

Tentative Course Syllabus – ME460 Combustion

Updated 3/22/2020 4:48 PM

Some men see things as they are and say why - I dream things that never were and say why not.
- George Bernard Shaw

Instructor: Dr. Duane Abata, Professor of Mechanical Engineering

Textbook: Ragland, K., and K. Bryden, Combustion Engineering, Second Edition, CRC Press, Taylor and Francis Group, ISBN 978-1-4200-9250-9, 2011.

wk	lec	day	date	read before class	homework due
1	1	M	Jan 13	Introduction	
	2	W	Jan 15	Journal Article "Why is there so much Oil the Middle East?"	read 'Middle East Oil' on F drive, expect quiz
	3	F	Jan 17	1. A. Oparin (1924), S. Miller and H. Urey (1952), read article "From Primordial Soup to the Prebiotic Beach" 2. Plate Tectonics 3. Petroleum and Coal: A Geological View from A. Lisenbee, 2017	read 'Primordial Soup' and 'Earth's Early Atmospheres (up to page 3) on F drive, expect quiz
2	4	M	Jan 20	No class - Martin Luther King Day	
	5	W	Jan 22	Basic Concepts from Organic Chemistry	skim to page 258: 'Organic Chemistry Sawyer Chap 5' available on F drive answer questions 5.1 through 5.6
	6	F	Jan 24	Chapter 1: Introduction Chapter 2: Fuels	2-1, 2-2
3		M	Jan 27		
	7	W	Jan 29		2-3, 2-5
	8	F	Jan 31		2-8 (gasoline, diesel only) 2-11 (bituminous coal only)
4	9	M	Feb 3	Chapter 3: Thermodynamics of Combustion	
	10	W	Feb 5		

holiday	exams	travel	on-line
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Note: Use constant specific heats at 300K for all problems

	11	F	Feb 7		
5	12	M	Feb 10	problem discussion	3-18
	13	W	Feb 12	Chapter 4: Chemical Kinetics	3-1, 3-28
	14	F	Feb 14	No class	
6	15	M	Feb 17	No class – President's Day	
	16	W	Feb 19		power plant combustor design project due (in-class assignment on Feb 7)
	17	F	Feb 21		4-1
7	18	M	Feb 24		CO oxidation problem on Website
	19	W	Feb 26		redo Example 4.2 for ethane (one step reaction only)
	20	F	Feb 28	problem discussion	4-6
8	21	M	Mar 2	Exam review	
	22	W	Mar 4	Exam No. 1	
	23	F	Mar 6		
				No Class – Spring Break March 9 – March 23	
9	24	M	Mar 23	Chapter 5: Flames 5.1 Laminar Premixed Flames	
	25	W	Mar 25	6.2 Fuel Substitution 6.3 Residential Gas Burners	
	26	F	Mar 27	6.4 Industrial Gas Burners 6.5 Utility Gas Burners	
10	27	M	Mar 30	Chapter 8: Detonation of Gaseous Mixtures 8.1 Transition to Detonation 8.2 Steady State Detonations	
	28	W	Apr 1	8.3 One Dimensional Model for Propagation Velocity, Pressure, and Temperature Rise	

**Schedule Changes Due to Campus Closure
For Reading and Problem Assignments
See D2L Site or contact D. Abata
duane.abata@sdsmt.edu**

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	29	F			
11	30	M	Apr 6	9.3 Fuel Injectors 9.4 Vaporization of Single Droplets	8.9
	31	W	Apr 8	Chapter 10: Oil Fired Furnace Combustion 10.1 Oil Fired Systems 10.2 Spray Combustion in Furnaces and Boilers	9.1
		F	Apr 10	No Class (Christian Good Friday)	
12	32	M	Apr 13	10.3 Plug Flow Model	9.4
	33	W	Apr 15	10.4 Emissions from Oil-Fired Furnaces and Boilers	9.5
	34	F	Apr 17	Problem Discussion	
13	35	M	Apr 20	Review	10.1, 10.4
	36	W	Apr 22	Exam No. 2	
	37	F	Apr 24	Exam discussion Chapter 13: Detonation of Mixtures 13.1 Detonation of Liquid Fuel Sprays 13.2 Detonation of Liquid Fuel Layers	
14	38	M	Apr 27	Chapter 14: Solid Fuel Combustion Mechanisms 14.1 Drying of Solid Fuels 14.2 Devolatilization of Solid Fuels	13.2
	39	W	Apr 29	14.3 Char Combustion	14.2
	40	F	May 1	Exam Week April 29 – May 3	

As of 12/30/19:

The Final Exam for this course is scheduled in the same room as class on XXX at XX am. Design projects are due at that time.

holiday	exams	travel	on-line
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