

**NORTH CAROLINA STATE UNIVERSITY
DEPARTMENT OF MATHEMATICS**

MA 501: Advanced Mathematics for Engineers and Scientists
Spring, 2008

Text: *Advanced Engineering Mathematics* by Peter V. O'Neil (6th edition)

SECTIONS	TOPICS
1.2, 1.3, 2.2 – 2.6	Review: ordinary differential equations
16.3	O.D.E. with Boundary Conditions, Sturm-Liouville Theory and Eigenfunction expansions
14.1 – 14.4	Fourier Series. Fourier sine and cosine series
17.1, 17.2, 18.1, 18.2	Fourier Series solution of the heat and wave equations (1-dimensional)
17.4	d'Alembert's Solution to wave equation
18.2.4, 18.2.5	Nonhomogeneous heat equation
19.1, 19.2	Laplace's equation
17.7, 18.5	Multiple Fourier Series solutions of Boundary Value Problems
	Review: Power series solutions of differential equations. Frobenius method
16.1, 4.3, 16.2	Legendre polynomials. Bessel Functions
17.5, 18.4, 17.6	Fourier-Bessel solution of boundary value problems
19.3, 19.8.2	Laplace's equation in a disk
19.7	Fourier-Legendre solution of boundary value problems
15.1, 15.2	The Fourier Integral. Fourier sine and cosine integrals
17.3, 18.3	The wave and heat equations in unbounded domains
15.3, 15.5, 15.6	Finite Fourier Transforms, Fourier Transforms (if time permits)