Math 286 Course Content and Objectives

COURSE CONTENT AND SCOPE - **Lecture:** Outline the topics included in the lecture portion of the course *(Outline reflects course description, all topics covered in class).*	Hours Per Topic	COURSE OBJECTIVES - **Lecture:** Upon successful completion of this course, the student will be able to...*(Use action verbs - see Bloom's Taxonomy for 'action verbs requiring cognitive outcomes.')*
Examples of partial differential equations (PDE's); classification of PDE's, conservation laws, diffusion, biological examples, vibrations and acoustics, quantum mechanics, heat flow, and Laplace's equation.	18	Derive the heat, wave, and Laplace's equation from physical principles as well as other PDE's of physical systems.
Unbounded domains: Cauchy problems (heat and wave equations), ill-posed problems, semi-infinite domains, Duhamel's principle, and Laplace and Fourier Transforms.	18	Solve the heat and wave equations on specified domains. This applies to such problems as cooling/heating of an object and string vibration.
Orthogonal expansions: Using Fourier Series to solve PDE's, orthogonal expansions in general, and Sturm-Liouville problems.	18	Apply Fourier series to solve a PDE. Applications include problems in signal processing such as the processing of analog data.
Bounded domains: Separation of variables, flux conditions, Laplace's equation, cooling of a sphere, diffusion in a disk, and sources on bounded domains.	17	Apply separation of variables to solve a PDE. Applications include problems in Quantum Mechanics such as the particle in a box.
Examples from the life sciences: Age-structured models, traveling wave fronts, and equilibria and stability.	17	Solve the transport equation. Applications include the 'traffic flow' model.
Final examination.	2	Final examination.
Total:	90	
Total Lecture Hours In Section I Class Hours:	90	