



University of Tehran
School of Electrical and Computer Engineering

Course:	8101706 – Fundamentals of Thermal Systems									
Course type:	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Elective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Level:	Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/>									
Co-requisite(s):	None.									
Prerequisite(s):	Physics I (8120115), Calculus I (8120122)									
Prerequisite by topic:	Heat and Temperature, Properties of Fluids									
Textbook(s):	[1] Cengel, Yunus A.;Boles, Michael A., Thermodynamics: An Engineering Approach, 5th Ed, McGraw-Hill College, Boston, MA.									
Coordinator:	Mr Sharifi									
Goals:	In this course, students are introduced to the formulation of the first and second laws of thermodynamics; energy conservation; concepts of equilibrium, temperature, energy, and entropy; equations of state; processes involving energy transfer as work and heat; reversibility and irreversibility; closed and open systems; and cyclic processes.									
Outcome:	Upon successful completion of the course, students will be able <ol style="list-style-type: none"> 1. To understand the basic concepts of systems, properties, states and temperature. 2. To teach the first law of thermodynamics: adiabatic processes, boundary work, extensive and intensive properties; equilibrium specification of state; enthalpy and specific heats. 3. To teach thermodynamic state and property of ideal gas. 4. To teach thermodynamic state and properties of pure substances 5. To teach energy analysis of open systems 6. To teach second law of thermodynamics and entropy: heat engines, reservoirs, second law postulates, closed system reversible and irreversible processes and refrigerators; entropy production and heat transfer and Carnot engine efficiency. 									
Topics:	<ol style="list-style-type: none"> 1) Introductory Concepts and Definitions 2) Energy and the First Law of Thermodynamics 									

	3) Evaluating Properties 4) Control Volume Energy Analysis 5) The Second Law of Thermodynamics 6) Entropy
Computer usage:	MATLAB
Assignments:	4 to 6 homework assignments
Projects:	None
Grading:	Assignments: 15 % Quizzes: 15% Final exam: 70 %
Further readings:	[1] Michael J. Moran, and Howard N. Shapiro, Fundamentals of Engineering Thermodynamics, 6th Ed. John Wiley and Sons, 2008. [2] J.B. Fenn, "Engines, Energy and Entropy", W.H. Freeman, San Francisco, 1982.
Prepared by:	Mr Sharifi
Date:	August 15, 2017.

*EE: Electrical Engineering		CE: Computer Engineering	
Com	Communications	SW	Software
E	Electronics	HW	Hardware
P	Power	IT	Information Technology
B	Bioelectronics		
Con	Control		
D	Digital System		