

Course Calendar

Unit I: Electricity and Magnetism

Wednesday, January 19
(OLIN 254)

Topic: “Introduction and Overview”
Objectives: none

Read: No reading.

Assigned Problems: None

Thursday, January 20
(OLIN 451)

Topic: “Electric Charges and Forces”
Objectives: 1.0, 1.1, 1.2, 1.3, (1.4)

Read: Chap. 21: Sec. 21-1 thru 21-3.

Assigned Problems: **CH 21:** 3, 5, 17, 19, 25, 29, 33, 35, 73; **E1**

Friday, January 21
(OLIN 254)

Topic: “Electric Field”
Objectives: 1.0, 1.4, 1.5, 1.6, 1.7

Read: Chap. 21: Sec. 21-4 thru 21-7.

Assigned Problems: **CH 21:** 7, 9, 15, 37, 41, 45, 51, 53, 61; **E2**

Notes: CH 21, #53: do you remember the work-kinetic energy theorem?

Monday, January 24
(CARN 210)

Problem Session

Tuesday, January 25

Hand-In Set #1 due by 4:30 pm (outside Olin 260)

CH 21: 4, 18, 30, 38, 44, 52, 78; **E3, E4, E5**

Notes: CH 21, #4: can use your finger or ground for parts a & b; do part c without finger or ground.
CH 21, #52: think about energy methods. CH 21, #78: review the first in-class exercise.

Wednesday, January 26 (OLIN 254)	Topic: “Continuous Charge Distributions” Objectives: 1.0, 1.8, 1.9, 1.10
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Read: Chap. 22: Introduction, Sec. 22-1 and 22-5.

Assigned Problems: **CH 22:** 21, 22, 26, 58, 59, 65, 72, 83; **E6, E7**

Notes: Answers to CH 22, #58: a) $1.42 \times 10^{-8} \text{ C/m}^2$; b) $4.4 \times 10^{-12} \text{ C}$

Thursday, January 27 (ROOKE 009)	Topic: “Computer Session #1: Numerical Determination of Electric Fields” Objectives: 1.0, 1.8
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Read: Numerical Integration Handout.

Assigned Problems: Computer Exercise #1

Friday, January 28 (OLIN 254)	Topic: “Charge, Electric Flux, & Gauss’s Law” Objectives: 1.0, 1.11, 1.12
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Read: Chap. 22: Sec. 22-2 thru 22-4.

Assigned Problems: **CH 22:** 7, 31, 33, 35, 42a, 45, 47, 61, 67; **E8**

Notes: CH 22, #42a answers: inner surface – 2Q; outer surface –5Q; CH 22, #45a: find the total charge by doing a volume integral; CH 22, #61b: draw field vectors instead of field lines

Monday, January 31 (CARN 210)	Problem Session
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Tuesday, February 1

Computer Exercise #1 and
Hand-In Set #2 due by 4:30 pm (outside Olin 260)

CH 22: 18, 28, 34, 44, 64, 66, 68, 74; **E9, E10**

Notes: CH 22, #18: draw field vectors instead field lines; CH 22, #28: you might need to evaluate integrals first in order to answer the questions; CH 22, #44a: see note for CH 22, #45a

Wednesday, February 2 (OLIN 254)	Topic: “Electric Potential and Energy” Objectives: 1.13, 1.14, 1.15, 1.16
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Read: Chap. 23: Sec. 23-1 thru 23-2;
optional: p. 736-737 – The Van de Graaf Generator and Dielectric Breakdown;
optional: Sec. 24-6

Assigned Problems: **CH 23:** 1, 3, 5, 11, 21abc, 25, 29, 35, 77, 89a; **E11**

Thursday, February 3 (OLIN 451)	Topic: “Current and Magnetic Force” Objectives: 1.17, 1.18, 1.19, 1.20, (1.21)
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Read: Chap. 25: Sec. 25-1 thru 25-2;
Chap. 26: Introduction, Sec. 26-1 thru 26-2

Assigned Problems: **CH 25:** 3, 41; **CH 26:** 1, 19, 21, 22, 23, 41, 45, 77; **E12**

Friday, February 4 (OLIN 254)	Topic: “Magnetic Torque and Hall Effect” Objectives: 1.21, 1.22
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Read: Chap. 26: Sec. 26-3 thru 26-4

Assigned Problems: **CH 26:** 53, 61, 63, 73, 83; **E13, E14**

Monday, February 7 (CARN 210)	Problem Session
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Tuesday, February 8

Hand-In Set #3 due by 4:30 pm (outside Olin 260)

CH 23: 22, 28, 42; **CH 25:** 40; **CH 26:** 28, 36, 40, 44, 58d; **E15**

Wednesday, February 9
(OLIN 254)

Topic: “Sources of Magnetic Field”
Objectives: 1.0, 1.23, 1.24, (1.29)

Read: Chap. 27: Sec. 27-1 thru 27-2; skim Sec. 27-5 (ignore formulas)

Assigned Problems: **CH 27:** 23, 29, 31, 43, 51, 56, 59a, 101, 105, 119; **E16**

Notes: Standard unit for magnetic field is Tesla (T); 1 Gauss (G) = 10^{-4} T.

CH 27, #56: a) $\frac{\mu_0}{4\pi} \frac{3I}{L} [\hat{\mathbf{i}} - \hat{\mathbf{j}}]$; b) $\frac{\mu_0}{4\pi} \frac{I}{L} [\hat{\mathbf{i}} - \hat{\mathbf{j}}]$; c) $\frac{\mu_0}{4\pi} \frac{I}{L} [-\hat{\mathbf{i}} - 3\hat{\mathbf{j}}]$. CH 27, #105: Since the magnetic field isn't uniform over the 5 cm lengths of the rectangular coil, integration is required.

Thursday, February 10
(OLIN 451)

Topic: “Magnetic Flux and Faraday's Law”
Objectives: 1.0, 1.25, 1.26, 1.27, 1.28

Read: Chap. 28: Introduction, Sec. 28-1 thru 28-3

Assigned Problems: **CH 28:** 2, 3, 9, 11, 16, 24a, 27ab, 31cba, 82, 83

Notes: 1 Weber (Wb) = $1 \text{ T} \cdot \text{m}^2$. CH 28, #2: a) counterclockwise; b) clockwise. CH 28, #16: a) 5×10^{-4}

Wb; b) 4.33×10^{-4} Wb; c) 2.5×10^{-4} Wb; d) 0. CH 28, #24: $\frac{\mu_0}{4\pi} 2Ib \ln \left| \frac{d+a}{d} \right|$. CH 28, #31: answer the questions in the reverse order they are asked in the problem. CH 28, #82: a) 8.48×10^{-3} Wb; b) 7.97×10^{-3} Wb.

Friday, February 11
(OLIN 254)

Topic: “Motional EMF”
Objectives: 1.0, 1.25, 1.26, 1.27, 1.28, 1.29

Read: Chap. 28: Sec. 28-4 thru 28-5

Assigned Problems: **CH 28:** 39, 52, 85, 91; **E17**

Monday, February 14
(CARN 210)

Problem Session

Tuesday, February 15

Hand-In Set #4 due by 4:30 pm (outside Olin 260)

CH 27: 28, 34, 106, 110; **CH 28:** 12, 28, 38ab, 90; **E18, E19**

Wednesday, February 16
(OLIN 254)

Topic: “Electricity and Magnetism Review”
Objectives: 1.0 – 1.29

Read: No New Reading

Assigned Problems: No New Assigned Problems

Thursday, February 17
(Olin 451)

Exam I: Electricity and Magnetism
