

**Brooklyn College**  
**Department of Computer and Information Sciences**

**CISC 3160 [24] Programming Languages**

4 hours; 4 credits

The design, implementation, and evolution of programming languages. Language features and their effects upon translation and run-time environments. Languages studied are chosen for their historical and current significance, programming paradigm, and run-time environment. Syntax and semantic specification; formal grammars.

**Objectives:**

Upon completing the course, the student will:

- a. be able to describe the salient characteristics of several language paradigms (procedural, object-oriented, imperative, declarative/logic, functional).
- b. understand the concept of data binding and its effect upon the semantic level of the language.
- c. be familiar with standard mechanisms of realizing language semantics at execution time.
- d. understand the spectrum of source-to-executable language translation, its effect upon efficiency and expressivity the corresponding relation to data binding.
- e. be able to use formal techniques (such as BNF) in the specification language syntax.
- f. be able to recognize the relationship between the semantic level of the language and its expressivity, efficiency, control mechanisms, and data types.
- g. be able to apply the conceptual material covered in this course (i.e. , binding times, run-time support etc.) to the analysis of specific languages.
- h. be able identify the core semantics of data types and control constructs and to recognize the similarity and differences between data and control representations of various languages.
- i. be able to code small programs that illustrate the core semantics of each of set of languages that represent the paradigms covered in the course.
- j. be able to discuss the technological, software-engineering, and educational issues that propelled the evolution of programming languages.

**Syllabus**

I. Introduction and Brief History	Chapter 1
II . Syntax and Semantics	Chapter 2
III. Imperative Programming Paradigm	Chaps. 3, 4, 5
IV. Object-Oriented Paradigm	Chaps. 6-7.3
V. Functional Paradigm	Chaps. 8, 10
VI. Logic Paradigm	Chapter 11

**Textbook:**

*Programming Languages Concepts and Construct*, Second Edition, by: Ravi Sethi  
Addison-Wesley Publishing, 1996

**Bibliography:**

- Programming Language Pragmatics, by Michael L. Scott
- Compilers, by Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman
- Structure and Interpretation of Computer Programs, by Harold Abelson and Gerald Jay Sussman