



# COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Basic and Applied Sciences

Course: Physics (2) Engineering

Course Code: BA114

Text Book: Applied Thermodynamics for Engineering Technologists,  
5<sup>th</sup> edition, T.D. Eastop, A. Mcconkey and Serway 9<sup>th</sup> edition

## Heat and Thermal Properties of fluids

### I. Course Outline (February, 2017)

Week	Chapter	Topics	Problems		
			Lecture	Tutorial	Homework
1,2	One	<b>Introduction</b> <ul style="list-style-type: none"> <li>Heat, work, and the system</li> <li>Units of pressure, temperature, volume and energy</li> <li>Reversible work with applications</li> </ul>	1.3,1.6	1.2,1.5	1.1 (i,iii,iv),
3	One	<b>The first law of thermodynamics</b> <ul style="list-style-type: none"> <li>The non-flow energy equation</li> </ul>		1.8, 1.10	1.7-1.9
	Chapter 20 Serway	i-Specific heat and Calorimetry ii- Latent heat	Exp. 20.2-16	3-22	5-23
4,5,6	Two	<b>The working fluid</b> <ul style="list-style-type: none"> <li>Steam: Wet, Dry and Superheated</li> <li>Perfect gas: Properties of perfect gas</li> </ul>	2.3, 2.8, 2.9	2.4, 2.10, 2.12	2.2, 2.7, 2.11
7	<b>7<sup>th</sup> week Exam</b>				
8,9	Three	<b>Reversible and irreversible processes</b> <ul style="list-style-type: none"> <li>Steam</li> <li>Perfect gas</li> </ul>	3.3, 3.9, 3.11, 3.14, 3.15	3.2, 3.7, 3.10, 3.13	3.1, 3.4, 3.5, 3.6, 3.8, 3.12
10,11	Four	<b>The second law of thermodynamics</b> <ul style="list-style-type: none"> <li>Entropy</li> <li>T-s diagram</li> <li>Reversible processes on T-s diagram</li> </ul>	4.2, 4.5, 4.13 <b>Sheet</b> steam: 1, 3, 5, 7 P.G:1, 3, 5, 7	4.4, 4.7, 4.10 <b>Sheet</b> steam: 2, 6, 8, 9, 10 P.G:2, 6, 8, 9, 10	4.1, 4.3, 4.6, 4.8, 4.9, 4.12 <b>Sheet</b> steam: 4, 11, 12,13, 14, 15 P.G: 4, 11, 12,13, 14,15
12	<b>12<sup>th</sup> week Exam</b>				

<b>13</b>	One	<b>The first law of thermodynamics</b> • <b>The steady flow Energy Equation</b>	1.14 <b>Sheet:</b> 7, 8	1.11, 1.12 <b>Sheet:</b> 2,3,9	1.13 <b>Sheet:</b> 1, 4, 5, 6, 10
<b>14</b>	Sixteen	<b>Heat transfer</b> • Conduction, Convection and radiation • The composite wall and the electrical analogy • Applications	16.1 <b>Sheet</b> 1, 2	16.2 <b>Sheet</b> 3, 5	16.3 <b>Sheet</b> 4
<b>15</b>	<b>Revision</b>				

## II. Lab Experiments:

	<b>Description</b>
<b>1</b>	Measurement of the velocity of sound by resonance in air column
<b>2</b>	Measurement of the frequency (AC) mains by sonometer (Mild experiment)
<b>3</b>	Measurement of specific heat capacity of metal by the method of mixtures
<b>4</b>	Calibration of thermocouple
<b>5</b>	Measurement of the electrical equivalent of heat
<b>6</b>	Measurement of the thermal conductivity of a bad conductor by Lee's disc method
<b>7</b>	Verification of Boyle's law

## III. Schedule:

Lectures: 2 hours/week

Tutorials: 2 hours/week

Lab work: 2 hours/ 2 weeks

## IV. Grading System:

- 1. 7<sup>th</sup> week: 30 marks**
  - a. Exam: **20** marks (7<sup>th</sup> )
  - b. Quiz: **10** marks (Tutorial)
  
- 2. 12<sup>th</sup> week: 20 marks**
  - a. Exam: 10 marks
  - b. Quiz: 5 marks (Tutorial)
  - c. Report: 5 marks
  
- 3. Lab: 10 marks**
  
- 4. Final: 40 marks**

**Good Luck**