

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Physics

Physics 8.02

Spring 2014

Class Schedule and Reading Assignments

Text: Liao, Dourmashkin, Belcher; Introduction to E & M MIT 8.02 Course Notes.

**Week One Introduction to Teal,
Coulomb's Law and Electric Fields**

W01D1 T Feb 4	Faraday's Law Exploration
W01D2 W/R Feb 5/6	Introduction to Teal, Fields, Coulomb's Law, Electric Fields, Discrete Charge Distributions
W01D3 F Feb 7 Reading	PS01: Coulomb's Law Course Notes: Chapter 1.1-1.7, 2.1-2.7

Week Two: Gauss's Law

Problem Set 1 Due Tuesday Feb 11 at 9 pm

W02D1 M/T Feb 10/11 Reading	Electric Dipoles and Continuous Charge Distributions Course Notes: Sections 2.9-2.13, 2.14.5-2.14.6
W02D2 W/R Feb 12/13 Reading	Gauss's Law Course Notes: Sections 3.1-3.2, 3.6, 3.7, 3.10
W02D3 F Feb 14 Reading	PS02: Gauss's Law Course Notes: Sections 3.6, 3.7, 3.10

**Week Three:
Electric Potential**

Problem Set 2 Due Tuesday Feb 18 at 9 pm

W03D1 T Feb 18	Monday Schedule: Faraday Law Exploration
W03D2 W/R Feb 19/20 Reading	Electric Potential, Discrete and Continuous Charges; Configuration Energy Course Notes: Sections Sections 4.1-4.3
W03D3 F Feb 21 Reading	PS03: Electric Potential Course Notes: Sections Sections 4.7-4.10

Week Four: Equipotentials and Energy; Exam 1

Problem Set3 Due Tuesday Feb 25 at 9 pm

W04D01 M/T Feb 24/25

Potential and Gauss's Law; Equipotential Lines and Electric Fields

Reading

Course Notes: Sections 3.3-3.4, 4.4-4.6, 4.10.5

W04D2 W/R Feb 26/27

Exam 1 Review

Exam 1 Thursday Feb 27

7:30 pm –9:30 pm

W04D3 F Feb 28

No Class

Week Five Capacitors and Capacitance, Dielectrics

Problem Set 4 Due Tuesday Mar 4 at 9 pm

W05D1 M/T Mar 3/4

Conductors and Insulators; Capacitance & Capacitors; Energy Stored in Capacitors;

Reading

Course Notes: Sections 3.3, 4.5, 5.1-5.4

W05D2 W/R Mar 5/6

Dielectrics; Conductors as Shields: Expt.1: Faraday Ice Pail.

Reading

Course Notes: Sections 5.4, 5.6, 5.8-5.9

W05D3 F Mar 7

PS04 Friday Problem Solving: Capacitance, Stored Energy, Capacitors in Parallel and Series, Dielectrics

Reading

Course Notes: Sections 5.6, 5.8-5.9

Week Six Current, Magnetic Fields and Forces

Problem Set 5 Due Tuesday Mar 11 at 9 pm

W06D1 M/T Mar 10/11

Current, Current Density, and Resistance and Ohm's Law, Magnetic Fields and Forces

Reading

Course Notes: Sections 6.1-6.3, 8.1-8.3, 8.5

W06D2 W/R Mar 12/13

Magnetic Force on Current Carrying Wire, Sources of Magnetic Fields: Biot-Savart Law

Reading

Course Notes: Sections 8.3, 9.1-9.2

W06D3 F Mar 14
Reading

PS05: Calculating Magnetic Fields and Magnetic Force
Course Notes: Sections 8.9, 8.10, 9.10.1, 9.11.1-3,
9.11.7-8

**Week Seven Magnetic Fields
and Exam 2**

Problem Set 6 Due Tuesday Mar 18 at 9 pm

W07D1 M/T Mar 17/18
Reading

Magnetic Dipoles, Torque and Force on a Dipole,
Experiment 2: Magnetic Dipole in a Helmholtz Coil
Course Notes: Sections 8.4, 8.6.4, 8.10.4, 8.13, 9.5, 9.9

W07D2 W/R Mar 19/20

Test 2 Review

Exam 2 Thursday Mar 20

7:30 pm –9:30 pm

W7D3 F

No Class

Week Eight Spring Break

Week Nine Faraday's Law

W09D1 M/T Mar31/Apr 1
Reading

Creating Fields: Ampere's Law
Course Notes: Sections 9.3-9.4, 9.7, 9.10.2

W09D2 W/R Apr 2/3
Reading

Faraday's Law; Expt.3: Faraday's Law,
Course Notes: Sections 10.1-10.4

W09D3 W F Apr 4
Reading

PS06: Ampere's Law and Faraday's Law Problem
Solving Faraday's Law;
Course Notes: Sections 9.10.2; 10.7, 10.9-10

**Week Ten Magnetic Induction
and Energy; DC Circuits**

Problem Set 7 Due Tuesday April 8 at 9 pm

W10D1 M/T Apr 7/8
Reading

Inductance & Magnetic Energy,
Course Notes: Sections 11.1-3

W10D2 W/R Apr 9/10
Reading

DC Circuits & Kirchhoff's Loop Rules;
Course Notes: Sections 7.1-7.5

W10D3 F Apr 11

PS07: PhET: Building a Circuit 7.1-7.5, 7.10

**Week Eleven RC, LR,
and Undriven RLC Circuits**

Problem Set 8 Due Tuesday April 15 at 9 pm

W11D1 M/T Apr 14/15
Reading

RC Circuits;
Course Notes: Sections 7.7-7.8, 7.11.3

W11D2 W/R Apr 16/17
Reading

RL Circuits; Expt. 4 Part 1: RC and LR Circuits
Course Notes: Sections 11.4-11.6, 11.12.2, 11.13.4-
11.13.5

W11D3 F Apr 18
Reading

PS08: RC and RL Circuits
Course Notes: Sections 7.11.3, 11.12, 11.13.1-11.13.5

**Week Twelve LC and
Undriven RLC Circuits, Exam 3**

W12D1 M/T Apr 21/22

Patriot's Day Holiday

W12D2 W/R Apr 23/24

Exam 3 Review

Exam 3 Thursday April 24 7:30 pm –9:30 pm

Drop Date Thurs Apr 24

W12D3 F Apr 25

No Class

Week Thirteen EM Waves

Problem Set 9 Due Tuesday April 29 at 9 pm

W13D1 M/T Apr 28/29
Reading

Undriven RLC Circuits;
Course Notes: Sections 11.7-11.9, 11.10, 11.13.6

W13D2 W/R Apr30/May 1

Maxwell's Equations and Displacement Current; Energy
Flow and the Poynting Vector, One Dimensional Wave
Equation

Reading

Course Notes: Sections 13.1-13.4, 13.6

W13D3 F May 2

PS09: Displacement Current; Energy Flow and the
Poynting Vector

Reading

Course Notes: Sections 13.6, 13.9, 13.12.3-13.12.4

Week Fourteen Interference and Diffraction

Problem Set 10 Due Tuesday May 6 at 9 pm

W14D1 M/T May 5/6

Reading

Maxwell's Equations and One Dimensional Wave Equation

Course Notes: Sections 13.4, 13.6-13.7

W14D2 W/R May 7/8

Reading

Energy Flow and the Poynting Vector Polarization Expt 5 MW; Interference

Course Notes: Sections 13.8, 13.10, 14.1-14.3

W14D3 F May 9

Reading

PS10 Maxwell's Equations, Energy Flow and the Poynting Vector

Course Notes: Section 13.5, 13.6-7, 13.11, 13.12

Week Fifteen Poynting Vector and Energy Flow; Final Review

W15D1 M/T May 12/13

Reading

Diffraction; Expt. 6: Interference and Diffraction

Course Notes: Sections 14.4-14.11

W15D2 W/R May 14/15

Final Review

Monday May 19 9 am-12 noon in Johnson Athletic Center Second Floor