



Faculty of Science
Department of Computer Science
Course Outline (Fall 2016)

CPS 710 – Compilers and Interpreters

Instructor	Sophie Quigley Dept. of Computer Science, Ryerson University Office: ENG263 Tel: 416-979-5000, x7401, Email: cps710@scs.ryerson.ca Office Hours: Tuesdays 3:00-5:00PM
Prerequisites	CPS615
Calendar Description	Introduction to modern compiler design: theory, techniques, and tools. Students will develop an interpreter or compiler. Assembler and preprocessors will also be briefly discussed. Lect: 3 hrs
Compulsory Textbook	None.
Reference Textbooks	<ul style="list-style-type: none">• Modern Compiler Design by David Galles, Scott/Jones 2005, ISBN 1-57676-105-3• Generating Parsers with JavaCC by Tom Copeland, Centennial Books, ISBN 0-9762214-3-8• Compilers Principles, Techniques, and Tools by Aho, Sethi, and Ullman, Addison-Wesley 1985, ISBN 0-201-10088-6• Introduction to Compiler Construction, by Thomas Parsons, ISBN-13: 978-0716782612• PDF version of Compiler Construction by Niklaus Wirth• PDF version of Language Implementation Patterns by Terence Parr, ISBN-13: 978-1-934356-45-6

Course Organization

3 hours of lecture per week for 12 weeks.

Learning Objectives

At the end of the course, a successful student will be able to:

1. Be able to develop a simple interpreter using compiler-generating tools
2. Have a good understanding of the theory underlying the design of compilers and interpreters.
3. Have a good understanding of the structure of compilers and interpreters
4. Have a good understanding of some of the major challenges related to the building of translators and compilers.

Course Evaluation

Type	Description	Handed out	Due	Late Penalty	Weight	Team Size	Topics Learned
Ass. 1	Scanner	Sept 21	Oct 5	-100%	10%	1	Scanning
Ass. 2	Parser	Oct 5	Oct 24	-100%	15%	1	Parsing
Ass. 3	Interpreter	Oct 25	Nov 16	-4 ⁿ	30%	1 or 2	Symbol tables, evaluation
Ass. 4	Error Checker	Nov 16	Nov 30	-4 ⁿ	10 %	1 or 2	Error management
Final Exam		Exam period			40%	1	

Note that the total weight adds up to 110%. This is because Assignment 4 is worth 5% with an extra bonus 5%.

Details

Follow the links in the table above for further information on how to submit assignments on the due date, late penalties, team sizes, and for details on the evaluations themselves. In particular: Teams who want to have one more member than the specified maximum for an assignment can do so with a penalty, but they must declare all team members on the marking sheet of that assignment when the assignment is submitted. Failure to do so constitutes academic misconduct and will be treated accordingly.

Course Technology

- D2L is used for grades and communications
- Other course information is posted on <http://cps710.scs.ryerson.ca/>

- Assignments are developed in java on the scs moons using javacc

Evaluation Guidelines

See <http://cps710.scs.ryerson.ca/> for details on each work in this course, or click on the links for each evaluation.

Missed Evaluations

Students are required to inform their instructors of any situation which arises during the semester which may have an adverse effect upon their academic performance, and must request any considerations and accommodations according to the relevant policies and well in advance. Failure to do so will jeopardize any academic appeals.

- *Medical certificates* – If a student misses the deadline for submitting an assignment, or the date of an exam or other evaluation component because of illness, he or she must submit a Ryerson Student Medical Certificate AND an Academic Consideration form within 3 working days of the missed date. Both documents are available at www.ryerson.ca/senate/forms/medical.pdf. If you are a full-time or part-time degree student, then you submit your forms to your own program department or school. If you are a certificate or non-certificate student, then you submit your forms to the staff at the front desk of the Chang School.
- *Religious observance* – If a student needs accommodation because of religious observance, he or she must submit a Request for Accommodation of Student Religious, Aboriginal and Spiritual Observance AND an Academic Consideration form within the first 2 weeks of the class or, for a final examination, within 2 weeks of the posting of the examination schedule. If the required absence occurs within the first 2 weeks of classes, or the dates are not known well in advance as they are linked to other conditions, these forms should be submitted with as much lead time as possible in advance of the required absence. Both documents are available at <http://www.ryerson.ca/senate/forms/reobservforminstr.pdf>. If you are a full-time or part-time degree student, then you submit the forms to your own program department or school. If you are a certificate or non-certificate student, then you submit the forms to the staff at the front desk of the Chang School.
- *Students who need academic accommodation support* should register with the Academic Accommodation Support office (formerly called the Access Centre). Before the first graded work is due, registered students should inform their instructors through an “Accommodation Form for Professors” that they are registered with Academic Accommodation Support and what accommodations are required.

Communication with Students

Ryerson’s email policy <http://www.ryerson.ca/content/dam/senate/policies/pol1157.pdf> states that only Ryerson e-mail accounts are to be used for communication with students. All students, including continuing education students, have access to Ryerson email through their my.ryerson.ca site, and this is the official way in which they receive communication. All students are required to register for and maintain this account. ***Emails sent from other accounts may not be answered!***

**Course
Content****Topics (approximate hours)**

- Introduction, history, and interpretation and compilation phases (3 hours)
- Scanning, finite-state automata, and regular expressions (5 hours)
- Parsing and grammars (9 hours)
- Intermediate representations (3 hours)
- Semantic analysis (2 hours)
- Evaluation (6 hours)
- Scoping (5 hours)
- Error detection and recovery (3 hours)

**Academic
Policies**

- Ryerson Policies of Interest*
Ryerson Senate Policies - <http://www.ryerson.ca/senate/policies/>
Ryerson Academic Integrity - <http://www.ryerson.ca/academicintegrity/>
Policy 46 - Undergraduate Grading, Promotion and Academic Standing
Policy 60 - Student Code of Academic Conduct
Policy 61 - Student Code of Non-academic Conduct
Policy 134 - Undergraduate Academic Consideration and Appeals
Policy 135 - Examination Policy
Policy 150 - Accommodation of Student Religious Observance Obligations
Policy 157 - Student Email Accounts for Official University Communication
- Obligations* – Students need to inform faculty of any situation arising during the semester which may have an adverse effect upon their academic performance; they must request any necessary considerations (e.g. medical or compassionate), or accommodations [e.g. religious observance, disability (should be registered with the Access Center), etc.] according to policies and well in advance. Failure to do so will jeopardize any academic appeals.
- Re-grading and Re-calculation* – Must be requested within 10 working days of the return of the graded assignment to the class.

**Academic
Conduct**

<http://www.ryerson.ca/academicintegrity/>

In order to create an environment conducive to learning and respectful of others' rights, phones and pagers must be silenced during lectures, lab sessions and evaluations.

Students should refrain from disrupting the lectures by arriving late and/or leaving the classroom before the lecture is finished.

**Academic
Misconduct**

According to the Ryerson policy 60

(<http://www.ryerson.ca/content/dam/senate/policies/pol60.pdf>), academic misconduct includes, but is not limited to:

- Plagiarism which is the claiming of words, ideas, artistry, drawings or data of another person. This also includes submitting your own work in whole or in part for

credit in two or more courses.

- Cheating
- Misrepresentation of personal identity or performance
- Submission of false information
- Contributing to academic misconduct
- Damaging, tampering, or interfering with the scholarly environment
- Unauthorized copying or use of copyrighted materials
- Violations of departmental policies or professional behavior
- Violations of specific departmental or course requirements

Committing academic misconduct will trigger academic penalties, including:

- *course-grade reduction greater than a grade of “zero” (0) on course work (A note to the Instructor: as per Article 5.2.3 of Policy 60, “this can only be applied to course components worth 10% or less, and any additional penalty cannot exceed 10% of the final course grade. Students must be given prior notice that such a penalty will be assigned (e.g. on the course outline, on the assignment handout, etc.).”)*
- *failing grades, suspension and possibly expulsion from the University. As a Ryerson student, you are responsible for familiarizing yourself with Ryerson conduct policies.*

Non-Academic Conduct

Ryerson's Student Code of Non-academic Conduct is described in Senate Policy 61: <http://www.ryerson.ca/content/dam/senate/policies/pol61.pdf>

Among many other infractions, the code specifically refers to the following as a violation: “Disruption of Learning and Teaching - Students shall not behave in disruptive ways that obstruct the learning and teaching environment”.