Hydraulic Power Trains and Hybrid Systems ME 697M /ABE 691M

Spring Semester 2012
This course provides a thorough understanding of continuously variable transmissions and hydraulic hybrid power train systems. It covers the design and modeling techniques for analyzing, predicting, and specifying the performance of continuously variable transmissions, hybrid power trains and complex hydraulic machine systems including transmission and power train controls. It also provides an introductory treatment of vehicle steering, braking and active vibration damping systems based on displacement control. Fundamentals of power train control and machine power management concepts will be discussed.

- **Power train control and machine power management**
  - Transmission & engine control
  - Power train control using efficiency maps of power train components
  - Machine power management

- **System design - special topics**
  To learn how to design advanced energy saving hydraulic circuits for power trains and hydraulic hybrids
  - Hydraulic steering, braking systems
  - Active vibration damping
  - Transmission noise

- **Laboratory Experiments**
  - CVT performance measurements
  - Hardware-in-the-loop testing
  - Vehicle vibration measurements

- **Hydrostatic & hydrodynamic transmissions**
  - Design principles of CVT
  - Steady state characteristics,
  - Measurement and modeling
  - Secondary controlled 4 wheel drive
  - Torque converter

- **Power split transmissions & hydraulic hybrid systems**
  - Output coupled transmissions
  - Input coupled transmissions
  - Dual stage and compound systems
  - Nonlinear and linear system models
  - Hydraulic hybrid power trains

- **by Monika Ivantysynova, MAHA Professor Fluid Power Systems**
  - **Tuesday 8:30 - 10:20**
  - **Thursday 8:30 - 10:20 @ MAHA Lab**