1. EM476 Vehicle Dynamics

2. Credit Hours (3) / Contact Hours (4)

3. Course Director – CAPT Len Hamilton

4. Course Textbook: There is no required textbook for this class.

5. Specific course information
    a. The fundamentals of passenger vehicle and light truck design and vehicle dynamics are covered. The engineering principles associated with acceleration, braking, handling, ride quality, aerodynamics and tire characteristics are discussed, as well as suspension and steering design. There will also be several lab exercises where vehicle systems are evaluated by students.
    b. Prereq: 1/C engineering major or approval of the Mech-E Department Chair.
    c. Senior engineering elective course

6. Educational objectives
    a. Understand system components related to vehicle performance (not including the engine) such as transmissions, clutches, differentials, brakes, steering and suspension systems, tires and aerodynamic devices.
    b. Analyze factors affecting vehicle design (e.g. tire data, vehicle mass and road loads).
    c. Identify various design parameters and their effect on vehicle dynamics performance (e.g. steering and suspension design, aerodynamics).
    d. Understand factors leading to understeer or oversteer characteristics.
    e. Be able to perform basic steps involved in hydraulic brake design.
    f. Understand the need for dampers and basic tuning procedures.
    g. Calculate lateral and longitudinal performance given basic vehicle dynamic properties.

7. Specific program outcomes addressed by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced		X					
Mastered	X					X	

8. Brief list of topics to be covered
    a. Dynamics Review
    b. Vehicle Components & History of Vehicle Development
    c. Aerodynamics, Road Load Calculations
    d. Steady-State Cornering
    e. Steering Design
    f. Brake Systems
    g. Dampers/Springs
    h. Kinematics
    i. Clutches

j. Manual/Sequential Transmissions
k. Differentials