



FIRST SEMESTER 2023-2024

Course Handout Part II

Date: 11/08/2023

In addition to Part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : CS F301
Course Title : Principles of Programming Languages
Instructor-in-Charge : Dr. R Gururaj
Instructors team : Dr. Jabez J Christopher

1.Scope and Objectives of the Course:

Programming languages play a significant role in writing programs (set of instructions) for execution by computers. High-level programming languages facilitate writing computer programs with ease without having to understand the HW specifics on which the programs are run. With this we can focus on solution to the problem rather than worrying about HW details.

This course covers features of programming languages and introduces the main programming paradigms and their applications. It covers approaches for specifying the structure/syntax of the programming languages with details about the semantics of the features of programming languages. Also provides an overview of lexical and Syntax analysis. This also covers naming, binding and scoping concepts pertaining to programming languages. This course also details the structure of sub-programs and implementation specifics, with parameter passing approaches and various aspects of runtime environments like global and local data, code, function call stacks, dynamically allocated data. This course also gives a briefing on runtime support required for exception handling and concurrent programming. It also gives an idea about concepts of Logic programming. It also covers briefing about concepts related to Functional programming.

The Course Objectives are:

- To list various programming paradigms, with a comparison on various important features.
- To understand concepts like- naming, binding and scoping concepts related to programming languages.
- To understand the aspects of describing the structure/syntax of programming languages.
- To understand the concepts like- Data types, Abstract data types, type checking etc.
- To understand the structure and implementation of sub-programs with parameter passing approaches.
- To understand the exception handling and concurrent programming aspects.
- To get an overview of fundamentals of Logic and Functional programming paradigms.

2. Pre requisites: CS F211(DSA)

3.Textbooks:

1. T1. Robert Sebesta , Concepts of programming languages 10th Edition

Reference books:

1. R1 Ravi Sethi, Programming Languages - Concepts and Constructs Pearson Education. 2nd Edition.



4.Course Plan:

Lecture No.	Learning Outcomes	Topics to be covered	Chapter in the Text Book
1-2	To provide an overview of the course and its importance. List the criteria for judging PLs. List the categories/domains of PLs..	Introduction to PPL with Preliminaries	Ch.1 (T1)
3-5	To understand the evolution of programming languages. To understand the environments that influenced the development of certain languages. Issues in language design.	Evolution of Major Programming languages. Important Programming Paradigms.	Ch.2 (T1)
6-12	Express formal syntax of programming language using BNF Methods of semantic description To get an Overview of Lexical and Syntax Analysis	Describing Syntax and Semantics of PLs. The Process of Lexical and Syntax Analysis .	Chapter 3, 4(T1) & Ch.2 (R1)
12-14	Understanding the fundamental semantic issues of variables. To list and understand the attributes of variables.	Names, bindings and scopes of variables. Type checking.	Ch.5 (T1)
15-18	Identify the needs for different data types and their characteristics. Compare different implementation of data types.	Types: Data Representation, Primitive and Structured Data types, ADTs.	Chapter 6, 11(T1) & Chapter 4 (R1)
19-21	Fundamentals of Sub-programs. Implementing sub-programs. To understand the different parameter passing mechanism,	Introduction to procedures, Recursion, Parameter Passing Methods, Call-by-Value, Call-by-Reference, Call by Value Result. Scope Functions and Call Stacks, Dynamically allocated data and heaps	Ch.9, 10 (T1) & Ch.5(R1) And class notes
22-24	Understanding Concurrent programs at various levels. To get an overview of Exception Handling and requires support.	Concurrent execution of statements, sub-programs. Fundamentals of PL Exception Handling mechanism.	Ch.13 & 14
25-27	Formulate problems using Logic programming	Logic Programming: Relations, First Order Logic, Logic Programming and Prolog.	Ch. 15(T1) Ch. 11(R1)
27-30	Formulate problems using functional programming	Fundamentals of Functional Programming, Applications of	Ch. 16(T1) & Ch.8,9,10(R1)



5. Evaluation scheme:

Component	Duration	Date & Time	Weightage	Remarks
Mid-semester Test	90 Mins.	10/10 - 2.00 - 3.30PM	35%	Close Book
Quiz-1 (before mid-semester Grading)	30 Mins.	16 th Sep (Sat) 10-15 to 11-45AM	10%	Open Book
Quiz-2 (after the mid-semester test and before the comprehensive exam)	30 Mins.	8 th Nov (Sat) 10-15 to 11-45AM	10%	Open Book
Comprehensive Exam	120 Min.	11/12 FN	45%	Close Book

6. **Make-up-Policy:** Make-up requests may be approved for genuine cases with prior permission of the IC, and after rigorous scrutiny.

7. **Course Notices:**

All notices pertaining to this course will be displayed on CMS Course webpage.

8. **Consultation:** 4-5 PM on Tue and Fri at H-103.

9. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor In-charge
CS F301

