

**Department of Computer Science and Engineering
National Institute of Technology Calicut**

Tentative Course Details : Monsoon 2021

CS4022D Principles of Programming Languages

Course:

Code : CS4022D
Title : Principles of Programming Languages
Credits : 04
Slot : F

Instructor:

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Course Outcomes:

1. Explain programming language concepts and constructs.
2. Develop the formal specification of programming language semantics.
3. Model programming language features using Lambda Calculus.
4. Design type systems with the objective of ensuring language safety.

References:

1. Benjamin C Pierce. *Types and Programming Languages*. MIT Press, 2002.
2. Allen B Tucker, Robert E Noonan. *Programming Languages: Principles and Paradigms*, Second Edition, Tata McGraw-Hill, 2007.
3. Luca Cardelli. Type Systems. In Allen B Tucker, Ed. *Handbook of Computer Science and Engineering*. CRC Press, 1996.
4. Michael L Scott. *Programming Language Pragmatics*. Elsevier, 2004.

Course Schedule:

	Evaluation	Topic
Week 01	Quiz I	Programming Languages: Concepts, Constructs
Week 02		Programming Languages: Syntax, Semantics, Type System
Week 03		Programming Paradigms: Overview, Functional Programming
Week 04		Formal Semantics: Various Approaches
Week 05		Structural Operational Semantics: Specification
Week 05	Test I	Structural Operational Semantics: Evaluation Derivations
Week 06		Properties of Programming Languages
Week 07		Type Systems: Typing Relation, Type Safety
Week 08	Quiz II	Untyped Lambda Calculus: Basics
Week 09		Untyped Lambda Calculus: Programming, Operational Semantics
Week 10		Simply Typed Lambda Calculus: Syntax, Semantics, Type System
Week 11	Test II	Extensions: Let Bindings, Pairs, Tuples
Week 12		Extensions: Records, Sums, Variants
Week 13		Extensions: References, Exceptions
Week 14		Sub typing: Introduction, Record subtyping
Week 15		Sub typing: Function types, Variants, Case studies

Grading - Exams and Assignments:

Test I	: 20%
Test II	: 20%
Course Project / Term Paper	: 20%
Quizzes	: 20%
Final Exam	: 20%

Grading - Policies:

- Grading will be relative.
- All issues regarding valuation of exams must be resolved within one week after the announcement of marks.