THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Principles of Programming Languages

CSE 3341

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture

Course Description:
Formal languages and grammars; recursive descent parsing; data types, expressions, control structures, parameter passing; compilers and interpreters; memory management; functional programming principles.

Prerequisites and Co-requisites:
Prereq: 2231, 2331 (680), and 2421, and 3901 (560), 3902, or 3903.

Course Goals / Objectives:

- Master using syntax-directed parsing, printing, execution, and compilation for simple imperative language constructs
- Master distinguishing between compile-time vs. run-time activities
- Be competent with using syntax-related concepts including regular expressions and context-free grammars to describe the structure of languages
- Be competent with analyzing programming language design issues related to data types, expressions and control structures, parameter passing
- Be competent with principles of object-oriented languages
- Be competent with implementing object-oriented languages
- Be familiar with memory management techniques for imperative languages, including object-oriented languages
- Be familiar with using functional programming languages
- Be exposed to analyzing variable bindings and scope rules

Course Topics:

- Overview of types of languages; language design and evaluation criteria; implementation methods (compilers and interpreters)
- Grammars (regular expressions, CFGs), abstract & concrete parse trees; recursive descent parsing;
- Recursive descent interpretation, compilation;
- Principles of OO languages (data abstraction, encapsulation, single and multiple inheritance, polymorphism (single and multiple dispatch), etc.)
- Implementation of imperative languages including OO languages (stack, heap management; activation records etc; runtime dispatch in OO languages)
- Functional programming principles (Scheme), including some discussion of implementation techniques
- More advanced ideas (ML types/inferencing, dynamically-typed languages, ...?)

Designation:

Elective