ME 320 Course Schedule** - Spring 2022 (Smith Section: AE2)

Week	Lecture	Date	Topic	Reading	HW	
		January				
W01	1	W 19	Introduction to Heat Transfer	1.1-1.2	1.10; 1.12	
	2	F 21	Rate Laws (Cont'd) and Energy Conservation Principle	1.2-1.5	1.15; 1.45	
W02	3	M 24	Introduction to Conduction	2.1-2.2	2.3, 2.9	Conduction
	4	W 26	Heat Flow and the Heat Diffusion Equation	2.3-2.5	2.33a,b; 2.38	
	5	F 28	Plane Wall Conduction and Thermal Resistance	3.1	3.12; 3.16	
W03	6	M 31	Conduction in Radial Systems	3.3-3.4	3.41; 3.44	
		February				
	7	W 2	Conduction with Volumetric Energy Generation	3.5	3.64	
	8	F 4	Fins (Extended Surfaces)	3.2, 3.6	3.95	
W04	9	M 7	Fin Performance and Arrays	3.6	3.124	
	10	W 9	2-D Steady Conduction	4.1-4.3	SP1; 4.20	
	11	F 11	Transient Conduction, Lumped Capacitance Method	5.1-5.3	5.19; 5.29*	
W05	12	M 14	Lumped Capacitance Examples, 1-D Transient Conduction: Finite Domains	5.1-5.3, 5.4-5.6	5.41*; 5.51a	
	13	W 16	1-D Transient Conduction: Semi-Infinite Domain	5.7	5.67; 5.72a	
	14	F 18	Exam 1 Review	--	--	
W06	--	M 21	Evening Exam 1 -- No Lecture during Regularly Scheduled Time	--	--	
	15	W 23	Numerical Conduction: Finite Volume (Energy Balance) Method; Steady	4.4-4.5	--	
	16	F 25	Numerical Conduction: Transient Discretization and Stability	5.10	4.61*; 5.112a*	
W07	17	M 28	The Convective Transfer Problem	6.1-6.3	6.3; 6.8	Convection
		March				
	18	W 2	Boundary Layer Equations and Similarity	6.4-6.5	6.25; 6.29	
	19	F 4	Similarity Example, Introduction to Mass Transfer	6.6	6.61; 6.67	
W08	20	M 7	Heat/Mass Analogy, Evaporative Cooling	6.7	7.2a,b; SP2	
	21	W 9	External Flow: Flat Plates in Parallel Flow	7.1-7.3	--	
	22	F 11	External Flow: Cylinders and Spheres in Crossflow	7.3-7.5	7.49a*; 7.111	
BREAK	--	M 14	No Lecture due to Spring Break	--	--	
	--	W 16	No Lecture due to Spring Break	--	--	
	--	F 18	No Lecture due to Spring Break	--	--	
W09	23	M 21	Introduction to Internal Flow: Flow Development, Energy Balance	8.1-8.3	8.8	
	24	W 23	Internal Flow: Convection Correlations	8.4-8.5	8.21; 8.27	
	25	F 25	Heat Exchangers: Log-Mean Temperature Difference Method	11.1-11.3	11.5*; 11.20	
W10	26	M 28	Heat Exchangers: ε-NTU Method	11.4	11.43	
	27	W 30	Overview of Free/Natural and Two-Phase Convection	9, 10	--	
		April				
	28	F 1	Exam 2 Review	--	--	
W11	--	M 4	Evening Exam 2 -- No Lecture during Regularly Scheduled Time	--	--	Radiation
	29	W 6	Introduction to Thermal Radiation Processes	12.1-12.2	--	
	30	F 8	Intensity, Spatial, and Spectral Effects	12.3	12.3; 12.8	
W12	31	M 11	Blackbody Emission	12.4	12.15; 12.22	
	32	W 13	Real Surface Emission	12.5	12.27; 12.30	
	33	F 15	Absorption, Reflection, Transmission; Kirchoff's Law	12.5	12.50a-c; 12.52	
W13	34	M 18	Gray Surface Approximation	12.8	--	
	35	W 20	Multi-Mode Analysis I	--	12.71; 12.79a,b	
	36	F 22	Introduction to Radiation Enclosures, The View Factor	13.1	13.1; 13.3a	
W14	37	M 25	Radiation Circuit Formalism	13.3	--	
	38	W 27	Radiation Circuit Examples	13.3	13.44; 13.56	
	39	F 29	Multi-Mode Analysis II	13.4	--	
W15		*May*				
	40	M 2	Course Review	--	--	
	41	W 4	Course Review	--	--	
	--	TBD	Final Exam (Time and Location to be Determined)	--	--	

Subject to change at the discretion of the instructor

(continued on the next page)

"SP" denotes a special problem to be posted on Compass.

***Changes to textbook problem statements:**

5.29 - To assess whether the lumped capacitance method is applicable to Problem 5.29 you may find Eq. 1.9 useful.

5.41 - For problem 5.41 use the definition for Q_0 listed in Eq. 5.47.

4.61, 5.112 - In both cases use the finite volume method. Control volumes must be properly indicated to receive credit. For 4.61 Matlab or Excel can be used to perform any required calculations, and a printout of your code/spreadsheet must be included to receive credit.

7.49 - In Problem 7.49 evaluate fluid properties at the film temperature of the appropriate fluid. Assume that the pin has a surface temperature of 25 degrees Celsius for the purposes of evaluating properties only. Do not assume the pin to have constant temperature

11.5 - For Problem 11.5c the temperature of water for which you are expected to solve is that of the cooling water, not the condensed steam. The specific heat that is specified is that of lake water. Consider the latent heat of condensing steam in obtaining your answer.