CSI 5137 Software Foundations
(3 hours of class per week, 3 credits, category T,E)

Fall 2021
Course Outline

Mathematical underpinnings of reliable software. Topics include basic concepts of logic, computer-assisted theorem proving and the Coq proof assistant, functional programming, operational semantics, Hoare logic, and static type systems.

Course Objectives:

• To develop a solid theoretical background in the mathematical underpinnings of reliable software, in particular techniques for specifying and reasoning about properties of software.

• To obtain substantial experience using tools for helping validate these kinds of properties, in particular the use of proof assistants to construct rigorous logical arguments.

• To gain a deep understanding of the idea of functional programming, both as a method of programming and as a bridge between programming and logic.

Prerequisites:

• Significant programming experience
• Mathematical sophistication
• Undergraduate functional programming or compiler class
• At least one of:
  – Be enrolled in a computer science or math Ph.D. program
  – Be enrolled in a computer science or math Master’s program with thesis
  – Have a computer science 4-year undergraduate degree
  – Be an undergraduate in computer science or math with special permission to enroll

Professor:

Dr. Amy Felty
SITE 5-068
afelty@uottawa.ca
Time and Place:

- Tuesday 14:30–15:50, Social Sciences Building (FSS), Room 1030
- Friday 16:00–17:20, Desmarais Building (DMS), Room 1110

Office hours:  Tuesday, 10:30–12:30

- 10:30–11:30 on Zoom
- 11:30–12:30 in SITE 5-068

Textbook:  Software Foundations, Volumes 1 and 2, Benjamin C. Pierce et. al.
The version of the textbook used for this course is available online from the course website.

Other Resources:

- Certified Programming with Dependent Types, Adam Chlipala, MIT Press, 2013, available online.

Evaluation:

- 30% Assignments (approximately weekly)
- 30% 2 Term Tests
- 10% Project/Presentation
- 30% Final Exam

Web Info:

Course Web page:  http://www.eecs.uottawa.ca/~afelty/csi5137/
Textbook Volume 1:  http://www.eecs.uottawa.ca/~afelty/csi5137/lf/
Course Outline:

Note that this schedule is subject to change during the semester.

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