

Advanced Topics in Language Design and Implementation

Subject: Computer Science (CS)

Catalog number: 842

Unit weight: 0.50

Meeting type: SEM

Grading Basis: NUM

Cross-listing(s): N/A

Requisites: An undergraduate course in programming languages or compilers or permission of the instructor.

Description:

This is a research-oriented graduate course on modern programming language design and strategies for implementing them. Some topics are applicable to broad classes of programming languages in widespread use, e.g. loop optimization and memory management. Other topics relate to specific features of more specialized programming languages, e.g. lazy evaluation, or types as first-class values. The course involves lectures, study of topics from the literature, and a programming project. The first part of the course will be topics presented by the instructor and the second part will be student presentations and discussions.

Topic Titles: The topics presented in class will be selected from:

- Memory management / garbage collection.
- Functional programming and closures.
- Lazy evaluation and parallel futures.
- Programming language issues around arithmetic types.
- Polymorphic language techniques.
- Types as first class values, type categories, dependent types.
- Method dispatch and optimization in object-oriented languages.
- Topics in code optimization, including dataflow analysis.
- Iterators, generators, co-routines and their optimization.

Faculty: Mathematics (MAT)

Academic level: GRD

Course ID: