MAT 546: Differential Equations

TEXTBOOK:

L. C. Evans, *Partial Differential Equations*, Graduate Studies in Mathematics Vol. 19, American Mathematical Society, Providence, RI, 1998.

OTHER REFERENCES:

1) G. Folland, *Introduction to Partial Differential Equations*, Princeton University Press, 1976.

2) P. Garabedian, *Partial Differential Equations*, Wiley, 1964.

3) D. Gilbarg and N. Trudinger, *Elliptic Partial Differential Equations of Second Order*, (2nd ed), Springer, 1983.

4) L. Hörmander, *The Analysis of Linear Partial Differential Operators*, Vol. 1-4, Springer, 1983-85.

5) F. John, *Partial Differential Equations*, (4th ed), Springer.

6) J. Kazdan, *Applications of Partial Differential Equations to Problems in Geometry*, Lecture Notes, University of Pennsylvania, 1993.

7) M. Taylor, *Partial Differential Equations*, Vol. 1-3, Springer, 1996.

SCHEDULE:

TuTh 2:20pm-3:40pm , Physics P123.

INSTRUCTOR:

Marcus Khuri, Math Tower 4-119, khuri@math.sunysb.edu

OFFICE HOURS:

TTh 11:30am-12:30pm, or by appointment.

TOPICS COVERED:

1) Linear and nonlinear first order equations.

2) Review of basic properties for the Laplace, Heat, and Wave operators.

3) Existence and regularity theory for linear elliptic, hyperbolic, and parabolic equations.

4) De Giorgi-Nash-Moser Theory.

5) General techniques for nonlinear equations: calculus of variations, fixed point theorems, continuity method, sub and super solutions, soft and hard implicit function theorems.

6) (If time allows) Various applications to problems in geometry and physics.

GRADE:

The grade will be based on homeworks and class participation.