Math 112C Suggested Syllabus

Text: *A First Course in Partial Differential Equations*, H.F Weinberger

Plus supplementary notes found at:
http://www.math.uci.edu/sites/math.uci.edu/files/Turing.pdf
http://www.math.uci.edu/sites/math.uci.edu/files/nonlinear.pdf
http://www.math.uci.edu/sites/math.uci.edu/files/firstorder.pdf

Lecture	Section	Topic
1	38	Some properties of eigenvalues and eigenfunctions
2	38	Cont.
3	39	Equations with singular endpoints
4	40	Some properties of Bessel functions
5	40	Cont.
6	41	Vibrations of a circular membrane
7	42	Forced vibrations of a circular membrane, natural frequencies and resonance
8	42	Cont.
9	43	The Legendre polynomials and associated Legendre functions
10	43	Cont.
11	44	Laplace's equation in the sphere
12	45	Poisson's equation and Green's functions for the sphere
13		Review
14		**Midterm**
15	--	First order PDEs and the derivation of transport equations
16	--	Linear 1st order PDEs of type $u_t + cu_x = 0$ and the method of characteristics
17	--	Equations of type $u_t + c(x; t)u_x = 0$
18	--	Equations of type $a(x; t)u_t + b(x; t)u_x + c(x; t)u = F(x; t)$
19	--	Nonlinear 1st order PDEs: the inviscid Burgers equation. Implicit solutions
20	--	Inviscid Burgers: the method of characteristics
21	--	Inviscid Burgers: compression and rarefaction waves
22	--	Inviscid Burgers: shock formation
23	--	Inviscid Burgers: conservation laws and construction of shock solutions
24	--	Cont.
25	--	Viscous Burgers equations
26	--	Cont.
27	--	Reaction-diffusion equations and Turing instability
28	--	Cont.
29		Review