Physics 232_001A (13380) Spring 2018 Prof. Walter Wimbush phone 703-845-6526
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Text: Young and Friedman, University Physics 13th ED, Pearson, 2014.

Laboratory Text: Wimbush, Lab Manual for 231-232, web page: www.nvcc.edu/home/nvwimbw

References: the film series of lectures referred to as the Mechanical Universe can be accessed via the web: at

1. You can get video tutoring from these web sites:
http://www.khanacademy.org

Attendance: Students are expected to arrive on time and to attend all lectures and laboratory sessions. Students are **responsible** for all material covered in either the textbook or in the lectures. If you miss a lecture, you should get the material from another student.

Classroom etiquette: All cell phones and pagers are to be turned off prior to class. Students are to arrive on time for class.

Withdraw/Audit Grades: No audit will be permitted after **Jan 29**. Last day to withdraw with tution refund : **Jan 29**. No withdraws will be permitted after the last day to withdraw, March 22. Students who miss three consecutive lectures may be withdrawn from class. The last day to withdraw with a grade of "W" is **March 22**. **You are responsible for withdrawing** yourself from the class.

Exam Policy: There will be four in class exams (1 hr 30 min) and one final exam (2-hours). There will be **NO make-up exams. If you miss an exam or fail an exam the final exam will be worth more to cover the missed exam or replace the failed grade. Do not miss two exams. Some formulas will be provided by the instructor**. You need only bring pencils, pen, and a working calculator with you to the examination. Any indication of **cheating will result in a grade of zero for the exam. The second episode of cheating will result in a grade of "F" for the course.**

Grading Policy: A = 90 - 100% B = 80 - 89% C = 70 - 79% D = 60 - 69%
Final % = 65%(lect.) + 20%(lab) + 15%(homework)

Special Needs and Accommodations: Please notify the instructor of any special problems or needs at the beginning of the semester. If you are seeking accommodations based on a disability, you must provide a disability data sheet, which can be obtained from the counselor for special needs, who is located in Room 148 of the Bisdorf Building, telephone number 845-6301.

The **Academic Center for Excellence** (ACE) and the **Academic Center for Reading and Writing** (ACRW) provide ***free*** peer tutoring and reading and writing assistance. ACE and ACRW are located in AA229. For more information or to schedule an appointment, stop by (AA229), call them (703.845.6363), or visit them online: http://www.nvcc.edu/campuses-and-centers/alexandria/campus-resources/academic-support/index.html.

Lecture Schedule: No class on following days: Jan 16, March 6 – 12

Homework due on Monday. **Homework will come from the textbook**.

Wednesday Jan. 10
Ch. 15: Waves — **Hw ch 15: 1, 9,19,23,27,32,37,38,41,55 Due Jan. 18.**

Lab: Waves on a string

Monday Jan. 15 **NO CLASS** MARTIN LUTHER KING DAY

Jan. 17 Waves — Lab: Speed of Sound & air column resonance

Jan 22
Ch. 16 Sound — **Hw 16: 1,6,9,15,19,25,27,31,33,35,39,45,49**

Jan. 24
Review Chapt 15 & 16 — Lab: Superposition of waves

Jan. 29
Exam I – Ch. 15 & 16

Jan 31
CH. 21: Electrostatics — **HW 21: 1,5,21,23,27, 31, 33, 42, 52, 53, 56, 89, 90, 94, 98**

Lab: Millikan oil drop

FEB 5
Ch. 22:Gauss' Law — **HW 22: 2, 7, 19,21,23,31, 36, 39, 43, 47**

FEB 7
cH: 23: Potential — **HW 23: 1 ,3,7, 13, 19, 21, 27, 29, 37, 45, 63, 79**
Lab: electric field Mapping

FEB 12
Ch. 24: Capacitors — **Hw 24: 1, 11, 16, 17, 25, 35, 39, 50, 74**

FEB 14
REVIEW for exam — Lab: Ohm's Law

FEB 26
Exam II – Ch. 21 – 24

FEB 28
Ch. 25: Current & resistors — **HW 25: 4, 22, 28, 33, 47, 60, 65,**
Lab: Kirchoff's Rules

Mar 5
Ch. 26: DC circuits — **HW 26: 1,4,7,9,13,15,24,25,27,35,40,41,47,57**

Mar 7 **Exam II – Ch. 25 – 26** Lab: RC Circuit

Mar 12-16 **SPRING BREAK**

Mar 19 Monday
Ch. 27: Magnetism — **HW 27: 1,3,7,11,16,19,25,29,35,37,45,49,53**

Mar 21 Wednesday
Ch. 28 Magnetic fields from currents — **HW 28: 1,3,7,13,19,22,25,31,37,39,43,46,49,52,56,57**
Lab: Charge to Mass ratio of electron

Mar 26
Ch 29: ElectroMagnetic Induction — **HW 29: 3,5,9,13,15,20,23,27,35,41,47**

Mar 28
Exam III ch. 27-29 — Lab: Magnetic Dipole Moment

Apr 2
30: electromag oscillations — **Hw 30:1,3,9,17,19,25,33,47,48,62,73**

Apr 4
Ch. 31: EM Waves — **HW 31: 1,5,7,12,13,14,19,51,52 ,(75)**
Lab: AC circuits

April 9

April 11
Ch 32: OPTICS — **hw 32: 5,8,16,31,38,41,56,57**
Lab: Lenses

April 16
Ch. 33: Lenses — **hw 33: 1,11,22,25,29,57,58**

April 18
Lab: Interference & Diffraction

April 23
ch. 34 Wave Optics — **hw 34: 1,5,32,39,43,54,61,67**

April 25
Wave Optics — Lab: Analysis of Light

April 30
Diffraction — **hw 35:1,7,13,25,33,35**

May 2
Lab: Review

May 7 Final Exam

5 points will be added to your final exam score if you have completed the course Evaluation online, You must show prof.

LABORATORY

The lab report should include:
1. **Abstract:** A brief statement of what the experiment "proves" and the validity of the method or procedures used.
2. **Theory**: Derive the formulas used in the experiment.
3. A **labeled diagram** of the apparatus. (labels in ink artwork in pencil)
4. **procedure**:Should be written in 3rd person, passive voice, past tense example: The thermometer was read in three minute intervals and the value recorded in table II. (do not write "I read the thermometer" or "read the thermometer every three minutes.")
5. **Data tables**: (data in pencil; labels and lines separating columns and rows in ink)
Graphs: (labels, scales for x- and y - axis: in ink , curve in pencil) Best done on Excel
6. Determination of **experimental Error**.
7. **Conclusion**:

Laboratory Schedule

All safety regulations will be enforced! You will be responsible for purchasing you own safety goggles and having them in class. Sandals will not be permitted in the laboratory. Anyone not obeying these rules will be told to leave the lab. You will forfeit the credit for that lab.!!!

Each individual will turn in a data sheet with calculations at the end of each lab to be checked by the instructor. Then, each individual will take a small quiz on the lab, its calculations, its conclusions, and its methodology. There will two lab reports, which will be done independently and submitted one week after the lab.

Instructions for Completing Laboratory Reports

During an experiment you are to record your data in a laboratory notebook. This notebook contains the actual measurements and preliminary calculations and must be handed in at the end of the semester.

One week from the day of performing the experiment you are to hand in a laboratory report.

Formal report: (This report is to be typed) A sample lab report can be found on my web page.
The report should contain:
On the First Page
Your Name
Title of Experiment
Date of performing experiment
Names of lab partners

1. **Abstract**: A brief description of the experiment and the results obtained. (approximately 4 or 5 sentences). State your Hypothesis and how you intend to "prove it" with his procedure.

On the remaining Pages
1. **Introduction**: Description of the Principle, Law, or phenomena under investigation; this should include any derivation of mathematical formula used.
2. **Labeled Diagram** of apparatus

3. **Procedure**: Describe the experimental method and discuss how the procedure corrected measured what was stated, and how these measurements support the theory. (a statement of what was done during the experiment, use the third person, passive voice, past tense…"The air tract was leveled by adjusting the screws until the glider did not slide down the track."
4. **Results**. Make a clear connection between your data and the intended principle being verified. All tables must have titles and all graphs must have captions.
5. **Conclusion**: Discuss the how the data in your experiment verifies the physical principle.
6. **References**. If you use any textbooks or reference books or web pages while writing your report, please cite them, and include a bibliography at the end.