Mathematics 257—January 12, 1996

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By far the best way to get in touch with me is by e-mail, which I read several times a day. Usually an appointment can be arranged in the evening for the following day.

The worst way to get in touch with me is to ask me to telephone you. I probably won't do it.

Text: *Boyce & DiPrima, Elementary Differential Equations and Boundary Value Problems, Fifth Edition.* This is the same you used in Mathematics 255.

Examinations: There will be at least two mid-term examinations and perhaps a few small quizzes, as well as a final examination. I do not know dates yet. *Examination grades will be counted proportionally to the length of time allotted to the examinations.* Our section will probably not have its final examination in common with the other sections. In my section's examinations calculators will be required, and usually — but not always — crib sheets will be allowed.

Assignments: Homeworks will be due roughly every week. They will not generally be accepted late, because usually answers will be discussed in class. I am not sure exactly how homework will be counted towards your grade (certainly, not much) except that

- (•) if you do essentially all the homework, you get special consideration in otherwise failing circumstances;
- (•) you do not have to do any homework if your other grades are exemplary. But *most examination questions will be based directly on homework problems*, and you will certainly suffer if you have not made a serious effort to do them (by yourself!).
- (•) certain of the homeworks may be counted more than others. I will signal this when I hand out the assignments.

Outline: We will cover most of the material in these chapters of Boyce & DiPrima:

9. Partial differential equations and Fourier series
10. Boundary value problems

In addition we might cover some of

5. Series solutions of second order equations

towards the end of the term. We will also cover a few topics dealt with briefly, or perhaps not at all, by the text. For this material I shall hand out class notes.

The order of topics will be something like this:

Review of symmetric operators
Periodic functions and Fourier series
Even, odd functions, and periodic functions
Complex exponential functions
Heat flow in general
Separation of variables and one dimensional heat flow
Two and three dimensional dimensional heat flow
Steady state and Laplace's equation
The wave equation in one, two, and three dimensions
Systems with variable conditions

We may also cover these more optional topics:

Finite elements
The Fourier transform
Discrete and fast Fourier transform
Different coordinate systems
Circular and spherical regions

The precise topics covered, and the order in which they are covered, will likwely be quite different from other sections.

Remark. I very much dislike repeating written instructions, but I do not mind explaining difficult concepts any number of times. This is especially important because I lecture rapidly. I encourage you to ask questions in class — if you are confused, the chances are very good that others are too.