

**ME 458 COURSE PROFILE****DEGREE PROGRAM:** Mechanical Engineering

|   |  |
|---|--|
| <b>COURSE NUMBER:</b> ME 458  | <b>COURSE TITLE:</b> Automotive Engineering  |
| <b>REQUIRED COURSE OR ELECTIVE COURSE:</b> Elective   | <b>TERMS OFFERED:</b> Fall, Winter   |
| <b>TEXTBOOK / REQUIRED MATERIAL:</b> Fundamentals of Vehicle Dynamics by Gillespie  | <b>PRE / CO-REQUISITES:</b> MECHENG 350. I, II (3 credits)   |
| <b>COGNIZANT FACULTY:</b> T. Gillespie  | <b>COURSE TOPICS:</b><br><ol style="list-style-type: none"> <li>1. Calculation of dynamic wheel loads</li> <li>2. Analysis of the power train</li> <li>3. Brake system design</li> <li>4. Modeling road loads</li> <li>5. Vehicle ride performance</li> <li>6. Steady-state cornering</li> <li>7. Suspension systems analysis</li> <li>8. Steering system performance</li> </ol> |
| <b>BULLETIN DESCRIPTION:</b> Emphasizes systems approach to automotive design. Specific topics include automotive structures, suspension steering, brakes, and driveline. Basic vehicle dynamics in the performance and handling modes are discussed. A semester team-based design project is required. |  |
| <b>COURSE STRUCTURE/SCHEDULE:</b> Lecture: 2 days per week at 1.5 hours   |  |

|  |  |
|--|--|
| <b>COURSE OBJECTIVES:</b><br><b>for each course objective, links to the Program Outcomes are identified in brackets.</b> | <ol style="list-style-type: none"> <li>1. Introduction to engineering analysis of the automobile and its sub-systems [1]</li> <li>2. Application of engineering principles to automotive design [1, 2]</li> <li>3. Familiarization with modeling and analysis methods [1, 2, 6]</li> <li>4. Familiarization with the automotive industry and its terminology [3, 7]</li> </ol>   |
| <b>COURSE OUTCOMES:</b><br><b>for each course outcome, links to the Course Objectives are identified in brackets.</b>    | <ol style="list-style-type: none"> <li>1. Develop a rudimentary understanding of how the automotive industry operates [4]</li> <li>2. Calculate dynamic wheel loads as influenced by accelerations, grades, aerodynamics and towed vehicles [1, 2, 3]</li> <li>3. Understand power train function and the translation of torques and speeds throughout [1, 2, 3]</li> <li>4. Design and proportion a brake system [1, 2, 3]</li> <li>5. Understand the nature of aerodynamic and rolling resistance forces exerted on the vehicle and its implications on fuel economy [1, 2, 3, 4]</li> <li>6. Understand the fundamentals of ride excitation sources and how to tune vehicle responses for best ride [1, 2, 3]</li> <li>7. Determine understeer properties based on tire, suspension and steering system properties [1, 2, 3]</li> <li>8. Knowledge of various suspension types and methods of analysis to determine their essential properties [1, 2, 3]</li> <li>9. Acquire a vocabulary for communicating with automotive engineers [4]</li> <li>10. Develop a rudimentary understanding of how the automotive industry operates [4]</li> </ol> |
| <b>ASSESSMENT TOOLS:</b><br><b>for each assessment tool, links to the course outcomes are identified</b>                 | <ol style="list-style-type: none"> <li>1. Regular homework problems</li> <li>2. Exam(s) and/or project(s)</li> </ol>   |

PREPARED BY: T. Gillespie

LAST UPDATED: 05/23/2011