UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

PH 205 – THERMODYNAMICS and Heat Transfer
SPRING SEMESTER 2014
COURSE SCHEDULE AND GRADING POLICY

COURSE COORINATOR: E. E. Khawaja - Office: Centre Block, Third Floor
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COURSE DESCRIPTION: Introduction and basic concepts in thermodynamics, properties of pure substances, energy transfer and general energy analysis, energy analysis of closed systems, zeroth, first and second laws of thermodynamics, entropy, heat engine, heat pump and refrigerator, gas power cycles (Otto, Diesel, Stirling, Ericsson, and Brayton engines), vapor and combined power cycles (Rankine engines).

EXPECTED OUTCOME: The purpose of this course is to provide students with a basis for understanding the principles of thermodynamics and their applications to heat engine and refrigeration. The course is vital to the understanding of both the operation of present day heat engines and refrigeration and any future development in the field.

TEXTBOOK: "THERMODYNAMICS" An Engineering Approach, by Yunus A. Cengel and Michael A. Boles, Seventh Edition, Tata McGraw Hill, 2008.

REFERENCE BOOK: Fundamentals of Engineering Thermodynamics, Third Edition, by Michael J. Moran and Howard N. Shapiro, John Wiley & Sons.

GRADING POLICY:

Assignments and quizzes	30 %
Mid-Term Examination	30 %
Final Examination	40 %

Assignments and quizzes: Problems will be assigned and quizzes will be given at regular intervals during the semester.

Mid-Term *examination: This will cover all the material covered during the period between 1st lecture and 15th lecture.*

Final examination: This will cover all the material covered during the semester.

ATTENDANCE POLICY: Students missing more than 20% of the lectures will receive an "F" grade in the course.

COURSE SCHEDULE

Week	Lecture #	TOPICS	CH	SECTIONS
1	1	Thermodynamics and energy	1	1 - 5
	2	Temperature and the zeroth law of thermodynamics	1	6 – 8
2	1	Pressure	1	9 - 11
	2	Forms of energy and energy transfer	2	1 - 4
3	1	Forms of work and first law of thermodynamics	2	5 - 7
	2	Energy and environment	2	8
4	1	Phases of a pure substance	3	1 - 3
	2	Property diagrams for phase-change processes	3	4
5	1	Enthalpy – A combination property	3	5
	2	The ideal gas equation of state	3	6
6	1	Energy analysis of closed systems	4	1 – 2
	2	Specific heats	4	3 - 4
7	1	Internal energy and enthalpy	4	5
	2	Mass and energy analysis of control volumes	5	1 - 3
8	1	Nozzles and diffusers	5	4
	2	Turbines, compressors, and throttling valves	5	4
9	1	Introduction to second law of thermodynamics	6	1 - 3
	2	Heat engines, refrigerators, and heat pumps	6	4
10	1	Reversible and irreversible processes	6	6 - 8
	2	The thermodynamic temperature scale	6	9 – 11
11	2	Entropy and the increase of entropy principle	**7**	1 - 3
	3	Isentropic processes and property diagrams	**7**	4 - 8
12	1	The entropy change of ideal gases	**7**	9 - 10
	2	Isentropic efficiencies of steady-flow	**7**	12 – 13
13	1	Basic consideration in the analysis of power cycle	9	1 - 4
	2	Otto Cycle: For spark-ignition engines	9	
14	1	Diesel, Stirling and Ericsson Cycles for engines	9	6 – 7
	2	Brayton Cycle: For gas-turbine engines	9	8
15	1	The Carnot vapor cycle	10	1 – 2
	2	Rankine Cycle: For vapor power cycle	10	3 - 4