

Course Syllabus

Course Information

(course number, course title, term, any specific section title)

EEPE 6358 Electrification of Transportation

Professor Contact Information

(Professor's name, phone number, email, office location, office hours, other information)

Kaushik Rajashekara, 972-883-4531, K.Raja@utdallas.edu;

Course Pre-requisites, Co-requisites, and/or Other Restrictions

(including required prior knowledge or skills)

EEPE 6354: Power Electronics

Course Contents:

1. Introduction to electric and hybrid vehicles
2. Hybrid vehicle architectures
 - a. Series hybrid vehicle architectures- range extender and full hybrid systems
 - b. Parallel hybrid architectures
 - c. Plug-in hybrid architectures
 - d. Commercially available electric and hybrid vehicles
3. Propulsion System Analysis
 - a. Basic Mechanics of a Vehicle
 - b. Energy consumed in a vehicle
 - c. Powertrain component sizing
 - d. Vehicle Simulation
 - e. Driving cycles
 - i. Energy requirements
 - ii. City cycle, highway cycle, and combined cycle
4. Fuel cell vehicles
5. Electric Motor Drive systems for EV/HEVs
6. Power Electronic converters for electric and hybrid vehicles
7. Energy Storage
 - a. Battery energy storage
 - b. Battery charging
 - c. Ultracapacitors
8. Energy management and control strategies
 - a. All electric range
 - b. Engine dominant blended strategy
 - c. Electric dominant strategy
 - d. Hybrid vehicle control strategies
9. More Electric Aircraft and More Electric Architectures

Student Learning Objectives/Outcomes

Upon successful completion of the course, students should be able to understand:

- Electric and hybrid vehicle operation and architectures
 - Operation of Toyota Prius, Chevy Volt, and Honda Insight vehicles
 - Vehicle characteristics, driving cycles, and performance parameters of the vehicle
 - Technology and sizing of the components – electric machines, power electronics, and energy storage
 - More Electric Aircraft systems
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Textbooks and Materials:

1. John Miller, “Propulsion Systems for Hybrid Vehicles,” Institute of Electrical Engineers, UK, 2004 (recommended)
2. C.M. Jefferson & R.H. Barnard, “Hybrid Vehicle Propulsion,” WIT Press, 2002
3. Iqbal Husain, “Electric and Hybrid Vehicles – Design Fundamentals,” CRC Press, 2010
4. James Larminie and John Lowry, “Electric Vehicle Technology Explained,” Oxford Brookes University, Oxford, UK, 2003
5. Chris Mi, M A Masrur, D W Gao, “Hybrid Electric Vehicles – Principles and applications with practical perspectives,” Wiley, 2011
6. All the class room lecture materials will be posted in the eLearning web site

Assignments & Academic Calendar

(Topics, Reading Assignments, Due Dates, Exam Dates)

Will be discussed in the class room

Grading Policy

(including percentages for assignments, grade scale, etc.)

Course & Instructor Policies

(make-up exams, extra credit, late work, special assignments, class attendance, classroom citizenship, etc.)

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.