

University of Texas at El Paso
Course Syllabus

COURESE DESCRIPTION

Dept., Number	CS3360	Course Title	Design and Implementation of Programming Languages
Approval Date	May 2022	Course Coordinator	Nigel Ward

CATALOG DESCRIPTION

Design and Implementation of Programming Languages (3-0) Design features of modern programming languages, including flow control mechanisms and data structures; techniques for implementation of these features.

TEXT BOOK

Robert W. Sebesta. Concepts of Programming Languages, 11^h edition, Pearson, 2016.

COURSE OUTCOMES

Level 1: Knowledge and Comprehension:

Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions.

Upon successful completion of this course, students will:

- a. Describe broad trends in the history of development of programming languages.
- b. Explain the stages of programming language interpretation and compilation.
- c. Understand data and control abstractions of programming languages.
- d. Understand how attribute grammars describe static semantics.
- e. Describe ways to formally specify the dynamic semantics of small subsets of programming languages, such as expressions and control structures.
- f. Understand code snippets written in a paradigm beyond imperative, object-oriented, and functional, e.g., algebraic, aspect-oriented, logic, or probabilistic languages.

Level 2: Application and Analysis:

Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details.

Upon successful completion of this course, students will be able to:

- a. Define syntax of a small context-free grammar in BNF.
- b. Define the syntax of a small subset of a programming language in BNF.
- c. Compare different approaches to naming, storage bindings, typing, scope, and data types.
- d. Analyze design dimensions of subprograms, including parameter passing methods, subprograms as parameters, and overload subprograms.
- e. Be able to write programs to solve simple problems in a purely functional language.
- f. Be able to write programs to solve simple problems in a scripting language.

Level 3: Synthesis and Evaluation

Level 3 outcomes are those in which the student can apply the material in new situations.

This is the highest level of mastery.

Upon successful completion of this course, students will be able to:

- a. Evaluate modern, representative programming languages critically with respect to design concepts, design alternatives, and implementation considerations for variables, types, expressions, control structures, and program modules.
- b. Choose a suitable programming paradigm and language for a given problem or domain.

ABET STUDENT OUTCOMES MAPPING

Course outcomes	Student outcome
None	1
3a-b	2 (ABET 1)
3b	3 (ABET 2)
None	4 (ABET 5)
None	5 (ABET 4)
None	6 (ABET 3)
None	7
3a	8
3b	9
1b,1c, 2c, 3a, 3b	10 (ABET 6)

PREREQUISITES BY TOPIC

CS 2302 with a grade of C or better

