

## SESSION: SPRING 2017

### General University Physics-I (PHY-231)

#### *Tentative Term Syllabus*

Mathematics, Science and Engineering (MSE) Division.

Northern Virginia Community College (NOVA), Alexandria, Virginia.

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#### Course Details:

**Course Description:** This is the first part of the two-semester General University Physics Course taught at NOVA. Major topics covered on this course are Mechanics, Wave Phenomena, and Heat and Thermodynamics with extended coverage of selected topics. The course also includes recitation as a major part of the lecture. Lecture consists of 4 hours, and Laboratory consists of 2 hours in every week. Course requires your active participation of a total of 6 class hours per week. The class is intended for students who plan to major in physics, engineering, chemistry, or computer science. If your major is different from those mentioned above, or you are not sure whether the class is for you, please, contact the physics department.

**Pre-requisites:** MTH 173 and a satisfactory placement score for ENG 111.

**Course Objective /Student Learning Outcomes:**

Upon completion of the course, students will be able to:

- Use physics as the basic tool of quantitative science and technology
- Relate physical events in terms of mathematical description using calculus
- Use the required physical and mathematical concepts and their sources
- Quantitatively analyze physical processes leading to the mechanical and thermodynamical events in practical life.
- Use Excel, and other fundamental computational tools to quantitatively analyze physical processes.
- Describe selected experimental techniques in contemporary physics and the underlying concepts.
- Develop team work, scientific communication and peer review skills.
- Develop critical thinking, analytical & problem solving skills in Physics.

More specifically, students are expected to know how to apply the following concepts to topics of Mechanics, Fluids, Oscillations, and Thermodynamics By the end of the semester:

- Kinematics: Motion in multiple dimensions, including Rotational Motion
- Dynamics: Forces, Newton's Three Laws and their applications.
- Energy and the Laws of its Conservation.
- Linear and Angular Momentum and their conservation.
- Quantitative Analysis of Thermodynamical Events

**Course Meeting Schedule:**

Lecture: PHYS 231 003A and Lab: PHY 231 0A3A: WF 10:00 AM-1:00 PM;

Location: TBA.

**Instructor Information:**

Instructor: Anil Pyakuryal, PhD

Office Hours: W 1.00-1:30 PM by appointment

Office/Phone: 312-925-4512

Email: apyakuryal@nova.edu

**Course Textbooks:**

- **Book:** Young and Friedman, University Physics, 13th ED, Pearson, 2014.
- **Lab-Manual:** Wimbush, Lab Manual for 231-232,  
(<https://blogs.nvcc.edu/alphy/files/2016/01/231Man2009.pdf>)

**Course Assessment Scheme:** (4+1 Credits): A, B, C, D, F, I

(1) Attendance and Class Participation [Informal]:

Attendance is mandatory on all classes except on medical condition, jury duty and/or emergency unavoidable situation.

(2) Group Discussion, Quizzes, and Recitations [50%]:

Total four sessions with each session worth 12.5% of total grade, will be arranged during the semester. There will be no make-up session available for any missing recitation session because of the complexity and nature of the type of the assessment. This is a part of active engagement session for the students with limited support from the instructor in the assessment process.

(3) Homework Assignments [10%]:

Three comprehensive problem sets will be assigned during the semester, and will be due on specific dates announced on Blackboard

periodically. Assignments are intended to be challenging and will require significant effort. Team work is encouraged to solve the homework problems, however **work** must be **unique** representation of your own effort.

(4) Course Project and Project Presentation [20%]:

Each team of ~4-5 students will be assigned to prepare a technical project report on selected topics in the field of biomedical physics and engineering, and other applied science applications. This project may involve significant searching of the scholarly literature. Each team will submit a 150-word abstract-proposal or brief description of their project immediately after the mid-term session. With the approved proposal, the teams will proceed to research the scholarly literature on the topic, and will submit a detailed draft report during the final week following the presentation. Each member of the group will be evaluated based on the defense and outcome and of the project.

(5) Comprehensive Final Exam [20%]:

A comprehensive examination will be administered at 9.30 AM-11.00 AM on Wednesday, **May 03, 2017**. Final exam will cover a cumulative series of materials from all the lectures, quizzes, and group discussion sessions pursued during the semester. Detail nature of the exam will be discussed and determined in class after the midterm evaluation.

[6] Labs Completion: At least 8 experiments must be completed during the regular lab sessions to pass the lecture and the lab. Lab reports must be prepared on standard formats using the following guidelines:

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:** (not a statement of error but what principles have been verified).

**Grading and Make-Up Policy:** (4+1 Credit hours):

***Absolute Letter Grades: A, B, C, D, F, I***

*Tentative Cut-off Scores for Letter Grades:*

$A \geq 90\%$ ;  $(90\% > B \geq 75\%)$ ;  $(75\% > C \geq 60\%)$ ;  $(60\% > D \geq 50\%)$ ; &  $F < 50\%$

***Course Withdraw and Audit Grades:***

*No audit will be permitted after **Census** date as announced on college calendar. Last day to withdraw from the course with full tuition refund is the **Census** date. No withdraws will be permitted after the last day to withdraw from the course without refund, and the same deadline applies to withdraw from the course with letter 'W'. Students who miss four consecutive lectures may be withdrawn from class.*

*You are responsible for withdrawing yourself from the class.*

***Make-Up Policy or Course Incompletion Grade (I):***

*Only applicable in special circumstances and hardship evidential from the documentation, and 70% course work is completed satisfactorily as indicated in the grade sheet. Consent of Instructor is required for any options prior to the final evaluation of the grade.*

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**Course Schedule:****Key dates:**

- No classes will be held on Friday, 20<sup>th</sup> January, 2017.

**Primary topics of discussion in the course:**

- Scalar and Vector Analysis
- 1D/2D Kinematics
- Force and Newton's Laws of Motion
- Circular and Relative Motion
- Work, Kinetic Energy, and Potential Energy.
- Collisions; Conservation of Energy and Momentum
- Momentum, Torque and Rotational Dynamics
- Equilibrium and Elasticity
- Gravitation and Harmonic Motion
- Gas Laws and Laws of Thermodynamics.

## Tentative Schedule and Course Outlines :

Week	Date (Month/Wednesday-Friday/2017)	Reading	Topics [ Labs / Lectures/ Group Discussions ]	Remarks
1	01/11-13/2017	Chapter 1	Lab Assignment # 0 : Lab Safety Quizzes Online; Lecture: Chapter 1- Vector Analysis; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab Safety Quizzes</li> </ul>
2	01/18-20/2017	Chapter 2	Lab Assignment #1 : Uniform Acceleration; Lecture: Chapter 2- 1 Dimension Kinematics; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• HW Set #1 Assigned (Comprehensive)</li> <li>• Lab #1 Assigned</li> </ul>
3	01/25-27/2017	Chapter 3	Lab Assignment #2 : Addition of Vectors; Lecture: Chapter 3- 2 Dimension Kinematics; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab #2 Assigned</li> </ul>
4	01/25-27/2017	Chapter 4	Lab Assignment #X : None; Lecture: Chapter 4- Force; Group Discussion and Recitation # 1: Force Table and Vector Resolution; [Worth 12.5%]	<ul style="list-style-type: none"> <li>• Recitation/Quiz#1 (Wednesday)</li> </ul>
5	02/1-3/2017	Chapter 5	Lab Assignment #3 : Newton's 2 <sup>nd</sup> Law; Lecture: Chapter 5- Newton's Laws; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab #3 Assigned</li> </ul>
6	02/8-10/2017	Chapter 5	Lab Assignment #4 : Centripetal Force; Lecture: Chapter 5- Relative and Circular Motion; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab #4 Assigned</li> </ul>
7	02/15-17/2017	Chapter 6	Lab Assignment #5 : Conservation of Energy; Lecture: Chapter 6- Work and Kinetic Energy; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab #5 Assigned</li> </ul>
8	Wednesday 02/22/2017	Chapter 7	Lab Assignment #X : None; Group Discussion and Recitation # 2: Conservation of Energy and Momentum; [Worth 12.5%]	<ul style="list-style-type: none"> <li>• Recitation/Quiz#2 (Wednesday)</li> </ul>



	Friday 02/24/2017	Chapter 7	Lecture: Chapter 7- Work and Potential Energy; Project : Group Arrangement & Topic Assignment	<ul style="list-style-type: none"> <li>• HW Set #2 Assigned (Comprehensive)</li> <li>• Initial Project Discussion</li> </ul>
9	03/1-3/2017	Chapter 8	Lab Assignment #6 : Torque; Lecture: Chapter 8- Momentum and Collisions; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab #6 Assigned</li> </ul>
10	03/6-12/2017	NA	SPRING BREAK	•
11	03/15-17/2017	Chapter 9	Lab Assignment #7 : Moment of Inertia/Fly Wheel Experiment; Lecture: Chapter 9- Rotational Dynamics; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab #7 Assigned</li> </ul>
12	03/22-24/2017	Chapter 10	Lab Assignment #X : None; Lecture: Chapter 10- Rotational Dynamics; Group Discussion and Recitation # 3: Projectile Motion using Ballistic Pendulum; [Worth 12.5%]	<ul style="list-style-type: none"> <li>• Recitation/Quiz#3 (Wednesday)</li> </ul>
13	03/29-31/2017	Chapter 11	Lab Assignment #X : Make Up; Lecture: Chapter 11- Equilibrium and Elasticity; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab #Make Up</li> </ul>
14	04/5-7/2017	Chapter 13 and 14	Lab Assignment #7 : SHM and Hook's Law; Lecture: Chapter 13&14- Gravitation and SHM; Group Discussion and Recitation : None;	<ul style="list-style-type: none"> <li>• Lab#7 Assigned</li> <li>• HW Set #3 Assigned (Comprehensive)</li> </ul>
15	04/12-14/2017	Chapter 17&19	Lab Assignment #8 : Gas Laws; Lecture: Chapter 17&19- Gas Laws & Thermodynamics; Group Discussion and Recitation #04 : Adjacent to the Lab #08 session; [Worth:12.5%]	<ul style="list-style-type: none"> <li>• Recitation/Quiz#4 (Wednesday)</li> </ul>
16	04/19-21/2017		Project Presentation	
	04/26-28/2017		Final Exam Review ( Exam Scheduled on Wednesday 05/03/2017; Time: 9:30 AM-11:10 AM)	

## **Classroom Policies:**

### **Late Assignments and Laboratory Regulations:**

Absolutely no assignments will be accepted after official deadlines. Missing assignments will be dropped only in cases of bonafide, documented emergencies. Under certain circumstances, assignments will be accepted after due date with the appropriate penalty.

All safety regulations will be enforced! You will also be responsible for purchasing your 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 and will forfeit the credit for that lab. You will turn in Lab reports one week from the day you completed the lab. Use Microsoft Word to include a statement of the purpose, theory, procedure, Data (tables and graphs), and a conclusion summary. You must indicate all of your lab partners on the report!

Safety quizzes must be completed satisfactorily available online prior to the labs. All students must be acquainted and abide by the [safety rules](#) as published on the [Physics Laboratory Webpage](#).

### **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. "Excessive absence" is defined as two more absences than the number of times the class meets per week during a fall or spring semester (with the number of absences to be prorated for accelerated sessions). If you miss a class session, it is your responsibility to find out what you have missed.

**Academic Honesty:**

Common examples of academic dishonesty and misconduct can be found in the Student Code of Conduct, College Guide. These examples are not an exhaustive list of all prohibited behavior. If you are in doubt about what constitutes academic dishonesty, consult your instructor or the Student Code of Conduct.

Faculty members may choose to impose grade or other applicable sanctions for violations of academic ethics, normally ranging from a minimum of an "F" on the assignment in which dishonesty occurred, to a maximum of an "F" in the course. Faculty members also have the prerogative of referring a case to the campus Dean of Student Development with a specific request that the dean consider imposing additional sanctions.

**Classroom Etiquette:**

The College seeks to provide an environment where discussion and expression of all views relevant to the subject matter of the class are recognized as necessary to the educational process. However, students do not have the right to interfere with the freedom of faculty to teach or the rights of other students to learn. All cell phones and pagers are to be turned off prior to class. Students are to arrive on time for class.

**Special Needs and Accommodations and other Student Services:**

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>.

A letter from Disability Support Services authorizing your accommodations will be needed for the arrangement in the classes and labs. Any student who may need assistance in the event of an emergency evacuation must identify to the Disability Support Services Office; guidelines for emergency evacuations for individuals with disabilities are found in college guide.

### **Student e-mail and Course Communication:**

Student e-mail (nova.edu) is an official means of communication for the College. You are expected to check your student e-mail account, and Blackboard notification center more frequently since as you are responsible to get yourself informed with the day-to-day developments of the course through the announcements posted in Blackboard Learning System.

### **Veterans:**

If you are a veteran on active or reserve status and you are interested in information regarding opportunities, programs and/or services, please visit the appropriate division of the college that handles the veteran affairs.

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