



16SP_PHY_312_A Electromagnetism

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Course Schedule

Physics 312 Course Schedule

2/1	Vector algebra	1.1
2/3	Differential calculus	1.2
	Line, surface, and volume integrals	1.3.1
	Mathematica examples	
2/5	Fundamental theorem of the calculus for line integrals, divergences, and curls	1.3.2-1.3.5
2/8	Spherical and cylindrical coordinates	1.4
2/10	Delta function	1.5
	Helmholtz theorem	1.6
2/12	Electric field	2.1-2.2.2
2/15	Gauss's law	2.2.3
2/17	Applications of Gauss's law	2.2.3
2/19	Curl of E	2.2.4
	Electric potential	2.3.1-2.3.3
2/24	Potential of a charge distribution	2.3.4-2.3.5
2/26	Work and energy in electrostatics	2.4
2/29	Conductors	2.5.1-2.5.4
3/2	Laplace's equation	3.1
3/4	Laplace's equation	3.2
3/14	Separation of variables technique - Cartesian coordinates 1	3.3.1
3/16	Separation of variables technique - Cartesian coordinates 2	
3/18	Separation of variables technique - spherical coordinates	3.3.2
3/21	In-class portion of midterm exam	3.4.1-2
3/23	Multipole expansion	
3/25	Electric Field of a dipole	3.4.3-4
3/28	Lorentz force law	5.1
3/30	Biot-Savart law	5.2-5.3.2
4/1	Curl of B	5.3.3-5.3.4
	Ampere's law	
4/4	Magnetic vector potential	5.4
4/6	Electromotive force	7.1

4/8	Conservation of charge Faraday's law	5.1 7.2.1-2
4/11	How Maxwell fixed Ampère's Law	7.3.2
4/13	Continuity equation and Poynting's theorem Electromagnetic waves in vacuum	8.1.1-2 9.2
4/15	Potential formulation	10.1.1
4/18		
4/20		
4/22		
4/25	Gauge transformations and gauges Retarded potentials	10.1.2-3 10.2.1
4/27	Electric dipole radiation	11.1
4/29	Lorentz transformation Structure of spacetime	12.1.3-4
5/2	4-vectors and tensors The field tensor	12.3.3
5/4	Electrodynamics in tensor notation Relativistic potentials	12.3.4-5
5/6	Superconductivity Chapter 21 from the Feynman Lectures, Volume 3	

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