Mathematical Methods in Physics III (PHYS 5319)

Summer, 2021
Tue. & Thu./10:30 AM-12:20 PM
online

Instructor: Dr. Qiming Zhang **Phone**: (817)-272-2020
Office: CPB 337 **Office Hours**: by appointment
Mailbox: 19059 **Email**: zhang@uta.edu
Web Page: http://omega.uta.edu/~zhang or pointer from Physics Dept's page
Textbook (not required: *Numerical Recipies by Press et al., 3rd Edition. (only selected topics inside) or older editions.*

Course Descriptions: Numerical methods for applied physics; Basic computational techniques, including using Linux OS and Programming in Matlab/FORTRAN; Numerical integration, differentiation, interpolation, fitting; optimization of functions; solving differential equations numerically; Fast Fourier Transformation(FFT) and linear algebra application. Techniques of simulations, such as molecular dynamics and Monte Carlo, will also be covered.

Course Plan (tentative):

Week 1:	Computing Basics, Linux OS, editor and Basic of programming
Week 2	Basic of programming, Numerical integration
Week 3:	Interpolation and Data fitting
Week 4:	Differentiation, Differential equations
Week 5:	Ramdom Number, Monte Carlo methods
Week 6:	FFT, 3d-FT driver, Linear algebra basic;
Week 7:	Optimizations: Steepest-descent, Conjugate-gradient
Week 8:	Computing hardware, code optimization, coding strategy
Week 9:	Scientific Computation Libraries: LAPACK, Eigenvalue problems
Week 10	Molecular Dynamics Simulation

Grading Policy

Homework(simple): 20%.
Projects/Presentations: 50%.
Final Project and Presentation: 30%

Programming Language: I use FORTRAN and Matlab to teach, but you can use your preferred to do the projects/homework.

Technology Requirements

This course is entirely online. So you need a PC or Mac. The course will primarily use the Canvas platform. The interactive lecture will be given on Microsoft Teams with the teams named

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You may use Search in Teams to find it.

Institution Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Grievances

It is physics department policy that any complaint or grievance should first be brought to the attention of the professor and every attempt be made to reconcile the conflict prior to escalation. Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. For further information see Undergraduate Grading Policies and Student Complaints,

Additional Information

Mandatory Face Covering Policy

All students and instructional staff are required to wear facial coverings while they are on campus, inside buildings and classrooms. Students that fail to comply with the facial covering requirement will be asked to leave the class session. If students need masks, they may obtain them at the Central Library, the E.H. Hereford University Center's front desk or in their department. Students who refuse to wear a facial covering in class will be asked to leave the session by the instructor, and, if the student refuses to leave, they may be reported to UTA's Office of Student Conduct. Note: since this class is entirely online, you are not required to wear a face mask unless you are taking the class in a public area (library, for example).

Attendance

At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, attendance will not be taken, but in order to receive full credit you will be expected to attend (online) Wednesday classes, since most of them will include short quizzes. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

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Student Success Programs
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 by appointment, drop-in tutoring, etutoring, supplemental instruction, mentoring (time management, study skills, etc.), success coaching, TRIO Student Support Services, and student success workshops. For additional information, please email resources@uta.edu, or view the Maverick Resources website.

The IDEAS Center (https://www.uta.edu/ideas/) **(**2nd Floor of Central Library) offers **FREE** tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

Librarian to Contact
Each academic unit has access to Librarians by Academic Subject that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

Emergency Phone Numbers
In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381