Jansons Institute of Technology

Karumathampatti, Coimbatore - 641 659

Approved by AICTE and Affiliated to Anna University

An ISO 9001:2015 certified institution

Industry Readiness Course - Syllabus

Department of Computer Science and Engineering

Computational Thinking, Programming & Problem-Solving

2023 - 2024 (ODD Semester)

Learning Objectives

- Enable students to effectively apply computational thinking principles, including critical thinking, data representation, abstraction, decomposition, and problem-solving algorithms to solve complex engineering problems.
- Equip students with skills to proficiently use spreadsheet tools for implementing and solving problems, such as fractals, calculus, and probability, through basic operations, cell references, and lookup operations.
- Foster students' competence in MATLAB, covering basic operations, vector plotting, array and matrix operations, for implementing and solving mathematical problems, including Micro-credentials, calculus-based challenges, and probability-related scenarios.
- Facilitate the integration of computational thinking across platforms, to solve diverse engineering problems, fostering a holistic understanding of computational methodologies in practical applications.

Learning Outcomes

- Proficiently apply computational thinking, including critical thinking, data representation, abstraction, and decomposition, to solve complex engineering problems.
- Effectively use spreadsheet to solve problems related to Micro-credentials, calculus, and probability.
- Apply computational algorithms using MATLAB, including basic operations, vector plotting, array and matrix operations, to solve mathematical problems such as Micro-credentials, calculus-based problems, and probability-related challenges.
- Integrate computational thinking skills across multiple domains, fostering a holistic understanding of computational methods in real-world applications.

MODULE 1

Computational thinking, critical thinking, data representation, abstraction, decomposition-breaking problems into parts, basic data types, pseudocode, algorithms-methods to solve the problems, brute-force or exhaustive search problems, divide and conquer problems.

MODULE 2

Computational thinking using spreadsheets, basic operations, cell references – relative and absolute, lookup operations, implement fractals – newton, Sierpinski triangle, L-system Micro-credentials, solve calculus-based problems using spreadsheet, using spreadsheet for solving probability related problems

MODULE 3

Computational thinking using matlab, basic operations, plotting of vectors, array and matrix operations, implement fractals – newton, Sierpinski triangle, L-system fractals, solve calculus-based problems using matlab, using matlab for solving probability related problems

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