**ME 458 COURSE PROFILE**

**DEGREE PROGRAM:** Mechanical Engineering

<table>
<thead>
<tr>
<th>COURSE NUMBER: ME 458</th>
<th>COURSE TITLE: Automotive Engineering</th>
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<tr>
<td>REQUIRED COURSE OR ELECTIVE COURSE: Elective</td>
<td>TERMS OFFERED: Fall, Winter</td>
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<td>COGNIZANT FACULTY: T. Gillespie</td>
<td>COURSE TOPICS:</td>
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**BULLETIN DESCRIPTION:** 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.

1. Calculation of dynamic wheel loads
2. Analysis of the power train
3. Brake system design
4. Modeling road loads
5. Vehicle ride performance
6. Steady-state cornering
7. Suspension systems analysis
8. Steering system performance

**COURSE STRUCTURE/SCHEDULE:** Lecture: 2 days per week at 1.5 hours
| COURSE OBJECTIVES: for each course objective, links to the Program Outcomes are identified in brackets. | 1. Introduction to engineering analysis of the automobile and its sub-systems [1]  
2. Application of engineering principles to automotive design [1, 2]  
3. Familiarization with modeling and analysis methods [1, 2, 6]  
4. Familiarization with the automotive industry and its terminology [3, 7] |
|---|---|
| COURSE OUTCOMES: for each course outcome, links to the Course Objectives are identified in brackets. | 1. Develop a rudimentary understanding of how the automotive industry operates [4]  
2. Calculate dynamic wheel loads as influenced by accelerations, grades, aerodynamics and towed vehicles [1, 2, 3]  
3. Understand power train function and the translation of torques and speeds throughout [1, 2, 3]  
4. Design and proportion a brake system [1, 2, 3]  
5. Understand the nature of aerodynamic and rolling resistance forces exerted on the vehicle and is implications on fuel economy [1, 2, 3, 4]  
6. Understand the fundamentals of ride excitation sources and how to tune vehicle responses for best ride [1, 2, 3]  
7. Determine understeer properties based on tire, suspension and steering system properties [1, 2, 3]  
8. Knowledge of various suspension types and methods of analysis to determine their essential properties [1, 2, 3]  
10. Develop a rudimentary understanding of how the automotive industry operates [4] |
| ASSESSMENT TOOLS: for each assessment tool, links to the course outcomes are identified | 1. Regular homework problems  
2. Exam(s) and/or project(s) |

PREPARED BY: T. Gillespie  
LAST UPDATED: 05/23/2011