1. **MEEG 341** **Thermodynamics**

2. **Credits 3** **Contact Hours 3**

3. **Fall 2016** Dr. Heather Doty, Ph.D.; Office 334 Spencer Lab

4. **Textbook** *Fundamentals of Engineering Thermodynamics* by M. Moran, H. Shapiro, D. Boettner, and M. Bailey, Wiley, 8th edition. ISBN13: 978-1118820445

5. **Specific course information**

   a. **Catalog Description:** Basic concepts of thermodynamics including properties of pure substances and gas mixtures, energy, entropy, and exergy. First and second law analysis of closed systems and control volumes. Applications to steady-flow devices and systems in power production, propulsion, and air conditioning.

   b. **Prerequisite:** MATH351 or equivalent

   c. **Course is required.**

6. **Specific goals for the course**

   a. **Specific Outcomes of Instruction:** understand scientific concepts and basic tools used for treating thermodynamic systems; determine the thermodynamics principles and necessary property relations to solve specific problems and applications; establish criteria to assess the relative importance of available information in the solution of engineering problems in thermodynamics; apply thermodynamic reasoning and basic mathematics to applications in real-world energy systems including power cycles, reverse cycles, air-conditioning systems.

   b. **Student Outcomes Addressed:**
   Recognition of the need for, and an ability to engage in, lifelong learning.

7. Brief list of topics to be covered

a. Thermodynamic properties (e.g., specific volume, internal energy, enthalpy, entropy, pressure, temperature)

b. Thermodynamic analysis of control volumes and closed systems

c. First law of thermodynamics

d. Second law of thermodynamics

e. Ideal and non-ideal gases

f. Power cycles, refrigeration and heat pump cycles

g. Exergy

h. Components including turbines, compressors, pumps, fans, heat exchangers, nozzles, diffusers, throttles

i. Isentropic efficiency for turbines, compressors, and pumps

j. Detailed thermodynamic analysis of the Rankine cycle, refrigerators and heat pumps, gas-turbine engines (air-standard Brayton cycle), HVAC