Applied Analysis

Instructor: Professor Wen-Ching Lien, Math 311, wlien@mail.ncku.edu.tw

Office Hours: Tuesday 2-3 pm (or by appointment).

Text:

1. G.I. Barenblatt, "Scaling"

2. J. Smoller, " Shock Waves and Reaction-Diffusion Equations"

3. G.B. Whitham, " Linear and Nonlinear Waves"

Introduction:
This course is intended to give students a basic and classical introduction to mathematical science, particularly the theoretical study of the compressible fluids. The modern compressible flow of today is a mixture of classical analysis along with computational techniques. Our purpose here is to provide an understanding of "nonlinear wave phenomena" through the mathematical theory, which is the main ingredient in building up the numerical computation theory.

This course is aimed at senior undergraduates and first-year graduate students in science college. The background knowledge is provided on each topic so that the interested student can consult more detailed and comprehensive treatments.

We shall cover the following materials if time allows:
- First-Order Equations
- Hyperbolic Conservation Laws
- Shock Wave Reflection
- Self-similar Motion
- Conical Flow

Homework: Homework assignments will be distributed in class. For each lecture's material we will assign a number of problems to be handed in. You may collaborate on homework problems but must write up your own solutions.

Exam: The course will have only the final exam. You may reschedule an exam in case of documented illness or family emergency or documented University sponsored trips.

Grading Policy: The final grade will be determined by your performance on the homework and the final exam, according to the following algorithm:

Homework: 70%   Final Exam: 30%