# CMPE 318 Principles of Programming Languages

**Department:** Computer Engineering  
**Program Name:** Computer Engineering  
**Course Number:** CMPE318  
**Credits:** 4 Cr  
**Year/Semester:** 2010-2011 Fall  

**Prerequisite(s):**  
CMPE211 Object-Oriented Programming

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**Catalog Description:**  
Formal specification of programming languages: syntax, analysis, and semantics; evolution of programming languages and concepts; names and scope; data representation; evaluation sequence at expression, statement, and subprogram levels; Object Orientation implementation issues; abstraction, inheritance, polymorphism, concurrency, and exception handling; sampling of other paradigms such as functional, logical, scripting, high-performance, etc. as time permits. Weekly homework and lab work are assigned in parallel to lectures.

**Course Web Page:**  
http://cmpe.emu.edu.tr/bayram/courses/318/Teaching/Fall%202010/Main.htm

**Textbook(s):**  

**Indicative Basic Reading List :**  
None

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**Topics Covered and Class Schedule:**  
(4 hours of lectures per week)

- **week 1** Overview
- **week 2** Introduction, history of programming languages
- **weeks 3-4** The JAVA programming language
- **week 5** Describing syntax and semantics
- **week 6** Lexical and Syntax Analysis  
- **week 7** Names, Bindings, Type Checking, Scopes, Data Types  
- **week 8** Midterm  
- **week 9** Expressions and Assignment Statements, Control Structures  
- **week 10** Logic Programming  
- **week 11** Subprograms  
- **week 12** Implementing subprograms  
- **week 13** Functional Programming  
- **week 14** Abstract data types and encapsulation concepts  
- **week 15** Support for Object-Oriented Programming

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**Laboratory Schedule:**  
(2 hours of laboratory per week, when there is a lab)

- **week 3** Netbeans + JAVA Tutorial.  
- **week 4** Data structures in JAVA  
- **week 6** Lexical analysis  
- **week 10** Syntax analysis
**Course Learning Outcomes:**
Upon successful completion of the course, students should be able to

1. Enumerate the major programming paradigms and representative languages from each paradigm
2. Differentiate between the concepts of syntax and semantics
3. Specify the syntax of programming languages using context free grammars
4. Draw a parse tree for a sentence in a language, given its grammar
5. Derive a sentence in a language, given its grammar
6. Demonstrate that a specific grammar is ambiguous
7. Write simple lexical and syntax analyzers
8. List the key features of major programming language paradigms
9. Describe subprogram call/return semantics and its stack implementation
10. Differentiate between static and dynamic scope
11. Differentiate between static and dynamic binding
12. List and describe the major parameter passing mechanisms for subprogram calls
13. Define and use the notions of abstraction, information hiding, inheritance and abstract data types
14. Write and trace programs in JAVA
15. Describe the way virtual method tables are used to implement inheritance in object-oriented programming languages
16. Write and trace simple programs in the Prolog Logic Programming Language
17. Write and trace simple programs in the Haskell Functional Programming Language

**Assessment**

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**Contribution of Course to Criterion 5**
Credit Hours for:

- Mathematics & Basic Science: 0
- Engineering Sciences and Design: 4
- General Education: 0

**Relationship of Course to Program Outcomes**
The course has been designed to contribute to the following program outcomes:
a) apply knowledge of mathematics, science, and engineering
e) identify, formulate, and solve engineering problems
k) use the techniques, skills, and modern engineering tools necessary for engineering practice

**Prepared by: Assoc. Prof. Zeki Bayram**
**Date Prepared: 15 Sept. 2010**