



CISC 260: Programming Paradigms
Winter 2018 Syllabus and Administrative Policies
last updated 01/07/18

This syllabus is a brief summary of the most important administrative information for CISC 260. Students enrolled in the course must also refer to the information available in the course's OnQ area.

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Lecture Times:

Mondays 8:30-9:20

Tuesdays 10:30-11:20

Thursdays 9:30-10:20

There will be no lectures during Reading Week (Feb. 19-23)

There WILL be a lecture on Easter Monday (Apr. 2) but there will not be an assignment due or a quiz on that day.

Lecture Location: Etherington Auditorium (Quizzes may be in a different location; will be announced on OnQ news)

Pre-requisite: CISC 124

Pre or Co-requisite: CISC 204

Please note that professors for individual courses do NOT have the authority to waive a pre- or co-requisite for this course. Any such requests must go through the Undergraduate Chair for the School of Computing.

Calendar Description:

Review of imperative programming features. Introduction to other widely used programming paradigms. Functional programming languages, such as LISP and Haskell. Higher order functions, lazy evaluation, abstract and recursive types, structural induction, symbolic expressions. Logic programming languages, such as PROLOG. Operational interpretation of predicates and terms, proof search, unification, backtracking. Typical applications.

Purpose: This course is designed to introduce students to programming paradigms beyond the imperative paradigm used in courses up to this point in languages such as Prolog and Java. It focuses on the functional and logical paradigms, using the Haskell and Prolog languages. These paradigms and languages will be useful for many students in later courses, and the ideas gained from studying them will be of use in future programming for every student in a Computing program. The languages from the course and similar languages such as Lisp, F# and many others are used in industry for a wide range of applications. Since the languages used in this course both use recursion heavily, this course also helps students gain skill and confidence with recursive programming, which is very useful for many applications, no matter what language you're using.

Learning Outcomes: By the end of the course you should be able to do the following things:

- in Haskell:
 - write interesting and useful functions in the pure functional subset of Haskell
 - read and understand functions written in the pure functional subset of Haskell
 - understand the Haskell type-checking system
 - use structural induction to prove properties of simple functions
 - understand and use higher-order functions
 - understand and use "lazy evaluation"
 - make use of simply algebraic types
- in Prolog:
 - write facts, rules and queries to solve small problems in Prolog
 - read and understand small Prolog programs
 - understand and explain the difference between the declarative and procedural meaning of a program
 - use negation and cuts in Prolog functions
 - write and understand Prolog programs involving interesting searching algorithms
- in both languages (and others):
 - use recursion confidently
 - use accumulators in recursive programs to help solve problems and be able to identify situations in which an accumulator would or would not make a recursive function easier to write and/or more efficient.

Textbooks: There are two required textbooks for this course:

- *Haskell: The Craft of Functional Programming*, by Simon Thompson (third edition)
- *Prolog: Programming for Artificial Intelligence*, by Ivan Bratko (fourth edition)

I apologize for asking you to purchase two textbooks, but this course requires studying two different languages and there is no published textbook that covers both of these languages adequately for our needs. The bookstore will almost certainly buy back these books at the end of the term if you don't want to keep them.

You must do the assigned readings! You can't expect to pick up everything you need for this course just from lectures. Many students find this course difficult and you should make sure you have the resources to handle it.

Course Organization: For most topics there will be assigned readings from the textbook or course notes. Lectures will not review the readings in detail but will focus on examples to illustrate the techniques and ideas in the readings and to demonstrate good programming techniques. Lectures will also include opportunities for students to work on practice problems with help available from the instructor.

Assignments and Practice Problems: Students will be given six marked assignments as well as many unmarked practice problems to work on. These are essential for doing well in the course. If you can't apply what you're learning in class to programming problems you will not be able to pass the quizzes and final exam.

Group Work: Group work is *forbidden* for the marked assignments in this course. What you hand in *must* be your own work and nobody else's. If you need help with an assignment, please talk to the instructor or a TA, but not to your classmates or anyone else. Failure to abide by this rule will be viewed as a violation of Queen's Academic Integrity regulations and may result in serious academic penalties.

For unmarked practice problems, learning is the only goal. If working in a group and discussing problems with other students helps you learn please feel free to do that. Just remember that seeing and understanding someone else's solution to a problem is no guarantee that you would be able to solve that problem or similar ones on a quiz or exam. It's important to include solo work in your studying to prepare yourself for writing your quizzes and exams on your own.

Course Schedule: Will be available on OnQ by the start of the term. Students will have adequate warning of all quizzes and assignment dates.

Marking Scheme:

The basic marking scheme is as follows:

assignments (average of the best 5 of the 6 assignments during the term): 10%
quizzes (average of the best 2 of the 3 quizzes given during the term): 50%
final exam: 40%
total: 100%

More Marking Details:

The marking scheme says “best 2 of the 3 quizzes given during the term”. At the end of the term I will ignore the lowest of your three quizzes and average your marks from the other two. That means if you miss a quiz for ANY reason that’s the one you drop. Your reason could be serious illness or forgetting to come to class that day or just deciding you don’t feel like writing that quiz; it doesn’t matter. That quiz will count as a zero and I’ll drop it and average the other two.

If you have to miss more than one quiz with a very good reason for both (such as illness) come talk with me or send me an e-mail as soon as possible after the second quiz and we’ll figure out a fair accommodation. But if just blew off one quiz and later are sick (or have another good excuse) for the second one, you will have to accept one of the zeros; there will be make-ups or changes to your marking scheme.

The marking scheme also says “best 5 of the 6 assignments”. The same is true here. If you miss 2 assignments you need good reasons for both of them before I change the marking scheme.

Moral: It’s a really, really bad idea to just decide not to write a quiz or do an assignment because you’re busy or don’t feel like it – unless it’s the very last quiz or very last assignment!

Academic Integrity: For the full statement of Queen's Academic Integrity policy, please see Arts & Science Academic Regulation 1 at http://www.queensu.ca/artsci/sites/default/files/academic_regulations.pdf#page=1. You are responsible for familiarizing yourself with these principles, which apply to all Queen's courses.

For this course, Academic Integrity prohibits any of the following:

- collaborating with other students for a solution to a marked assignment – including copying another student's work or allowing another student to copy your own work
- posting a solution to an assignment (or even *part* of an assignment) in any public space (online or a physical space)
- submitting a solution to an assignment in which all or part is copied from a solution posted elsewhere
- copying another student's work on a quiz or the final exam, or allowing another student to copy your work
- discussing a quiz or the final exam with another student who is being allowed to write it late
- asking another student to discuss a quiz or the final exam with you if you are being allowed to write it late.

Please be warned that I take Academic Integrity quite seriously and WILL make formal charges if violations are detected. These charges will affect your mark and possibly your status at Queen's.

How To Get Help: Even the best students have questions from time to time! It’s nothing to be ashamed of. It’s part of how we all learn. (Yes, even profs....) Here are some helpful strategies for when a question comes up:

- Make sure you done the assigned reading; the answer to your question may be in there.
- If it’s an administrative question, look in the syllabus
- Check the OnQ news to see if there has been an announcement that answers your question
- Visit office hours.
- Talk with me after class. I try to avoid scheduling things right after lectures. Occasionally I may have to rush off to a meeting or other appointment, but usually I will be able to hang around and talk with people when needed.

More Tips For Doing Well in This Course:

- Read all of the assigned readings carefully and on time.
- Attend lectures regularly. Participate in practice problems and don't be afraid to ask questions.
- Get an early start on the assignments; don't leave them until the last minute.
- Work on practice problems in addition to the assignments. Practice problems for many of the topics in this course will be suggested on the web site. I will also be posting quizzes from the last few years of this course in our OnQ area and there are many years of old final exams available on [Exambank](#). Even though you don't get marks for practice problems, practicing is the best way to make sure you understand the course material and can apply it on your assignments, quizzes and exam, which *are* marked.
- Check the OnQ news for this course daily (or subscribe to it and make a habit of checking your Queen's e-mail daily). When I need to make important announcements they will go on the OnQ news and I will assume that students will see them there.
- In the fall I created OnQ discussion forums for the students in my class and nobody used them. So I won't bother to create forums this term unless students in this course tell me OnQ forums would be useful.
- When you have questions, OnQ should be the first place you look for answers (including the OnQ news). Please check the news before you send me administrative questions.
- For general help with this course, or to discuss administrative issues, please feel free to visit my office hours. No appointment is necessary. I'm hoping to schedule some TA help sessions as well. In a class this size, please understand that the TAs and I can't make individual appointments to tutor students.

Students Needing Accommodations During the Semester: Queen's does a lot of work to make sure students with long- or short-term illnesses or other problems are given the accommodations they need. The system can sound a bit complicated, but it's a good one. The goal is to make sure that every student gets the help they need to make a "level playing field" for everyone, and to prevent putting students into a situation where they have to talk to their profs about personal details. I will summarize the procedures in the space below and also go through them during the first lecture of the term (which will be available on video from our OnQ area for anyone who adds this class late). If you are still confused about what procedures are right for you I'm willing to talk with you about it, but it might be better to go directly to your faculty office for advice.

1. Students With Disabilities or Long-Term Health Conditions (more than 3 months in duration):

If you have not already done so, you need to visit the Student Wellness website at: <http://www.queensu.ca/studentwellness/accessibility-services/>. They will arrange for you to meet with a counselor who will assess your needs and provide you with a letter to give your profs. This letter won't include any personal details, just a list of the accommodations you need (extra time, large print, or whatever). It is your responsibility to complete this registration and provide all of your profs with a copy of your letter.

If your letter says you need to write your quizzes with a computer, you will be proctored by the Exams Office, but only if you apply to the Exams Office (with documentation) *at least 10 days before the first quiz*, which for this class means **Friday, January 19**. Please note that if you are allowed to write your quizzes with a computer it will be a special computer with no Internet connection and only a few basic programs such as Notepad and Microsoft Word. You will not have access to any programming tools such as compilers; these would give you an unfair advantage over students writing on paper.

If you need other sorts of accommodations for quizzes (extra time, a small room, etc), you must inform me no later than **Friday, January 19** and *include a copy of your complete class schedule* (preferably a screenprint from SOLUS). The reason for the deadline is that in a class this size there may be quite a few students needing accommodations of various kinds and it takes time to make arrangements for everyone. The reason for the class schedule is that it may not be possible to have everyone who needs accommodations write at the same time as the rest of the class and I need to make sure I don't schedule your quiz at a time when you have another class. If you don't get in touch by the deadline and provide me with a schedule it may not be possible to arrange a quiz that meets your needs and avoids conflicting with your other classes.

If you need any sort of accommodation for your final exam, that is handled by the Exams Office. Queen's Accessibility services will probably set this up for you, but it's your responsibility to make sure this happens. Please check with Accessibility Services early in the term to make sure they're taking care of it. If you have a long-term disability and neglect to inform the Exams Office you will have to write in the regular exam hall without any accommodations. I will not proctor a special exam for you if you neglect to arrange it with the Exams Office.

2. Students With Special Circumstances Lasting More Than 2 Days But No More Than 3 Months:

If you're in Arts & Science, go to <https://www.queensu.ca/artsci/accommodations> and read the information about "Short-Term Extenuating Circumstances". You'll need to fill out a form and also submit a verification form from an appropriate professional (doctor, police officer, or whatever). When that is done, the faculty will send your profs letters telling us what kind of help you need (for example, extensions on assignment deadlines) without revealing any personal details.

If you're registered in a faculty other than Arts & Science, go to your faculty's web site and they will have equivalent procedures, although for some faculties the forms are on paper rather than online. If you can't find them, call the faculty office and ask.

3. Students With Special Circumstances Lasting No More Than 2 Days:

If you're in Arts & Science, go to <https://www.queensu.ca/artsci/accommodations> and read the information about "Self-Declaration For Brief Absence". It's essentially the same as the above except that for this kind of short things you don't need a verification form, just a self-declaration. (Although the Faculty Office *will* be keeping records and will be contacting students who have this kind of circumstances often.)

And as above, if you're registered in a faculty other than Arts & Science, go to their web site or contact them to ask for instructions.