WASHINGTON STATE UNIVERSITY
VANCOUVER
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School of Engineering and Computer Science

Mech 301: Thermodynamics

Catalog Data:	**Mech 301 Thermodynamics**; 3 credits Thermodynamic properties of matter, ideal and real gases, work and heat, first and second laws and their application to engineering systems.
Class Schedule:	Three 50-minute lectures per week, for one semester.
Laboratory Schedule:	None
Prerequisites by Course:	Phys 201; Recommended prerequisite: Math 220, Math 315
Prerequisites by Topic:	1. Basic knowledge of Physics. 2. Good understanding of Calculus.
Required Texts:	Fundamentals of Engineering Thermodynamics, M.J. Moran, H.N. Shapiro
Elective or Required Course:	Required
Course Coordinator:	Dr. Amir Jokar
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 Program Outcomes	E-1. Classify thermodynamic problems, such as closed or open systems, depending on conditions or assumptions defined in engineering problems. H-3. Evaluate the interaction between a system and its surroundings, and the effects of a system on the environment and universe. J-1. Recognize the impact of environmental issues based on thermodynamic laws. J-2. Apply thermodynamic laws to describe engineering decisions for new energy resources.		
	Other	A-1. Apply mathematical principles to derive equations for conservation of mass, momentum, and energy for the thermodynamic problems. A-2. Review the fundamental conservation laws; mass, momentum, and energy. A-3. Apply 1st and 2nd law of thermodynamics, thermodynamic cycles, ideal gas, and psychometrics to solve engineering processes and systems. E-2. Examine different methods, such as integral or differential forms, for specific thermodynamic problems.		
Required or Elective Course:		Required		
Contribution to Professional Component:		Engineering Topics		
Relationship of Course to Program:		Meets: Educational Objectives 1, 2, 3, 4 Program Outcomes A, E, H, J		
Prepared by:		Dr. Amir Jokar	Date:	October 10, 2008
Approved by CAC:				