

Course 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.						
Textbooks							
References							
Course Learning Outcomes							
Assessment of the Contribution to Student Outcomes							
Outcome →	1	2	3	4	5	6	7
Assessed →	X	X	X		X		X
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.