TENTATIVE SCHEDULE

WEEK | TOPICS
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Week 1. | Background and motivation (Project)
Week 2. | Review of classical control (HW1)
Week 3. | Integrated power system architectures –hybrid vehicles and wind turbines
Week 4. | Integrated system model development – vehicles and wind turbines (HW2)
Week 5. | Control of hybrid systems – rule based, ECMS
Week 6. | Control of hybrid systems – dynamic programming (HW3)
Week 7. | Modeling for servo loop control – batteries
Week 8. | Mid-term exam
Week 9. | Modeling for servo loop control – fuel cell stacks
Week 10. | Modeling for servo loop control – fuel cell systems
Week 11. | System analysis and linearization
Week 12. | Multi-variable control (HW4)
Week 13. | Non-minimum phase systems
Week 14. | State of the art controls for engines and transmissions
Week 15. | Course project demo and report

Prerequisites: ME344 or equivalent, ME364L or equivalent

Ref. Text:

Notes and handouts will be distributed through the UT Blackboard.


Grading:  
Homework 20%  No late HW accepted w/o prior approval/excuse  
Midterm Exam 30%  
Final Project 50%
OBJECTIVES
Upon completion of this course, the students should obtain fundamental understanding of vehicle powertrain systems, develop modeling skills to capture the system dynamics in mathematic representation, conduct analysis and control design to achieve required system performance.

COURSE CATALOG DESCRIPTION
Advanced powertrain systems, including hybrid and electric drivetrains; control oriented powertrain models, vehicle control hierarchy and power management; linearization, estimator design, optimization, dynamic programming, and multivariable feedback control and their applications in vehicle propulsion systems. Three lecture hours a week for one semester.

HOMEWORK POLICY
Homework will be assigned to support lecture material and reading assignments—approximately four homework assignments. No late homework will be accepted except for illness or other extenuating circumstances. Students should bring a signed excuse from a health professional (if ill) or other authoritative professional (other extenuating circumstances).

EXAMINATION and PROJECT POLICY
One midterm examination will be given in the course. It is scheduled in the middle of the term. The format of the exams will be discussed prior to the exam. Make-up exam will not be provided. Signed excuses from appropriate professionals (i.e. doctors for illness, etc) must be turned in if the examination is not taken—otherwise a grade of zero will be assessed for the examination.

One term project will be assigned at the beginning of the term. The final report and program files need to be turned in during the last class.

CLASS FORMAT
Lecture style.

ATTENDANCE
Regular class attendance is expected but roll will not be taken. Class participation will be noted.

IMPORTANT DATES
Refer to course catalogs.