

King Saud University

College of Computer and Information Sciences

Department of Computer Science

CSC 340 Syllabus

Course title: Programming Languages & Compilation Credit hours: 3

Prerequisites: CSC 212 and CSC 339

Instructor: Dr. Khalil El Hindi

Objectives

The objective of this course is to explore different types of programming languages and their features, and study translation/compilation techniques used in translating the high-level languages to a machine language. A basic compiler for a small programming language will be implemented during the semester.

Course Outcomes:

1. The students will learn about the syntactic and semantic elements of programming languages.
2. The students will learn about grammars and their use in describing languages.
3. The students will learn the basic algorithms used by compilers to translate high-level programming languages into machine languages.
4. The students will learn how to implement a compiler through a programming project.
5. The students will learn to use compiler construction tools.

Course Content:

1. Overview of Compilers and Programming languages
 - A brief History of Programming Languages
 - Factors that Influence Programming Language Designs
 - Categories of Programming Languages
2. Scanning
4. Parsing:
 - Top-Down Parsing I
 - LL(1) Parsing
 - Bottom-Up Parsing
 - LR(0), LR(1)
5. Semantic Analysis
 - Scoping
 - Type checking
6. Runtime Environments
7. Code Generation
8. Local and global Optimization

References:

1. Concepts of Programming Languages by Robert Sebesta, Addison-Wesley.
2. Compilers: Principles, Techniques and Tools (2nd Ed.), by A. Aho, M. Lam, R. Sethi, J. Ullman, Addison Wesley.
3. Modern Compiler Implementation in Java, (2nd Ed.) by Andrew W. Appel and J. Palsber, Cambridge University Press
4. Compiler Construction: Principles and Practice, by Kenneth C. Loudon, PWS Publishing

Expected Performance Criteria:

The students are expected to pass written examinations on class material, submit homeworks and complete a small project on implementing basic compiler for a small programming language.

Evaluation:

- 20% Midterm 1
- 20% Midterm 2
- 20% Project and Assignments
- 40% Final