

2024 Syllabus CHEM/ENCH 211

COURSE INFORMATION	2
DESCRIPTION	2
TOPICS.....	2
IMPORTANT UNIVERSITY DATES	2
LEARNING OUTCOMES	2
INCLUSION.....	3
LAND ACKNOWLEDGEMENT	3
EQUITY, DIVERSITY, AND INCLUSIVITY STATEMENT.....	3
BUILDING A CLASSROOM COMMUNITY.....	3
FOSTERING ACCESSIBILITY.....	3
NAME/PRONOUN.....	4
COURSE MATERIALS & TECHNOLOGIES.....	4
REQUIRED COURSE TEXTBOOKS	4
OTHER REQUIRED MATERIALS.....	4
SUPPLEMENTAL MATERIALS	4
EDUCATIONAL TECHNOLOGIES, HELP, PRIVACY, AND ACCESSIBILITY	4
NOTICE OF OBSERVATION.....	5
COPYRIGHT OF COURSE MATERIAL	5
COMMUNICATION	5
QUESTIONS ABOUT THE COURSE AND CONTACTING THE TEACHING TEAM	5
QUEEN'S EMAIL.....	5
COURSE FEEDBACK.....	6
ASSESSMENTS.....	6
WEIGHTING AND ALIGNMENT WITH COURSE LEARNING OUTCOMES (CLOs).....	6
DESCRIPTIONS OF LEARNING ACTIVITIES, ASSESSMENTS, AND ASSESSMENT FLEXIBILITY	6
POLICY REVIEW OF GRADED WORK	8
POLICIES (SPECIFIC TO CHEM/ENCH 211)	8
ATTENDANCE	8
PASSING REQUIREMENTS.....	8
USE OF GENERATIVE ARTIFICIAL INTELLIGENCE (AI) TOOLS	8
POLICIES (ALL FACULTY OF ARTS AND SCIENCE).....	9
ACADEMIC SUPPORT	9
ACCOMMODATIONS FOR DISABILITIES	9
ACADEMIC CONSIDERATION FOR STUDENTS IN EXTENUATING CIRCUMSTANCES	9
QUEEN'S POLICY STATEMENT ON ACADEMIC INTEGRITY	10

Course Information

Course: **CHEM 211**

Course title: **Main Group Chemistry**

Pre-requisites: **CHEM 112** (or CHEM 109 and CHEM 110)

Semester and year: **Fall 2024**

Number of credits: **3**

Learning hours: **144 hours** (36 Lecture, 36 Laboratory, 9 Tutorial, 63 Private Study)

Modality (on campus, blended, or online): **On campus**

Classroom accessibility: Room is wheelchair accessible, has wide aisles, and has two wheelchair seats. Door handle is a lever, automatic door operator.

Description

An introduction to chemistry of main group inorganic and organic compounds with the use of fundamental quantum mechanics, molecular orbital diagrams and Lewis structures to describe the structure and bonding. The stereochemistry and chirality of organic compounds, solid state inorganic chemistry, and descriptive chemistry of compounds of the main group elements will be covered. The laboratory will introduce skills in inorganic and organic synthesis.

Topics

Week*	Module	Topic	Required Readings	
			Housecroft 4/5 ed.	Clayden 2 nd ed.
1	Unit 1	Atoms and Molecules (Review)	1	1, 2
2	Unit 1	Geometry and bonding (Review)	1, 2	1, 2
3	Unit 2	Symmetry	3.1 – 3.7	—
4	Unit 3	Valence Bond Theory	2 and 5.1 – 5.3	4
5	Unit 4	MO Theory - Introduction	2 and 5.4 – 5.5	4
6	Unit 4	MO Theory - Advanced	5.5 – 5.7	—
7	Unit 5	Chirality	3.8, 19.8	14
8	Unit 6	Conformational analysis	—	16
9	Unit 7	Delocalization	13.8, 14.4	7
10	Unit 7	Delocalization	13.8, 14.4	7
11	Unit 8	Groups 13-16	13-16	4, 5 (B-N bonds)
12	Unit 8	Case Study – Main Group	28**, 29**	27**, 42**

* Timeline is approximate. ** only a cursory reading is necessary

Important University Dates

Please visit the [Faculty of Arts and Sciences Sessional Dates website](#) for all academic deadlines.

Learning Outcomes

On successful completion of this course, students will be able to:

1. Predict molecular shapes using VSEPR theory, valence bond theory, and molecular orbital theory.
2. Describe molecular shapes in terms of point groups, stereochemistry, and types of isomers.
3. Prepare molecular orbital diagrams and interpret them to predict bonding order and molecular reactivity.
4. Explain the causes of differences in structure and reactivity of compounds of different main group elements.
5. Describe the structure, bonding, and reactivity of a given main group molecule.
6. Perform laboratory experiments using main group molecules given a written procedure.

Inclusion

Land Acknowledgement

Ne Queen's University e'tho nón:we nikanónhsote tsi nón:we ne Haudenosaunee táhnon Anishinaabek tehatihsnonhsáhere ne onhwéntsya.

Gimaakwe Gchi-gkinoomaagegamig atemagad Naadowe miinwaa Anishinaabe aking.

Chemistry is the “central science,” meaning that choices made by chemists have broad impacts on the land and its people. We must consider both benefits and hazards to ensure we respect and protect these lands. To read more about the history of the land, see the [Queen's Encyclopedia](#) and the [Office of Indigenous Initiatives](#)

Equity, Diversity, and Inclusivity Statement

In my teaching, I value equity, diversity, and inclusion because every person has a right to equitable treatment and learning environments that are free from discriminatory or abusive behaviour. The university and our classrooms are strengthened by diverse backgrounds, perspectives, and experiences. In this class I will work to promote an anti-discriminatory, anti-racist and accountable environment and commit to self-education on issues facing equity seeking groups. Every member of this class is asked to show respect for every other member. This allyship will ensure that all students in this class are treated fairly and are supported in their studies.

Building a Classroom Community

University is a place to share, question, and challenge ideas. Each student brings a different set of lived experiences. You can help to create a safer, more respectful classroom community for learners by following these guidelines:

- Make a personal commitment to learn about, understand, and support your peers.
- Assume the best of others and expect the best of them.
- Recognize and value the experiences, abilities, and knowledge each person brings to the course.
- Acknowledge the impact of oppression on other people's lives and make sure your words and tone are respectful and inclusive.
- Encourage others to develop and share their ideas.
- Pay close attention to what your peers say/write before you respond. Think through and re-read what you have written before you post online or send your comments to others.
- Be open to having your ideas challenged and challenge others with the intent of facilitating growth.
- Look for opportunities to agree with one another, building on and intentionally referencing peers' thoughts and ideas; disagree with ideas without making personal attacks, demeaning, or embarrassing others.

Fostering Accessibility

All of us have a shared responsibility for fostering accessibility and promoting meaningful inclusion of those with disabilities. The [Accessibility Hub](#) at Queen's University's Human Rights & Equity Office offer a host of [tutorials](#) that provide us all with practical tips for:

- creating accessible documents, e.g., to submit to your teaching team or share with peers in peer feedback activities/in a presentation,
- emails, e.g., while communicating with group members or your teaching team, and
- meeting practices (e.g., in tutorials/labs/seminars or virtual meetings).

Name/Pronoun

If, for whatever reason, you wish to change how your name appears in onQ and/or on class lists, please follow these steps. You may also use this process to add your pronouns to the appearance of your name.

1. Log into SOLUS.
2. Click on Personal Information tab.
3. Click on the Names tab
4. Click on the Add New Name tab
5. Choose Preferred from the Name Type drop down menu
6. Enter the name you would like to appear in onQ and/or on class lists.
7. Click Save.

Please allow 24 to 48 hours for your name to be registered within the system. If you have further questions or concerns, please contact ITS at Queen's University.

Course Materials & Technologies

Required Course Textbooks

Course Textbooks	Edition(s)	Publisher	Where to purchase	At Queen's Library?
Inorganic Chemistry by Housecroft & Sharpe	4 th or 5 th	Pearson	Book store	Yes
Organic Chemistry by Clayden, Greeves & Warren	2 nd	Oxford	Perusall (link in onQ) or Book store	Yes

Other Required Materials

Resource	Access	Further Information
CHEM 211 Lab manual	Available in CHEM STORES, first floor Chernoff Hall	Other laboratory safety equipment is also required and available.

Supplemental Materials

Resource	Resource Type	Access
Chemistry: Atoms First 2e	Open Educational Resource	openstax.org/books/chemistry-atoms-first-2e
ChemTube 3D	Website	https://www.chemtube3d.com/
Model Kit	Other	Bookstore or www.indigostruments.com/molecular_models/student_sets

Educational Technologies, Help, Privacy, and Accessibility

This course makes use of the following website(s), program(s), and/or application(s) for specific educational use/purposes. Queen's University is committed to developing courses that are accessible. For further information on accessibility compliance of the website(s), program(s) application(s) used in the course, please consult the links below.

Privacy: Be aware that your independent use of the website(s), programs, and/or application(s) used in this course, *beyond what is required*, is subject to their terms of use and privacy policy. You are encouraged to review the applicable privacy statements before using the site. Please see below.

Software	Use	Support	Privacy	Accessibility
onQ	Accessible learning	Student onQ Support	See Privacy Policy for onQ	Accessibility Hub
Perusall	Collaborative learning	Perusall support	Perusall's does not sell or share personal student data with publisher partners.	Accessibility features of Perusall
Mentimeter	Interactive learning	Mentimeter "how to participate"	Data are not sold or rented to third parties. Collection or use of data is limited to product requirements.	Accessibility features of Mentimeter

Notice of Observation

As part of an ongoing study for quality assurance/quality improvement, this classroom may be observed over the course of the term. The purpose of the study is to understand how to integrate more active learning strategies within the classroom and/or laboratory. These written and/or typed observations will be completely anonymous and will not focus on individual activity in the classroom and/or laboratory. Observations will not interfere with your regularly scheduled class and/or laboratory and involves minimal risk for you as participants. Anonymous observations will be generalized, and results will be communicated e.g., published in journals or presented at academic conferences. General findings related to the chemistry program may also be published to a wider Queen's community. The data collected as part of the study have no impact on any students' academic standing. Hardcopies of the data collected from the classroom and/or laboratory will be securely stored in a locked cabinet in a locked office. Electronic data will be backed up online through One-Drive for Business through Queen's, in a folder only accessible to the PI or co-investigators. If you have any questions about the study, contact Co-Investigator Shauna Schechtel: 22sls@queensu.ca. If you have any ethics concerns, please contact the General Research Ethics Board (GREB) at chair.GREB@queensu.ca. Please note that GREB communicates in English only.

Copyright of Course Material

Course materials created by the course instructor, including all slides, presentations, handouts, tests, exams, and other similar course materials, are the intellectual property of the instructor. **It is a departure from academic integrity to distribute, publicly post, sell or otherwise disseminate** an instructor's course materials or to provide an instructor's course materials to anyone else for distribution, posting, sale or other means of dissemination, without the instructor's express consent. A student who engages in such conduct may be subject to penalty for a departure from academic integrity and may also face adverse legal consequences for infringement of intellectual property rights.

Communication

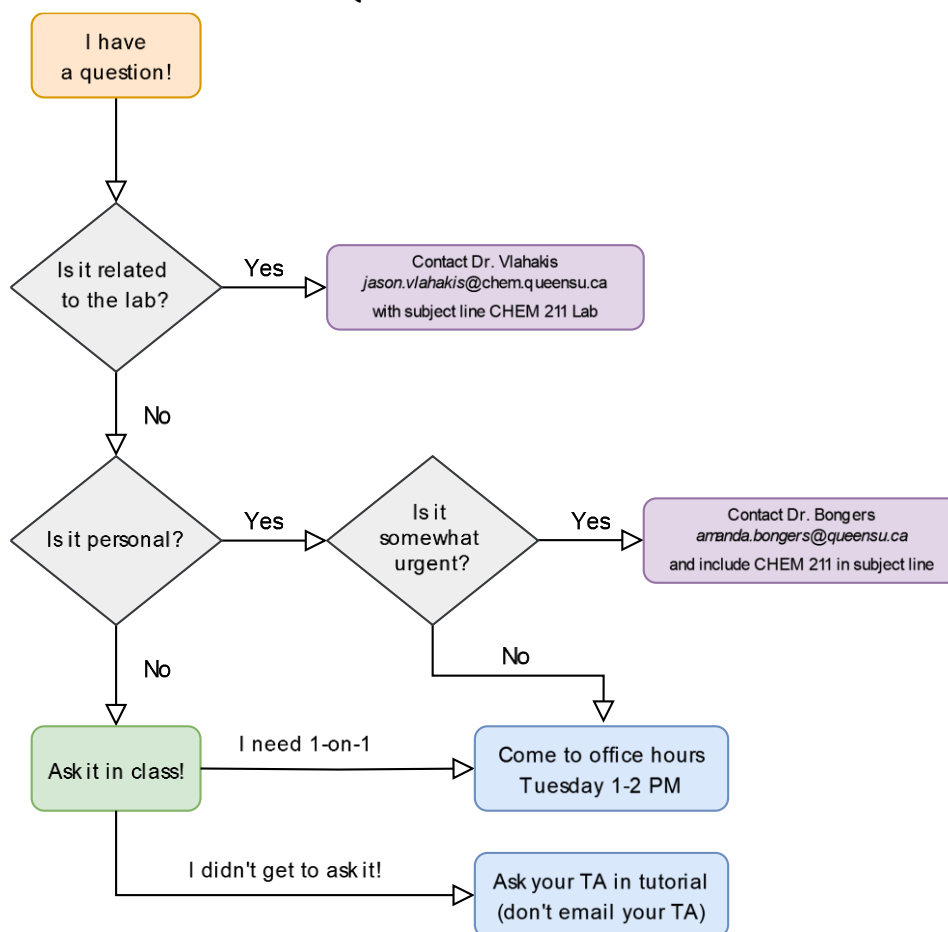
Questions about the Course and Contacting the Teaching Team

Throughout the course, we will post important announcements on the course onQ homepage. Please check the course onQ throughout the semester or turn on email notifications. See the flow chart below.

Queen's Email

The university communicates with students via Queen's email. Please check your email regularly to ensure you do not miss important information related to your course. Dr. Bongers will not answer questions about course content via email (see flow chart above).

QUESTION FLOWCHART



Course Feedback

At various points during the course, you may be asked to participate in various feedback activities, such as surveys and questionnaires. This feedback enables the teaching team to improve the course. All surveys are anonymous and are directly related to activities, assessments, and other course material.

Assessments

Weighting and Alignment with Course Learning Outcomes (CLOs)

Assessment	Alignment with CLOs	Weighting
Laboratory	6	25%
Tutorial	1-5	10%
Midterm	1-3	25%
Final Exam	1-5	40%

Total = 100%

Descriptions of Learning Activities, Assessments, and Assessment Flexibility

Laboratory (25%)

Laboratory work is an integral part of this course. **All labs must be completed to pass the course.** It is the responsibility of the student to notify the lab coordinator (Dr. Vlahakis) when a lab cannot be

completed at the scheduled time. In exceptional circumstances, the following considerations will be given if a scheduled lab cannot be completed at the assigned time:

- 1) When possible, the preferred solution is a make-up lab shortly before/after the missed experiment;
- 2) The lab may be completed during the following academic year. In this case, a course mark of IN will be assigned until the missing work is completed;
- 3) In rare circumstances, other accommodations may be made in consultation with the lab coordinator.

For further information consult the lab manual or contact the lab coordinator.

Tutorial (10%)

Weekly tutorials with mandatory attendance. Tutorials are dedicated time for you to apply knowledge and practice the skills learned in class. At each tutorial, you will work through the weekly problem set with your Teaching Assistant and submit an Exit Ticket. Exit Tickets will have one question from the problem set and/or a short metacognitive assessment or reflection. These weekly Exit Tickets are recorded as either complete or incomplete after review by the Teaching Assistant. You will receive feedback on your answers where appropriate to give you a formal assessment on your learning.

Tutorial Assessment Policy

To build in flexibility and accommodate illness for missed tutorials, two incomplete (including missed) tickets will be dropped. There will be no make-ups or grace periods for Exit Tickets, since extra time is built into the tutorial and the problem sets are provided, and can be worked on, in advance of the tutorial. Answers to problem sets will be posted promptly throughout the term.

Midterm (25%)

A take-home exam with a 48-hour window, a timed assessment which should take 1-3 hours.

Midterm Assessment Policy

To build in flexibility and promote accessibility and inclusion for all students, this midterm exam is take-home and due within a 48-hour window. If your midterm is not handed in or completed by the due date and time, then your midterm grade will be replaced by your score on the final exam in the calculation of your final grade.

Students with letters of accommodation should, if possible, confirm the implementation of their accommodations prior to the listed due date. Please see the “Accommodations for Disabilities” section of this syllabus for more information.

Students experiencing short-term extenuating circumstances that are beyond their control and may affect their academic work should submit a request to their faculty office for academic consideration. Please see the “Academic Considerations for Students in Extenuating Circumstances” section of this syllabus for more details.

Final Exam (40%)

An in-person proctored final exam scheduled by the exams office, covering all content from the course. A combination of multiple choice and written answer questions covering all course learning outcomes (except the laboratory skills).

Final Exam Assessment Policy

In the calculation of your final grade, your midterm grade will be replaced by your score on the final exam if this is to your advantage (i.e., if you score higher on the final exam than on the midterm).

STUDENTS MUST DELAY FINALIZING ANY TRAVEL PLANS UNTIL AFTER THE EXAMINATION SCHEDULE HAS BEEN POSTED. EXAMS WILL NOT BE MOVED OR DEFERRED TO ACCOMMODATE EMPLOYMENT, TRAVEL/HOLIDAY PLANS OR FLIGHT RESERVATIONS.

Once the exam schedule has been finalized, the exam date will be posted on your SOLUS account. The exam dates for each term are listed on the Faculty of Arts and Science webpage under "[Important Dates](#)." Student exam schedules for the Fall Term are posted on SOLUS immediately prior to Thanksgiving and on the Friday before Reading Week for the Winter Term.

For information regarding what is considered extenuating circumstances and qualifications for Academic Consideration, please visit the [Faculty of Arts and Science's Academic Consideration webpage](#).

If you are unable to attend an exam and receive approval for a deferred proctored exam, a further deferral of that exam will not be accommodated.

Policy Review of Graded Work

Requests for regrading may be made to your TA 48 hours after you have received the marked copy of your work, but no more than 10 days later. Be sure to read your TA's feedback carefully before you submit a review of graded work. To request that your work be reviewed, please include the following in your email:

- Your name, student number, and TA's name.
- The original copy of your marked work, attached.
- Your reason for the request.

If a review of graded work results in only a slightly different final grade, the original grade will stand. Should we find an error where marks were not assigned when they should have been or were missed in adding up the total score or were added up incorrectly resulting in a higher score than earned, the grade will be changed so that it is accurate. Grades would only increase or decrease if there was evidence of an error in marking, not simply because the regrader interprets or applies the rubric slightly differently than the original grader.

Policies (specific to CHEM/ENCH 211)

Attendance

I expect that you attend class regularly and participate in class conversations and learning activities. These types of activities provide active engagement, promote a deeper understanding of the course content, and contribute to your success in this course. Your presence and participation in class contributes to the knowledge and skills that you will develop throughout this course. I also expect that you attend tutorials as they are mandatory and designed to support you in practicing the skills and knowledge learned in class.

Passing Requirements

Students must pass both the lecture (75% total) and the lab (25%) components to pass the course.

Use of 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.

Policies (all Faculty of Arts and Science)

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 use contact information from onQ for your instructor and TA(s), where relevant.

Queen's Policy Statement on 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.

Queen's [Student Academic Success Services](#) (SASS) offers a self-directed, online academic integrity module which we encourage all students to take which will help with:

- Understanding the nature of the academic integrity departure
- Understanding the expectations of and role of sources in scholarly writing
- Integrating sources into your writing (paraphrasing, quoting, summarizing)
- Understanding when and how to cite your sources
- Managing your time effectively to avoid the need for shortcuts
- Taking effective notes to ensure accuracy of source material and correct attribution