INSTRUCTORS:

<table>
<thead>
<tr>
<th>Name</th>
<th>Component &amp; Projects</th>
<th>Email</th>
<th>Room</th>
<th>Ext</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colgoni, Andrew</td>
<td>Science Literacy</td>
<td><a href="mailto:colgoni@mcmaster.ca">colgoni@mcmaster.ca</a></td>
<td>Thode 203</td>
<td>27743</td>
</tr>
<tr>
<td>Da Silva, Rosa</td>
<td>Drug Discovery</td>
<td><a href="mailto:rdasilv@mcmaster.ca">rdasilv@mcmaster.ca</a></td>
<td>LSB 540</td>
<td>26314</td>
</tr>
<tr>
<td>Dragomir, George</td>
<td>Mathematics</td>
<td><a href="mailto:dragomir@math.mcmaster.ca">dragomir@math.mcmaster.ca</a></td>
<td>HH 414</td>
<td>26056</td>
</tr>
<tr>
<td>Dumont, Randy</td>
<td>Thermodynamics</td>
<td><a href="mailto:dumontr@mcmaster.ca">dumontr@mcmaster.ca</a></td>
<td>ABB 234</td>
<td>23301</td>
</tr>
<tr>
<td>Ellis, Russ</td>
<td>Lab Practicum</td>
<td><a href="mailto:ellisr@mcmaster.ca">ellisr@mcmaster.ca</a></td>
<td>GSB 114</td>
<td>21503</td>
</tr>
<tr>
<td>Eyles, Carolyn</td>
<td>History of the Earth (HotE)</td>
<td><a href="mailto:eylesc@mcmaster.ca">eylesc@mcmaster.ca</a></td>
<td>Thode308a</td>
<td>24077</td>
</tr>
<tr>
<td>Gillespie, Deda</td>
<td>Neuroscience</td>
<td><a href="mailto:gilles@mcmaster.ca">gilles@mcmaster.ca</a></td>
<td>PC 310</td>
<td>28671</td>
</tr>
<tr>
<td>Harvey, Chad</td>
<td>PAIx, EP</td>
<td><a href="mailto:harvech@mcmaster.ca">harvech@mcmaster.ca</a></td>
<td>Thode 306B</td>
<td>21565</td>
</tr>
<tr>
<td>O’Dell, Duncan</td>
<td>Neuroscience</td>
<td><a href="mailto:dodell@mcmaster.ca">dodell@mcmaster.ca</a></td>
<td>ABB-320</td>
<td>23189</td>
</tr>
<tr>
<td>Symons, Sarah</td>
<td>HotE, SciLit</td>
<td><a href="mailto:symonss@mcmaster.ca">symonss@mcmaster.ca</a></td>
<td>Thode 306A</td>
<td>21641</td>
</tr>
<tr>
<td>van Wersch, Geneviève</td>
<td>Instructional Assistant, EP</td>
<td><a href="mailto:vanwer@mcmaster.ca">vanwer@mcmaster.ca</a></td>
<td>GSB 114</td>
<td>21799</td>
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ADMINISTRATIVE SUPPORT:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Email</th>
<th>Office Location</th>
<th>Ext</th>
</tr>
</thead>
<tbody>
<tr>
<td>Misiak, Rebecca</td>
<td>Academic Advisor</td>
<td><a href="mailto:misiakr@mcmaster.ca">misiakr@mcmaster.ca</a></td>
<td>GSB 105D</td>
<td>21181</td>
</tr>
<tr>
<td>Robinson, Sarah</td>
<td>Administrator</td>
<td><a href="mailto:sjrobin@mcmaster.ca">sjrobin@mcmaster.ca</a></td>
<td>GSB 105F</td>
<td>20841</td>
</tr>
<tr>
<td>MSAF Submissions</td>
<td>(an address only for use on MSAF form)</td>
<td><a href="mailto:2a18msaf@mcmaster.ca">2a18msaf@mcmaster.ca</a></td>
<td></td>
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</tbody>
</table>

COURSE DESCRIPTION:

ISCI 2A18 is an 18 credit course open only to students registered in the Honours Integrated Science program. The course aims to

- provide you with a wide-ranging background of core concepts in the areas of mathematics, ecology, statistics, biochemistry, history of the Earth, neuroscience, thermodynamics, and science literacy, appropriate to the continuation of study in those areas in upper year courses;
- illustrate the interconnectedness of the scientific disciplines, drawing on the research projects;
- equip you with a wide range of scientific, problem-solving, critical thinking, and collaborative skills;
- nurture a creative, student-oriented, distinctive learning environment in which you can further develop your academic identities, scientific interests, research, and professional development skills within our community of students, staff, and faculty.

Program Website: [http://www.science.mcmaster.ca/isci/](http://www.science.mcmaster.ca/isci/)

Avenue to Learn site: [http://avenue.mcmaster.ca/](http://avenue.mcmaster.ca/)
LEARNING OBJECTIVES:
Throughout the course, you will be developing a range of skills including: research skills, team work, leadership, communication skills, information literacy, experimental design, critical thinking, data analysis, numeracy, and math literacy. The learning objectives for each component are:

Mathematics
The math portion of ISCI 2A18 extends integral calculus from the two-dimensional world of single variable functions to higher dimensions; the main focus is understanding how the fundamental theorem of calculus generalizes to this new setting. It covers multiple integrals, parametric curves and surfaces, line and surface integrals, conservative fields, and the integral theorems of Green, Stokes and Gauss. While the emphasis is placed on the geometric and physical interpretation of these concepts and results, other important applications of multivariable calculus to natural and social sciences are also discussed. As part of the integration with the other ISCI 2A18 components, we touch on additional topics such as Fourier series, partial differential equations, and multivariate probabilities and statistics.

Plant-Animal Interactions
Plants (in one form or another), as primary producers, are the foundation of any ecological system – they make the planet Earth green. Yet, the planet is prolific with plant-eating organisms. So...why is the world ‘green’? To address this scientific question, we will study the ecological, evolutionary and biochemical interactions, mechanisms and paradigms that relate to this paradox. In the context of understanding plant-animal interactions, this project will highlight the practice of experimental design and data collection coupled with an introduction to statistical analysis.

Neuroscience
This project will cover fundamental concepts of neuroscience and very roughly survey the interdisciplinary nature of this field. Basic themes will include: ionic basis of the resting and action potentials, ion channels, synaptic transmission, transduction, structure/function relationships, and neural processing. We will touch on a subset of underlying concepts from biochemistry, biophysics, and cell biology.

Drug Discovery
Macromolecules such as nucleic acids and proteins are essential elements of life. They are responsible for the proper execution of various biochemical processes within the living organism. The conformational states and chemical stability of these macromolecules are often precisely tuned for achieving their optimal (normal) functions. As such, disease states can occur when these macromolecules are structurally modified. We will develop an understanding of what principles and strategies are considered during drug discovery, design and development and how externally introduced medicinal drugs can interact with macromolecules to facilitate the treatment of many symptoms and the overall progression of many disorders. This will be accomplished through studying the chemical and conformational properties of these target molecules and their interactions with medicinal drugs.

History of the Earth
The main events in the evolution of the Earth will be examined in the context of the historical development of major scientific ideas and concepts. We will examine conditions on the early Earth, the evolution of life forms (including dinosaurs), mass extinction events, and the movement of continents on our planet over geologic time. We will focus particularly on the evolution of the North American continent. At the same time, we will consider how scientific thought has developed and how scientists have addressed key scientific issues in different historical periods.

Thermodynamics
This project will explore the reasons underlying spontaneous changes in the form and composition of physical systems. We’ll ask questions about why some changes occur spontaneously while others are impossible to elicit and apply fundamental concepts such as energy and entropy to discover answers.
Lab Practicum

Students will learn important skills and techniques commonly used in many of the science disciplines. The lab practicum sessions will provide opportunities for hands on learning and exposure to a variety of laboratory equipment and techniques related to each specific Research Project. A separate Lab Practicum Manual is posted on Avenue.

Science Literacy

Students will choose a variety of SciLit activities to count towards their SciLit component, including drafting project work, participating in the Synthesis Symposium, and blogging.

Enrichment Project (EP)

Each modular project will identify areas that students can work on as an enrichment module. Descriptions of the enrichment project topics will be included in a separate project pack. Enrichment topics will be shared with students in term 1. In January, students will prepare a short proposal associated with the enrichment topic of their choosing. Assessment will be determined between each student and their specific enrichment project leader.

CLASS ACTIVITIES:

The weekly course timetable will be posted on Avenue. *The course calendar (a Google Calendar) on Avenue will supersede all other calendars including MOSAIC.* Any schedule changes will be announced on Avenue.

*Check the Avenue course site daily.*

You must be prepared to be present at all of the times indicated for iSci classes, including iConS, invited speaker seminars, labs & tutorials.

Format

There will be eighteen hours of supervised time per week (not including some field trips and exams). Attendance is mandatory for all supervised time. The course contains nine components: five research projects, an enrichment project, math, lab practicum, and science literacy. The types of activities are:

iConS: (Integrated Concept Seminars): Class activities led by an instructional team member. These will focus on core disciplinary knowledge, scientific techniques and interdisciplinary topics. They will usually contain activities and discussion. Your understanding of content presented in iConS will be assessed via exams, continuous assessment, and/or project work.

SciLit (Science Literacy): The focus during the weekly Sci Lit sessions will be developing research and communication skills needed for current and future course work.

Labs: Each week, approximately six hours will be spent in laboratories and workshops, including field excursions, computer labs and research project labs.

Workshops: An activity or exercise that you do in any discipline area that does not appear in the lab manual and does not involve lab notes. Workshops may include in class work on computers or problem sets. Workshops do NOT include any work done on computers that would be considered experimental (e.g. simulations). There may be assignments associated with workshops.

OFFICE HOURS:

Instructors and Teaching Assistants will hold office hours and communicate via Avenue when and where these take place.
REQUIRED TEXTS & MATERIALS:

The following items can all be purchased at the Campus Store.

Mathematics (required – read note below)

Note: The access code purchased last year for ISCI 1A24 Math is multi-term and should work this year as well.

Plant-Animal Interactions (recommended)

Neuroscience (required)

Neuroscience (on reserve – Thode Library)

Drug Discovery (required)

History of the Earth (recommended)

Thermodynamics (required)
Dumont, R., Custom Course Ware

Thermodynamics (recommended)

Other Required Materials
i>Clicker (required) Electronic audience response system. ISBN: 9780716779391
Lab coat and safety goggles (required)
Calculator (required) Casio fx-991 MS Plus ONLY
## COURSE SCHEDULE:

<table>
<thead>
<tr>
<th>Dates</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 4 - October 19</td>
<td>RP: Plant Animal Interaction</td>
</tr>
<tr>
<td>September 17 – November 30</td>
<td>RP: Neuroscience</td>
</tr>
<tr>
<td>October 8–14</td>
<td>Mid-term Recess</td>
</tr>
<tr>
<td>October 24 - December 5</td>
<td>RP: Drug Discovery</td>
</tr>
<tr>
<td>December 7–20</td>
<td>Exams</td>
</tr>
<tr>
<td>January 7 – February 15</td>
<td>RP: History of the Earth</td>
</tr>
<tr>
<td>January 14 - March 29</td>
<td>RP: Thermodynamics</td>
</tr>
<tr>
<td>February 18-24</td>
<td>Mid-term Recess</td>
</tr>
<tr>
<td>February 25 – March 31</td>
<td>RP: Enrichment Project</td>
</tr>
<tr>
<td>April 1-9</td>
<td>iSci Symposium</td>
</tr>
<tr>
<td>April 11-29</td>
<td>Exams</td>
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ASSESSMENT:

ISCI 2A18 will be assessed across five projects (plant & animal interactions, neuroscience, drug discovery, history of the Earth, and thermodynamics), through exams and research project marks. You will also be assessed in mathematics, laboratory practicum, science literacy and an enrichment project.

Each project topic will have an exam that takes place immediately following the project. There will also be one mathematics exam per term. These exams will assess your core knowledge with topic-specific content. Exams may have a synoptic section that will test interdisciplinary conceptual problems and synthesis.

Research Project assessments may include laboratory work, exercises, preparatory tasks, and general “homework” and quizzes. Assessments may also include individual and group reports, posters or presentations. Deliverables specific to each project will be clearly outlined in the Research Project Pack that will be made available to you before the beginning of the project.

Research Projects will contain varied assessed deliverables that demonstrate not only scientific skills, but also additional research, collaborative authorship, project management, peer review, and communication skills. Most work will be compiled and graded as group work. There will be some individual assignments.

This course is worth 18 credits. The table below shows how the ISCI 2A18 course mark will be assembled.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>ACTIVITY</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td></td>
<td>Exams</td>
<td>Other Assessments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Activities &amp; weights at instructor’s discretion</td>
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<tr>
<td>Plant-Animal Interactions</td>
<td>10</td>
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<td>Drug Discovery</td>
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<tr>
<td>History of the Earth</td>
<td>10</td>
<td>25</td>
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<tr>
<td>Enrichment</td>
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<tr>
<td>Math</td>
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<tr>
<td>Laboratory Practicum</td>
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<tr>
<td><strong>TOTAL</strong></td>
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PASS-FAIL CRITERIA BY COMPONENT

Passing ISCI 2A18 requires passing (i.e. grade of 50% or higher) seven of the nine component parts (projects, enrichment, mathematics, laboratory practicum and science literacy). Pass criteria for each component can be found in the component outline or project pack.

There may be opportunities to make up project topic content over the summer. It will be left to the discretion of the instructor to determine the content that needs to be made up.
ABSENCES & MISSED WORK:

If you are absent from the university for a minor medical or personal reason, lasting up to 3 calendar days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form (MSAF). MSAF is available in MOSAIC Student Center (in the drop down menu under Academics). Absences of a longer duration (>3 days), and/or for work worth more than 25% of the final grade, and/or if you have already submitted an MSAF request for the term, must be reported to the Office of the Associate Dean of Science (BSB 129), with documentation, and relief from term work may not necessarily be granted. When using the MSAF, you MUST use 2a18msaf@mcmaster.ca as the contact e-mail for your ISCI 2A18 work. You MUST ALSO contact the relevant component lead or laboratory coordinator (depending on what you missed) within 48 hours by email. If you do not, your MSAF may not be granted. Please refer to the contact list on the first page of this outline for appropriate email addresses. Your component lead or laboratory coordinator will indicate what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam/quiz/test. An MSAF is a request for individual consideration: understand that an instructor may respond with an individual solution. Please note that the MSAF may not be used for final project deliverables, deliverables worth more than 25% of the final grade, nor can it be used for a final examination or its equivalent.

Absence from iConS, Tutorials or Workshops: If you are absent from any scheduled ISCI 2A18 session, it is your responsibility to make up missed work. If you are absent from a scheduled ISCI 2A18 session that has an associated piece of assessment (e.g. test, quiz, presentation, etc.) without authorization your mark will be recorded as 0 (see procedure for authorized absence above).

Absence from Invited Speaker Seminars: Unless approval for missing an Invited Speaker Seminar is obtained (see procedure for authorized absence above) your project mark associated with the Invited Speaker Seminar could be reduced by 20%. Attendance will be taken at all Invited Speaker Seminars.

Absence from Laboratory Practicum: Students unable to attend a laboratory due to illness or other personal situation should complete a McMaster Student Absence Form (MSAF). Please refer to procedure for authorized absence above.

If a lab is missed with a MSAF submission, the remaining labs in the component may be re-weighted or an alternate lab component will be assigned. Any unauthorized absences (i.e. no MSAF submission) will result in a mark of 0 for that lab.

No more than 1 lab practicum per term may be missed, irrespective of MSAF submission. If more than 1 lab per project type (PAIx, Neuro, DD, Thermo, HotE, Technical) or more than 2 labs in total are missed during the ISCI 2A18 course, the student will fail the Lab Practicum component of ISCI 2A18. Accommodation for missed lab quizzes or tests is at the discretion of the Lab Practicum lead, providing an MSAF has been properly submitted. Failure to do so for either of these latter two components will result in a grade of zero.

Students are expected to arrive to their scheduled laboratory time slot at least 5 minutes before the lab begins. The door will be locked once the lab starts. Students who arrive late to the lab will be turned away and the lab will be subject to a mark of 0 and count as a missed lab.

Missed deadlines

Any late submissions will result in a penalty of 20% per day unless faculty members are notified of any problems in advance and approve of a late submission. It is left to the discretion of the instructor to determine if accommodations will be made. This holds for both group and individual assignments.

Missed exams and other assessment activities

Exams or other assessment activities missed for reasons of unauthorized absence will be graded as zero. Authorized absence will result in rescheduled exams or compensation from other assessment activities.
CHECKING YOUR GRADES and RE-MARK POLICY

You will have one week from the date that an assignment (or test or mid-term exam) is returned to you to appeal your mark. If you wish to appeal a grade, you must submit to the component lead (or laboratory coordinator for labs) a written note justifying why you wish to have the assignment remarked, with the assignment attached. If your component lead or laboratory coordinator considers the written justification to be insufficient (e.g. simply wanting a higher grade is insufficient), the assignment will not be re-graded. If the justification is considered sufficient, the entire assignment will be re-graded. You must therefore understand that your mark can increase or decrease.

Your marks will be recorded on Avenue. It is your responsibility to check that all grades entered into Avenue are recorded properly. You must notify your component leaders and laboratory coordinator about any errors with regards to how your mark was entered. You have until 48 hours prior to the final exam to discuss any Avenue mark issues.

The policy for viewing and requesting a formal review of final exams will be available on Avenue.

COMMUNICATION BETWEEN STUDENTS AND THE INSTRUCTIONAL TEAM

Any e-mails addressed to faculty must have a brief, relevant subject line, must come from a mcmaster.ca e-mail account and must copy in all relevant parties (e.g. other markers, other group members). All e-mail communication addressed to students will be sent to their mcmaster.ca e-mail account.

All assignments must be handed in via Avenue, in the specified file format (usually pdf). Author(s) name(s) and group designations, if applicable, must be clearly marked on the first page of the work handed in. Submitted files must be named in a way to easily identify the assignment and the author and/or group designation.

Work that is late, handed in to the wrong person, inadequately identified, or in the wrong format, risks losing marks. Instructors will endeavour to return marked materials within two weeks of hand-in.

PLAGIARISM DETECTION

In this course, we will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to

https://www.mcmaster.ca/academicintegrity/turnitin/students/index.html

POLICY ABOUT ONLINE ACCESS OR ONLINE COURSE WORK REQUIREMENTS

In this course we will be using e-mail, Avenue, and PebblePad. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

STUDENT RESPONSIBILITIES

To get the most out of the course, you must be prepared to:

- attend all sessions, make up all missed work, and provide documentation for authorized absences;
- interact frequently with faculty, students, TAs, and other support staff;
- plan and manage your own time;
- complete preparatory tasks (such as reading, writing assignments, and initial research) in advance of sessions;
• develop and use reflective learning skills (for example identifying learning objectives, planning and carrying out research tasks, acting on academic feedback);
• work as an effective, efficient, and responsive team member on group assignments;
• follow all the guidelines as outlined in the Introduction section of the Laboratory Manual;
• check the course Avenue site, and your McMaster e-mail daily for updates; and,
• follow all university policies and guidelines, and in all ways be a responsible university member.

SENATE STUDENT POLICIES

Students can view full policies here (http://www.mcmaster.ca/policy/Students-AcademicStudies/).

Senate Policy Statements are also available from the Senate Secretariat Office, Room 104, and Gilmour Hall.

Academic Integrity

http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty.

The following illustrate only four of many forms of academic dishonesty:

• plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained;
• copying or using unauthorized aids in laboratory exercises
• improper collaboration in group work; and,
• copying or using unauthorized aids in quizzes, tests and examinations

All students are reminded of the importance of academic integrity, and the serious consequences of academic dishonesty.

Student Code of Conduct


You acknowledge that your behavior in all aspects of this course should meet the standards of the McMaster University Student Code of Conduct. You understand that any inappropriate behavior directed against any of your colleagues, teaching assistants, or the instructional team will not be tolerated. Disruptive behavior during any session (e.g. lecture, seminar, lab, tutorial) such as talking, sleeping or non-class computing while an individual presents information, or constantly being late, will also not be tolerated. Abuse, ridicule, slander, inappropriate language, and discrimination towards instructors, teaching staff, teaching assistants and other students will not be tolerated in any capacity. Shared spaces including e-spaces such as the Avenue to Learn course discussion board are to be considered inclusive and safe.

Copyright Policy

In this course you will have access to material that is subject to copyright laws. This includes (but is not limited to) textbooks and all resources developed by the instructors such as lab manuals, demonstration videos, quizzes, assignments, tests, class notes and class slides. Under no circumstance are you allowed to share or redistribute this material in any printed or electronic form without the explicit written consent of the copyright holder. This includes posting any course material on Internet bulletin boards, course repositories, social networks, etc.

McMaster Accommodation for Religious, Indigenous and Spiritual Observances Form (RISO):

At the beginning of EACH term, visit the website of the Office of the Associate Dean (Academic) https://www.science.mcmaster.ca/associatedean/current-students/procedures-forms.html if you need accommodations for religious, Indigenous and/or spiritual observances. Follow the procedure explained there under “Accommodation for Religious, Indigenous and Spiritual Observances Form (RISO)".
**Inclusivity and Accommodations:**

McMaster University aims to foster a supportive, inclusive learning environment that will encourage both individual and collective growth. Students are required to register with Student Accessibility Services (SAS) first ([https://sas.mcmaster.ca/](https://sas.mcmaster.ca/)). Any student who then wishes to invoke an accommodation for any aspect(s) of this course must contact the instructor at the beginning of the semester to discuss how the accommodations detailed in their SAS letter will be fulfilled in this course.

**The instructors and the university reserve the right to alter this outline if necessary.**

**Extreme circumstance**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.