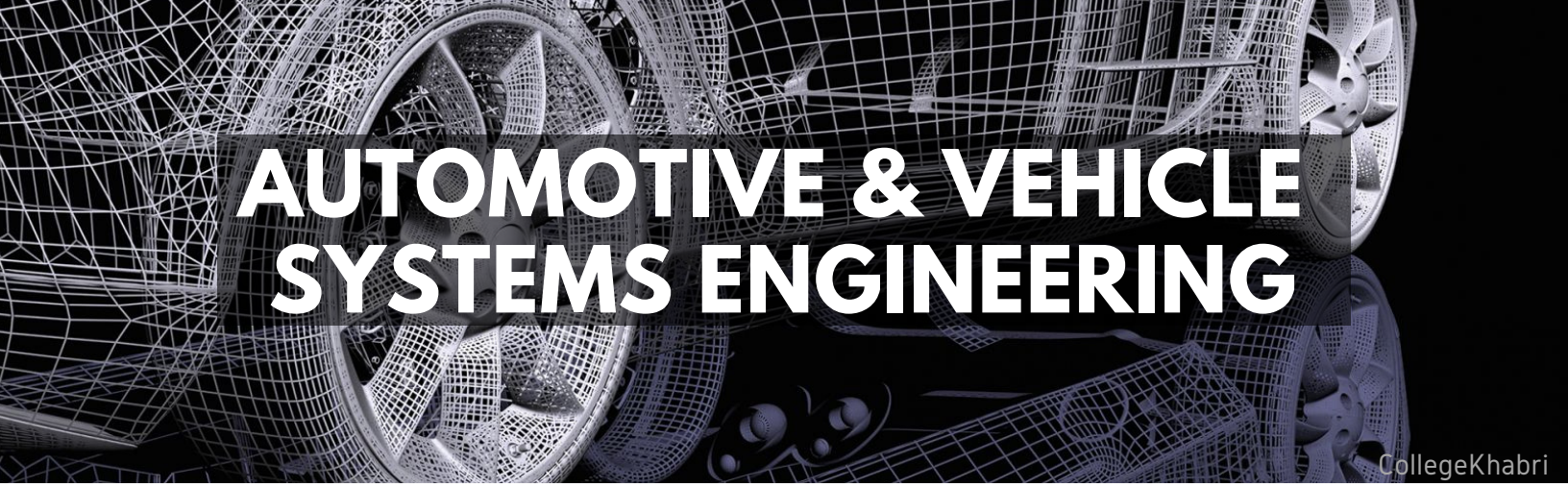

AUTOMOTIVE & VEHICLE SYSTEMS ENGINEERING

Track Description

Automotive and ground vehicle systems are crucial in the modern world, with impacts on driving safety, energy consumption, environment, mobility, and overall quality of life. With technological and engineering advances, automobiles and ground vehicles have evolved as complex engineered systems featuring multi-disciplinary innovations. Understanding automotive and vehicle system dynamics, modeling, and controls can enhance opportunities for mechanical engineers to address real-world challenges and collaborate with engineers in other relevant disciplines. This thrust allows students to gain fundamental knowledge in automotive and vehicle systems engineering that can be applied to both industry and graduate studies.

Required Courses

M E 360: Vehicle System Dynamics and Controls
M E 360B: Propulsion Systems and Controls

Other Undergraduate Elective Courses (select two)*

M E 374C Combustion Engine Processes
M E 374D Automotive Engineering Laboratory
M E 355K Engineering Vibrations
M E 379N Engineering Acoustics
M E 360C Cyber Vehicle Systems
M E 3xx Real-time Control Systems Labs
M E 377K Projects in Mechanical Engineering**

Industry Applicability

This certificate program area is appropriate to prepare mechanical engineers for jobs in industry that deal with one or more of the following functions:
- Modeling and analysis of automotive and vehicular systems
- Design and evaluation of automotive and vehicle control systems
- Intelligent, automated, and autonomous ground vehicles
- Off-road vehicle and construction equipment systems development

Faculty Mentors

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Organizations & Societies

Society of Automotive Engineers (SAE)
American Society of Mechanical Engineers (ASME)
IEEE Intelligent Transportation Systems Society
IEEE Vehicular Technology Society

For course descriptions visit the University Catalog.
* Please contact faculty mentors to petition other courses.
** Recommended for students interested in graduate school.

The University of Texas at Austin
Walker Department of Mechanical Engineering
Cockrell School of Engineering

Selected Examples

1. Vehicle Propulsion Systems: ground vehicles consume a substantial amount of energy and are also a major air pollution contributor. Technology innovations strive to improve energy efficiencies and reduce tailpipe emissions for ground vehicles. With the increasing complexity of vehicle propulsion and exhaust gas after treatment systems, understanding of the dynamic modeling, estimation, and control methods for various vehicular power train, drive train, and after treatment systems can facilitate future product development and technology creations for efficient and environmentally-friendly ground vehicles.

2. Vehicle Chassis Systems: design and control of vehicle chassis systems are vital for vehicle driving safety, handling performance, ride comfort, and maneuverability. Knowledge on vehicle chassis system kinematic / dynamic models, estimation, and motion control methods is essential for design, analysis, and testing of basic vehicle chassis system such as steering, suspension, and braking systems as well as for development of electronic vehicle chassis control systems to improve vehicle safety and performance.

3. Automated and Intelligent vehicles: as an emerging industry, development of automated and intelligent vehicles demands multi-disciplinary efforts. Knowledge and understanding on ground vehicle propulsion and chassis system modeling, estimation, and control are critical in order to effectively collaborate with engineers in other relevant fields such as computer science and electrical engineering for synergistic engineering advances.

4.Off-road Vehicle and Construction Equipment Systems: off-road vehicle and construction equipment are another important application area where the fundamental knowledge learnt in this track can also be very useful. Many principles can be directly applied in addressing the engineering challenges related to efficiency, emissions, and vehicle maneuverability in this industry sector.