



Sungkyunkwan University (SKKU) International Summer Semester (ISS) 2023

## Fundamentals of Programming Languages

Prof. Tamer ABUHMED, Sungkyunkwan University

### SHORT COURSE DESCRIPTION

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The Principles of Programming Languages course is a comprehensive introduction to the fundamental concepts of programming languages. The course gradually covers the design issues of various language constructs and examines the design choices for these constructs in some of the most common languages. Students will learn about different language categories, the evolution of programming languages, and the principles of syntax and semantics in modern programming languages. The course also covers several programming concepts such as lexical and syntax analysis, names, bindings, type checking, scoping, data types, expressions, statements, and control structures. Additionally, the course covers subprograms, abstract data types, functional programming languages, and logic programming languages. The course will provide students with a solid foundation in the principles of programming languages and an understanding of the design choices that led to creating a programming language.

### READING MATERIALS

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**Textbook:** Concepts of Programming Languages, Robert W. Sebesta, Pearson, Eleventh/or Twelfth Edition.

### COURSE REQUIREMENTS AND GRADING

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This course grade is pass/fail based on the student's academic achievement evaluated by grades on a scale of 100 points (a grade of 60 or above is a Pass). SKKU regulations require students to attend at least 80% of all classes. It is expected that students will be familiar with SKKU's policies regarding plagiarism and academic dishonesty. Students will be graded on the following course activities:

- a) **Homework assignments:** Homework assignments will be graded based on the accuracy of the answers provided: 50%.
- b) **Attendance and class participation:** 20%.
- c) **Final Exam:** There will be one exam of "choose the correct answers, and true/false statements" at the end of the course to review the learned concepts: 30%.

All the communications and activities will be carried out through the SKKU ICampus platform.

### COURSE SCHEDULE

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#### – WEEK I –

Monday (26 June) Course overview, Introduction to principles of programming languages.

Tuesday (27 June) Fundamentals in Programming Languages: The General Problem of describing Syntax of programming languages.

Wednesday (28 June) Continuo on the Formal Methods of Describing programming languages Syntax, Attribute Grammar, Lexical and Syntax Analysis

Thursday (29 June) Names, Bindings, Type checking, and Scoping

**– WEEK II –**

Monday (3 July) Design issues in Programming Languages: Types of Programming Languages

Tuesday (4 July) Data types and expressions design: Primitive Data Types, User-Defined Ordinal Types, Array, Types, Associative Arrays, Record Types, Tuple Types

Wednesday (5 July) Continuo on Data types and expressions design: List Types, Union Types, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence.

- Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions.

Thursday (6 July): Break with midterm assignment

**– WEEK III –**

Monday (10 July) Control flow in programming languages: Statement Level Control Structures

Tuesday (11 July) Subprograms: Implementing issues of subprograms in programming languages.

Wednesday (12 July) Abstract Data Types and Encapsulation Constructs

Thursday (13 July) Design Issues for Object-Oriented Languages

**– WEEK IV –**

Monday (17 July) Functional Programming Languages: Overview, examples, and programming design issues.

Tuesday (18 July) Logic Programming Languages: Overview of Logic Programming and Applications.

Wednesday (19 July) Final Exam