

**THE UNIVERSITY OF TEXAS AT EL PASO**  
**COLLEGE OF SCIENCE**  
**DEPARTMENT OF PHYSICS**

- Course #, Title and credits: 17489, PHYS 4353, **Mathematical Methods in Physics**, 3 credit hours  
Term: Fall 2022
- Course Meetings & Location: M W 3:30-4:50 PM, Physical Science Bldg. room 222A.
- Prerequisite Courses: MATH 2326, PHYS 2420, PHYS 2421 or consent of the instructor.
- Instructor and coordinates: Ramon Ravelo, PSCI 223E, 915-747-5620, ravelo@utep.edu  
Office Hrs: M 2:00 – 3:00 PM or by appointment
- Textbook(s), Materials: Required: **Mathematical Methods in the Physical Sciences** by Mary L. Boas, 3<sup>rd</sup> edition (Wiley 2006).
- Suggested: **Mathematical Methods for Physicists** by G.B Arfken, H.J. Weber and F.E. Harris, 7<sup>th</sup> Edition, Elsevier.
- Course Objectives (Learning Outcomes): This course will introduce you to important topics and methods in mathematics relevant to physics. Emphasis will be on the use and application of the methods rather than on derivations. The course assumes prior knowledge of calculus, linear algebra and one year of calculus-based physics: PHYS 2420 and PHYS 2421. For more detail on topics to be covered, see list below.
- Course Activities/Assignments: Class will be composed of two 80 minutes lectures and weekly homework assignments.
- Assessment of Course Objectives: Assessment will be through weekly homework, and three exams.
- Grading Policy: Grade will be determined based on 2 midterm exams (50%), one final exam (30%) and weekly homework and quizzes (20%).
- Make-up Policy: **Exams.** Make up exams are given only on extraordinary cases of severe illnesses or emergencies. In all cases, documentation will be required.
- Academic Integrity Policy: Any student who commits an act of academic dishonesty is subject to discipline. Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the 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, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures, and available on the homepage of the Dean of Students at [www.utep.edu/dos](http://www.utep.edu/dos), may result in sanctions ranging from disciplinary probation, to a failing grade on the work in question, to a failing grade in the course, to suspension or dismissal, among others.
- Civility Statement: During class, please:  
— Turn off cell phones and any devices, which might disturb class.
- Disability Statement: If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at [www.sa.utep.edu/cass](http://www.sa.utep.edu/cass).

Military Statement: Students being called for military duties need to contact the instructor as soon as possible.

COVID-19 Statement:

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to [covidaction@utep.edu](mailto:covidaction@utep.edu), so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID 19 testing.

**Topics to be covered:**

Week	Content		Observations
Aug 22– 26	Ch 10	Review of Vectors, Vector Calculus, Tensors	
Aug 29 – Sep 2	Ch 3: § 1-3	Linear Algebra, Matrices	
Sep 5 – 9	Ch 3: § 6, 11,12	Matrix operations, Vector Spaces	<b>Sep 5: Labor Day</b> <b>Sep 7: Census day</b>
Sep 12 – 16	Ch 3: § 11-12	Linear equations: Eigenvalues and Eigenvectors, Diagonalization	
Sep 19 – 23		<b>Midterm I, Wed Sep 21</b>	
Sep 26 – 30	Ch.1: § 1-12	Infinite Series	
Oct 3 – 7	Ch.2: § 1-9	Complex Numbers	
Oct 10 – 14	Ch 14: § 1-5	Complex Variables	
Oct 17 – 21	Ch 9: § 1-4	Ordinary Differential Equations	
Oct 24 – 28		<b>Midterm II, Wed Oct 26</b>	<b>Oct 28: Course drop deadline</b> No automatic “W” after this day
Oct 31 – Nov 4	Ch 4: § 5-11	Ordinary Differential Equations	
Nov 7 – 11	Ch 13: § 1-3	Partial differential equations	
Nov 14 – 18	Ch 13: § 4, 8	Partial differential equations	
Nov 21 – 25	Ch 12: § 1-9	Series Solutions to differential equations Legendre polynomials	<b>Nov 24-25 Thanksgiving holidays</b>
Nov 28 – Dec 2	Ch 12: § 12-19	Series Solutions to differential equations Bessel Functions	<b>Dec 1: Last day of classes</b> <b>Dec 2: dead day</b>
Dec 5 – 9		<b>FINAL EXAM (Comprehensive)</b> <b>Monday Dec 5, 1:00-3:45PM</b>	<b>Final Exams</b>