CSCE 531: Compiler Construction

1. Course number and name: CSCE 531: Compiler Construction

2. Credit: 3-hrs; Contact: 3 lecture periods of 50 minutes or 2 periods of 75 minutes per week

3. Instructor: Steve Fenner or Marco Valtorta

4. Textbook: Alfred V. Aho, Ravi Sethi, and Jeffrey D. Ullman, *Compilers: Principles, Techniques, and Tools*, Addison-Wesley, Boston, MA, 1986 [required]

   Samuel P. Harbison and Guy L. Steele, *C: A Reference Manual*, 5th edition, Prentice Hall, 2002 [recommended]

5. Specific course information
   a. Catalog description: Techniques for design and implementation of compilers, including lexical analysis, parsing, syntax-directed translation, and symbol table management.

   b. Prerequisites: CSCE 240
   c. CSCE 5xx elective

6. Specific goals for the course
   a. Specific outcomes of instruction are that students will be able to:
      1. Formally define the grammar and semantics of a language
      2. Design and implement finite state machines appropriate for use a lexical scanner
      3. Given the definition of an appropriate context free grammar, design either a bottom-up or top-down parser for the grammar
      4. Given the semantic definitions for an appropriate language, implement the semantic routines for a top-down or bottom up parser
      5. Perform code generation at the tuple level

   b. As an elective this course cannot be counted upon to contribute to the attainment of any student outcome.

7. Topics covered and approximate weight (14 weeks, 4 hours/week, 56 hours total)
   1. Introduction to compiler, structure, implementation, and operation (2 hours)
   2. Specification, design, and implementation of a simple recursive descent compiler (8 hours)
   3. Lexical analysis (3 hours)
   4. Grammars and Parsing (8 hours)
   5. Semantics (4 hours)
   6. Symbol Tables (2 hours)
   7. Run-time storage organization (4 hours)
   8. Translation of language components (4 hours)

9. Code generation (3 hours)
10. Reviews and tests (4 hours)