MATH 251 SPRING SEMESTER 2012
Final Exam study guide

Exam Date/Time: Monday, April 30, 2012, from 8:00 to 9:50 am
Format: 150 points in 15 questions. The exam is cumulative, with approx. 60% based on new (chapter 10) material.
Location: 102 Forum (sections 1, 4, 8, 10), 105 Forum (sections 2, 3, 5), 108 Forum (sections 7, 9, 11, 12), 110 Wartik (section 6)

> *A table of Laplace transforms (a copy of table 6.2.1 from the textbook) will be provided during the exam.*

Topics to study

All the topics from the midterm exams:
http://www.math.psu.edu/tseng/class/Math251/MATH251_SP2012_exam_1_guide.pdf
http://www.math.psu.edu/tseng/class/Math251/MATH251_SP2012_exam_2_guide.pdf
Plus,

1. Separation of variables
2. Two-point eigenvalue problems; finding eigenvalues / eigenfunctions
3. Fourier series; Euler-Fourier formulas
4. The Fourier Convergence Theorem
5. Even and odd functions; even and odd periodic extensions
6. Solution of heat conduction problems (w/ different boundary conditions)
7. Steady-state solution of the heat conduction equation
8. Wave equation: vibration of a fixed-end elastic string

Except: the topics below are explicitly NOT covered on the final exam:

a. Mixing/air resistance problems
b. Reduction of order
c. D'Alembert solution of the wave equation
d. Lapalce/potential equation (section 10.8; note that this topic is different from Laplace transforms, which will be on the exam)

Comments: Students should know basic integration techniques; partial differentiation; the Existence and Uniqueness theorems; the general long-term behavior of different types of solutions; the behavior of the solutions of various types of mass-spring systems; stability/ phase portrait classifications; Laplace transforms; computing Fourier coefficients and determine the convergence of Fourier series; finding the steady-state solution for simple nonhomogeneous boundary conditions; and each of the steps used to solve a second order linear PDE initial-boundary value problem.