Dept Number | CS 516 | Course Title | Advanced Compilers
Semester Hours | 3 | Course Coordinator | Henry Hexmoor
Catalog Description | A continuation of 416 including advanced topics in lexical and syntax analysis, error recovery, semantic analysis, code optimization, and compiler compilers.

Course Learning Outcomes

Assessment of the Contribution to Program Outcomes

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Prerequisites by Topic

CS 416

Major Topics Covered in the Course
1. Lexical Analysis
   Some sophisticated pattern matching algorithms and their optimization. Use of LEX.

2. Error Recovery
   Detection, reporting, recovery and repair of errors in the compilation process.

3. Syntax Analysis
   Canonical LR parsers, handling of ambiguous grammars, error reporting in LL(1),
   operator precedence and LR parsing, efficient generation of LALR(1) sets,
   optimization of LR parsers, optimization of transformations.

4. Run Time Storage
   Activation records, handling recursive calls, management of variable length blocks,
   garbage collection and compaction

5. Type Checking
   Overloading of functions and operators, polymorphic functions, unification
   algorithm.

6. Code Generation and Semantic Analysis
   Semantic stacks, attributed translation, analysis of syntax directed translation.

7. Code Optimization
   Basic blocks and folding, optimization within iterative loops, global optimization
   through flowgraph analysis, code improving transformations, Machine dependent
   optimization.

8. Compiler-Compilers
   Parser generators, YACC, attributed LL(1) parser generator, machine independent
   code generation.

9. Other Topics
   COMPILERS for parallel machines, compilers for functional languages.