AMATH 250 Final Exam Information

Date: Thursday, April 20
Time: 12:30–3:00 p.m.
Place: PAC, Area 4

Office hours (MC 5124):
Tuesday April 18, Wednesday April 19, 1-4 p.m.
Or by appointment: sacampbell@uwaterloo.ca, 888-4567 ext. 5461

Material Covered:
All material covered in lectures and assignments.
All material covered in the Course Notes except sections 1.2.5 and 1.2.6.
Approximately 60% of exam will be on material since the midterm.
Statements of all theorems and definitions given in the Course Notes.
The proofs of the following theorems:
Chapter 3: Superposition Principle for Homogeneous DEs (Proposition, p. 53)
Chapter 4: First Shift Theorem (p. 85)
Derivative Theorem (Proposition 1, p. 85)
Chapter 5: Laplace Transform of **Ax** (Proposition 2, p. 112)
Derivative property for fundamental matrices (Proposition 1, p. 124)

Practice Problems:
Course Notes: Problem Sets
Reserve books:
Borrelli and Coleman(QA 371.B74 2004)
Sections 1.1-1.3, 2.1-2.2,2.5, 3.1-3.7, 4.1-4.4, 5.1-5.2, 6.1-6.5
Boyce and DiPrima (QA 372.B73 1992)
Sections 2.1-2.7, 3.1-3.2,3.4-3.6,3.8-3.9, 6.1-6.4, 7.1,7.5-7.9
Edwards and Penny (QA 371.E28 2004)
Sections 1.1,1.2,1.4,1.5, 3.3-3.7, 5.1-5.4,5.6, 7.1-7.4

You will be given the formula sheet on the reverse with your exam.

Final Grade: will be calculated as the greater of
(10% Assignments (best 9 of 10) + 25% midterm + 65% final) or (100% final)

AMATH 250 Formula Sheet

Laplace Transforms

$f(t) = \mathcal{L}^{-1}\{F(s)\}$	$F(s) = \mathcal{L}\{f(t)\}$
e^{at}	$\dfrac{1}{s-a}$
$\cos(bt)$	$\dfrac{s}{s^2+b^2}$
$\sin(bt)$	$\dfrac{b}{s^2+b^2}$
t^n	$\dfrac{n!}{s^{n+1}}$
$e^{ct}f(t)$	$F(s-c)$
$H(t-c)f(t-c)$	$e^{-cs}F(s)$
$f'(t)$	$sF(s)-f(0)$
$(-t)^n f(t)$	$F^{(n)}(s)$

Partial Fractions

$$\frac{1}{(s+a)(s+b)} = \frac{1}{a-b}\left(\frac{1}{s+b} - \frac{1}{s+a}\right)$$

$$\frac{s}{(s+a)(s+b)} = \frac{1}{a-b}\left(\frac{a}{s+a} - \frac{b}{s+b}\right)$$

$$\frac{1}{(s+a)(s^2+b^2)} = \frac{1}{a^2+b^2}\left(\frac{1}{s+a} + \frac{a-s}{s^2+b^2}\right)$$

$$\frac{s}{(s+a)(s^2+b^2)} = \frac{1}{a^2+b^2}\left(-\frac{a}{s+a} + \frac{b^2+as}{s^2+b^2}\right)$$

$$\frac{1}{(s^2+a^2)(s^2+b^2)} = \frac{1}{b^2-a^2}\left(\frac{1}{s^2+a^2} - \frac{1}{s^2+b^2}\right)$$

$$\frac{s}{(s^2+a^2)(s^2+b^2)} = \frac{1}{b^2-a^2}\left(\frac{s}{s^2+a^2} - \frac{s}{s^2+b^2}\right)$$

Trigonometric Identities

$$\cos(A+B) = \cos A\cos B - \sin A\sin B$$

$$\sin(A+B) = \sin A\cos B + \sin A\cos B$$

$$\cos A - \cos B = -2\sin\left(\frac{A-B}{2}\right)\sin\left(\frac{A+B}{2}\right)$$