Computational Physics (PHYS 2321)

Fall 2013

Class time: Monday, Wednesday & Friday/10:00 AM-10:50 AM

Life Science, Classroom 101

Instructor:	Prof. Muhammad N. Huda	**Phone**:	817 272 1097
Office:	CPB 339	**Office Hours**:	Wed./Fri. 11:00-12:00 AM,
			or by appointment
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Course Prerequisite: PHYS 1443, PHYS 1444. Basic computer literacy is needed.

Textbook: *Computational Physics* (2nd edition) by N.J. Giordano and H. Nahanishi.

(Webpage for the book: http://www.physics.purdue.edu/~hisao/book/)

To learn simple FORTRAN language you may consult Schaum's Outlines series "Programming with FORTRAN 77" by W. E. Mayo and M. Cwiakala.

Other useful book: *Computational Physics* by R. H. Landau, M. J. Paez and C. C. Bordeianu.

Course Descriptions: Development of basic computational techniques, including using LINUX through applications to selected physical problems. A survey of topics including function evaluation, data fitting, integration, differential equations, and Monte Carlo and molecular dynamics simulations. FORTRAN computer language will be used for class instruction purpose.

First 3 weeks of class will be devoted to the basic computation introduction, such as LINUX, FORTRAN etc. After this we'll start with the first chapter of the text book.

Course Learning Goals/Objectives: The goal of the course is to provide fundamental concepts and understanding in computational physics. The course will emphasize skill development using numerical methods and computing programming language(s) for problems solving in physical sciences.

Attendance: Attendance and engaging with the class discussion is very important for learning from this class. Hence 10% of the total grade is assigned for attendance. Please note, attendance will be taken randomly. If you foresee that you may not attend a class, please send me an email before the class.

Exam dates (*tentative*):
First exam: September 20, 2013
Second exam: October 28, 2013
Third exam: November 18, 2012
Final exam: December 9, 2013

Best of the second and third exam will be counted toward final grade. You have to participate in all the exams. If you miss either second or third exam your grade will be an average of these two exams. Second, third and final exam will be mainly coding base projects.

There will be no make-up exam unless there is a documented emergency!

Home work: Several computational (coding) projects will be assigned throughout the semester. Each project needs to be returned by email by 5PM on the due date.

Your email containing the HW should clearly specify how to run your code. If your code do not run or give error message, you will not get credit for that project. In addition, each code should contain enough "comments" lines to describe what is done (e.g. what method is being used etc.) to get full credit.

So it is advisable that you start working on your HW project early to avoid such problems. Though we will be using FORTRAN for the class purpose, you may submit your project in C or C++, etc. if you find them convenient. **However, package programs like Mathematica or Matlab will not be accepted.**

In addition, there will be traditional problem solving HW depending on the need of the course.

No late homework will be accepted.

It is important to note that for all the coding projects (either in exams or in homeworks), the total points will be divided into two parts: (i) description of the algorithm and (ii) the actual coding.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Grading Policy
>Homework & Projects: 30%.
>Exam-1: 20%
>Best of second and third Exam: 15%
>Final Project: 25%
>Class Participation: 10% (Class participation will be defined by the attendance in class.)

A: 100% to 90%; **B**: 75% to 89%; **C**: 65% to 74%; **D**: 55% to 64%; **F**: 0% to 54%

Useful links:
  UTA's computing facility: http://oit.uta.edu/
  UNIX/LINUX introduction: link from above, or http://www.uta.edu/oit/cs/unix/index.html
  Fortran 77 Tutorial   http://www-teaching.physics.ox.ac.uk/Unix+Prog/hargrove/tutorial_77/
  Fortran 90 Tutorial   http://www.scd.ucar.edu/tcg/consweb/Fortran90/F90Tutorial/tutorial.html

Note:
Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Academic Integrity: Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.