WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

MECH 301: Thermodynamics

Catalog Data:	**301 Thermodynamics** 3 Course Prerequisite: PHYSICS 201. Thermodynamic properties of matter, ideal and real gases, work and heat, first and second laws and their application to engineering systems. Typically offered Fall.
Class Schedule:	Three 50-minute lecture sessions per week, for one semester.
Laboratory Schedule:	None
Prerequisites by Course:	PHYSICS 201
Prerequisites by Topic:	1. Basic knowledge of physics. 2. Good understanding of calculus.
Textbook:	M.J. Moran, H.N. Shapiro, *Fundamentals of Engineering Thermodynamics*
Course Coordinator:	Dr. Hua Tan
Course Objectives:	1. Ability to explain the basic principles of classical thermodynamics. 2. Ability to find the thermodynamic properties of pure substances (using tables, charts, and ideal gas law) and apply them to thermodynamic analysis. 3. Ability to identify, formulate, and solve engineering problems of closed and open systems involving heat and work interactions with the surroundings. 4. Ability to apply the First and Second Laws of Thermodynamics to analyze thermal systems. 5. Ability to determine properties of ideal gas mixtures and apply them to thermodynamic analysis. 6. Ability to calculate properties of air-water mixtures and apply them to thermodynamic analysis.
Topics Covered:	1. Thermodynamic concepts 2. Closed systems – 1st Law 3. Properties of pure substances 4. Open systems – 1st Law 5. Systems - 2nd Law 6. Thermodynamic cycles 7. Ideal gas mixtures 8. Thermodynamics of state
Lab Experiments and Activities:	None
Course Outcomes:	Students will be able to:
Assessed for Student Outcomes	1-b. Classify thermodynamic problems, such as closed or open systems, depending on conditions or assumptions defined in engineering problems. 4-a. Apply thermodynamic laws to explain engineering decisions for new energy resources.

	Other	1-a. Review the fundamental conservation laws of mass, momentum, and energy. 1-c. Apply 1st and 2nd law of thermodynamics, thermodynamic cycles, ideal gas, and psychometrics to solve engineering processes and systems. 1-d. Apply mathematical principles to derive equations for conservation of mass, momentum, and energy for the thermodynamic problems.		
Required or Elective Course:		Required		
Relationship of Course to Program:		Meets: Educational Objectives 1, 3 Student Outcomes 1, 4		
Prepared by:		Dr. Hua Tan	Date:	4/9/2018 (4/10/18 mb)
Approved by USC:		4/9/18		