

Principles of Programming Languages (IPPL430C)  
Syllabus (Jan.-Jun. 2017)  
B. Tech. IT, Sem. IV  
Course Instructor(s): UST, Rahul Kala & Amit Dhar.

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Part A. Imperative languages

Unit 1. History and Need of Various types of Programming Languages(PL), Types of PL, Characteristics of PL, Syntax, Semantics, Pragmatics Analysis

Unit 2. Procedure based languages: General features, Data types, Abstract Data Types (ADT), Structuring, Syntax, Semantics, RAM model of computation, Example: C language

Unit 3. Object based languages: Concepts of objects, Class vs ADT, control structures, methods, General features-inheritance, polymorphism, derived classes & information hiding, Example: C++ and Java, Difference with C.

Unit 4. Concurrent programming languages: Concurrency structure for message passing, loosely coupled system, shared memory, PRAM, monitor, semaphore, Example: Java RMI, Parallel Java, Parallel C.

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Part B. Declarative languages

**Unit 5. Logic programming:**

**Predicate calculus- Logical operators, Propositional forms, Rules of inference, Logical equivalence, Quantification, Well formed formula, Disproofs;  
Prolog- Syntax, Lists, Operators and arithmetic, Control, i/o, data structures.**

**Unit 6. Functional programming:**

**Lambda calculus- Lambda expressions, Variables, Substitutions, Arithmetic, Conditionals, Recursion, Lambda reduction, Type assignment, Polymorphism, Lambda calculus and computability;  
Lisp- Control constructs, List processing, Files and i/o, Generic functions, Objects, Exceptions.**

Unit 7. Exception Handling in Various Languages; Programming Events, Handling Large Databases; Special Languages.

Suggested Books/References:

1. Programming Languages: Concepts and Constructs by Ravi Sethi, Pearson Education.
2. Programming Language Concepts by Carlo Ghezzi and Mehdi Jazayeri, John Wiley & Sons.
3. Programming Languages: Paradigm and Practices by Doris Appleby and J. J. Vandekopple, McGraw Hill.
4. Concepts of Programming Languages by Robert W. Sebesta, Pearson Education.