

**NIRMA UNIVERSITY**

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| <b>Institute:</b>            | Institute of Technology  |
| <b>Name of Programme:</b>    | BTech CSE, Integrated BTech (CSE)-MBA,<br>BTech CSE (Artificial Intelligence & Machine Learning) |
| <b>Course Code:</b>          | XXXX   |
| <b>Course Title:</b>         | Contemporary Programming   |
| <b>Course Type:</b>          | Department Elective-I  |
| <b>Year of Introduction:</b> | 2024-25  |

| L | T | Practical Component |    |   |   | C |
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**Course Learning Outcomes (CLO):**

At the end of the course, the students will be able to –

1. classify the major programming paradigms (BL2)
2. identify building blocks for various contemporary programming languages (BL3)
3. defend the principles and techniques involved in the design and implementation of modern programming languages (BL5)
4. develop hands-on skills in contemporary programming languages. (BL6)

| Unit     | Contents  | Teaching Hours<br>(Total 45) |
|----------|---|------------------------------|
| Unit-I   | <b>Introduction to Contemporary Languages:</b> Role of programming languages, towards high-level programming languages, problems of Scale, programming paradigms, Language implementation. The need for structured programming, syntax-directed control flow, and design considerations   | 05                           |
| Unit-II  | <b>Basics of GO:</b> Introduction to GO programming, data types, variables, constants, decision making, looping, functions, arrays, pointers, structures, slices, maps, range, error handling, strings, basics of modules and tools   | 10                           |
| Unit-III | <b>Kotlin Programming Language:</b> Introduction to Kotlin programming, data types, variables, control flow, classes and objects, functions, basics of App development using Kotlin, an overview of the standard library, multiplatform development, and tools  | 10                           |
| Unit-IV  | <b>Swift Programming Language:</b> Overview of Swift, Swift Environment, Data Types, Control Flow, Functions, Closures and Collections, Enumerations and Structures, OOPs, Applications   | 10                           |
| Unit-V   | <b>R Programming:</b> Overview, Environment Setup, Basic Syntax; Data Types, Variables, Operators, Decision Making, Loops, Functions, Strings, Vectors, Lists, Matrices, Arrays, Factors, Data Frames, Packages, Data Reshaping, File Handling, Error Handling, Data Interfaces, Data Visualisation, basics of R Charts & Graphs and R Statistics | 10                           |

**Self-Study:**

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents

**Suggested Readings/ References:**

1. Sethi R., Programming Languages concepts & constructs, Pearson Education
2. Alan A. A. Donovan, Brian W. Kernighan, The Go Programming Language, O'Reilly
3. Dawn Griffiths, David Griffiths, Head First Kotlin, O'Reilly
4. Aaron Hillegass and Christian Keur, iOS Programming, The Big Nerd Ranch Guide
5. Tilman M. Davies, The Book of R: A First Course in Programming and Statistics, No Starch Press

**Laboratory Work:**

Laboratory work will be based on the above syllabus with a minimum of 10 experiments to be incorporated. The students in a suitable group size will design and perform one experiment as a part of Laboratory work.

| <b>Sr. No.</b> | <b>List of Experiments/Exercises</b>                                      | <b>Hours</b> |
|----------------|---|--------------|
| 1              | Introduction to Contemporary Programming Languages, Syntax Implementation | 02           |
| 2              | Basics of Go language building blocks                                     | 02           |
| 3              | Develop Golang programs to compare the equality of struct, slice, and map | 02           |
| 4              | Basics of the Kotlin Language.  | 04           |
| 5              | Application Development using the Kotlin Language                         | 04           |
| 6              | Understand the Swift framework  | 02           |
| 7              | Basics of the Swift Language.   | 04           |
| 8              | Application Development using Swift Language                              | 02           |
| 9              | Learn the basics of the R Language.                                       | 04           |
| 10             | Data Analysis using R   | 04           |