ST.FRANCIS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
UNIVERSITY SYLLABUS

SUBJECT: PARADIGMS AND COMPUTER PROGRAMMING FUNDAMENTALS
SEM-III/2023-24 (Odd Semester)
CLASS: SE IT A and B

Course Code	Course Name	Teaching Scheme (contact hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
ITC305	Paradigms and Computer Programming Fundamentals	03	……	…….	03	…….	……..	03
		Examination Scheme						
		Theory Marks				Term Work	Practical/Oral	Total
		Internal Assessment						
Course Code	Course Name	Test-1	Test-2	Avg.	End Sem.			
ITC305	Paradigms and Computer Programming Fundamentals	20	20	20	80	……	……	80

Course Objectives

1. To introduce various programming paradigms and the basic constructs that underline any programming language

2. To understand data abstraction and object orientation.

3. To introduce the basic concepts of declarative programming paradigms through functional and logic programming.

4. To design solutions using declarative programming paradigms through functional and logic programming.

5. To introduce the concepts of concurrent program execution

6. To understand use of scripting language for different problem domains.

Course Outcomes

Course Outcomes		Blooms taxonomy	PO	correlation	PSO	correlation
C305.1	To understand basic concepts of compilation and interpretation, compare and implement different programming paradigm concepts. (PSO2) (PO1)		1	3	1	2
C305.2	To understand and implement imperative programming paradigm through object oriented constructs. (PSO2) (PO1)		1	2	1	2
C305.3	To understand and implement declarative programming paradigm through functional programming (PSO2) (PO1)		1/2	2/2	1	2

C305.4	To understand, formulate and implement declarative programming paradigm through logic programming (PSO2) (PO1)	1/2	2/2	1	2
C305.5	To understand alternative paradigm through concurrent programming fundamentals and design, develop applications based on declarative paradigm(PSO2)(PO2)	1/2	2/2	1	2
C305.6	To understand alternative paradigm through scripting languages and formulate applications based on real life applications (PSO2,PSO4)(PO2)	1/2/3	3/2/2	1	2

Syllabus Detailing

Sr. No	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Compilation and interpretation Focus on overview of compilation steps.	02	CO1
I	Introduction to Programming Paradigms and Core Language Design Issues	Introduction to different programming paradigms. Names, Scopes, and Bindings, Scope Rules, Storage Management. Type Systems, Type Checking, Equality Testing and Assignment. Subroutine and Control Abstraction: Stack Layout, Calling sequence, parameter passing Generic subroutines and modules. Exception handling, Co-routines and Events. **Self-learning Topics:** Implementation of basic concepts using any programming language.	10	CO1
II	Imperative Paradigm: Data Abstraction in Object Orientation	Grouping of data and Operations- Encapsulation, Overloading, Polymorphism, Inheritance, Initialization and Finalization, Dynamic Binding. **Self-learning Topics:** Implementation of OOP concepts using OOP language	05	CO2
III	Declarative Programming Paradigm: Functional Programming	Introduction to Lambda Calculus, Functional Programming Concepts, Evaluation order, Higher order functions, I/O- Streams and Monads. **Self-learning Topics:** Implementation of I/O using any programming language.	7	CO3
IV	Declarative Programming Paradigm: Logic Programming	Logic Programming with PROLOG - Resolution and Unification, Lists, Arithmetic execution order, imperative control flow, database manipulation, PROLOG facilities and deficiencies **Self-learning Topics:** Implementation of basic operation and control flow using PROLOG in Healthcare.	6	CO4
V	Alternative Paradigms: Concurrency	Concurrent Programming Fundamentals, Implementing synchronization, Message Passing - Background and Motivation, Multi-threaded programs, Communication and Synchronization, Language and Libraries, Thread creation Syntax **Self-learning Topics:** Implementation of module IV concepts for real time application.	04	CO4, CO5

VI	Alternative Paradigms: Scripting Languages	Common characteristics, Different Problem domains for using scripting, use of scripting in Web development–server and clients side scripting, Innovative features of scripting languages - Names and Scopes, string and pattern manipulation ,data types ,object orientation. **Self-learning Topics:** Implement a simple website for client-server.	05	CO6

Text Books

1. Graham Hutton, Programming in Haskell, 2nd Edition, Cambridge University Press, 2016

2. Scott M L, Programming Language Pragmatics, 3rd Edn., Morgan Kaufmann Publishers, 2009

3. Programming Languages: Concepts and Constructs; 2nd Edition, Ravi Sethi, Pearson Education Asia, 1996.

Reference Books:

1. Harold Abelson and Gerald Jay Sussman with Julie Sussman foreword by Alan J. Perlis, Structure and Interpretation of Computer Programs (2nd Edition) (February 2, 2016)

2. Programming Languages: Design and Implementation (4th Edition), by Terrence W. Pratt, Marvin
V. Zelkowitz, Pearson, 2000

3. Yogesh Sajanikar, Haskell Cookbook, Packt Publishing, 2017.

Internal Assessment Test for 20 marks

Internal Assessment (IAT) for 20 marks:

IAT will consist of Two Compulsory Internal Assessment Tests.

Approximately 40% to 50% of syllabus content must be covered in First IA Test and remaining 40% to 50% of syllabus content must be covered in Second IA Test

Question paper format

Question Paper will comprise of a total of six questions each carrying 20 marks Q.1 will be compulsory and should cover maximum contents of the syllabus

Remaining questions will be mixed in nature (part (a) and part (b) of each question must be from different modules. For example, if Q.2 has part (a) from Module 3 then part (b) must be from any other Module randomly selected from all the modules)

A total of four questions need to be answered

End Semester Examination:

- Some guidelines for setting the question papers are as:
- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total six questions, each carrying 20 marks.

- Q.1 will be compulsory and should cover maximum contents of the syllabus.
- Remaining question will be mixed in nature (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)

- Total four questions need to be solved.

Dr. Joanne Gomes

Ms. Mrinmoyee Mukherjee — Dr. Prachi Raut

(Faculty in Charge) — (HOD-IT)