Elearning for Engineers

System Integration & Simulation of HEV

This 3-day live short course presents HEV simulation methods for SIL and HIL development of HEV energy management strategies. Participants will be introduced to HEV system integration and energy management concepts using simulation methods based on Matlab/Simulink tools.

Using lecture and hands-on lab exercises, the short course results in participants developing their own energy management strategy based on the simulator developed during the course. Short course modules include:

- Concepts and potential benefits of drivetrain hybridization strategies
- Energy consumption of road vehicles & energy demand on fuel economy/emissions
- Overview of electric machines & modeling energy efficiency of electric traction drives
- Mathematical models of energy use in IC engines and transmissions
- Modeling to predict fuel consumption & emissions
- Hybrid powertrain architectures & control strategies for HEV

HEV energy analysis & simulation is performed through optimization of the supervisory energy management controller fuel economy. Participants will receive a copy of the modular Matlab/Simulink simulator used throughout the short course.

Prerequisite: Undergraduate background in electrical and mechanical engineering, including knowledge of differential equations and elementary linear algebra. Familiarity with basics of matrix analysis is required, including elementary matrix operations, vector spaces and matrix operations.