



# PHYS 590 – PHYSICS UNDERGRADUATE RESEARCH THESIS

## Course Syllabus – 2023/24

This is your course syllabus. Please download the file and keep it for future reference.

### TEACHING TEAM

#### COURSE COORDINATOR

#### Alex Wright

Department of Physics, Engineering Physics, and Astronomy  
Queen's University

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Office hours: By appointment

About me: I am an Associate Professor here in the Department of Physics, Engineering Physics, and Astronomy, and a Research Scientist with the Institute of Particle Physics. My research is in the area of Astroparticle Physics; specifically I work on experiments studying neutrinos and searching for dark matter. For more information about me and my research you are welcome to visit my research web site at <https://www.queensu.ca/academia/wright/>.

#### RESEARCH ADVISOR

Each student in PHYS 590 is matched with a faculty member in the Department of Physics, Engineering Physics, and Astronomy, or a closely aligned Department, who acts as that students' research advisor.

# PHYS 590 (Fall 2023/Winter 2024: 6.0 Units)

## COURSE DESCRIPTION

Investigation of a contemporary research topic in physics or astronomy under the supervision of a faculty member, and leading to a written thesis and an oral presentation of results.

## PRE-REQUISITES

Level 4 or above and registration in a PHYS, ASPH or MAPH Plan

## PRE-REQUISITE KNOWLEDGE

This course is designed for upper year students with an interest in pursuing research. The pre-requisite knowledge varies with the research topic selected; students are encouraged to discuss the pre-requisite knowledge for a specific topic with the relevant faculty member.

## COURSE LEARNING OUTCOMES (CLOs)

By the end of this course, students should be able to:

CLO	DESCRIPTION
CLO 1	Present a significant personal contribution to cutting-edge scientific research.
CLO 2	Carry out cutting-edge scientific research with increasing confidence, technical skill, and autonomy.
CLO 3	Prepare manuscripts describing research results in the style expected by scientific journals.
CLO 4	Prepare and present scientific posters that describe research results in the style expected at scientific conferences.
CLO 5	Prepare and deliver oral presentations describing scientific research results in the style expected at scientific conferences.

## EXPECTED TIME COMMITMENT

Students in PHYS 590 should expect to spend at least 10 hours per week on the course. With relatively few and widely spaced deliverables, active time management on the part of the student is important to ensure successful completion of the course.

# COURSE TIMELINE AND EVALUATION

## DELIVERABLES TIMELINE AND WEIGHTING

Deliverable	Due Date (before 23:59 ET)	Weight
<b>Initial Deliverable</b>		<b>2%</b>
Project Proposal	September 22 <sup>nd</sup>	2%
<b>Midyear Deliverables</b>		<b>28%</b>
Midyear Report Draft	November 9 <sup>th</sup>	1%
Midyear Report	November 23 <sup>rd</sup>	18%
Midyear Oral Presentation	Week of December 4 <sup>th</sup>	9%
<b>Final Deliverables</b>		<b>70%</b>
Final Report Draft	March 14 <sup>th</sup>	1%
Final Report	March 28 <sup>th</sup>	46%
Final Poster Presentation	Week of April 8 <sup>th</sup>	23%
		<b>100%</b>

## DELIVERABLES DESCRIPTIONS

### Project Proposal

The project proposal should be 1 page in length and describe the aim of your research project and briefly discuss the proposed methodology. You may wish to include one or two key references. Students who are working with their summer research supervisors should provide an additional description of the relation between their summer work and the work they plan to do in PHYS 590. The proposal should be submitted in electronic form, by email, to the course coordinator. The project proposals help me to ensure that everyone's projects are a good fit with PHYS 590 course expectations

## Written Report Drafts (Midyear and Final)

Report drafts are due about two weeks before each of the major reports. These drafts, in pdf form, should be sent electronically to your supervisor and the course coordinator for comment/feedback. The drafts are meant to be an opportunity for us to provide you with constructive feedback, so the more complete the draft the more useful our feedback can be. The drafts should include at a minimum a properly formatted skeleton of the paper with section headings, an image, and a point form outline of what you plan to say in each section – this will help you get started with your thinking about the draft contents and ensure you have the formatting tools in place. This is intended to be helpful, and will be graded as either 0 or 1/1. Should you receive 0, the mark will be dropped and the weighting assigned to this component in your overall mark will be added to the corresponding written report.

## Midyear Report

Midyear reports should be no more than 10 pages in length (including figures and tables). Reports should be formatted in the style of a journal publication, with single line spacing and 12 pt font. Reports should be prepared using a word-processing package that is capable of handling equations, tables, and figures, as necessary (use of LaTeX is recommended; I can provide an introduction if requested). The reports should include an introduction, a literature review, a discussion of methodology, a report of progress to date, and a clear statement of the goals for the coming semester. Students should include (as an appendix and not counted toward the page limit) a timeline for their remaining 590 work. PDF versions of the report should be emailed to me and your supervisor. Further information regarding the report format and assessment, including the grading rubric, will be provided in a class meeting nearer the end of term.

## Midyear Oral Presentation

An oral presentation of your results to your assessment committee. The presentations should be 12 minutes in length, and will be followed by questions from the committee. Further guidance regarding the oral presentation will be provided in a class meeting near the end of term.

## Final Report

The Final Report should be similar in format to the Midyear Report, but may be up to 20 pages in length. A PDF version of the report should be emailed to me and your supervisor.

## Final Poster Presentation

A scientific poster describing your research and results will be produced and presented. The poster will be presented “socially” to members of the Department of Physics, Engineering Physics, and Astronomy through a joint poster session with ENPH 455 students, followed by scheduled presentations to your committee members. Further guidance on poster production and presentation, including the marking rubrics, will be provided during a class meeting nearer the end of winter term.

## GRADING

The major deliverables in this course will be evaluated by a committee including your supervisor and two faculty members who are experts in your research area. The grading rubrics for each deliverable will be made available to you well in advance of the deliverable submission date.

All assessments in this course will receive numerical grades. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade using Queen's official grade conversion scale:

Grade	Numerical Course Average (Range)
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

## LATE POLICY

Students who submit deliverables late will receive a 10% deduction for the first day late, and an additional 5% deduction for each day thereafter. In the event of extenuating circumstances penalty-free extensions may be pre-arranged, at the discretion of the course coordinator.

# COURSE COMMUNICATION

## COURSE ANNOUNCEMENTS

Course announcements will be circulated by email. Please check your Queen's email account on a regular basis.

## COURSE WEB SITE

The course web site is available at <https://www.queensu.ca/academia/wright/teaching/phys-590-info/phys-590-2023-2024>.

## MEETINGS WITH RESEARCH ADVISOR

It is the student's responsibility to remain in good contact with their research advisor. It is recommended that regular meetings (typically weekly or semi-weekly) be established.

## MEETING WITH COURSE COORDINATOR

If you have anything that you would like to discuss with the course coordinator, please email me at the address on the first page of this document and we can find a time to meet.

# STATEMENTS AND POLICIES

## ACADEMIC SUPPORT

All undergraduate students face new learning and writing challenges as they progress through university: essays and reports become more complex; effectively incorporating research into writing becomes more important; the types of assignments become more diverse; managing your time and developing the skills you need to read and think critically gets more challenging. I encourage students to contact Student Academic Success Services (SASS). SASS offers many different ways to receive support:

- Free online or in-person [appointments](#) to get personalized support on writing and academic skills from expert staff and trained peers.
- [Workshops](#) and [drop-in programs](#). SASS' [Events Calendar lists events coming soon](#).
- [Online resources](#) that provide strategies for academic skills and writing development at university.
- If English is not your first language, SASS has specific resources for [English as Additional Language students](#), including weekly programs and EAL academic skills

appointments. You can meet on an ongoing basis with an EAL consultant to work on your academic writing, speaking, listening, and reading skills.

## **ACCOMMODATIONS FOR DISABILITIES**

Queen's University is committed to working with students with disabilities to remove barriers to their academic goals. Queen's Student Accessibility Services (QSAS), students with disabilities, instructors, and faculty staff work together to provide and implement academic accommodations designed to allow students with disabilities equitable access to all course material (including in-class as well as exams). If you are a student currently experiencing barriers to your academics due to disability related reasons, and you would like to understand whether academic accommodations could support the removal of those barriers, please visit the [QSAS website](#) to learn more about academic accommodations or start the registration process with QSAS by clicking Access Ventus button at [Ventus | Accessibility Services | Queen's \(queensu.ca\)](#)

VENTUS is an online portal that connects students, instructors, Queen's Student Accessibility Services, the Exam's Office and other support services in the process to request, assess, and implement academic accommodations.

To learn more go to: <https://www.queensu.ca/ventus-support/students/visual-guide-ventus-students>

## **ACADEMIC CONSIDERATION FOR STUDENTS IN EXTENUATING CIRCUMSTANCES**

Academic Consideration is a process for the University community to provide a compassionate response to assist students experiencing unforeseen, short-term extenuating circumstances that may impact or impede a student's ability to complete their academics. This may include but is not limited to,

- Short term Physical or Mental Illness or Injury (stomach flu, anxiety/depression, mononucleosis, concussion, broken bones, surgery, medical treatments, etc.)
- Traumatic Event/Confidential (Bereavement, serious injury, illness or required treatment for a significant other/family member or a traumatic event such as divorce, sexual assault, social injustice, etc.)
- Requirements by Law or Public Health Authorities (court dates, jury duty, requirements to isolate, etc.)
- Significant Event (varsity athletic event, distinguished event, serving in the Reserve Forces, etc.)

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances. For more information, please see the [Senate Policy on Academic Consideration for Students in Extenuating Circumstances](#).

Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. For more information, undergraduate students in the Faculty of Arts and Sciences should consult the Faculty's webpage on [Academic Consideration in Extenuating Circumstances](#) and submit a request via the [Academic Consideration Request Portal](#). Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

Students are encouraged to submit requests as soon as the need becomes apparent and to contact their instructor and/or course coordinator as soon as possible once academic consideration has been granted. Any delay in contact may limit the options available for academic consideration.

For more information on the Academic Consideration process, what is and is not an extenuating circumstance, and to submit an Academic Consideration request, please see the Faculty of Arts and Science's [Academic Consideration website](#). ASO courses include links to information on Academic Consideration on your Course Homepage in onQ.

Please see the Teaching Team page for contact information for your instructor and TA(s), where relevant.

## **ACADEMIC INTEGRITY**

Queen's University is dedicated to creating a scholarly community free to explore a range of ideas, to build and advance knowledge, and to share the ideas and knowledge that emerge from a range of intellectual pursuits. Queen's students, faculty, administrators and staff therefore all have responsibilities for supporting and upholding the fundamental values of academic integrity. Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility and by the quality of courage. These values and qualities are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University.

The following statements from "The Fundamental Values of Academic Integrity" (2nd edition), developed by the International Center for Academic Integrity (ICAI), contextualize these values and qualities:

1. **Honesty** Academic communities of integrity advance the quest for truth and knowledge through intellectual and personal honesty in learning, teaching, research, and service.
2. **Trust** Academic communities of integrity both foster and rely upon climates of mutual trust. Climates of trust encourage and support the free exchange of ideas which in turn allows scholarly inquiry to reach its fullest potential.



3. **Fairness** Academic communities of integrity establish clear and transparent expectations, standards, and practices to support fairness in the interactions of students, faculty, and administrators.
4. **Respect** Academic communities of integrity value the interactive, cooperative, participatory nature of learning. They honor, value, and consider diverse opinions and ideas.
5. **Responsibility** Academic communities of integrity rest upon foundations of personal accountability coupled with the willingness of individuals and groups to lead by example, uphold mutually agreed-upon standards, and take action when they encounter wrongdoing.
6. **Courage** To develop and sustain communities of integrity, it takes more than simply believing in the fundamental values. Translating the values from talking points into action -- standing up for them in the face of pressure and adversity -- requires determination, commitment, and courage.

Students are responsible for familiarizing themselves with and adhering to the Senate [regulations](#) concerning academic integrity, along with [Faculty or School](#) specific information. Departures from academic integrity include, but are not limited to, plagiarism, use of unauthorized materials, facilitation, forgery and falsification. Actions which contravene the regulation on academic integrity carry sanctions that can range from a warning, to loss of grades on an assignment, to failure of a course, to requirement to withdraw from the university.

### **GENERATIVE ARTIFICIAL INTELLIGENCE (AI) TOOLS**

Using generative AI writing tools such as ChatGPT in your submitted work is not permitted in this class. This type of use constitutes a Departure from Academic Integrity.

Original work, completed wholly by you, is expected to be submitted in this course. The use of an artificial intelligence tool like ChatGPT is not permitted.

### **EQUITY, DIVERSITY, AND INCLUSIVITY STATEMENT**

Queen's University is committed to counteracting discrimination in this institution and developing a climate of educational equity that recognizes and respects the equal dignity and worth of all who seek to participate in the life, work and mission of the University. Such a climate is created and maintained by developing a university-wide commitment to and understanding of educational equity, supported by policies, programs, curricula, practices and traditions that facilitate individuals - and equity-seeking groups - free, safe, and full participation.

## **LAND ACKNOWLEDGEMENT**

Queen's University is situated on the traditional territory of the Anishinaabek and Haudenosaunee.