WASHINGTON STATE UNIVERSITY
VANCOUVER
World Class. Face to Face.

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: A-1. Apply mathematical principles to derive equations for conservation of mass, momentum, and energy for the thermodynamic problems. A-2. Choose the closed or open system analysis to solve for the mass, momentum and energy balance of the systems. A-3. Review the conservation laws; mass, momentum, and energy. A-4. Analyze 1st and 2nd law of thermodynamics, thermodynamic cycles, ideal

	gas, and psychometrics on the engineering processes and systems. E-1. Classify the thermodynamic problems, such as based on the closed or open system, depending on conditions or assumptions defined in the engineering problems. E-2. Examine different methods, such as integral or differential forms, for specific thermodynamic problems. E-3. Use analytical, computational, or experimental analysis to obtain solutions for a specific thermodynamic problem. H-3. Evaluate the interaction between a system and its surroundings, and the effect of 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. K-4. Numerically analyze the 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, K		
Prepared by:	Amir Jokar	Date:	November 1, 2006
Approved by CAC:			