Birla Institute of Technology & Science, Pilani – K K Birla Goa Campus
First Semester: 2019-2020
Course Handout (Part II)

In addition to Part -I (General Handout for all courses appended to the Time-Table) this portion gives further details pertaining to the course.

August 14, 2019

Course No. **: CS/IS F301**

Course Title**: Principles of Programming Languages.**

Instructor-in-Charge**: RAMPRASAD JOSHI.**

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Course Description:

Introduction to programming language constructs, programming paradigms. Introduction to language description; syntax and semantics. Introduction to language processors. Procedural languages. Object-oriented languages. Functional languages. Scripting languages. Web-programming, extension and embeddable programming. Programming language pragmatics, basic concepts: control flow; values and types, variables, aggregates, storage classes, pointers and references; bindings and scope; procedural abstraction and stack. Introduction to data abstraction. Introduction to concurrency, basic issues.

1. Scope & Objective:

This course aims at understanding the fundamental concepts and constructs of programming language paradigms and particularly highlights several languages, which exhibit these features. It also focuses on the central features of high-level languages (like scope, environment, data types, control structures etc.), and introduces the basic preparation for compiler design. The primary objective is to emphasize design and implementation issues for the systems-programmer rather than on language features from a programmer's point of view. It also aims at providing the student adequate background so as to enable him / her to gain good conceptual understanding needed for further studying the science and tools of compiler writing. The approach chosen by the IC is to devise methods and tools for examining and exposing features of programming languages with or without manuals – demystification.

2. Text Book:

T_1**.** Ravi Sethi. *Programming Languages: Concepts and Constructs, (2/e).* Pearson Education, 2002.

3. Reference Books:

R_1**.** Michael L. Scott. *Programming Language Pragmatics (3/e).* Morgan Kaufmann/Elsevier Indian Reprint, 2010.

R_2**.** David A. Watt. *Programming Language Design Concepts, (1/e).* Wiley India, 2004.

Reading material in other forms will be put up from time to time on the course page on the LMS.

4. Course Plan:

Lect	Topics	References
	Module I: Introduction	
1-3	Basics: the questions to be asked and answered; language processors; various languages and paradigms	Notes
4-5	Language Description	T_1, Ch 2; Notes
	Module II: Basic Pragmatics	
6-10	Control Flow: assignment, expression evaluation, control constructs. Iteration and recursion.	R_1 Ch 6; T_1 Ch 3; R_2 Ch 9.
11-15	Values and Types: type checking, pointers and references, layouts and size, aggregates.	R_1 Ch 7; T_1 Ch 4; R_2 Ch 2,3.
16-20	Data Abstraction and Object-Orientation I: grouping of data and operations.	R_1 9.1-9.3; T_1 Ch 6; R_2 Ch 6.
21-25	Names, Scopes, and Bindings: blocks and subroutines, static and dynamic scoping.	R_1 Ch 3; T_1 5.1-5.4, 5.6; R_2 Ch 4, 5.1.
26-30	Functional Programming: Lisp.	R_1 Ch 10; Notes.
	Module III: Implementation Issues	
31-35	Subroutines and Control Abstraction: procedure activation and stacks, handling recursion and nested calls.	R_1 8.1-8.3; T_1 5.5; R_2 5.2-5.3.
36-40	Object-Orientation II: dynamic binding, polymorphism, generic abstraction. Introduction to Concurrency.	R_1 8.4-8.8, 9.4-9.7; T_1 Ch 7.
41-45	Introduction to Processor Architectures: data representation, instruction sets, multithreading, multicore architectures, pipelining, register allocation.	R_1 Ch 5 (CD)[1].
	Module IV: Demonstrations and Tutorials	
1-4	Analysis of stages in the translation from program design to execution.	Notes, manuals.
5-14	Introduction to regular-expressions and string processing	Notes, manuals.

5. Evaluation Scheme:

#	Component	Weightage	Date – Time	Mode
1	Mid-Sem	30%	30 Sept – 0900-1030 hrs	Open Book
2	Compre	40%	02 Dec – FN	Partly Open Book
4	Assignments and Tutorials	30%	Announced from time to time	Announced on time

Any form of material, electronic or paper, will be allowed to be carried or referred to in open book components.

6. Chamber Consultation: By appointment.

7. Notices: All notices concerning this course will be mainly declared in the class and tutorial sessions. If LMS is working, it should carry the same notices, but no guarantees there. Also see **CS/IS** notice board. Keep an eye on the ID/ARC notices as well. To clarify matters, use rsj@goa.bits-pilani.ac.in. Trust the written word more than the spoken one. And other than recheck requests based on the text written in the questions and answers, any talk about grades before or after any exams will be seen as an offence.

8. Make-up Policy: Prior permission is needed. Otherwise, zero will be awarded for that component without make-up. Granting make-up is the sole discretion of the IC.

Instructor-In-Charge, CS/IS F301