THE UNIVERSITY OF TEXAS AT EL PASO

COLLEGE OF SCIENCE

Physics

Course & CRN #: PHYS 3360 19209

Course Title/Topic: Introduction to computational methods for physics problems

Credit Hrs: 3

Term: FALL 2017

Course Meetings & Location: PSCI 218

Prerequisite Courses: PHYS 3351, MATH 2326, PHYS 3325 or consent of instructor.

Instructor: Tunna Baruah

Office Location: PSCI Rm 120

Contact Info: E-mail: tbaruah@utep.edu

Phone: 915-747-7529

Website:

Office Hours: W 1:00 – 2:00 pm

Textbook(s), Materials: Required: Computational Physics: Tao Pang;

Suggested: Numerical Methodsfor Physics, 2nd Edition: Alejandro L. Garcia; Computational Physics: N. J. Giordano and H. Nakanishi.

Course Objectives : The objective of this course is to introduce undergraduate students in physics to numerical solutions of physical problems which are too intractable using the traditional analytical methods. Computer simulations begin with the development of a model that can be represented by an algorithm. In the simulations many numerical methods can be used. The purpose of the course is to teach how to effectively use various existing numerical methods to solve particular problems in physics. Familiarity with a higher-level programming language is encouraged but not required. A programming language will be briefly introduced and used to solve physical problems. The students will learn numerical methods mostly related to solving physics problems. The students will be encouraged to write simple codes in the class which will enhance their understanding about methods as well as scientific programming. The physics topics to be covered are: numerical methods for simulating single particle motion, trajectories in 2D and 3D, oscillatory motion, two- and three-dimensional motion of a charges particle in an electro-magnetic field, dynamics of a driven pendulum, damp driven pendulum, classical scattering cross-sections for Yukawa potential, planetary motion, solution of one dimensional Schrodinger equation, random numbers, introduction to classical Monte Carlo method, determining the geometry of a small cluster with classical potential.

Course Assignments: There will be materials related to the numerical methods which the students will have to apply to solve physics problems. The lab work is an integral part of the course.

Assessment of course objectives: The assessment should be on the course-cum-lab work assigned and through a final test.

Course Schedule: Meet for 3 hours every week

Attendance Policy: None.

Grading Policy: Grading based on lab work, results and independent analysis.

Academic Integrity Policy: The University policy is that all suspected cases or acts of alleged scholastic dishonesty must be referred to the Dean of Students for investigation and appropriate disposition. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. For further information, please refer to: http://academics.utep.edu/Default.aspx?tabid=23785 or http://www.lib.iastate.edu/commons/resources/facultyguides/plagiarism/dis honest.html.

Civility Statement: Please do not use cell phones, pagers, IPods, MP3 players, blue tooth devices, etc. during class. Cell phones and pagers should be set to silent or vibrate, and any calls should be taken outside of class. Please do not wear headsets or blue tooth devices during class.
Disability Statement: If a student has or suspects she/he has a disability and needs an accommodation, he/she should contact the Disabled Student Services Office (DSSO) at 747-5148 or at <dss@utep.edu> or go to Room 106 Union East Building. The student is responsible for presenting to the instructor any DSS accommodation letters and instructions.

Military Statement: If you are a military student with the potential of being called to military service and/or training during the semester, please contact me by the end of the first week of class.