

PHY 1122 A  
*FUNDAMENTALS OF PHYSICS II*  
<http://www.courseweb.uottawa.ca/phy1122/>

LABS: see Blackboard Learn

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#### CLASSES

- TUE. 8:30 – 9:50
- FRI. 10:00 – 11:20
- THU. 10:00 – 10:50 (Discussion Group)
- FRI. 8:30 – 9:20 (Discussion Group)

#### OFFICE HOURS

- MON. 10:00 – 11:00
- WED. 10:00 – 11:00

#### PHYSICS HELP CENTER, MCD215

- MON. 14:30 – 17:30
- TUE. 17:30 – 20:30
- WED. 14:30 – 17:30, 19:00 – 20:30
- THU. 16:00 – 19:00

#### COURSE OUTLINE

- FLUID MECHANICS
  - \*density, pressure
  - \*Pascal's and Archimedes' principles, buoyancy
  - \*surface tension, capillarity
  - \*equation of continuity, Bernoulli's equation - applications
  - \*viscosity and turbulence

## ■ THERMODYNAMICS

- \*temperature, thermal equilibrium, zeroth law of thermodynamics
- \*thermal expansion of solids and liquids
- \*heat, work, first law of thermodynamics
- \*phase transitions, heat transfer
- \*kinetic theory of gases
- \*second law of thermodynamics - applications
- \*entropy and disorder, arrow of time
- \*third law of thermodynamics

## ■ ELECTROSTATICS

- \*Coulomb's law, electric field, Gauss' law
- \*electric potential, capacitors and dielectrics

## ■ CURRENT AND RESISTANCE

- \*Ohm's law
- \*electric charge and Coulomb's law
- \*superconductors and semiconductors
- \*electric energy and electric power
- \*Kirchhoff's rules, RC circuits

## ■ NATURE OF LIGHT

- \*measurements of the speed of light
- \*reflection and refraction
- \*Huyghens' principle
- \*total internal reflection

## ■ GEOMETRIC OPTICS

- \*images formed by plane and spherical mirrors
- \*thin lenses and lens aberrations
- \*the eye
- \*the optical instruments

## ■ INTERFERENCE OF LIGHT WAVES

- \*conditions for interference
- \*Young's double slit experiment
- \*phasor addition of waves
- \*change of phase due to reflection
- \*interference in thin films

## ■ DIFFRACTION AND POLARIZATION

- \*single slit diffraction
- \*resolution of single-slit and circular apertures
- \*the diffraction grating; holography
- \*diffraction of x-rays by crystals
- \*polarization of light waves

## COURSE MATERIAL

- H.D. Young and R.A. Freedman, *Sears & Zemansky's University Physics*, 14<sup>th</sup> Edition
- *Student's Study Guide* for Vol. 1
- *Student's Study Guide* for Vols. 2&3
- W. Anderson and A.L. Ford, *Student's Solutions Manual* for Vol. 1
- W. Anderson and A.L. Ford, *Student's Solutions Manual* for Vols. 2&3
- Z.M. Stadnik, *PHY 1122 A Lecture Notes*
- Chapters in the textbook: 12, 17–26, 33–36

## EVALUATION

- Mini quizzes (Q): 8%
- Mid-term exam (M): 22%; **March 1, 2016**
- Assignments (A): 15%
- Final exam (F): 55%
- Q are close-book, multiple-choice quizzes
- M and F are open-book, multiple-choice exams

## Quizzes

- Five-minute mini quizzes will be written every class. They consist of four multiple-choice questions. They will be administered at a time selected by the lecturer. The same rules as those for an exam apply to writing a mini quiz. In particular, an identity of a student will be verified.
- The students write the answers on their sheet of paper. It should contain the student first and last name (in capital letters), the student number, the student Q/A number, and the answers to the four questions. A typical mini-quiz answer sheet should look like this:

## QUIZ #4

- John BROWN, st. #391245, Q/A #54

- 1. D
- 2. C
- 3. E
- 4. A

## Assignments

- There will be five assignments per semester. An assignment consists of 10 problems. An assignment is an individual work of which the student should be the only author. Copying from fellow students and other forms of plagiarism will be treated as an academic fraud. The assignments are submitted via *MasteringPhysics*.
- Q, A, M, and L (laboratory) are compulsory
- Mid-term exam: 14 questions; each is worth 8.0; maximum mark =  $14 \times 8.0 = 112.0$
- Final exam: 31 questions; each is worth 3.5; maximum mark =  $31 \times 3.5 = 108.5$

## FINAL GRADE

$$\blacksquare 0.80 \times (0.08Q + 0.15A + 0.22M + 0.55F) + 0.20 \times L$$

## GRADES

Letter Grade	Percentage Scale
▪ A+	$89.50 \leq G \leq 100.00$
▪ A	$84.50 \leq G \leq 89.49$
▪ A-	$79.50 \leq G \leq 84.49$
▪ B+	$74.50 \leq G \leq 79.49$
▪ B	$69.50 \leq G \leq 74.49$
▪ C+	$64.50 \leq G \leq 69.49$
▪ C	$59.50 \leq G \leq 64.49$
▪ D+	$54.50 \leq G \leq 59.49$
▪ D	$49.50 \leq G \leq 54.49$
▪ E	$39.50 \leq G \leq 49.49$
▪ F	$0.00 \leq G \leq 39.49$

## PHY1122A Preclass Reading

#1. January 15, 2016

- ⇒ textbook: pp. 369–378
- ⇒ lecture notes: F4–F36b

#2. January 19, 2016

- textbook: pp. 379–387
- lecture notes: F37–F57

#3. January 22, 2016

- textbook: pp. 545–564
- lecture notes: T1–T14, Q1–Q12

#4. January 26, 2016

- ♣ textbook: pp. 565–571, 618–630
- ♣ lecture notes: Q13–Q38

#5. January 29, 2016

- ∇ textbook: pp. 584–599, 602–607
- ∇ lecture notes: Q39–Q57b

#6. February 2, 2016

- ⊕ textbook: pp. 599–602, 630–636, 647–652, 656
- ⊕ lecture notes: Q58–Q76'

#7. February 5, 2016

- ◆ textbook: pp. 652–656, 657–669
- ◆ lecture notes: Q77–Q93

#8. February 9, 2016

- textbook: pp. 669–673
- lecture notes: Q94–Q118

#9. February 12, 2016

- ♠ textbook: pp. 683–698, 699–704
- lecture notes: E1–E18

#10. February 23, 2016

- ♣ textbook: pp. 699, 705–710
- ♣ lecture notes: E19–E25'

#11. February 26, 2016

- ◆ textbook: pp. 722–742
- ◆ lecture notes: E27–E44

#12. March 4, 2016

- ♣ textbook: pp. 752–774
- ♣ lecture notes: E45–E60a

#13. March 8, 2016

- ➔ textbook: pp. 785–806
- ➔ lecture notes: E61–E83

#14. March 11, 2016

- textbook: pp. 816–838
- lecture notes: E84–E103

#15. March 15, 2016

- ☒ textbook: pp. 848–870
- ☒ lecture notes: E104–E119

#16. March 18, 2016

- textbook: pp. 1078–1086, 1089
- lecture notes: GO1–GO12''

#17. March 22, 2016

- textbook: pp. 1086–1089, 1090–1091, 1100–1102
- lecture notes: GO12'''–GO18

#18. March 29, 2016

- 📖 textbook: pp. 1111–1127
- 📖 lecture notes: GO19–GO28

#19. April 1, 2016

- 📖 textbook: pp. 1128–1148
- 📖 lecture notes: GO29–GO44

#20. April 5, 2016

- textbook: pp. 1160–1178
- lecture notes: IN1–IN10'''

#21. April 8, 2016

- textbook: pp. 1186–1209
- lecture notes: DI1–DI11'

#22. April 12, 2016

- textbook: pp. 1091–1100
- lecture notes: PO1–PO7'