

ME 555 Advanced Heat Transfer I – Conduction

Class Schedule (revised)

Spring 2007

Date	Topic	Reading	Suggested Exercises
Jun. 16	Introduction, review of elementary problems	vii-17, 365-367	1•5, 1•6
	Lumped-system transient with periodic ambient	17-20	1•14, 1•20
	23 Normalization (parameter simplification)	177-183	1•22
	Series solutions, Bessel's equation	24-36	7•1, 7•5, 7•7, 2•1, 2•2
30	Special functions		
	• Bessel, gamma, modified Bessel, Kelvin	36-42, 49, 368-369	2•3, 2•12, 2•14, 2•18
	• General Bessel equation	46-48	2•24, 2•30
Feb. 06	Plane-wall transients		
	• Specified temperature boundary, initial conditions	52-69, 370	3•5, 3•17, 3•21
	• Convection boundary	70-77, 371-373	3•22
	13 Plane-wall transients		
	• Nonzero heat-flux boundary	78-84	
	• Time-dependent nonhomogeneous problems	85-92	3•25, 3•36
	20 Two-dimensional problems	93-109	3•39, 3•46
	Cylindrical coordinates	110-125	3•55
	27 Reduction to one-dimensional transients	129-133	3•58
	Superposition and Duhamel's theorem	141-146	4•2, 4•14
Complex combination	149-156	5•3	
Laplace transforms	158-174, 374-375		
Normalization (engineering approximations)	183-189	7•9	
Mar. 06	Midterm Examination		
20	Finite differences (introduction)	196-201	8•1, 8•6, 8•7
	• Discretizing the spatial problem	202-215	8•12
	• Heat-flow computation	216-217	
27	Finite differences		
	• Steady problems	217-235, 390-393	8•17, 8•20, 8•26
	• Transient problems	235-247	8•34
Apr. 03	Exact solution of finite-difference equations	248-257	8•45
10	Analysis of Euler and Crank-Nicolson methods	258-265	
	Finite differences		
	• Critical-time-step estimate	266-270	8•51
	• Supplementary problems	271-280	
17	Finite elements (introduction)	288-296	
	• Interior elements	297-304	9•1
	• Boundary segments	305-310	9•2
24	Finite elements		
	• Heat-flow computation	311-317	9•7, 9•9
	• Program FEHT	318-319	9•21
	• Steady-state problems	320-328	9•22, 9•23
May 01	Finite elements		
	• Transient problems	329-344	9•32
	• Supplementary problems	345-355	

May 8 **Final Examination** (Tues. May 8, 6-7:50 p.m.)