

**Fayetteville State University
College of Arts and Sciences
Department of Chemistry and Physics
PHYS 111**

SYLLABUS

I. LOCATOR INFORMATION

Term: One Semester

Course Name: GENERAL PHYSICS I

Course Number: PHYS 111

Credit Hours: 4

Total Contact Hours for Class: 5.0

Class meets for: one hour lecture, 3 times a week
two hours Lab, 1 time a week

Office hours: ten hours a week

Departmental Office Location: ST Room 305

Departmental Office Telephone: 672-2441

The following statement is required by the university to appear on the first page of each course syllabus.

FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account (username@uncfsu.edu) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail. Rules and regulations governing the use of FSU email may be found at <http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf>

Disabled Student Services: In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); 910-672-1203.

II. TEXTBOOKS

Lect.: Physics (9th Edition, JW, Wiley) by *John D. Cutnell and Kenneth W. Johnson*
ISBN:9780470879528

Lab.: Physics Laboratory Manual (4th Edition, Cengage) by *David H. Loyd*.
ISBN: 9781133950639

Digital ISBN: 9781285545981 (e-Book Digital Edition).

Note: If you choose to purchase the Digital Edition, you are limited to print out up to one-third of the material. It is, therefore, advisable that you print the Lab. Report Sheets only. You can still read any part of the electronic book.

III. COURSE DESCRIPTION

A calculus-based introductory study of Newtonian mechanics, wave motion, thermodynamics, and related concepts, with special emphasis on problem-solving and with laboratory emphasis providing practical knowledge in handling laboratory apparatus, data collection, and data interpretation related to topics discussed in the lectures. The objective behind studying these principles is to cultivate an interest in the student to understand the natural laws and to develop analytical skills for the student to be able to tackle some of the fundamental problems in nature.

IV. SPECIFIC COURSE OBJECTIVES AND COMPETENCIES

In view of the scope and sequence of this course, the following objectives have been identified. (Numbers in parentheses identify competencies established by the State Department of Public Instruction for Middle Grades Education majors. Numbers in square brackets identify competencies established by the State Department of Public Instruction for High School Education majors).

Students shall:

- A. Understand the relationships between matter, energy, and motion.
 1. List the International System units of measure for length, mass, volume, time, and force; and apply the basic metric system prefixes to these measurements.
 2. Define mechanics, vector and scalar quantities, speed, velocity, acceleration, work, potential energy, kinetic energy, power, and momentum; and calculate any of these when given sufficient data. (Physics 30) [Physics 1.3] [Physics 1.4]
 3. State Newton's three laws of motion and use each to analyze the implications for objects at rest or in motion. (Physics 31) [Physics 1.2]
 4. List and describe the properties of waves and waveforms and compare and contrast electromagnetic radiation with mechanical waves. (Physics 29) [Physics 1.1]
 5. Explain and interpret heat, temperature, specific heat, heat capacity, entropy, plasma, latent heat of fusion, latent heat of vaporization, and the laws of thermodynamics. (Physics 29) [Physics 1.1]

- B. Demonstrate the practical aspects of the above theoretical and conceptual learning outcomes
 1. Demonstrate familiarity with the use of specific lab tools and equipment such as a metric rulers, calipers, digital scales, digital thermometers, digital voltmeters, ammeters, and ohmmeters, instruments that measure pH values of chemical solutions.
 2. Demonstrate proficiency in utilizing a computer for data analysis and communication (Excel, Word, Powerpoint) for lab. reports, research papers, and other assignments.

3. Communicate using standard scientific format using laboratory report procedures and conform to the laboratory report rubrics. Prepare research papers as a means to demonstrate their ability to communicate scientific information.
 4. Apply the scientific process, including creating and assessing hypotheses, testing hypotheses, and interpreting and expressing results of observation and experimentation as assessed by laboratory assignments and presentation of research.
- C. Demonstrate the practical aspects of the above theoretical and conceptual learning outcomes and apply to situations common to daily life
1. Demonstrate familiarity with the use of specific lab tools and equipment such as a metric rulers, calipers, digital scales, digital thermometers, digital voltmeters, ammeters, and ohmmeters.
 2. Apply the use of scientific equipment and lab tools to situations that involve daily life as preparing ingredients with appropriate measurements, making necessary conversions between metric and English units, and measuring the temperature of the food that is being cooked.
 3. Demonstrate proficiency in utilizing a computer for data analysis and communication (Excel, Word, Powerpoint) for lab reports, research papers, and other assignments.
 4. Communicate using standard scientific format using laboratory report procedures and conform to the laboratory report rubrics. Prepare research papers as a means to demonstrate their ability to communicate scientific information.

V. EVALUATION CRITERIA

The progress of each student will be evaluated by means of FOUR exams, quizzes (both on-line and off-line), reports related to the laboratory exercises to be performed, and a **comprehensive** final examination. An optional (fifth) exam may be given and the lowest exam may be dropped at the discretion of the instructor.

A. Grade Distribution:

Final grades will be determined by weighting the averages and scores from the above-mentioned evaluative activities.

- | | |
|------------------------|-----|
| • Four Exams | 40% |
| • Quizzes | 15% |
| • Laboratory Exercises | 25% |
| • Final Examination | 20% |

Short quizzes will be given almost on the daily basis, either in the beginning or at the end of the class.

B. Grading Scale:

The final letter grade assigned to the student will be based upon the following numerical equivalencies as stated in the University Catalog.

- A = 90 - 100 Superior
- B = 80 - 89 Good
- C = 70 - 79 Marginal
- D = 60 - 69 Below marginal
- F = Below 60 Failure

REVISION OF GRADES – STUDENT RESPONSIBILITIES
The following revisions become effective on August 16, 2007.

WN GRADE DISCONTINUED:

- **WN - Withdrawal due to non-attendance - discontinued, effective August 16, 2007.**

STUDENTS: Do not expect faculty to withdraw you for non-attendance. Drop or withdraw* from classes according to the deadlines published in the catalog. *See warning below about class withdrawals.

NEW TYPE OF GRADE: INTERIM GRADES – (New name for “midterm grade,” with additional purposes). Interim grades will be assigned from the first week of the semester until the deadline for class withdrawals. Interim grades are used for informational and warning purposes only; they are not part of your permanent transcript and have no effect on your GPA. Instructors may assign interim grade of F to warn students of poor academic performance or they may assign “X” or “EA” grades. (See below for explanations) After midterm, faculty will assign all students an interim grade of A – F to inform students of their academic status as of midterm.

- **INTERIM GRADE X = NO SHOW** – Assigned to students who are on a class roster, but never attend class. For warning purposes only; NOT a final grade.

STUDENTS: Check interim grades early in the semester. If you have an X grade, either begin attending the class or withdraw* from it. *See warning below about class withdrawals. If you do not take action in response to an X grade, you will receive a final grade of FN. (See “FN” below)

- **INTERIM GRADE EA = EXCESSIVE ABSENCES** - Assigned to students whose class absences exceed 10% of the total contact hours. For warning purposes only, NOT a final grade.

STUDENTS: Check your interim grades often. If you have an “EA” grade for a class, you are in jeopardy of failure if you do not take immediate actions. Either resume attending the class or withdraw from it. *See warning below about class withdrawals.

NEW FINAL GRADE:

- **FN = FAILURE DUE TO NON-ATTENDANCE** – Assigned to students who are on class roster, but never attend the class. An FN grades is equivalent to an F grade in the calculation of the GPA.

STUDENTS: You must attend (or withdraw* from) all the classes for which you are enrolled. *See warning below about class withdrawals.

WARNING ABOUT CLASS WITHDRAWALS:

- When you withdraw from a class, you are wasting your money and time. You receive no refund for withdrawing from individual classes and you slow your progress toward degree completion.
- If you withdraw from or fail more than one-third of your classes, you will no longer be eligible for financial aid.

- STRIVE TO EARN CREDIT FOR ALL THE CLASSES IN WHICH YOU ENROLL;
WITHDRAW FROM CLASSES ONLY WHEN IT IS ABSOLUTELY NECESSARY!

VI. ACADEMIC SUPPORT RESOURCES

Frequently access Blackboard for Lecture Notes, Assignments, On-Line Quizzes, Grades, etc.

VII. COURSE OUTLINE WITH ASSIGNMENT SCHEDULE

Lectures and laboratory exercises will be undertaken in accordance with the following assignment schedule. It is also assumed that in addition to the topics listed below, the student is assigned both the textual material as well as the exercise problems at the end of the chapters. Any item listed below may be arbitrarily changed by the instructor for his/her convenience, or as the constraints imposed by equipment and space limitations may compel.

VIII. TOPIC OUTLINE

This course will cover Chapters 1-15.

Selected sections from the textbook will be offered; these are referred to with the symbol §.

The syllabus is as follows:

Date (Tentative)	Topic
Week 1	Chapter 1: Introduction and Mathematical Concepts: Measurement, International System of Units, Fundamental physical quantities in mechanics, Scalars and Vectors, Vector Algebra. § 1.1 through 1.9
Week 2 and 3	Chapter 2: Kinematics in One Dimension. Motion Along a Straight Line. § 2.1 through 2.8
Week 3 and 4	Chapter 3: Kinematics in Two Dimensions § 3.1 through 3.3 and 3.5
	Exam # 1 on Thursday, Feb. 06 (Chapters 1, 2 and 3)
Week 5 and 6	Chapter 4: Forces and Newton's Laws of Motion § 4.1 through 4.13
Week 7	Chapter 5: Dynamics of Uniform Circular Motion § 5.1 through 5.6 and 5.8
Week 8	Chapter 6: Work and Energy § 6.1 through 6.10
Week 9	Chapter 7: Impulse and Linear Momentum; Collisions; Conservation of Linear Momentum § 7.1 through 7.6
	Exam # 2 on Thursday, March 06 (Chapters 4, 5, 6, and 7)
Week 10	Chapter 8: Rotational Kinematics; Angular Momentum; Torque § 8.1 through 8.6 and 8.8
Week 11	Chapter 9: Rotational Dynamics § 9.1 through 9.7

Week 12	Chapter 10: Simple Harmonic Motion § 10.1 - 10.6
Week 13	Chapter 11: Fluids; Fluid Statics § 11.1 - 11.6
	Exam # 3 on Thursday, Apr. 10 (Chapters 8, 9, 10, and 11)
Week 14	Chapter 12: Temperature and Heat § 12.1 through 12.8
Week 14	Chapter 13: The Transfers of Heat § 13.91 through 13.5
Week 15	Chapter 14: The Ideal Gas Law and the Kinetic Theory § 14.1 through 14.3
	Exam # 4 on Thursday, Apr. 24 (Chapters 12, 13, 14, and 15)
Week 16	Chapter 15: The Laws of Thermodynamics § 15.1 through 15.13
Final Exam	Date, time, and location will be announced as the information becomes available.

IX. COURSE REQUIREMENTS

Students are required to:

- Attend all lecture and laboratory sessions, except in cases of illness and other unforeseen emergencies. It is the student's responsibility to contact the instructor about the steps that must be taken for making up any and all missed work. It is recommended that contact with the instructor take place within twenty-four (24) hours of having missed class. See the university catalog for the details.
- Be punctual. Attendance will be taken promptly at the beginning of each session. Any student coming in after the roll has been called will have been marked absent. It is the student's responsibility to see that all tardies have been duly noted. Students will also be charged with a tardy for departure from the class before the specified end of class. The accumulation of three (3) tardies will result in the student being charged with one (1) absence.
- Participate actively in classroom discussions and activities. Two key ingredients of every student's learning are sharing opinions and experiences with others, and interacting with others in the teaching-learning situation.
- Read over and take notes on the indicated chapters BEFORE they are presented in class. This activity mentally prepares one for the learning experience. It also is important because it raises questions that one needs to have answered in order to fully understand concepts presented.
- Take notes in class. Recopy these notes at the first opportunity after class and certainly the same day as the class in which the notes were taken. Reconcile any discrepancies in the notes taken in class as well as with notes taken in initial reading. Add explanations or drawings or other examples for clarity.
- Study about two hours for each hour of lecture. This is an absolute minimum for maximum success in a class.
- Avail themselves of all pertinent audiovisual and computer-assisted instructional materials.

8. Take examinations ON THE SCHEDULED DATES. No make-up examinations will undertake. An automatic grade of ZERO is recorded for any exam missed for any reason.
9. Be in compliance with the university policy on drugs which prohibits the possession or use of alcoholic beverages or illegal drugs on any part of the campus.
10. Be in compliance with the university policy on student conduct in the classroom.
11. See the instructor immediately when SPECIFIC DIFFICULTIES are encountered.

The pace of the teaching strongly depends on the student preparedness, the attention paid to the teaching, and the non-disruption of the teaching. Therefore, only a full cooperation of the students with the professor will allow covering the entire program.

While the professor will do all possible to help students succeed in getting the most from this course, students are required to come to the class very well prepared. They are advised to review the materials offered in previous classes and do the recommended exercises. Also they are required to check Blackboard for any news and modifications intended to improve the offering.

For maximum teaching efficiency and hence better student learning outcomes, students must avoid disrupting the class. For instance, the use of communication devices and computers severely disrupt the pace of the entire class, thus **cell phones are absolutely prohibited** in the classroom. Also, **laptops** do not help grasping the lecture of this course and the instructions, thus students **must avoid using them** in the classroom.

X. TEACHING STRATEGIES

The primary teaching strategy for this course will take the form of lectures and demonstrations of the specific processes and effects related to the topics of interest. Particular sections of the course will be taught in accordance to the instructional styles of the individual faculty member.

XI. BIBLIOGRAPHY

The textbook will be considered the primary resource in this class. However, textbooks often do not contain enough information or information in the manner that will be most advantageous for student learning. In light of these shortcomings, it is recommended that each student perform additional reading on each topic covered in class. This may be accomplished by seeking other physical science texts in the library or the instructor's office. It is recommended that the student read the following books:

1. Understanding Physics and Chemistry Using Formal Graphs
2. The language of physics : a foundation for university study
by John P. Cullerne, Anton Machacek Oxford ; New York : Oxford University Press, 2008
3. University Physics
by Hugh D. Young and Roger A. Freeman (Tenth edition 2010)
4. Physics for Scientists and Engineers
by Raymond A. Serway (Third Edition 2010)
5. College Physics
by Franklin Miller (Fourth edition).
6. The Feynman Lectures on Physics

by Richard P. Feynman, Robert Leighton, and Matthew Sands

7. Teaching Children about Physical Science

by Elaine Levenson, NY Tab Books, c1994

During the time frame in which this course is taught, far more exciting discoveries and interpretations will undoubtedly occur which will not be in texts. It is therefore recommended that the student routinely examine periodical literature such as: Science News, Science, Scientific America, American Journal of Physics, Physics Today, Physical Review, Physical Review Letters, and many others.

Physics 111-01
Spring 2014 Lab. Schedule

#	Title of the Lab.	Lab. #	Page #
1	General Laboratory Information	0	1-11
2	Measurement of Density	2	23
3	Force Table and Vector Addition of Forces	3	33
4	Uniformly Accelerated Motion on the Air Track	4	43
5	Coefficient of Friction	7	73
6	Newton's Second Law on the Atwood Machine	9	95
7	Torques and Rotational Equilibrium of a Rigid Body	10	105
8	Conservation of Spring and Gravitational Potential Energy	12	127
9	The Ballistic Pendulum and the Projectile Motion	13	137
10	Conservation of Momentum on the Air Track	14	149
11	The Pendulum: Approximate Simple Harmonic Motion	19	197
12	Simple harmonic Motion: Mass on a Spring	20	207
13	Speed of Sound – Resonance Tube	22	225
14	Specific Heat of Metals	23	235

Lab Reports:

- 1) Turn-in your lab report during the following Lab session.
For late reports, maximum grade will be reduced by 3 points per day.
- 2) Attach the pre-Lab assignment to the report.
- 3) Reports that are not **neatly written and formatted** will be immediately returned to the student.
- 4) You are advised to photocopy the worksheets from the Lab Book rather than tearing them from the book.

PHYSICS LABORATORY MANUAL

DAVID H. LOYD

FOURTH EDITION

