Course Syllabus & Policies – Electric Vehicles and Energy Storage

Course: ECE 4xx Electric Vehicles and Energy Storage, 3(3,0)

Time: TBA (T-Th)
Room: TBA (422 Rhodes)

Instructor: Dr. P. Pisu, Assistant Professor of Mechanical Engineering, pisup@clemson.edu

Office Hours: Posted outside of office or by appointment

Textbooks:

1. L. Guzzella, A. Sciaretta, Vehicle Propulsion Systems, Springer, 2007.
2. John M. Miller, Propulsion Systems for Hybrid Vehicles, IEE Power and Energy Series 45, 2004.
3. Additional notes will be provided as needed

References:

1. M. Ehsani, Y. Gao and A. Emadi, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design, Second Edition, CRC Press 2009.
2. J.J. Santin, C. H. Onder, J. Bernard, D. Isler, P. Kobler, F. Kolb, N. Weidmann, and L. Guzzella, The World's Most Fuel Efficient Vehicle: Design and Development of PACcarII, vdf Hochschulverlag AG an der ETH Zurich, 2007.

Catalog Description:

Introduction to hybrid electric propulsion systems and energy storage systems with an emphasis on application to different vehicles architectures including plug-in hybrids and fuel cell hybrids. Topics include a review of fundamentals of electric vehicles and hybrid electric vehicles architectures covering reasons for hybridization, energy analysis of architecture and components, overview of energy storage systems (batteries and supercapacitors), modeling of components, vehicle simulation, and supervisory control. *Prerequisite*: ECE 320 or consent of instructor

Course Objectives:

1. To become familiar with the various hybrid electric vehicle architectures and understand the concepts and potential benefits of hybridization.
2. To develop a methodology for constructing general models of energy storage and power flow processes in hybrid electric vehicles, and implement the methodology to create building blocks for hybrid vehicle simulators.
3. To introduce design optimization concepts, and apply them to the design of hybrid electric vehicle drivetrain architectures.
4. To learn principles of optimal energy management and supervisory control strategy for optimal energy storage in hybrid electric vehicles
5. To learn energy storage system typologies and design, their charging/ discharging characteristics, and their application to hybrid electric vehicles.

Course Grading:

Midterm Exam = 25 %
Homework (assignments throughout the semester) = 20 %
Project with presentation = 30 %
Final Exam = 25 %
Total = 100%

Grading Policy:

10% will be deducted from late homework assignments turned in within 24 hours of the deadline. 50% will be deducted from late homework assignments that are more than 24 hours but less than 7 days late. No credit will be given for homework turned in more than 7 days after the deadline.

All questions and problems regarding grades must be presented in writing within one week after the test, homework, or project has been returned. Grades will be assigned based on all the work you have completed during the semester following the traditional practice of A=90-100, B=80-89, C=70-79, D=60-69, F<60.

Attendance:

Regular class attendance and participation in discussions is expected with attendance taken. Students with more than 2 unexcused absences will not receive a passing grade in the class. An unexcused absence is any absence for which the instructor was not notified before the start of the class.

Academic Honesty (Clemson University Catalog):

"*As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.*"

Learning Disabilities:

It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation. Any student with an official Clemson University recognized learning disability must inform the instructor within the first week of class meetings so that arrangements can be made to meet the student's needs.