

## Physics 3211 - Electricity & Magnetism I – SP24

Instructor: Jerry Peacher  
109 Physics  
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Office Hours: MTWTh 3:00 - 4:00 p.m. Generally available at other times or by appointment.

Text: INTRODUCTION TO ELECTRODYNAMICS, FIFTH EDITION,  
by David J. Griffiths, published by Cambridge University Press

Course outline:

Ch. 1	Vector Analysis
Ch. 2	Electrostatics
Ch. 3	Special Techniques
Ch. 4	Electric Fields in Matter
Ch. 5	Magnetostatics
Ch. 6	Magnetic Fields in Matter
Ch 7	Electrodynamics

Course points:

Test 1	100 points
Test 2	100 points
Quizzes	100 points
Final	100 points
<u>Homework</u>	<u>100 points</u>
Total	500 points

Grades: A(90%), B(80%), C(70%), D(60%), F(<60%)

Test Schedule:

Test 1	Monday, Feb 19, 2024
Test 2	Monday, Apr 8, 2024
Final	Friday, May 10, 2024 from 12:30 pm to 2:30 pm

Homework is an important part of this course. It will allow you to test yourself to see how well you have absorbed the material. Keeping up with the homework should help you to keep up with the course and do better on the exams. Homework is due no later than noon on the day following the due date. Late homework will be penalized at the rate of 10% per scheduled class day late. No homework will be accepted after the graded homework is returned to the class.

This course is offered by the MS&T Physics Department,  
Chaired by Dr. Thomas (tvojta@mst.edu), 102 Physics, Phone: 341 - 4781

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Date	Topics covered	Homework HW	Quizzes
Jan 15 - M	Martin Luther King, Jr. Day		no class meeting
Jan 17 - W	Gradient; Divergence; Curl Fundamental Theorems Curvilinear coordinates		
Jan 19 - F	Curvilinear coordinates Area vectors, Delta function		
Jan 22 - M	Delta function Coulomb's law; Electric field		
Jan 24 - W	$\vec{\nabla} \cdot \vec{E}$ ; Gauss's law	HW01	
Jan 26 - F	$\vec{\nabla} \times \vec{E}$ ; Def. of $V$ ; Poisson's eqn		Quiz 1
Jan 29 - M	Superposition principle  $V(\text{sphere})$		
Jan 31 - W	Electrostatic boundary conditions	HW02	
Feb 02 - F	Electrostatic work and energy		Quiz 2
Feb 05 - M	Conductors, Induced charges Force on a conductor		
Feb 07 - W	Capacitors	HW03	
Feb 09 - F	Laplace's eqn. Images – plane Classic problem		Quiz 3
Feb 12 - M	Images – sphere Classic problem Force and energy		
Feb 14 - W	Cartesian solution	HW04	

Date	Topics covered	HW	Quizzes
Feb 16 - F	Cylindrical solution		
Feb 19 - M	TEST 1		TEST 1
Feb 21 - W	Return Test 1	HW05	
Feb 23 - F	Spherical solution Legendre polynomials		Quiz 4
Feb 26 - M	Classic problem Conducting sphere in a uniform E field		
Feb 28 - W	Multipole expansion of $V$	HW06	
Mar 01 - F	Multipole expansion of $V$		Quiz 5
Mar 04-	Field of a dipole; Polarization $P$		
Mar 06- W	Displacement $D$	HW07	
Mar 08 - F	Dielectrics		Quiz 6
Mar 11 - M	Gauss's law with $D$		
Mar 13 - W		HW08	
Mar 15 - F	Spring Recess No class meeting		Spring Recess No class meeting

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Date	Topics covered	HW	Quizzes
Mar 18 - M	Dielectric sphere		
Mar 20 - W	Lorentz force, Magnetostatics Biot-Savart Law, Cycloid motion	HW09	
Mar 22 - F	Ampere's Law correction Magnetic Vector Potential		Quiz 7
Mar 25 - M	Spring Break		no class meeting
Mar 27 - W	Spring Break		no class meeting
Mar 29 - F	Spring Break		no class meeting
Apr 01 - M	Torques and forces, Atomic orbits		
Apr 03 - W	H field and Ampere's Law	HW10	
Apr 05 - F	Magnetic susceptibility Ferromagnetism		
Apr 08 - M	<b>TEST 2</b>		<b>TEST 2</b>
Apr 10 - W	Return Test 2	HW11	
Apr 12 - F	Ohm's Law, drift velocity, Joule heating		Quiz 8 Last day to drop
Apr 15 - M	Motional emf Flux rule		
Apr 17 - W	Faraday's Law	HW12	

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Date	Topics covered	HW	Quizzes
Apr 19 - F	Induced E field		Quiz 9
Apr 22 - M	Mutual inductance M Self-inductance L Stored energy in an inductor		
Apr 24 - W	Maxwell's Equations and Ampere's Law	HW13	
Apr 26 - F	Maxwell's Equations in matter		Quiz 10
Apr 29 - M	Boundary Conditions		
May 01 - W	Field of a rotating Magnet		
May 03 - F			

Final Exam – Friday, May 10, 2024 from 12:30 pm to 2:30 pm