

COURSE OUTLINE

Department of Thermo-Fluids, Faculty of Mechanical Engineering Universiti Teknologi Malaysia		
Course : Thermodynamics II Code : SKMM 2423 Section : 01	Academic Session : 2013/2014 Semester : I	
Lecturer : MOHSIN MOHD SIES Room No. : C24-313 Tel. No. : 07-5534578 E-mail : mohsin@fkm.utm.my		
Synopsis : The aim of this course is to teach senior mechanical engineering students on the application of thermodynamics principles to evaluate the performance criteria of various thermal systems. These include the reciprocating air-compressor, internal combustion engines, vapor power plants, gas turbine plants, refrigeration and heat pump systems. Also, principles of conservation of mass and energy are applied to various air-conditioning processes to assess the energy transfer during the processes.		
Course Learning Outcomes : At the end of the course, students should be able to:		
1. describe the working principles of thermodynamics systems (steam & gas power plants; reciprocating compressors; internal combustion engines; refrigerators and heat pumps) and the important psychrometric properties of the atmospheric air		
2. analyze the performance of thermodynamics systems (steam & gas power plants; reciprocating compressors; internal combustion engines; refrigerators and heat pumps)		
3. apply the principles of the conservation of mass and energy to various air-conditioning processes		
4. propose ways for further improvement of thermodynamics systems thermal performance.		
Teaching Methodology : Through lectures, in-class exercise, quizzes, assignments and tutorials.		

Assessment :

1. Quizzes/Assignments.....	10%
2. Project.....	5%
3. Test 1.....	15%
4. Test 2.....	15%
5. Test 3.....	15%
6. Examination.....	40%
Total.....	100%

Textbook:

Eastop & McConkey, "Applied Thermodynamics for Engineering Technologists", 5th Edition, Prentice Hall (Pearson Education), Essex, England, 1993

References :

1. Y.A. Cengel & M.A. Boles, "Thermodynamics: An Engineering Approach", 6th Edition, McGraw-Hill Inc., New York, 2007
2. M.J. Moran and H.N. Shapiro, *Fundamentals of Engineering Thermodynamics*, Fifth Edition, John Wiley & Sons, Inc., United States of America, 2004
3. R.E. Sontag, C. Borgnakke and G.J. Van Wylen, *Fundamentals of Thermodynamics*, Sixth Edition, John Wiley & Sons, Inc., United States of America, 2003

Class Schedule: Section 01**Tutorial: Section 01**

SKMM 2423 - Schedule

1st meeting	CHAPTER 1 : STEAM CYCLES* (Pg 234) The Rankine Cycle; Rankine Cycle with Superheat;
1st meeting	The Enthalpy-Entropy Chart; The Reheat Cycle;
1st meeting	The Regenerative Cycle.
2nd meeting	TEST 1 : (Topics : 1st meeting) CHAPTER 2 : GAS TURBINE CYCLES* (Pg 260) The Practical Gas Turbine Cycle;
2nd meeting	Modifications to the Basic Cycle: Intercooling; Reheat;
2nd meeting	Modifications to the Basic Cycle: Heat Exchanger; Effect of Pressure Loss.
3rd meeting	TEST 2 : (Topics : 2nd meeting) CHAPTER 3 : POSITIVE DISPLACEMENT MACHINES* (Pg 381) Reciprocating Compressors; Reciprocating Compressors Including Clearance;
3rd meeting	Multi-stage Compression, Steady-flow Analysis
Week 9	Mid-Semester I Break (1 week)
4th meeting	CHAPTER 4: RECIPROCATING INTERNAL-COMBUSTION ENGINES* (Pg 419) Four-stroke Cycle; Two-stroke Cycle; Criteria of Performance: Indicated Power; Brake Power; Friction Power and Mechanical Efficiency
4th meeting	Criteria of Performance: BMEP, Thermal Efficiency and Fuel Consumption; Volumetric Efficiency.
5th meeting	Test 3 : (Topics : 3rd meeting) CHAPTER 5 : REFRIGERATION AND HEAT PUMPS* (Pg 485) Reversed Heat Engine Cycles; Vapour-Compression Cycles; Refrigerating Load; The Pressure-Enthalpy Diagram;
5th meeting	Compressor Types; The Use of the Flash Chamber; Vapour-Absorption Cycles.
6th meeting	CHAPTER 6: PSYCHROMETRY AND AIR-CONDITIONING 15-1 Psychrometric mixtures; 15-2 Specific humidity, relative humidity and percentage saturation; 15-3 Specific enthalpy, specific heat capacity and specific volume of moist air;
6th meeting	15-4 Air-conditioning systems.
23/12/13 – 29/12/13	Revision Week
30/12/13 – 19/1/14	Final Examination