Dimensional Analysis and Flow Visualization Using MATLAB
Rubric for MATLAB Report

This rubric evaluates the MATLAB report and associated modules developed for the project "Dimensional Analysis and Flow Visualization Using MATLAB." The rubric aims to ensure alignment between learning goals, technical competency, and communication outcomes. The assessment focuses on students' ability to integrate computational modeling, analytical reasoning, and interpretation of physical principles. Each category below includes qualitative descriptions and point values.

Category	Description	Weight
Dimensional Analysis Module	Assesses the accuracy and functionality of the MATLAB tool that performs dimensional analysis using the Buckingham π theorem. Students should correctly identify the number of π groups, demonstrate understanding of dimensional independence, and validate results using known physical problems.	25%
Flowline Module (Streamlines and Pathlines)	Evaluates the numerical implementation and visualization quality of the MATLAB code that computes and displays streamlines and pathlines. Solutions should be physically accurate, well-documented, and validated against canonical flow cases (e.g., uniform, vortex, stagnation, rotational).	25%
Application (Potential Flow Around a Cylinder)	Measures the student's ability to apply both modules to a real fluid mechanics problem, perform nondimensional analysis, and interpret results. Students should analyze the role of circulation ratio, identify stagnation points, and discuss physical implications in a clear, well-reasoned manner.	25%
Reflection and Insight	Evaluates the student's ability to analyze their own learning process, recognize limitations, and propose improvements or extensions to their work. Reflection should demonstrate metacognitive awareness and connect directly to project goals.	10%
Report Quality and Presentation	Assesses the structure, clarity, and professionalism of the written report. Figures must be properly labeled, equations formatted clearly, and discussions organized logically. Reflection on limitations, physical significance, and computational challenges is encouraged.	15%