WENTWORTH INSTITUTE OF TECHNOLOGY

College of

Compiler Design

Summer 2014

**Course Number:** COMP603-01-06 **Instructor Name:** Joseph Lawrance

**Classroom:** Wentworth 210 or Wentworth 212 **Office Hours:** 9am, 11am, noon, 1pm MWF

**Class Schedule:** 8am, 10am, 1pm MWF **Office Location:** Dobbs 133

**Lecture/Lab/Total Credits:** 3/2/4 **Office Telephone Number**: 617-989-4749

**Email address:** lawrancej@wit.edu

**COURSE DESCRIPTION:**

This course covers the principles and techniques used in the design of compilers. Topics include lexical and semantic analysis, parsing, translation, code generation, and optimization.

Prerequisite: COMP285, Senior status.

**REQUIRED TEXTBOOK(S):**

Fischer, Cytron, LeBlanc, Crafting a Compiler, Addison-Wesley, 2010.

**THE COLLEGE BOOKSTORE:**

Location: 103 Ward Street Boston MA 02115

Telephone: 617-445-8814

**RECOMMENDED LEARNING MATERIALS:**

<http://www.cprogramming.com/tutorial/c-tutorial.html>

<http://www.iu.hio.no/~mark/CTutorial/CTutorial.html>

<http://c.learncodethehardway.org/book/>

**COURSE LEARNING OUTCOMES:**

Define the terms: compiler, language.

Define and explain each phase of a compiler.

Write regular expressions to match patterns.

Implement regular expression matchers.

Design grammars to match languages.

Distinguish LL from LR context-free grammars and how to parse them.

Design the abstract syntax tree for a simple language.

Design visitor classes to traverse ASTs to optimize and generate code.

Implement each phase of a compiler.

Recognize when to use compiler construction techniques in non-compiler programs.

**INSTRUCTIONAL METHODOLOGIES:**

Learning requires work. Research indicates that we learn through practice, teaching others, and discussion that corrects misconceptions. Lecture, reading and demonstrations are largely ineffective. We learn once we put what we read, hear or see into practice.



**ATTENDANCE POLICY:**

Show up on time. Participate regularly.

* After 3 unexcused absences, you will receive an attendance warning.
* After 6 unexcused absences, you will be withdrawn from the course.
* <http://www.wit.edu/catalog/2012-Catalog/academic-policies/Attendance.html>

Excused absences include: athletics, conferences, funerals, illness, jury duty, and transit problems.  
Unexcused absences include: hangovers, all-nighters, sleeping through the alarm, video game launches, etc.

**GRADING POLICY:**

**Points Activity**

20 Exams (Midterm and Final)

20 Quizzes, weekly participation

60 Assignments, labs and project

See the grading rubric for more information.

**WENTWORTH GRADING SYSTEM:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade** | **Definition** | **Weight** | **Numerical Definition** |
| A | Student learning and accomplishment far exceeds published objectives for the course/test/assignment and student work is distinguished consistently by is high level of competency and/or innovation. | 4.00 | 96-100 |
| A- | 3.67 | 92-95 |
| B+ | Student learning and accomplishment goes beyond what is expected in the published objectives for the course/test/assignment and student work is frequently characterized by its special depth of understanding, development, and/or innovative experimentation. | 3.33 | 88-91 |
| B | 3.00 | 84-87 |
| B- | Students learning and accomplishment meets all published objectives for the course/test/assignment and the student work demonstrates the expected level of understanding, and application of concepts introduced. | 2.67 | 80-83 |
| C+ | 2.33 | 76-79 |
| C | 2.00 | 72-75 |
| C- | Student learning and accomplishment based on the published objectives for the course/test/assignment were met with minimum passing achievement. | 1.67 | 68-71 |
| D+ | 1.33 | 64-67 |
| D | 1.00 | 60-63 |
| F | Student learning and accomplishment based on the published objectives for the course/test/assignment were not sufficiently addressed nor met. | 0.00 | Less than 60 |

**ADD/DROP:**

Students should check the academic calendar to confirm the add/drop deadline. Dropping and/or adding courses is done online. Courses dropped in this period are removed from the student’s record.

Non-attendance does not constitute dropping a course. If a student has registered for a course and subsequently withdraws or receives a failing grade in its prerequisite, **then the student must drop that course**. In some cases, the student will be dropped from that course by the Registrar. However, it is the student’s responsibility to make sure that he or she meets the course prerequisites and to drop a course if the student has not successfully completed the prerequisite. The student must see his or her academic advisor or academic department chair for schedule revision and to discuss the impact of the failed or withdrawn course on the student’s degree status.

**MAKE-UP POLICY:**

Please talk to me if you are absent or plan to be. Work receives a 20% penalty for each day late. I will drop the lowest grade, except for students who plagiarize and their accomplices.

**ACADEMIC SUPPORT:**

The Learning Center assists all Wentworth students with academic challenges in the areas of math, science, technical courses specific to majors, and writing. The Learning Center is a supportive and safe learning environment for students looking to improve or maintain their academic standing. In this student-based learning environment, students can receive individual help with their studies, meet and work in study groups, or find resources to assist them in meeting their goals for academic success.  It includes tutors in many subjects, writing assistance and workshops.  Make appointments at [www.wit.edu/tlc](http://www.wit.edu/tlc)

**ACADEMIC HONESTY STATEMENT:**

Students at Wentworth are expected to be honest and forthright in their academic endeavors. Academic dishonesty includes cheating, inventing false information or citations, plagiarism, tampering with computers, destroying other people’s studio property, or academic misconduct” (Academic Catalog). See your catalogue for a full explanation.

**STUDENT ACCOUNTABILITY STATEMENT:**

Plagiarism is misrepresenting work as your original creation. You may discuss work with others, but cite any collaboration. You learn by doing the work, so you cheat yourself by avoiding it. If you plan to cheat, why not drop out now and buy a fake diploma online instead? It’s much cheaper and quicker than pursuing a Wentworth degree. Cheating and plagiarism will result in a grade of zero for violators and accomplices and will not be dropped. The second violation will result in an “F” for the course for violators and accomplices. Other potential penalties include: removal from the course, institute suspension or expulsion.

**DISABILITY SERVICES STATEMENT:**

Any student who thinks s/he may require a disability related accommodation for this course should contact Disability Services to discuss your specific needs. Disability Services coordinates reasonable accommodations for students with documented disabilities. They are located in Watson Hall 003 (the Counseling Center) and can be contacted at 617-989-4390 or [counseling@wit.edu](mailto:counseling@wit.edu). For more information on acceptable documentation and the Disability Services process, visit the Disability Services website at [www.wit.edu/disabilityservices](http://www.wit.edu/disabilityservices).

**COLLEGE OF THE FENWAY STUDENTS:**

If you are enrolled in this course through COF Cross Registration, notify your course instructor. Please provide her/him with your email address to be sure that you receive course information in a timely way. You should also discuss how to access online applications that might be used in the course. Please note that cross registered students who wish to drop or withdraw from this course must complete the necessary paperwork according to the Wentworth calendar.

**SYLLABUS OUTLINE:**

1. Introduction, basic terminology, project
2. Regular expressions
3. NFA, DFA and derivative matching
4. Context-free grammars
5. LL (recursive descent), LR (shift-reduce) and derivative parsing
6. Abstract syntax trees, visitors
7. Optimization & code generation