ISCI 1A24 Course Outline 2013/14

Description and objectives

ISCI 1A24 is a 24 credit course open only to students registered in the Integrated Science program. The course aims to

- provide you with a wide-ranging background of core concepts in the areas of mathematics, physics, chemistry, life science, earth sciences, and science literacy, appropriate to the continuation of study in those areas in level two courses;
- illustrate the interconnectedness of the scientific disciplines, drawing on examples from topics of current public interest;
- 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 begin to 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/

Avenue to Learn site http://avenue.mcmaster.ca/

Instructors

<table>
<thead>
<tr>
<th>Name</th>
<th>Component</th>
<th>Room</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cockcroft, Robert</td>
<td>Physics, RP1</td>
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<td>21237</td>
<td><a href="mailto:cockcroft@physics.mcmaster.ca">cockcroft@physics.mcmaster.ca</a></td>
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<tr>
<td>Dumont, Randy</td>
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<td><a href="mailto:dumontr@mcmaster.ca">dumontr@mcmaster.ca</a></td>
</tr>
<tr>
<td>Ellis, Russ</td>
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<td>GSB 115</td>
<td>21503</td>
<td><a href="mailto:ellISR@mcmaster.ca">ellISR@mcmaster.ca</a></td>
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<tr>
<td>Eyles, Carolyn</td>
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<td>Thode 308a</td>
<td>24077</td>
<td><a href="mailto:eylesc@mcmaster.ca">eylesc@mcmaster.ca</a></td>
</tr>
<tr>
<td>Harvey, Chad</td>
<td>Life Science, RP2, RP3</td>
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<td>21565</td>
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<tr>
<td>Hayward, Joseph</td>
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<tr>
<td>Lock, Pippa (term 1)</td>
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<td>ABB 160</td>
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<td><a href="mailto:lockpe@mcmaster.ca">lockpe@mcmaster.ca</a></td>
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<tr>
<td>MacDonald, Michelle</td>
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<td>HSC 4H44</td>
<td>22316</td>
<td><a href="mailto:macdonml@mcmaster.ca">macdonml@mcmaster.ca</a></td>
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<tr>
<td>Patterson, Michael</td>
<td>Life Science, RP4</td>
<td>JCC 4-44</td>
<td>67005</td>
<td><a href="mailto:mike.patterson@jcc.hhsc.ca">mike.patterson@jcc.hhsc.ca</a></td>
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<tr>
<td>Robinson, Sarah</td>
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<tr>
<td>Symons, Sarah</td>
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<tr>
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<tr>
<td>Walls, Patrick</td>
<td>Mathematics</td>
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<td>tba</td>
<td><a href="mailto:pwalls@math.mcmaster.ca">pwalls@math.mcmaster.ca</a></td>
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</table>
You must be prepared to be present at all of the times indicated for iSci classes, including iConS, invited speaker seminars, labs & tutorials.

The weekly course timetable will be posted on Avenue. The Avenue calendar will supersede all other calendars including MUGSI. Any schedule changes will be announced on Avenue.

Check the Avenue course site daily.

Format

There will be twenty-four hours of supervised time per week (not including some field trips and exams). Attendance is mandatory for all supervised time. During the first six weeks of the course, the focus will be on background and basic skills. For the rest of the course, many activities will be directly related to Research Project work. 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.

Project iConS: When working on Research Projects, progress will be monitored and guided during these sessions. Faculty will often be available for “Q&A” sessions.

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 eleven 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.

Invited Speaker Seminars: During the Research Projects, speakers will be invited to widen your understanding of key issues. At other times, the one-hour Invited Speaker Seminar slot will be used for review periods and additional teaching.
Syllabus

General Skills
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.

Life Science
The goal of the life science component of ISCI 1A24 is to generate understanding in how the scientific process pertains to our knowledge of biological (including human) systems. You will develop conceptual understanding of biology and psychology through discussion of theory and hands-on laboratory practice. After completion of ISCI 1A24, you should be able to understand biological concepts spanning cellular to ecosystem level perspectives and demonstrate synthesis across scientific disciplines.

Chemistry
The objectives for chemistry in ISCI 1A24 are to discuss and understand chemical concepts, theories and examples of fundamental chemistry. You will develop skills needed to solve chemical problems and gain experience in the experiment-driven investigation of chemical questions. You should be able to apply chemistry to current examples within the themes of health, energy, the environment and chemical biology, and demonstrate how your chemistry skills can be used to undertake interdisciplinary problems.

Physics
The physics portion of ISCI 1A24 covers Newtonian mechanics including Newton’s laws of motion, gravity, conservation laws, fluids, and harmonic motion; light and interference phenomena; and the basics of quantum mechanics and atomic structure. You should be able to bring your knowledge and acquired skills in physics to bear on interdisciplinary problems.

Mathematics
The math portion of ISCI 1A24 covers standard topics in calculus including limits, continuity, derivatives, integrals and series. Although we focus on functions of one variable, we will cover other topics as needed. Using differential equations, we will build models for a number of important and relevant applications in all branches of science.

Earth Science
The Earth science portion of ISCI 1A24 will be an introduction to the many dynamic geological and geomorphological processes that shape the Earth and its surface and subsurface environments. These processes will be discussed using both local and global applications.

Science Literacy
The science literacy portion of ISCI 1A24 will introduce students to oral and written forms used to communicate science to scientists and non-scientists. Through weekly exercises, students will develop the ability to convey scientific data and concepts clearly and concisely. Students will also become familiar with a variety of information sources, and how to find and use that information effectively.
Textbooks and equipment

The following items can all be purchased at Titles Bookstore on campus.

Life Science (recommended)
Note: Vols. 1 & 2 can be purchased together. Both volumes (1 & 2) will be referenced.
ISBN for both volumes together: 9781256859468.

Physics (recommended)

Chemistry (recommended)

Math (recommended)
(may be cheaper as a pack with the optional Students’ solution manual)
Note: the same textbook was used last year; as well, the same textbook will be used in 2A18 next year
MAPLE software – student version 11 or newer

Earth Science (recommended)

Science Literacy (recommended)

iClicker (required) Electronic audience response system. ISBN: 9780716779391
Lab coat and safety goggles (required)
Lab notebook (required) Student lab notebooks with carbonless duplication (Hayden-McNeil, Spiral Bound Chemistry 100)
Field notebook (required) Student field notebook with waterproof paper (Forestry Suppliers)
Calculator (required) Casio fx-991 MS Plus ONLY

Mandatory Safety Training

Before entering the laboratories, you must complete two laboratory safety courses:

• SCIENCE 1A00
• HTH SCI 1BS0

These courses can be accessed via Avenue to Learn.
Assessment

ISCI 1A24 will be assessed across six components (mathematics, physics, chemistry, life science, Earth science, and science literacy) through three formats: exams, continuous assessment, and research projects. Mid-term and final exams will assess your core knowledge with discipline-specific content containing questions similar to other level one course exams. Further “synoptic” exams will test interdisciplinary conceptual problems and synthesis.

**Discipline-specific continuous assessments** will include laboratory work, exercises, preparatory tasks, and general “homework” and quizzes. Most work will be graded individually, but there may be some group assignments. **Research Projects** will contain varied assessed deliverables, which 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 24 credits. The table below shows how the ISCI 1A24 course mark will be assembled.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>Exams</th>
<th>Continuous</th>
<th>Projects</th>
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<tbody>
<tr>
<td></td>
<td>Exam Breakdown</td>
<td>Discipline Exams</td>
<td>Synoptic Exams</td>
</tr>
<tr>
<td>Math</td>
<td>6:8:6:10</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>Physics</td>
<td>6:9:6:9</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>Chemistry</td>
<td>6:9:6:9</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>Life Science</td>
<td>6:8:6:10</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>Earth Sciences</td>
<td>2:3:2:3</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Science Literacy</td>
<td>No exams</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>140</strong></td>
<td><strong>100</strong></td>
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* RPO assessment for Chemistry and Life Science are included in component continuous marks.
Pass-fail criteria by component

Passing ISCI 1A24 requires attaining a grade of 50% or higher in the course as a whole. Passing ISCI 1A24 also requires passing all components as described below. In addition, no more than two core laboratories, per component, may be missed. If more than two core labs are missed, the student will fail that component.

Mathematics
A student will pass the math component of ISCI 1A24 only if s/he satisfies all the following criteria:
- Gains at least 15 points (out of 30 available) in the exam element of the math component
- Gains at least 40 points (out of 80 available) in the component overall

Physics
A student will pass the physics component of ISCI 1A24 only if s/he satisfies all the following criteria:
- Gains at least 15 points (out of 30 available) in the exam element of the physics component
- Gains at least 40 points (out of 80 available) in the component overall
- Attends and completes the core physics laboratories

Chemistry
A student will pass the chemistry component of ISCI 1A24 only if s/he satisfies all the following criteria:
- Gains at least 15 points (out of 30 available) in the exam element of the chemistry component
- Gains at least 40 points (out of 80 available) in the component overall
- Attends and completes the core chemistry laboratories

Life Science
A student will pass the life science component of ISCI 1A24 only if s/he satisfies all the following criteria:
- Gains at least 15 points (out of 30 available) in the exam element of the life science component
- Gains at least 40 points (out of 80 available) in the component overall
- Attends and completes the core life sci laboratories

Earth Science
A student will pass the Earth science component of ISCI 1A24 only if s/he satisfies all the following criteria:
- Gains at least 5 points (out of 10 available) in the exam element of the Earth science component
- Gains at least 20 points (out of 40 available) in the component overall
- Attends and completes the core Earth sci laboratories

Science Literacy
A student will pass the science literacy component of ISCI 1A24 only if s/he satisfies all the following criteria:
- Attends class (persistent absence from SciLit classes will result in failure of the component).
- Completes at least 4 blog posts during the year.
- Gains at least 20 points (out of 40 available) in the component

There may be opportunities to make up component 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

Absence from iConS, Tutorials or Workshops: If you are absent from any scheduled ISCI 1A24 session, it is your responsibility to make up missed work. If you are absent from a scheduled ISCI 1A24 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, below).

Absence from Invited Speaker Seminars: Unless approval for missing an Invited Speaker Seminar is obtained (see Procedure for authorized absence, below) 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
Students unable to attend a laboratory due to illness should complete a McMaster Student Absence Form (MSAF), Please refer to ‘Procedure for authorized absence’ below.

If a lab is missed with a MSAF submission, the mark for that lab will be redistributed as appropriate or a make-up opportunity will be undertaken if possible.

Any unauthorized absences (i.e. no MSAF submission) will result in a mark of 0 for that lab. Any unauthorized absences from project labs will result in a 50% reduction of the total project mark.

If more than 2 labs PER DISCIPLINE are missed, irrespective of MSAF submission, the student will fail that core component of ISCI 1A24 AND THUS FAIL THE ENTIRE COURSE.

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.

Procedure for authorized absence:

If you are absent from the university for a minor medical reason, lasting fewer than 5 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons must be reported to your Faculty office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to Sarah Robinson via sjrobin@mcmaster.ca. You must then contact the component lead or laboratory coordinator (depending on what you missed) immediately (normally within 2 working days) by email. 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. Please note that the MSAF may not be used for final project deliverables, nor can it be used for a final examination or its equivalent.

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

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.

Student Conduct

You acknowledge that your behaviour in all aspects of this course should meet the standards of the McMaster University Student Code of Conduct. You understand that any inappropriate behaviour directed against any of your colleagues, teaching assistants, or the instructional team will not be tolerated. Disruptive behaviour during any iSci session (e.g. iConS, Invited Speaker Seminars, labs, tutorials) such as talking, sleeping or non-iSci 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 such as iStudy and e-spaces such as the Avenue to Learn course discussion board are to be considered inclusive and safe.

Student Responsibilities

The level of student participation in this course is much higher than in traditionally-taught courses. 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 ISCI 1A24 Laboratory Manual
- check the course Avenue site, individual components’ web pages (if applicable) and your McMaster and Avenue e-mail daily for updates
- review, understand and abide by the ISCI 1A24 Student Responsibilities Contract; and
- follow all university policies and guidelines, and in all ways be a responsible university member.
Communication between students and faculty

Any e-mails addressed to faculty must have a brief, relevant subject line, must come from a ‘mcmaster.ca’ e-mail account or via Avenue, and must copy in all relevant parties (e.g. other markers, other group members). Keep in mind that Avenue does not accept emails sent from outside Avenue. So, if you are sending an email to a mcmaster.ca account and are expecting a reply, use your McMaster email, and not Avenue. All e-mail communication addressed to students will be sent to their mcmaster.ca e-mail account or via Avenue.

All assignments must be handed in via Avenue, in the specified file format (usually pdf). Author(s) name(s), student number(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.

Senate Student Policies

You should note the Senate’s Student Policies (http://www.mcmaster.ca/policy/student.htm). Senate Policy Statements are also available from the Senate Secretariat Office, Room 104, Gilmour Hall.

In particular you should read the Academic Integrity Policy, specifically Appendix 3: 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.

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, solution manuals 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.

The instructors and the university reserve the right to alter this outline if necessary. The instructors and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. 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. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.