



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

1. Course Outline			
<b>Course Title</b>	Principles of Programming Languages		
<b>Course Code</b>	CSPC23		
<b>Department</b>	CSE	<b>No. of Credits</b>	3
<b>Pre-requisites Course Code</b>	NIL	<b>Faculty Name</b>	Dr. S. Usha Kiruthika
<b>E-mail</b>	usha@nitt.edu	<b>Telephone No.</b>	9444446959
<b>Course Type</b>	Core Course		

2. Course Overview
Principles of Programming Languages mainly describes about the syntax, semantics and implementation of various programming language paradigms.
3. Course Objectives
<ul style="list-style-type: none"> <li>• To understand and describe syntax and semantics of programming languages</li> <li>• To understand data, data types, and basic statements</li> <li>• To understand call-return architecture and ways of implementing them</li> <li>• To understand object-orientation, concurrency, and event handling in programming languages</li> <li>• To develop programs in non-procedural programming paradigms</li> </ul>
4. Course Outcomes (CO)
<ul style="list-style-type: none"> <li>• Describe syntax and semantics of programming languages</li> <li>• Explain data, data types, and basic statements of programming languages</li> <li>• Design and implement subprogram constructs</li> <li>• Apply object-oriented, concurrency, and event handling programming constructs</li> <li>• Develop programs in Scheme, ML, and Prolog</li> <li>• Understand and adopt new programming languages</li> </ul>

5. Course Outcome (CO)	Aligned Programme Outcome (PO)							
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8
Describe syntax and semantics of programming languages	S	B	M	M	B	M	B	M
Explain data, data types, and basic statements of programming languages	S	B	M	B	M	B	B	M
Design and implement subprogram constructs	M	B	S	S	M	M	M	B

Apply object-oriented, concurrency, and event handling programming constructs	S	M	M	M	S	B	M	M
Develop programs in Scheme, ML, and Prolog	S	M	M	M	B	M	M	B
Understand and adopt new programming languages	M	M	B	B	S	B	M	B

S = 0.6

M = 0.4

B = 0.0

6. Course Teaching and Learning Activities								
L. No	Title	Type		Mode of delivery				
		L	T	C & T	PPT	VL/VC	DEMO	
<b>UNIT I</b>								
1.	Evolution of programming languages	√			√			
2.	Describing syntax & semantics Lexical analysis	√		√	√			
3.	Parsing – recursive- decent – bottom up parsing	√		√	√			
4.	Primitive data types –strings - Array types associative arrays	√		√				
5.	Record types - Union types –Pointers and references	√		√				
6.	Arithmetic expressions –relational and Boolean expressions	√		√				
7.	Assignment statements - Mixed-mode assignments	√		√				
8.	Control structures –Selection –Iterations	√		√				
9.	Branching –guarded statements	√		√				
10.	Programming Assignments							√
<b>UNIT II</b>								
11.	Subprograms –Design issues	√		√				
12.	Local referencing –Parameter passing	√			√			
13.	Overloaded methods –generic methods	√		√	√			
14.	Design issues for functions	√		√				
15.	Semantics of call and return –implementing simple subprograms	√		√	√			
16.	Dynamic local variables –Nested subprograms	√			√			
17.	Blocks –Dynamic scoping	√		√				
18.	Programming Assignments							√
<b>UNIT III</b>								
19.	Object-orientation –design issues for OOP languages	√		√				
20.	Implementation of object-oriented constructs	√		√				
21.	Concurrency - Semaphores	√		√				
22.	Monitors	√			√			
23.	Message passing	√		√				
24.	Threads –statement level concurrency	√		√	√			
25.	Exception handling –even handling	√		√				
26.	Programming Assignments in C++							√

UNIT IV							
27.	Introduction to lambda calculus	√		√	√		
28.	Fundamentals of Functional programming languages	√		√			
29.	Programming with Scheme	√		√			
30.	Introduction to LISP	√		√			
31.	Lists - Storage allocation for lists	√		√	√		
32.	Some useful functions - Error handling	√		√	√		
33.	Programming Assignments in LISP						√
UNIT V							
34.	Introduction to logic and logic programming	√		√			
35.	Computing with relations	√			√		
36.	Programming with Prolog - Introduction	√		√			
37.	Data structures in Prolog	√		√			
38.	Programming techniques - Control in Prolog	√		√	√		
39.	Cuts – Multi-paradigm languages	√			√		
40.	Programming Assignments in PROLOG						√

7. Course Assessment Methods				
Sl. No.	Mode of Assessment	Week/Date	Duration	Marks
1	Assignment 1	1 <sup>st</sup> week of Aug '17	1 week	5
2	Cycle Test – 1	4 <sup>th</sup> week of Aug '17	1 hour	20
3	Cycle Test – 2	4 <sup>th</sup> week of Sep '17	1 hour	20
4	Assignment 2	2 <sup>nd</sup> week of Oct '17	1 week	5
5	End Semester Exam	2 <sup>nd</sup> week of Nov '17	3 hours	50
Total				100

8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)
<p><b>Text Books</b></p> <ul style="list-style-type: none"> <li>• Robert W. Sebesta, “Concepts of Programming Languages”, Tenth Edition, Addison Wesley, 2012.</li> <li>• Michael L. Scott, “Programming Language Pragmatics”, Third Edition, Morgan Kaufmann, 2009.</li> <li>• R. Kent Dybvig, “The Scheme programming language”, Fourth Edition, MIT Press, 2009.</li> <li>• Jeffrey D. Ullman, “Elements of ML programming”, Second Edition, Prentice Hall, 1998.</li> <li>• Richard A. O'Keefe, “The craft of Prolog”, MIT Press, 2009.</li> <li>• W. F. Clocksin and C. S. Mellish, “Programming in Prolog: Using the ISO Standard”, Fifth Edition, Springer, 2003.</li> </ul>

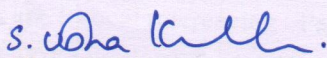
### 9. Course Feedback

Student feedback regarding the course will be collected twice – 1<sup>st</sup> week of Sep '17 and 4<sup>th</sup> week of Oct '17.

### 10. Course Policy

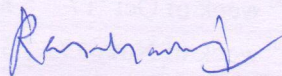
- **Attendance:** Minimum 75% is mandatory to write the end semester examination. Students having attendance 65%-74% are eligible for the end semester exam only after justifying their leave. Students have to redo the course, if they have less than 65% percentage of attendance at any cost. Students coming late to the class will not be provided attendance for that hour at any cost.
- Medical certificate or on-duty certificate should be submitted immediately after rejoining the next class.
- Students should turn off electronic devices during classes, such as cell phones, iPods, laptop, etc.
- **Academic Honesty:** Students disturbing the class, not attentive and students who do malpractices in assignments and test will not be permitted to attend any test commencing thereafter (including the end semester exam).
- Late submission of assignments will be awarded zero mark.

### For Senate's Consideration



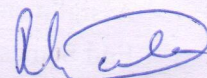
(Dr. S. Usha Kiruthika)

Course Faculty



(Dr. N. Ramasubramanian)

Class Committee Chairperson



(Dr. R. Leela Velusamy)

HOD