AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
Department of Mechanical Engineering

Course Information	
Course Code and Name:	ME323: Thermodynamics-II
Credit Hours**:**	**3 (**3 Lecture + 1 Tutorial)
Prerequisites:	ME221 Thermodynamics-I

Course Description
Thermodynamic power and refrigeration systems. Availability and evaluation of thermodynamic properties, general thermodynamic relations, equations of state, and compressibility factors. Chemical reactions, combustion, gaseous dissociation. Phase equilibrium. Design and optimization of thermal systems.

Textbook			
Title	Thermodynamics: An Engineering Approach		
Authors	Yunus A. Cengel & Michael A. Boles		
Publisher	McGraw Hill	Year and Edition	2011, 7th edition

Course Contents
1. Thermodynamic Cycle Classification, Air standard assumptions, reciprocating engines overview, the Otto cycle.
2. The Diesel cycle, the Stirling and Ericsson cycles, the Brayton cycle.
3. Advanced Brayton cycles.
4. Steam Power Plant Cycle review, increasing efficiency of Rankine cycle, Reheat Rankine cycle.
5. The Regenerative Rankine cycle, Cogeneration, Combined Gas-vapor power cycles.
6. Review of V-C Refrigeration cycle.
7. Heat Pump Systems, Innovative V-C Refrigeration systems
8. Gas Refrigeration cycles, Absorption refrigeration systems
9. Availability (exergy) and second law efficiency, exergy change of a system
10. Exergy transfer, decrease of exergy principle, exergy destruction and exergy balance.
11. Air quality, dew point temperature, saturation and wet bulb temperatures
12. The psychrometric chart and the air-conditioning processes
13. Fuels and combustion, combustion processes
14. Enthalpies of formation and combustion, first law analysis od reacting systems
15. Stagnation properties, speed of sound and Mach number, 1-d isentropic flow, isentropic flow through nozzles.

Academic Coordinator	**Signature**
Dr. Syed Muhammad Fakhir Hasani	

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