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