Introduction to PDE's **Math 4163-001** **Spring 2016**

9. Homework

Show all your work! Justify your answers!

Sec. 4.2 #s 5, 7, 9.
Sec. 4.3 #s 4, 7.

1) Find the Fourier Cosine Series of $f(x) = x^2$ in the interval $(0, \pi)$.
2) Solve
$u_{xx} + u_{yy} = 0, \quad 0 < x < l, \quad 0 < y < m;$
$u(x, 0) = \frac{1}{l}(l - x); \quad u(x, m) = 0;$
$u(0, y) = \frac{1}{m}(m - y); \quad u(l, y) = 0.$

3) Solve
$u_{tt} - u_{xx} = xt; \quad 0 < x < a, \quad t > 0;$
$u(x, 0) = 0, \quad u_t(x, 0) = x;$
$u(0, t) = 0, \quad u(a, t) = 0.$

4) Find a series representation of the solution of
$u_t + u - 4u_{xx} = 0, \quad 0 < x < 2, \quad t > 0;$
$u(x, 0) = \cos(2x)\,,$
$u_x(0, t) = 0\,,$
$u_x(\pi, t) = 0\,.$