. comprehensible to a classmate of the student). Further, it should briefly describe a plan for the semester, with clear milestones described as a function of time, agreed upon by the students and supervisor. For instance, the plan could address the intended frequency and planning of meetings between the student and supervisor (or a research group member), to ensure sufficient research support. It should be read and approved by the supervisor prior to submission, and the supervisor must be emailed a copy (with the course instructor in cc).
2. **Interim report (tentatively due March 8, 2021)** An interim report of approximately 3-4 pages (single spaced) or 5-7 pages (double spaced) is due in outline format. The interim report should include a detailed, "bullet-point" outline of the anticipated final report, in the spirit of "*Writing a Paper*" by George Whitesides (though you should adapt the sections and format as needed for

your project). The interim report should reflect your progress to date and your research plans. The interim report should contain at least 2 figures, including data and complete captions, and all planned figures should be fully described. The outline must include the project title, your name(s) and your supervisor's name. Please note that your supervisor is expected to provide preliminary feedback on the interim report prior to submission, so you will want to begin working on it at least several weeks in advance of the deadline.

3. **Final presentations (tentative: April 8-16, 2021)** Each project will give an oral presentation of 15 minutes duration (12 min talk + 3 min questions), most likely via Zoom, exact date to be determined. Please note that the timing requirements are quite strict – no more than 10 slides are recommended; the presentations will be recorded. The presentations should be aimed at an audience of undergraduate physicists, and provide motivation and context, a description of the subject area and project, a clear explanation of your contribution, and appropriate conclusions, outlook, and references. These presentations offer an opportunity to share your work with classmates, practice formal presentation skills, and get feedback prior to finishing the final report.
4. **Final report (tentative: April 20, 2021)** The final report should build on the interim report, converting the detailed outline into a full manuscript in the style of a research paper. The typical length is 6-8 pages single-spaced or 10-14 pages double spaced, including all figures and references. Please follow your supervisor's preference for format and single- vs double-spacing.

Additional course components:

The above list represents only the required components of the course. In addition, the following are recommended but not required.

1. **Course meeting (mid-to-late January, time TBD)** A meeting will be held after all students have committed to the course to discuss the course requirements, give examples of what is asked for, and decide on dates for subsequent deadlines. A scheduling poll will be sent to decide the time of the meeting.
2. **Feedback on draft presentations (times TBD)** There will be slots for short virtual meetings (optional) for students to sign up to discuss a draft version of their presentation slides with the instructor. You will need to provide the draft slides in .ppt or .pdf format.

Evaluation:

- Interim report (10%) – graded pass/fail (100/0). Note that the purpose of the interim report is not to judge your work: its purpose is to provide you an opportunity to get early feedback, and help you to pace your work. If you fail, you may resubmit (within 1 week of receiving your grade) for 80% credit.
- Oral presentation (30%) – Evaluation by supervisor and instructor.
- Research work and final report (60%) – Evaluation by supervisor with review by instructor. Note that supervisors may request additional supporting information such as detailed wikis, documentation, well-commented codes, etc. which relate to continuity of research in their groups. The supervisor will comment on the quality of this documentation and lab book as part of the research work component of the course mark.

NOTE: Your work will primarily be evaluated by your supervisor, since they are in the best position to understand and assess your contributions. The role of the instructor is to ensure uniformity in

evaluation across different supervisors, and to assist you in creating the highest-quality materials possible.

Inclusivity and accessibility: This course is intended to serve students from diverse backgrounds, and interactions in the course must respect all students' identities, whether involving gender, race, ethnicity, sexuality, disability, or socioeconomic status.

- Information about accessibility resources at McGill can be found at https://mcgill.ca/equity/resources/disability, along with information specific to accessibility at home during the COVID-19 pandemic: https://mcgill.ca/equity/resources/disability/accessibility-home-during-covid-19
- Please contact me if you have any concerns, for example:
    - you would like to let me know your preferred name or pronoun.
    - you anticipate a conflict with a religious holiday or event.
    - you have concerns about your current situation or experience impacting your performance in the course.
- As an instructor, I am still learning about others' perspectives and experiences and how best to welcome and educate a diverse student population. I invite you to reach out to me with any concerns, questions, or suggestions.

Notes:

- McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ for more information).
- Work submitted for evaluation as part of this course may be checked with text matching software.
- In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.
- Additional policies governing academic issues which affect students can be found in the McGill Charter of Students' Rights.
- In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.