



Marshall University Syllabus College of Science

Course

Phy.203 – College Physics II

Course Description

Second half of an introduction to physics for life-science students, using algebra and trigonometry, including electric and magnetic fields, circuits, geometrical and physical optics, atomic and nuclear physics.

Credits

3 Credit Hours, undergraduate, with Normal Grading Mode

Prerequisites

Phy.201 and Phy.202 with minimum grade of C;

Phy.204 as prerequisite/co-requisite to carry a Core II Natural Science attribute.

Section , Term , Year , CRN

section 202 , Spring 2024: CRN 4373

Class Meeting Days and Times

_T_R_ @ 12:30 – 13:45 , plus Common Final Exam Sat Apr.20 @ 12 – 2pm

Location

Science 277

Academic Calendar

first regular class meeting T Jan.09

drop/add ends F Jan.12

Spring Break M Mar.18 – F Mar.22

withdrawals end F Apr.12

last regular class meeting R Apr.18

Common Final Exam Sat Apr.20, noon – 2pm

Instructor

Dr. Curt W. Foltz

Contact Information

- Office: Science Building room 159
- 159 Office Hrs: _T_R_ 10-12 & 2³⁰-3³⁰ ; _W_ 9³⁰-11³⁰ & 2³⁰-3³⁰ ; _F_ 10³⁰-11³⁰
Physics II Herd Hours (mostly peer instruction) in Sci.103 , M__ 12-4
- Office Phone: (304) 696-2519
- Marshall e-mail: foltzc@marshall.edu

Health and Safety Information

All members of the Marshall University community are expected to always observe health and safety protocols. This includes general health and safety protocols as well as specific protocols that might emerge in response to community and campus health conditions.

Required and/or Recommended Texts and Materials

Required Texts and Materials

College Physics 4th edition by Knight, Jones, Field © 2019 Pearson

or some comparable *College Physics* or *General Physics* textbook

email access : I will use your marshall email address for official communications

emails sent from another account might be treated as spam by my computer

web browser able to display html & pdf files, and run webworks on Blackboard

course home page is www.science.marshall.edu/foltzc/203_24s.htm

non-programmable calculator : buttons for EXP/EE/ $\times 10^{\wedge}$, sin, \sqrt{x} , x^2 , e^x , $1/x$

we will test your EE button on day 1 ... E-notation: $6.63\text{E}-34 = 6.63 \times 10^{-34}$

attendance in each class, ready to learn with pencil & paper & calculator

study time outside class, ≥ 6 effective hours/week to do homework & webwork

Recommended/Optional Texts and Materials

Notebook with lined paper : for class-notes, and paper homeworks to turn in

study partner : more fun & usually more thorough than studying alone

peer instruction is not sharing answers – it's sharing *how you get* your answer

end-of-chapter exercises to try, with answers available (odd #s in back-of-book)

try some problems after becoming familiar with that topic's exercises

occasional learning help from Foltz (email), or PhysicsForums or KhanAcademy

avoid asking ChatGPT for help – it is still as bad as Chegg and CourseHero

Course Student Learning Outcomes

Course student learning outcome Students will:	How students will practice each outcome	How student achievement will be assessed
know basic facts and theories about electricity & magnetism, EM waves, and microscopic matter	class discussion, in-class exercises, homework sets, webwork sets	Quizzes & Exams
identify atomic charge, magnetism, and energies	discussion, exercises, homework, webwork	Quizzes & Exams
relate concepts & explanations by math & logic	discussion, exercises, homework, webwork	Quizzes & Exams
read & interpret verbal descriptions accurately	discussion, exercises, homework, webwork	Quizzes & Exams
recognize and use physics vocabulary correctly	discussion, exercises, homework, webwork	Quizzes & Exams
compare measured observables with predictions	discussion, exercises, homework, webwork	Quizzes & Exams

Course student learning outcome Students will:	How students will practice each outcome	How student achievement will be assessed
predict Forces, Energies, momenta, and powers for simple model scenarios at many size scales	discussion, exercises, homework, webwork	Quizzes & Exams
synthesize diode, phasor, Poynting descriptions	discussion, exercises, homework, webwork	Quizzes & Exams
discuss deBroglie, Heisenberg, Schrödinger view	discussion, exercises, homework, webwork	Quizzes & Exams
judge the validity of model approximations	discussion, exercises, homework, webwork	Quizzes & Exams
Show how corrected measurements lead to different numerical predictions for observables	discussion, exercises, homework, webwork	Quizzes & Exams

Course Requirements/Due Dates

E&M Concept test T Jan.09, Phy.1 Review webwork set due Sunday Jan.14

Topic 1: webwork due W Jan.17, Quiz R Jan.18

Topic 2: webwork due T Jan.23, Quiz R Jan.25

Topic 3: webwork due T Jan.30, Quiz R Feb.01

Unit 1 Exam T Feb.05

Topic 4: webwork due W Feb.14, Quiz R Feb.15

Topic 5: webwork due T Feb.20, Quiz R Feb.22

Unit 2 Exam T Feb.27

Topic 6: webwork due W Mar.06, Quiz R Mar.07

Topic 7: webwork due T Mar.12, Quiz R Mar.14

Topic 8: webwork due T Mar.26, Quiz R Mar.28

Unit 3 Exam T Apr.02

Topic 9: webwork due W Apr.10, Quiz R Apr.11

Topic 10: webwork due T Apr.16, Quiz T Apr.16,

Unit 4 Exam R Apr.18, E&M Concept test R Apr.18

Common Comprehensive Final Exam Sat.Apr.20

Grading Policy

12 webwork sets \times 4 points/set = 48 points (12%) [incl.E&M Conc.test 1]

E&M Conc.Test 2 (paper, in-class) bonus up to 25 points (6½%)

10 topic Quizzes \times 10 points/quiz = 100 points (25¾%)

4 unit Exams \times 50 point avg/exam = 200 points (51½%) [60, 40, 60, 40 pts]

Comprehensive Common Final Exam = 40 points (10%)

100% > A > 85% > B > 75% > C > 65% > D > 55% > F

Late homework sets will be penalized – not accepted after solutions are posted.

If you miss a Quiz or Exam email me (foltzc) ASAP to arrange a make-up time

Attendance/Participation Policy

Students are expected to attend every class meeting and discuss its content, but University Policies (below) allow absences for Personal Health issues and other University Excused Absences, and for safety issues with Inclement Weather.

University Policies

By enrolling in this course, you agree to the University Policies. Please read the text of each policy (listed below) by going to [MU Academic Affairs: University Policies](https://www.marshall.edu/academic-affairs/university-policies/). (URL: <https://www.marshall.edu/academic-affairs/policies/>)

- Academic Dishonesty Policy
- Academic Dismissal Policy
- Academic Forgiveness Policy
- Academic Probation and Suspension Policy
- Affirmative Action Policy
- Pre-Finals Week Policy
- D/F Repeat Rule
- Excused Absence Policy for Undergraduates
- Inclement Weather Policy
- Sexual Harassment Policy- Title IX prohibits the harassment of students based on sex, which includes pregnancy, childbirth, and related conditions. This includes that students will not be penalized for taking medically necessary leave related to pregnancy, childbirth, or related conditions. Marshall's Title IX Office may be contacted at TitleIX@marshall.edu
- Students with Disabilities (Policies and Procedures)
- University Computing Services Acceptable Use Policy

Course Schedule – the one on the web is more complete!

week of	Tuesday	thuRsdAy	Lab
Jan.08	conserved Electric charge $Q = ne$ Electric Force $F = qE$, Electric Field $E = \sum k_c Q/r^2(\hat{r})$	E torque to dipole $\sum E$ contributions via trig Gauss : $\sum \kappa E \cdot A_{out} = 4\pi k_c Q$	Electric Charge & Force
Jan.15	E -field lines & induced dipole F Work : $F \cdot \delta x = -\delta U$; $KE + PE$ $E \cdot \ell = -\delta V$ (down-potential)	Quiz 1 $U = qV$ & $V = \sum kQ/r$ $U(x)$ graphs & voltage	Electric Field & Potentials
Jan.22	$Q = CV$; $C \sim (\kappa/4\pi k_c)A/\ell$ series δV_c 's add (ℓ 's add) parallel Q 's add (A 's add)	Quiz 2 current $I = \sum \rho_q v \cdot A = \Delta Q/\Delta t$ $\delta V = I(\rho_r \ell/A) = IR$	Charge on Capacitors
Jan.29	parallel I 's add ; series δV 's add R vs $T \Rightarrow$ wire RTD or thermistor R C relaxation τ	Quiz 3 $F = qv \times B$ $B = (\mu_o/4\pi) \sum qv \times \hat{r}/r^2$	Current Thru Resistors
Feb.05	Unit 1 Exam	$qv = I\ell \Rightarrow B$ from line & loop circular paths across B B torque to coil = $NIA \times B$	Magnetic Field & Force

Feb.12	Ampere: $\mathbf{B} \cdot \ell = \mu_0 \sum \rho_q \mathbf{v} \cdot \mathbf{A}$ relative \mathbf{v} separates Q rail guns & motors	Quiz 4 Faraday: $\mathbf{E} \cdot \ell = -\Delta(\mathbf{B} \cdot \mathbf{A}) / \Delta t$ Inductance $L : L/R = T$	Faraday's Law
Feb.19	Alternating Current & RMS generators & transformers reactance $X @ \phi$; filters	Quiz 5 AC rectified to DC DC inverted to AC	RLC Resonant Circuit
Feb.26	Unit 2 Exam Maxwell: $\mathbf{B} \cdot \ell = \mu_0 k \epsilon \Delta(\mathbf{E} \cdot \mathbf{A}) / \Delta t$	Poynting: $\mathbf{S} = \mathbf{E} \times \mathbf{B} / \mu \sim 1/r^2$; photon $E = \mathbf{p} \cdot \mathbf{v}$, $v^2 = 4\pi k_c / k \mu$ Huygens: \mathbf{S} ray \perp wavefront	Reflection & Refraction
Mar.04	$\lambda = v/f$; $v = c/n$; $\ell_{\text{optic}} = nL$ Snell: $n_a \sin \theta_a = n_b \sin \theta_b$ prism deflection $\delta \approx (n - 1)\alpha$	Quiz 6 lens : $1/f \approx (n - 1)(1/R - 1/R)$ focus : $1/f = 1/d_{im} + 1/d_{ob}$	Lab Exam 1
Mar.11	negative F , d_{obj} , d_{img} multi-lens systems prescription eyeglasses	Quiz 7 reflection interference ($2n t$) hard reflection \mathbf{E} flip + $1/2\lambda$	Thin Lenses
Mar.18	Spring Break	no classes	no Lab
Mar.25	2-slit interference ($d \sin \theta$) multi-slit gratings single-slit interference	Quiz 8 DeBroglie: $e^- \lambda = h/p$ Heisenberg: $\delta p \cdot \delta x \geq h$	Telescope & Microscope
Apr.01	: Unit 3 Exam :	e^- standing-waves in flat well Schroedinger $\lambda(x)$ e^- levels in spike (atom) well	Diffraction & Interference
Apr.08	X-rays & cascades conduction electron "bands" stable nuclei (U_E , U_B , U_{strong})	Quiz 9 α , β^- , γ decays ; β^+ & e^- fission & fusion ($\Delta E = \Delta m c^2$) LAST WITHDRAW FRI !	H Balmer series & Rydberg
Apr.15	Quiz 10 activity; likelihood & half-life radiation Energy & dose Phy.2 Concept post-test	Unit 4 Exam Common Final SAT 12 =>	Lab Exam 2