DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Course Title	PRINCIPLES OF PROGRAMMING LANGUAGES		
Course Code	CSPC31	No. of Credits	04
Course Code of Pre-requisite subject(s)	————	Semester	III
Session	JULY 2022	Section (if, applicable)	A
Name of Faculty	Dr. A. Santhanavijayan	Department	CSE
Email	vijayana@nitt.edu	Telephone No.	0431 - 2503217
Name of Course Coordinator(s) (if, applicable)	————		
E-mail	————	Telephone No.	————
Course Type	√ Core course	Elective course	

Syllabus (approved in BoS)

UNIT - I

Syntax and Semantics and Basic Statements: Evolution of programming languages –describing syntax & semantics –lexical analysis –parsing –recursive-decent –bottom up parsing–primitive data types –strings –array types –associative arrays –record types –union types –pointers and references –Arithmetic expressions –relational and Boolean expressions –assignment statements –mixed-mode assignments –control structures –selection –iterations –branching –guarded statements. *

UNIT - II

Subprograms and Implementations: Subprograms –design issues –local referencing –parameter passing –overloaded methods –generic methods –design issues for functions –semantics of call and return –implementing simple subprograms –stack and dynamic local variables –nested subprograms –blocks –dynamic scoping. *

UNIT - III

Object-Orientation, Concurrency, and Event Handling: Object-orientation –design issues for OOP languages –implementation of object-oriented constructs –concurrency –semaphores –monitors –message passing –threads –statement level concurrency –exception handling –event handling. *

UNIT - IV

Functional Programming: Introduction to lambda calculus –fundamentals of functional programming languages –Programming with Scheme –Introduction to LISP - Lists - Storage allocation for lists - Some useful functions - Error handling. *

UNIT - V

Logic Programming: Introduction to logic and logic programming- Computing with relations – Programming with Prolog- Data structures in Prolog - Programming techniques - Control in Prolog - Cuts.–multi-paradigm languages.*

*Lab Component - Programming assignments are mandatory.

Text Books:

1. Robert W. Sebesta, "Concepts of Programming Languages", Tenth Edition, Addison Wesley, 2012.

2. Michael L. Scott, "Programming Language Pragmatics", Third Edition, Morgan Kaufmann, 2009.
Reference Books:

1. R. Kent Dybvig, "The Scheme programming language", Fourth Edition, MIT Press, 2009.

2. Allen B Tucker and Robert E Noonan, "Programming languages – Principles and Paradigms", Second Edition, Tata McGraw Hill, 2007

3. Jeffrey D. Ullman, "Elements of ML programming", Second Edition, Prentice Hall, 1998.

4. Richard A. O'Keefe, "The craft of Prolog", MIT Press, 2009.

5. W. F. Clocksin and C. S. Mellish, "Programming in Prolog: Using the ISO Standard", Fifth Edition, Springer, 2003.

COURSE OBJECTIVES

- To understand the various ways to describe syntax and semantics of programming languages

- To understand data, data types, and basic statements of programming languages

- To understand parameter passing and function call mechanisms

- To understand object-orientation, concurrency, and event handling in programming languages

- To acquire knowledge about functional and logic programming paradigms

COURSE OUTCOMES (CO)

Upon completion of this course, the students will be able to:

- Define data types, functions, syntax and semantics of all programming languages
- Use the various styles of programming languages for any given problem
- Compare and use appropriate parameter passing technique for solving problems
- Distinguish between the usage of all programming languages
- Apply the appropriate programming language to solve real-world problems

Mapping of Course Outcomes with Programme Outcomes

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO - 1			√	√		√		√				
CO - 2	√		√	√		√		√				
CO - 3	√		√	√	√							
CO - 4	√	√		√				√				
CO - 5	√	√	√			√						

COURSE PLAN – PART II

COURSE OVERVIEW

This course mainly describes about the syntax, semantics and implementation of various programming language paradigms.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1/3	Evolution of programming languages –describing syntax & semantics Lexical analysis –Parsing –recursive-decent –bottom up parsing Primitive data types –strings Array types associative arrays –record types	Chalk and Talk
2	2/3	Union types –Pointers and references Arithmetic expressions – relational and Boolean expressions Assignment statements Mixed-mode assignments	Chalk and Talk
3	3/3	Control structures – Selection Iterations Branching – guarded statements Programming Assignments	Chalk and Talk

4	3/2	Lab Component	Demo
5	4/3	Subprograms –Design issues Local referencing –Parameter passing Overloaded methods – generic methods Design issues for functions	Chalk and Talk
6	5/3	Semantics of call and return – implementing simple subprograms Dynamic local variables –Nested subprograms Blocks –Dynamic scoping Programming Assignments	Chalk and Talk
7	5/2	Lab Component	Demo
8	6/3	Object-orientation –design issues for OOP languages Implementation of object-oriented constructs – Concurrency	Chalk and Talk, PPT
9	7/3	Semaphores Monitors Message passing Threads –statement level concurrency Exception handling – Event handling Programming Assignments in C++	Chalk and Talk
10	7/2	Lab Component	Demo
11	8/3	Introduction to lambda calculus Fundamentals of Functional programming languages Programming with Scheme – Introduction to LISP	Chalk and Talk
12	9/3	Lists - Storage allocation for lists Some useful functions - Error handling Programming Assignments in LISP	Chalk and Talk , PPT
13	9/2	Lab Component	Demo
14	10/3	Introduction to logic and logic programming- Computing with relations Programming with Prolog - Introduction	Chalk and Talk
15	11/3	Data structures in Prolog Programming techniques - Control in Prolog Cuts – Multi-paradigm languages Programming Assignments in PROLOG	Chalk and Talk

| 16 | 11/2 | Lab Component | | | Demo |

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment 1 (written Test)	SEP'22 3rd week	1 hour	20
2	Assessment 2 (written Test)	OCT'22 3rd week	1 hour	20
3	Lab Component – Programming Assignment	Every week during Lab Session	2 hours	20
CPA	Compensation Assessment	NOV'22 4th week	1 hour	20
4	Final Assessment (written Test)	DEC'22 1st week	3 hours	40
			TOTAL	100

COURSE EXIT SURVEY

- Feed backs are collected after the end semester exam in the feedback forms.
- Suggestions from the students are incorporated for making the course more sympathetic and motivating.
- Students may give their feedback at any time, through their class representatives to the concerned faculty and also in the class committee meetings.

COURSE POLICY

MODE OF CORRESPONDENCE (email/ phone etc)
- Both email and phone

COMPENSATION ASSESSMENT

Compensation assessment (Retest) will be conducted for absentees in assessment 1 or assessment 2 only after the submission of medical or On-Duty certificates signed by competent authority. The portions for compensation assessment will be the portions of assessment 1 and assessment 2.

ATTENDANCE POLICY

- ➢ At least 75% attendance in each course is mandatory.

- ➢ A maximum of 10% shall be allowed under On Duty (OD) category.

- ➢ Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- ➢ Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

- ➢ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

- ➢ The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

ADDITIONAL INFORMATION

The students can clarify their doubts at any time during working hours from the faculty with prior appointment.

FOR APPROVAL

Course Faculty	**CC-Chairperson**	**HOD**

(Dr. A. SANTHANAVIJAYAN)   (Dr.E.SIVASANKAR)   (Dr.S. MARY SAIRA BHANU)