Proposal Template – Fill out and submit the below table as **pdf** to Gradescope.

Course	ENGR 13300	Semester	Spring 2025
Assignment Name	*Individual Project Proposal*	Section	LC1 20
Student Name	Noah Walden	List collaborators if any (Name, Purdue login)	
Student Purdue login	Walden28		

Individual Project Proposal	
Programming Language	MATLAB
Project Theme	The theme of this "Dream Project" is to create a MATLAB code that will help a user determine the suspension and aerodynamics of a vehicle.
Dream Project Idea	If I had an unlimited budget, resources, and time to complete it, I would create software that brings motorsports engineering into the streetcar world. This would bridge the gap between the billion-dollar-per-year professional world and the amateur racing world. The software would use computational fluid dynamics (CFD), finite elements analysis (FEA), and real-time telemetry to simulate the effects of aftermarket modifications. This would include custom aerodynamics or engine upgrades either for the street or track. This software would feature CAD integration to allow the user to either import scans or create their own designs, to modify, and test custom components. I am extremely excited about a project like this because eventually, I want to own a performance shop and software like this would make this work a lot easier. I would need to get my degree in motorsports engineering to understand all the fields but also extensive programming skills to pull off a program as large as this.
Proposal	For this individual project, I plan to create a MATLAB tool that helps users analyze basic suspension geometry and aerodynamic downforce for a performance vehicle. While this is a scaled-down version of my Dream Project, it will maintain the core spirit of motorsports engineering applied to real-world scenarios. The program will allow users to input parameters such as spring rate, damping ratio, ride height, wing angle of attack, and speed. Based on these inputs, the tool will calculate: - Suspension travel using a simplified 2D model - Ride frequency - Downforce generation using a simplified wing model (thin airfoil theory or lift equation) - Drag force estimation The user will be able to visualize results through simple plots (e.g., downforce vs. speed) and see how changing variables impacts the performance. This

	tool could help someone trying to tune a car for autocross or track-day events — which ties directly into the inspiration behind my Dream Project. The program will include:
	• A user-defined function to perform the calculations
	• Input prompts for user interaction
	• Plotting functions to show trends in the data
	• Clear documentation and modular code to allow for future expansion
	This project allows me to apply foundational MATLAB skills while exploring topics related to my future career in motorsports engineering.
Proposal Exception	This proposal stays closely aligned with the original Dream Project idea, but it represents a scaled version that matches my current programming skills. Instead of integrating full CFD, CAD, and telemetry systems, I will simulate simplified suspension and aerodynamic systems using MATLAB. This is a practical stepping stone toward building the larger software concept in the future.