UNIVERSITY OF CENTRAL FLORIDA
Department of Mathematics
FALL 2007

MAP 7119..01 **ADVANCED NONLINEAR DYNAMICS** **CREDIT: 3 HOURS**

PREREQUISITES: Applied Mathematics I (MAT 5407) or some exposure to the Calculus of Variations. Familiarity with Perturbation (Asymptotic) Methods will be helpful, but isn't essential.

INSTRUCTOR: Dr. S. Roy Choudhury

OFFICE: MAP 202F

OFFICE HOURS: MW: 9:00 - 10:30 A.M., F: 9:00 - 10:00 A.M.

OFFICE PHONE: 823–2635 **E-MAIL:** choudhur@longwood.cs.ucf.edu

CLASSES MEET: 4:30 – 5:45 P.M. TR in BA 126

TEXT: NO text. Lecture notes and handouts from papers

SUPPLEMENTARY TEXTS:
(a) Solitons, P.G. Drazin and R.S. Johnson, Cambridge
(b) Chaos and Integrability in Non Linear Dynamics, M. Tabor, Wiley.

Since this is a special topics course, neither of the texts is strictly required. Material will be taken from both texts. Lecture notes will usually be sufficient for all homework problems.

COURSE:

This course will cover modern techniques for nonlinear Partial Differential Equations of interest in areas such as Nonlinear Optics, Plasma Physics, Water Waves, and Mechanical and Aerospace Engineering. Techniques covered will include Hirota's Method, Painlevé Analysis, two variants of exponential asymptotics, perturbation theory, and variational methods. The instructor will attempt to accommodate models of interest to the students.

ASSIGNMENTS, FINAL PROJECT AND GRADES:

Evaluation will consist of two long homeworks worth 60% of the grade, and a group project worth 40% at the end based on investigating one of the models discussed in the course with one or more of the techniques which will be introduced.