Semester	**3**
Course	**Skill**
Paper Code	**S2DS250311P**
Paper Title	**Data Engineering - I**
No. of Credits	**3**
Theory/Composite/ Practical	**Practical**
Number of Classes per week	**4**
Minimum No. of preparatory hours per week a student has to devote	**4**
Number of Module	**2**
Syllabus	**Module1:** **Introduction to R Programming [26L]** Installing and getting started with R studio. Using R as calculator. Reading numeric, character & logical data. Use of inbuilt mathematical & statistical functions. Data storage using dataframe, tibble, matrix, list. Use of tidyverse package, graphics package. Conditional statements. Implicit and explicit loops. User defined functions. Importing data from external files. Analysing real life data using R functions and report writing using R markdown. **Module2:** **Introduction to Prompt Engineering** **Unit 1: Foundations of Prompt Engineering [6L]** Introduction to Generative AI & LLMs, Concept of Prompt Engineering, Types of Prompts (Zero-shot, Few-shot, Chain-of-thought), Anatomy of a Prompt (Instructions, Context, Output Format), Evaluating AI Responses (Accuracy, Relevance, Bias) **Unit 2: Core Prompting Techniques [8L]** Zero-shot vs Few-shot prompting in practice, Chain-of-thought prompting & reasoning enhancement, Role prompting & persona-based instructions, Instruction tuning & context setting, Delimiters, formatting, and structured outputs (JSON, tables),Prompting for summarization, translation, and Q&A,Error handling & iterative refinement of prompts **Unit 3: Advanced Prompting Strategies [6L]** Self-consistency & ensemble prompting, Multi-turn conversations & memory-aware prompts, Prompting for data extraction and cleaning, Prompting for text classification & labeling tasks, Prompting for knowledge retrieval & augmentation (RAG overview)

	Unit 4: Prompt Engineering in Data Science Applications [4L] Prompting for exploratory data analysis (EDA) assistance, Prompting for feature engineering ideas, Prompting for visualization & storytelling with data. **Unit 5: Ethics, Tools & Project [2L]** Ethics, Bias, and Responsible Prompting, Case Study.
Learning Outcomes	1. Apply R programming constructs and packages (*tidyverse, graphics*) to manipulate and analyse datasets. 2. Analyse and interpret real-life data and generate reproducible reports using *R Markdown*. 3. Understand the fundamental concepts and techniques of prompt engineering used with generative AI and large language models. 4. Apply core and advanced prompting strategies to solve data science–related tasks such as summarization, data extraction, and exploratory data analysis. 5. Design and evaluate effective, ethical prompts to enhance reasoning, reduce bias, and generate structured, context-aware outputs for real-world applications.
Reading/Reference List	**LLM Prompt Engineering for Developers**, Jason Wei, O'Reilly Media **Prompt Design Patterns**, James Phoenix & Mike Taylor, O'Reilly Media.
Evaluation	Continuous Assessment