COURSE #: CHE 330	**COURSE TITLE:** CHEMICAL & ENGINEERING THERMODYNAMICS
TERMS OFFERED: Winter	**PREREQUISITES:** ChE 230 Material and Energy Balances
TEXTBOOKS/REQUIRED MATERIAL: Sandler, Stanley I., *Chemical, Biochemical, and Engineering Thermodynamics*, 4th ed., John Wiley & Sons, Inc. 2006, ISBN: 978-0-471-66174-0	**COGNIZANT FACULTY:** Glotzer, Lin, Scott, Ziff
INSTRUCTOR: Scott	**FACULTY APPROVAL:** 2013-12-19
CoE BULLETIN DESCRIPTION: Development of fundamental thermodynamic property relations and complete energy and entropy balances. Analysis of heat pumps and engines, and use of combined energy-entropy balance in flow devices. Calculation and application of total and partial properties in physical and chemical equilibria. Prediction and correlation of physical/chemical properties of various states and aggregates. Elements of statistical thermodynamics.	**COURSE TOPICS:** (number of hours in parentheses) 1. Thermodynamic concepts, definitions (3) 2. Mass and energy balances, enthalpy (3) 3. Entropy balance and irreversibility (4) 4. Equations of state, heat capacity calculations (4) 5. Thermodynamic relations, changes (5) 6. Thermodynamics of multi-component systems (7) 7. Phase equilibrium for multi-component systems (6) 8. Chemical reaction thermodynamics (5)
COURSE STRUCTURE/SCHEDULE: Lecture: 3 per week @ 1 hour; Discussion: 1 per week @ 1 hour	

COURSE OBJECTIVES	Links shown in brackets are to course outcomes that satisfy these objectives. 1. Provide students with a lasting and solid understanding of thermodynamics. [1-5] 2. Effectively teach fundamental concepts such as enthalpy, entropy, fugacity, free energy, and chemical potential. [1-4] 3. Teach students how to set up and solve thermodynamics problems. [1-5] 4. Equip students to estimate or locate necessary thermodynamic data. [2,5] 5. Provide examples of applications of thermodynamics to chemical engineering processes and process safety, biological sciences, energy, and environmental sciences. [1] 6. Provide opportunities for students to become proficient using computer tools for solving problems. [1, 3, 5]
COURSE OUTCOMES	Links shown in brackets are to student outcomes a-k 1. Apply the laws of thermodynamics to chemical engineering processes. [a,e] 2. Calculate differences in thermodynamic properties using equations of state, charts and tables, and computer resources. [k] 3. Solve problems dealing with multi-phase chemical systems and reactive systems. [e] 4. Explain the molecular basis of thermodynamics. [a] 5. Interpret thermodynamic data for applications in chemical engineering processes, process safety, biological sciences, energy, and environmental sciences. [b]
ASSESSMENT TOOLS	1. Weekly homework problems assess course outcomes 1-5. 2. Written examinations assess course outcomes 1-5. 3. Group assignments assess course outcomes 1-3, and 5. 4. End of term course evaluation provides student self-assessment of course outcomes 1-5.