



Faculty of Engineering and Applied Science

## CHEE 421 –RESEARCH PROJECT

### Course Syllabus – Fall & Winter 2021/2022

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

#### LAND ACKNOWLEDGEMENT

Queen's University is situated on traditional Anishinaabe and Haudenosaunee Territory.  
See: <http://www.queensu.ca/encyclopedia/t/traditional-territories>

#### INCLUSIVITY STATEMENT

Queen's students, faculty, and staff come from every imaginable background – small towns and suburbs, urban high rises, Indigenous communities, and from more than 100 countries around the world. You belong here: <https://www.queensu.ca/inclusive/>.

## TEACHING TEAM

#### COURSE INSTRUCTOR

**David Poirier, M.Sc., P.Eng.**  
Chemical Engineering  
Queen's University

E-mail: [david.poirier@queensu.ca](mailto:david.poirier@queensu.ca)



For an up-to-date list of personnel, please check the course website.

## CHEE 421 (FW K7)

### COURSE DESCRIPTION

This course provides an opportunity for students to work on an individual basis with faculty members of the department. Students will submit interim oral and written progress reports and a final oral presentation and technical report. They will be expected to present and defend their results in a conference/seminar setting. The projects may be concerned with engineering design and development work or may be of a more fundamental research nature. Students enrolling for this course are advised to consult with the faculty member concerned late in the winter term of their 3<sup>rd</sup> year of study.

(0/0/28/0/56) (Mathematics/Natural Sciences/Complementary Studies/Engineering Science/Engineering Design)

### COURSE LEARNING OUTCOMES (CLO)

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

CLO	DESCRIPTION	INDICATORS
CLO 1	Identify the knowledge/skills required, evaluate available literature, and design experiments and/or develop methodology to meet the project objective(s) safely and efficiently.	IN-Conduct LL-Reflection LL-Acquisition LL-Information
CLO 2	Apply appropriate engineering techniques, tools, and processes to accomplish the task.	ET-Create ET-Apply IN-Analysis IN-Safety
CLO 3	Synthesize information from experimentation, investigation, and literature to reach substantiated conclusions.	IN-Synthesis
CLO 4	Describe nature and possible causes of uncertainty in analysis, interpretation, and measurement.	ET-Limitations
CLO 5	Generate a traceable and defensible record of the project using an appropriate project records system.	TW-Contribution CO-Documentation EC-Management
CLO 6	Write and revise technical memos and reports to communicate intentions and findings using appropriate conventions and concise, precise, and clear language.	CO-Written CO-Graphics
CLO 7	Demonstrate confidence in formal and informal oral communications with supervisor and colleagues.	CO-Spoken CO-Graphics TW-Feedback PR-Interpersonal

This course develops the following attributes at the 4<sup>th</sup> year level:

**Investigation (IN):**

**IN-Conduct** Conduct investigations to test hypotheses related to complex problems. **Analysis** Analyze and interpret data using appropriate techniques and tools.

**IN-Synthesis** Synthesize information from investigations, considering sources of uncertainty and limitations to reach substantiated conclusions.

**IN-Safety** Adhere to appropriate workplace safety protocols in all work environments.

**Engineering Tools (ET):**

**ET-Create** Develop, adapt, and/or extend appropriate software, equipment, models, and simulations for a range of engineering activities.

**ET-Apply** Apply and manage appropriate techniques, apparatus, databases, models, tools, and/or processes to accomplish a task.

**ET-Limitations** Evaluate limitations and errors of instrumentation/ measurement techniques/models/ simulations to assess appropriateness of the results.

**Individual and teamwork (TW):**

**TW-Contribution** Take initiative to plan, organize and complete tasks, as an individual and team member, in order to meet goals.

**TW-Feedback** Share ideas and information by eliciting, giving, and applying positive and effective feedback.

**Communications (CO):**

**CO-Written** Produce clear, concise, precise, and well-organized written communication with language appropriate for the audience.

**CO-Spoken** Deliver formal and informal oral presentations with suitable language, content, style, timing, and flow, while adapting format, content and tone to audience and purpose.

**CO-Graphics** Create figures, maps, tables, and drawings to engineering report standards.

**CO-Documentation** Generate a traceable and defensible record of a technical project using an appropriate records system.

**Professionalism (PR):**

**PR-Interpersonal** Demonstrate professional conduct and integrity.

**Economics and Project Management (EC):**

**EC-Management** Effectively plan project, including mitigating risk and managing change, to complete project on-time and on-budget.

**Life-long learning (LL):**

**LL-Reflection** Evaluate and reflect on own knowledge, skills, and learning. **Acquisition** Independently acquire new knowledge and skills for ongoing personal and professional development.

**LL-Information** Identify, organize, and critically evaluate information from an appropriate range of sources, to meet learning needs.

## RELEVANCE TO THE PROGRAM

This course provides students with an opportunity to work with a Chemical Engineering Faculty Member on a project related to a Professor's research program. The structure of the course requires students to produce similar deliverables to those expected of a Masters candidate working on a similar project. This course is an excellent fit for someone considering an advanced engineering or science degree.

## COURSE EVALUATION

### ASSESSMENT WEIGHTING

Deliverable*	Week or Date*	Weight	Alignment with CLOs
Course orientation and safety briefing quiz	1 <sup>st</sup> week of term	2%	
Memos of research progress (4 in total)	end of Oct, Nov, Jan & Feb	10%	5
Literature review & proposal	mid-Oct	20%	1
Interim seminar presentation	early Dec	10%	7
Final seminar presentation	early Apr	15%	7
Draft version of final report	mid-March	20%	2, 3, 4, 6, 7
Final report (short journal article)	early Apr	15%	2, 3, 4, 6, 7
Work practices (teamwork, safety practices, being tidy, organized, prepared in the lab, etc.)	throughout Fall and Winter terms	5%	1, 2, 5, 7
Assessment of the contribution by each team member to the work done (peer evaluation)	end of Winter term	3%	7

\* See course onQ (D2L) website for assessment descriptions and deadlines/due dates.

### GRADING

All assessments in this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade according to the established [Grade Point Index](#).

### Feedback on Assessments

The Research Supervisor and Course Instructor will provide feedback on graded activities on onQ.

### Accessing Your Final Grade

Your final grades will show on SOLUS. Official transcripts showing final grades will be available on the Official Grade Release Date at the end of Winter term (there will be no interim grade at the end of Fall term).

## COURSE MATERIALS

### Required Textbook

- No textbook required

The main information resource for CHEE 421 is the course onQ (D2L) website. Information related to deliverable expectations, evaluation rubrics, safety, schedules, project information, etc. can all be found in content modules on the course onQ website.

Technical information related to research projects can be found in published scientific literature and materials provided by your Research Supervisor.

### Required Hardware/Software

Students must have a reliable [internet connection and hardware](#) that are compatible with online learning and remote proctoring system requirements.

### Required Time Commitment

Students are required to spend a minimum of 10 hours/week during both terms working on their research projects. Students submit regular progress memos to the Course Instructor and are required to have regular meetings with their Research Supervisor/s.

## COURSE STRUCTURE AND ACTIVITIES

There are no regularly scheduled lectures for this course. Students are required to spend a minimum of 10 hours/week in both terms working on their research projects. Students submit regular progress memos to the Course Instructor and are required to have regular meetings with their Research Supervisor/s.

The research project course involves the following main tasks/events:

- Mandatory course orientation and safety lectures are given during the 1<sup>st</sup> week of Fall term.
- Meeting with Project Supervisor to clarify project objectives.
- A literature search workshop is held the 2<sup>nd</sup> week of Fall term.
- A literature review and project proposal are due mid-October.
- Interim oral presentations are made in a seminar setting at the end of Fall term.

- A journal article writing workshop is held the 2<sup>nd</sup> week of February.
- A final report in the form of a journal article is due at the end of Winter term.
- Final oral presentations are made in a seminar setting at the end of Winter term

Information related to CHEE 421 deliverable expectations, evaluation, safety, schedules, etc., can be found on the CHEE 421 website. Complete course information, including submission links for electronically submitted deliverables can be found on the course onQ (D2L) website.

## **EXPECTATIONS FOR LAB WORK**

An emphasis is placed upon minimal supervision in the laboratory and the importance of safety and successful teamwork. All students are required to read the department Safety Manual. Seeking help from within one's group and from fellow classmates is encouraged. Please consult your supervisors and/or graduate students in the research lab first.

# **COURSE COMMUNICATION**

## **NETIQUETTE**

In this course, you may be expected to communicate with your research group members and the course instructor through electronic communication. You are expected to use the utmost respect in your dealings with your colleagues or when participating in activities, discussions, and online communication.

## **QUESTIONS ABOUT COURSE MATERIAL**

Questions or comments regarding the course structure, requirements, policies, etc. should be addressed with the Course Instructor. Questions related to technical aspects of your research project should be address with your Research Supervisor or other members of the research group.

## **COURSE ANNOUNCEMENTS**

The instructor will post course news in the Announcements section on the main course homepage on onQ. Please sign up to be automatically notified by email when the instructor posts new information in onQ Announcements.

## **OFFICE HOURS**

Use e-mail to arrange meeting times with the Course Instructor or your Research Supervisor.

## **CONFIDENTIAL MATTERS**

If you have a confidential matter you would like to discuss with your instructor, their contact details are on the first page of this document. Expect email replies within 48 hours.

## COURSE POLICIES

Please review the following policies concerning copyright, academic integrity, absences and academic accommodations:

### COPYRIGHT

Unless otherwise stated, the material on the course website is copyrighted and is for the sole use of students registered in this course. The material on the website may be downloaded for a registered student's personal use but shall not be distributed or disseminated to anyone other than students registered in this course. Copying this material for distribution (e.g. uploading material to a commercial third-party website) can lead to a violation of Copyright law and constitutes a violation of Academic Integrity.

### ACADEMIC INTEGRITY

As an engineering student, you have made a decision to join us in the profession of engineering, a long-respected profession with high standards of behaviour. As future engineers, we expect you to behave with integrity at all times. Please note that Engineers have a duty to:

- Act at all times with devotion to the high ideals of personal honour and professional integrity.
- Give proper credit for engineering work

The standard of behaviour expected of professional engineers is explained in the [Professional Engineers Ontario Code of Ethics](#). Information on policies concerning academic integrity is available in the [Queen's University Code of Conduct](#), in the [Senate Academic Integrity Policy Statement](#), on the [Faculty of Engineering and Applied Science website](#), and from your instructor.

Departures from academic integrity include plagiarism, use of unauthorized materials or services, facilitation, forgery, falsification, unauthorized use of intellectual property, and collaboration, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the University.

### LATE POLICY

Unless other arrangements have been approved, [departmental policies](#) regarding late and missed assignments, and missed quizzes/exams will be followed. In the event of extenuating circumstances, you may request an extension to an assignment due date without penalty. Requests must be made to your instructor prior to the original due date of the assignment, and some substantiating documentation is often required (see information below on absences). Note that unacceptable reasons include extra-curricular activities, travel plans, generally behind on

schoolwork, etc. In the absence of substantiating documentation, the normal late penalty will apply as described in the assignment or departmental policies.

## **ABSENCES (ACADEMIC CONSIDERATIONS) AND ACADEMIC ACCOMMODATIONS**

For absences and academic accommodations please review the information on the [FEAS website](#).

## **ACADEMIC AND STUDENT SUPPORT**

Queen's has a robust set of supports available to you including the [Library](#), [Student Academic Success Services \(Learning Strategies and Writing Centre\)](#), and [Career Services](#). Learners are encouraged to visit the Faculty of Engineering and Applied Science [Current Students](#) web portal for information about various other policies such as academic advisors, registration, student exchanges, awards and scholarships, etc.

### **INDIVIDUAL NEEDS AND SUPPORT**

If you have a disability or health-related condition that may require academic accommodations, please approach the [Queen's Accessibility Services](#). The staff at Accessibility Services are available by appointment to develop individualized accommodation plans, provide referrals, and assist with advocacy. The sooner you let us know your needs, the better we can assist you in achieving your learning goals. For questions or assistance with requesting Academic Consideration or Accommodation, contact the FEAS Academic Accommodation Coordinator at [engineering.aac@queensu.ca](mailto:engineering.aac@queensu.ca)

Every effort has been made to provide course materials that are accessible. For further information on accessibility compliance of the educational technologies used in this course, please consult the links below.

<b>EDUCATIONAL TECHNOLOGY</b>	<b>ACCESSIBILITY COMPLIANCE INFORMATION</b>
onQ (Brightspace Learning Management System by D2L)	<a href="https://www.d2l.com/accessibility/standards/">https://www.d2l.com/accessibility/standards/</a>
Zoom	<a href="https://zoom.us/accessibility">https://zoom.us/accessibility</a>

If you find any element of this course difficult to access, please discuss with your instructor how you can obtain an accommodation.



## RELIGIOUS OBSERVANCE

Students in need of accommodation for religious observance are asked to speak to their professor within a week of receiving their syllabus. Note also that alternative assignments are considered a "reasonable accommodation" under the Ontario Human Rights Code. Students with questions about their rights and responsibilities regarding religious accommodation should contact Chaplain Kate Johnson via [Chaplain@queensu.ca](mailto:Chaplain@queensu.ca).

## TECHNICAL SUPPORT

Some basic comfort level with basic hardware and software skills are required for this course. If you require technical assistance, please contact [Technical Support](#).

## SUPPORTIVE PERSONAL COUNSELLING

If at any time you find yourself feeling overwhelmed, anxious, sad, lonely, or distressed, consider confidential supportive counselling offered by the [embedded counselors](#) at the Student Wellness Service Faculty of Engineering and Applied Science.