



PHZ 3113
Mathematical Methods in Physics
82461 001
Fall 2026

Instructor Name

George Nolas

University Course Description

The course is designed to develop the basic mathematical skills required in subsequent courses in physics, as well as form the basis for a fundamental understanding of the mathematics needed for the study of physics.

Course Requisites

Prerequisite(s):

(PHY 2049 Minimum Grade: C-
or PHY 2049C Minimum Grade: C-
or PHY 1049 Minimum Grade: C-
or PHY 1049C Minimum Grade: C-
or PHY 2061 Minimum Grade: C-
or Physics C:Elcty/Mgntsm Minimum Score: 4)
and (MAC 2283 Minimum Grade: C- (may be taken during same term)
or MAC 2313 Minimum Grade: C- (may be taken during same term))

Corequisite(s):

Course Format

After introducing a subject or section, I will solve illustrative problems that represent the fundamentals of the particular subject or section in class. Questions are encouraged.

Student Learning Outcomes

Apply the language of physics, mathematics, to problems in physics; Apply power series and complex algebra in simplifying solutions to problems in physics; Apply linear algebra to solving problems in physics; Understand and apply multiple integration in physics problems involving surfaces and volumes; Understand and apply special functions to physical problems; Apply techniques to solving ordinary and partial differential equations to solve several fundamental problems in physics, including radioactive decay, oscillatory motion, resonance, gravitation, electromagnetics, steady-state mass and temperature flow, diffusion, wave propagation and quantum mechanics.

Course Objectives

The course is designed to develop the basic mathematical skills required to proceed as majors in physics at the undergraduate level. Strong emphasis will be on the fundamentals, and the topics will include power series, complex algebra, matrices, multiple integrals, ordinary and partial differential equations, series expansions and vector algebra. The skills learned in this course will be used in subsequent courses and will form the basis for a fundamental understanding of the mathematics needed in physics.

Required Texts and/or Readings and Course Materials

Mathematical Methods in the Physical Sciences, 3rd ed; Publisher: Wiley; Author: M.L. Boas

How to Succeed in this Course

The main ideas are understood and re-enforced by developing conceptual problem-solving skills. This is important in understanding the material, and success in the course; therefore, problems will be assigned from each chapter of the text. I will also solve illustrative problems that represent a fundamental understanding of the material in class. In studying for this course, you are encouraged to work on problems, e.g., the examples from each chapter, in the book in addition to those assigned. It is paramount that you come to every lecture to keep up with the work.

Grading Scale

90 – 100 A
80 – 89 A-
74 – 79 B+
70 – 74 B
65 – 69 B-
60 – 64 C+
55 – 59 C
50 – 54 C-
45 – 49 D+
40 – 44 D
30 – 39 D-
< 30 F

Grade Categories and Weights

best 3 out of 4 exams: 90 %

graded HW problems: 10 %

Major Topics and Course Schedule

Week Beginning	Chapters in the text	Assignments
Aug 24 Infinite Series and Power Series (1)	1.5, 2.2, 4.6, 5.2, 5.4, 6.3, 6.10, 6.20, 6.35 7.2, 9.16, 10.3, 13.11, 13.14, 13.34, 13.41, 14.10, 16.10	
Aug 31		
Sept 7 Complex Algebra (2)	4.1, 5.16, 5.19, 5.26, 5.32, 5.46, 5.62, 6.5 6.12, 7.1, 7.10, 9.7, 9.17, 10.7, 11.3, 12.25	
Sept 14 Thursday, Sept 17, EXAM Chs 1&2	14.8, 15.4, 17.22	
Sept 21 Linear Algebra (3)	2.11, 3.3, 3.4, 3.13, 3.16, 4.18, 6.2, 6.17a,b 8.10, 8.25, 9.4, 11.17, 12.15	
Sept 28		
Oct 5 Multiple Integrals (5)	2.7, 2.21, 2.39, 3.3a-d, 4.1a-c, 4.5a, 4.19	

Oct 12 **Thursday, Oct 15, EXAM Chs 3&5**

Oct 19 Vector Analysis (6) 3.7, 3.19a, 4.8, 6.2, 6.17, 8.1a-c, 8.9, 9.4,
10.2, 11.20, 12.13a-d

Oct 26

Nov 2 Ordinary Differential Equations (8) 1.1, 2.2, 2.6, 3.3, 3.8, 3.18, 4.1, 4.4, 5.1,
5.33, 5.38, 6.3, 6.17, 6.18, 6.25, 6.34, 8.18,

Nov 9 **Thursday, Nov 12, EXAM Chs 6&8** 9.3, 9.9, 9.12, 10.5, 11.15

Nov 16 Series Solutions of Diff. Eqs. (12)	1.1
Partial Differential Equations (13)	1.2, 1.3, 2.1, 2.5, 2.1 (redo with a finite plate height of 15cm – prob. 2.5 will help), 3.7,
4.1, 4.6,	5.11(use Ch. 8), 7.1, 9.3

Nov 23

Nov 30

Dec 7 Thursday, Dec 10, FINAL EXAM, 10:00 AM - 12:00 noon

USF Core Syllabus Policies

USF has a set of central policies related to student recording class sessions, academic integrity and grievances, student accessibility services, academic disruption, religious observances, academic continuity, food insecurity, pregnancy and related conditions, and sexual harassment that **apply to all courses at USF**. Be sure to review these online:

<https://www.usf.edu/provost/faculty-success/resources-policies-forms/core-syllabus-policy-statements.aspx>

Student Recordings

Florida Statute 1004.097 Free Expression on Campus

Students may, without prior notice, record video or audio of a class lecture for a class in

which the student is enrolled for their own personal, educational use (USF Policy 10-048). A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach enrolled students about a particular subject. Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, private conversations between students in the class or between a student and the faculty member is prohibited. Recordings may not be used as a substitute for class participation and class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the USF Student Conduct Code.

Course Policies: Grades

First Day Attendance Policy:

Attendance will be taken on the first day, to confirm your presence in the course. Students who are not present run the risk of being dropped from the course.

Late Work Policy:

Assigned problems for the particular chapters will be collected on the day of the exams for those chapters. There are no make-ups for assigned problems.

Make-up Exams Policy: Offer specifics about your policy on exam make-ups.

If a student cannot be present for an examination for a valid reason (validity to be determined by the instructor), a make-up exam will be given. Make-up exams are given on the official days for make-up exams, or at the convenience of the professor.

Extra Credit Policy:

There is no extra credit for this class.

Rewrite Policy: Offer specifics about your policy on rewrites.

There are no re-writes for this class.

**Exam Retention Policy:
Describe how long you will keep graded work.**

After exams are graded, the exams will be given back to the students. The final exam will be retained for one semester following the current one, and then they will be destroyed.

**Essay Commentary Policy:
Offer specifics about your policy on essays.**

There are no essays for this class.

Group Work Policy: Offer specifics about your policy on group work.

There is no group policy, however, I encourage students to study together as this is one good way to study and help one other.

Final Examinations Policy: All final exams are to be scheduled in accordance with the University's final examination policy.

Grades of "Incomplete"

The current university policy concerning incomplete grades will be followed in this course. For undergraduate courses: An "I" grade may be awarded to a student only when a small portion of the student's work is incomplete and only when the student is otherwise earning a passing grade. The time limit for removing the "I" is to be set by the instructor of the course. For undergraduate students, this time limit may not exceed two academic semesters, whether or not the student is in residence, and/or graduation, whichever comes first. For graduate students, this time limit may not exceed one academic semester. "I" grades not removed by the end of the time limit will be changed to "IF" or "IU," whichever is appropriate.

Campus Free Expression

It is fundamental to the University of South Florida's mission to support an environment where divergent ideas, theories, and philosophies can be openly exchanged and critically evaluated. Consistent with these principles, this course may involve discussion of ideas that you find uncomfortable, disagreeable, or even offensive.

In the instructional setting, ideas are intended to be presented in an objective manner and not as an endorsement of what you should personally believe. "Objective" means that the idea(s) presented can be tested by critical peer review and rigorous debate, and that the idea(s) is supported by credible research.

In this course you may be asked to engage with complex ideas and to demonstrate an understanding of the ideas. Understanding and engaging with an idea does not require you to believe it or to agree with it.

Course Policies: Technology and Media

As noted by USF above (i.e., "**Delivery Method:** Classroom"), this course is in class delivery with no online component. You may use laptops to take notes. Cell phones must be turned off during class.

Course Policies: Student Expectations

Health and Wellness

Your health is a priority at the University of South Florida. We encourage members of our community to look out for each other and to reach out for help if someone is in need. If you or someone you know is in distress, please make a referral at www.usf.edu/sos so that the Student Outreach & Support can contact and provide helpful resources to the student in distress. A 24-hour licensed mental healthcare professional, offered through the counseling center, is available by phone at 813-974-2831, option 3. Please remember that asking for help is a sign of strength. In case of emergency, please dial 9-1-1.

Title IX Policy

USF is committed to fostering a safe and respectful learning environment, free from sex discrimination and sexual harassment, in accordance with Title IX and USF Policy 0-004. If a student shares an experience of sexual harassment, sexual assault, stalking, or relationship violence with a USF employee (including faculty), that employee will notify the Title IX Office. This allows the Title IX Office to send the student an email with information about support resources and options—if it is safe to do so. Students are not required to respond to this email. The Title IX Office is a private resource. Information is shared only on a need-to-know basis to provide students with support measures. To speak to a confidential resource, students may contact USF Center for Victim Advocacy at 813-974-5757. Confidential resources do not notify the Title IX Office unless the student requests it. For more information about Title IX, available resources, or to make a report, please visit www.usf.edu/title-ix.

Course Hero / Chegg Policy

The USF Policy on Academic Integrity specifies that students may not use websites that enable cheating, such as by uploading or downloading material for this purpose. This does apply specifically to Chegg.com and CourseHero.com – almost any use of these websites (including uploading proprietary materials) constitutes a violation of the academic integrity policy.

Professionalism Policy

Per university policy and classroom etiquette; mobile phones, iPods, etc. must be silenced during all classroom and lab lectures. Those not heeding this rule will be asked to leave the classroom/lab immediately so as to not disrupt the learning environment. Please arrive on time for all class meetings. Students who habitually disturb the class by talking, arriving late, etc., and have been warned may suffer a reduction in their final class grade.

Turnitin.com

In this course, turnitin.com may be utilized. Turnitin is an automated system which instructors may use to quickly and easily compare each student's assignment with billions of web sites, as well as an enormous database of student papers that grows with each submission. Accordingly, you may be expected to submit all assignments in both hard copy and electronic format. After the assignment is processed, as instructor I receive a report from turnitin.com that states if and how another author's work was used in the assignment. For a more detailed look at this process visit <http://www.turnitin.com>.

Netiquette Guidelines

- Act professionally in the way you communicate. Treat your instructors and peers with respect, the same way you would do in a face-to-face environment. Respect other people's ideas and be constructive when explaining your views about points you may not agree with.
- Be sensitive. Be respectful and sensitive when sharing your ideas and opinions. There will be people in your class with different linguistic backgrounds, political and religious beliefs or other general differences.
- Proofread and check spelling. Doing this before sending an email or posting a thread on a discussion board will allow you to make sure your message is clear and thoughtful. Avoid the use of all capital letters, it can be perceived as if you are shouting, and it is more difficult to read.
- Keep your communications focused and stay on topic. Complete your ideas before changing the subject. By keeping the message on focus you allow the readers to easily get your idea or answers they are looking for.
- Be clear with your message. Avoid using humor or sarcasm. Since people can't see your expressions or hear your tone of voice, meaning can be misinterpreted.

Email and Discussion Board Guidelines

- Use the subject line effectively by using a meaningful line of what your email or discussion is about.
- Keep your emails and postings related to the course content. You should not post anything personal on a discussion board unless it is requested by the instructor.
- Any personal, course or confidential issues should be directly communicated to the instructor via email. The discussion boards are public spaces; therefore, any issues should not be posted there.

End of Semester Student Evaluations

All classes at USF make use of an online system for students to provide feedback to the University regarding the course. These surveys will be made available at the end of the semester, and the University will notify you by email when the response window opens. Your participation is highly encouraged and valued.

Food and Drink Policy (for in-campus sessions only).

Please adhere to the firm policy of no beverages (other than bottled/capped water), food, tobacco products, or like items in the classroom. Your understanding of the necessity for this policy and cooperation will be greatly appreciated. This policy will be strictly enforced.

Learning Support and Campus Offices

Academic Accommodations

Students with disabilities are responsible for registering with Student Accessibility Services (SAS) in order to receive academic accommodations. For additional information about academic accommodations and resources, you can visit the SAS website.

[SAS website for the Tampa campus and Sarasota-Manatee Teachout site.](#)

[SAS website for the St. Pete campus.](#)

Academic Support Services

The USF Office of Student Success coordinates and promotes university-wide efforts to enhance undergraduate and graduate student success. For a comprehensive list of academic support services available to all USF students, please visit the [Office of Student Success website](#).

Canvas Technical Support

If you have technical difficulties in Canvas, you can find access to the Canvas guides and video resources in the “Canvas Help” page on the homepage of your Canvas course. You can also contact the help desk by calling 813-974-1222 in Tampa or emailing help@usf.edu.

[USF IT Services](#)

Center for Victim Advocacy

The [Center for Victim Advocacy](#) empowers survivors of crime, violence, or abuse by promoting the restoration of decision making, by advocating for their rights, and by offering support and resources. Contact information is available online.

Counseling Center

The Counseling Center promotes the wellbeing of the campus community by providing culturally sensitive counseling, consultation, prevention, and training that enhances student academic and personal success. Contact information is available online.

[Counseling Center website for the Tampa campus and Sarasota-Manatee Teachout site.](#)

[Counseling Center website for the St. Pete campus.](#)

Tutoring

The Tutoring Hub offers free tutoring in several subjects to USF undergraduates. Appointments are recommended, but not required. For more information, email asctampa@usf.edu.

[Tutoring website for the Tampa campus and Sarasota-Manatee Teachout site.](#)

[Tutoring website for the St. Pete campus.](#)

Writing Studio

The Writing Studio is a free resource for USF undergraduate and graduate students. At the Writing Studio, a trained writing consultant will work individually with you, at any point in the writing process from brainstorming to editing. Appointments are recommended, but not required. For more information or to make an appointment, email: writingstudio@usf.edu.

[Writing studio website for the Tampa campus and Sarasota-Manatee Teachout Site.](#)

[Writing studio website for the St. Pete campus.](#)

Student Ombuds Office

Florida Statute 1006.51 and Florida Board of Governors Regulation 6.011 require that all public institutions provide ombuds services to students. The Student Ombuds Office at USF is a confidential, impartial, informal, and independent resource for students experiencing challenges related to the university. Ombuds can help students safely explore options, clarify processes, and consider next steps. [Learn more or make an appointment at usf.edu/student-ombuds.](https://usf.edu/student-ombuds)