Programme: B. Tech. (CSE)	Course Title: **Programming Paradigms and Applications**			Course Code: **CSE-4xy**
Type of Course: **Program Elective (PE)**	Prerequisites: **Data Structures and Algorithms**			Total Contact Hours: **40**
Year/Semester: **4/Odd**	Lecture Hrs/Week: **3**	Tutorial Hrs/Week: **0**	Practical Hrs/Week: **0**	Credits: **3**

Learning Objective:

This course aims to offer theoretical and practical insights into four (4) programming paradigms, namely, (i) the imperative programming, (ii) the predicate logic-based programming, (iii) the functional programming and (iv) the object-oriented programming paradigm. It explains the theoretical foundation and offers appropriate programming examples to illustrate (a) how to analyze a given problem, (b) how to determine the suitable paradigm, and (c) how to design a program of that paradigm as a solution. This course offers a team-based project to put learning into practice.

Course outcomes (COs):

On completion of this course, the students will have the ability to:		Bloom's Level
CO-1	**Understand** the different types of problems which are best solved by different programming paradigms.	**2**
CO-2	**Understand** the theoretical concepts and **Apply** the programming techniques associated with each of the four programming paradigms to solve problems.	**2, 3**
CO-3	**Analyze** a given problem to determine the appropriate programming paradigm.	**4**
CO-4	**Evaluate** options and **Create** (design) a program of that paradigm, as a solution.	**5, 6**

Course Topics	CO Mapping	Lecture Hours	
UNIT – I (An Overview to the Course)		**6**	
1.1 An overview – why, what of four programming paradigms.	**CO-1**	**3**	**6**
1.2 An overview of the applications of each of the paradigms.	**CO-2**	**3**	
UNIT – II (The Imperative Programming Paradigm)		**4**	**4**
2.1 Principles of Imperative Programming Paradigm – Semantics of	**CO-1**	**2**	

instructions, execution model, important characteristics			
2.2 Programming Techniques and Applications	**CO-2**	1	
2.3 Strengths and Drawbacks of Imperative Programming Paradigm	**CO-3** **CO-4**	1	
UNIT – III (The Logic Based Programming Paradigm – with Emphasis on Predicate Logic)		**12**	**12**
3.1 Principles of Logic Programming Paradigm - Semantics of instructions, execution model, important characteristics	**CO-1**	3	
3.2 Programming techniques of Predicate Logic	**CO-2**	6	
3.3 Analysis of problems and design of solutions -- examples	**CO-3**	2	
3.4 Strengths and Drawbacks of Imperative Programming Paradigm	**CO-4**	1	
UNIT-IV (The Functional Programming Paradigm)		**12**	**12**
4.1Principles of Functional Programming Paradigm - Semantics of instructions, execution model, important characteristics	**CO-1**	3	
4.2 Functional Programming using Common LISP	**CO-2**	6	
4.3 Analysis of problems and design of solutions -- examples	**CO-3**	2	
4.4 Strengths and Drawbacks of Imperative Programming Paradigm	**CO-4**	1	
UNIT – V (The Object – Oriented Programming Paradigm)		**6**	**6**
5.1 Principles of and Programming in O - O Programming Paradigm - Semantics of instructions, execution model, important characteristics	**CO-1**	3	
5.2 Programming Techniques	**CO-2**		
5.3 Analysis of problems and design of solutions -- examples.	**CO-3**	2	
5.4 Strengths and Drawbacks of Imperative Programming Paradigm	**CO-4**	1	

Textbook References:
Text Book:
1. *Programming Languages: Principles and Paradigms by Allen Tucker & Robert Noonan, McGraw Hill Education, Indian Edition, July 2017*
2. *A Review of Programming Paradigms Throughout the History: With a Suggestion Toward a Future Approach by Elad Shalom Amazon Kindle Edition, January 2018*
3. *Essentials of Logic Programming: 1 by Christopher John Hogger (Graduate Texts in Computer Science) Oxford University Press, December 1990*
4. *Practical Common Lisp by Peter Seibel, Springer APress, December 2014*

Reference books: Nil

Evaluation Method	
Item	**Weightage (%)**
Two Quizzes (one before mid-term and one after mid-term examination)	20 (Two quizzes = 10 x 2 = 20)
Project Work to apply the understanding and create a solution – Spread over the 2nd, 3rd & 4th months.	15
Mid-Term Examination	25
End-Term Examination	40
Total Percentage	100

CO and PO Correlation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1			2	3		2	2	2	3	2		2
CO2	2					1	1					3	1		1
CO3	2	2				2	2					3	2		2
CO4	2	2				3	3		2	2	2	3	3		3

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