NJIT New Jersey Institute of Technology

COLLEGE OF SCIENCE AND LIBERAL ARTS

DEPARTMENT OF PHYSICS

COURSE OUTLINE **PHYSICS 102-006** **Spring 2024**

Class Schedule
Day and Time: Wed 1:00-2:20 (Recitation), Fri 8:30-9:50 (Lecture)
Room: Kupfrian 207 (Wed), Kupfrian 210 (Fri)
Delivery Mode: Face-to-Face (Delivery of instruction is structured around in-person classroom meeting times. Instruction is delivered in person and students are expected to attend class).

Instructor Information
Instructor: Steve Kane
Office: Tiernan 457
Office Hour: Wed 2:30-3:00, Fri 11:30-1:00
Phone: (973) 596-3560. Leaving phone messages is discouraged; please email instead.
E-Mail: steve.kane@njit.edu or through the Canvas mail system
Webex room: https://njit.webex.com/meet/sk466

General Information

- Description: Physics 102 is an algebra-based physics course introduction to Mechanics. It includes motion in one and two dimensions, Newton's laws of motion and their applications, work and energy, linear momentum and collisions, rotational motion, and principles of conservation.
- Prerequisite: Satisfactory completion of two high school mathematics courses and two high school science courses.
- Corequisite: Phys 102A.

Note: The Laboratory Course, PHYS 102A, must be taken concurrently with PHYS 102. The student must register for both the LECT/REC and the Lab Course. The grading for the laboratory is separate from the course/recitation (Phys 102) and the grades are given by the laboratory instructors.
For more information about the Lab course see https://centers.njit.edu/introphysics/welcome/.

Learning Outcomes:
For this course, you can expect to be assessed on the following learning outcomes:

1. Recall the definitions and relationships involving position, velocity, speed, acceleration, vectors, Newton's Laws, circular motion, free-body diagrams, friction, work, energy, linear and angular momentum, torque, angular velocity and acceleration, and gravitation.
2. Apply the equations governing 1-D and 2-D constant acceleration to mechanical systems for various initial conditions. Calculate unknown quantities based on physical relationships, initial conditions, and known quantities.
3. Comprehend the meaning of the equations governing net force and acceleration (Newton's Laws), and be able to manipulate them in conjunction with a free-body diagram to obtain any desired quantitative relationship. Understand the extension of these equations to rotational motion, and gravitation.
4. Generalize the concepts underlying the equations of motion, such as work, kinetic and potential energy, conservation of energy, and equilibrium.
5. Comprehend the meaning of equations governing momentum, impulse, and collisions. Apply the equations governing momentum, impulse, and collisions mechanical systems for various initial conditions. Understand under what conditions momentum is conserved and how to use this relation to calculate unknown quantities based on physical relationships, initial conditions, and known quantities.
6. Understand the extension of linear motion equations to rotational motion. Comprehend the meaning of the equations governing rotational motion and acceleration, and be able to manipulate them in conjunction with a free-body diagram to obtain any desired quantitative relationship.

Course Materials

Textbook:
Physics - Principles with Applications, 7th ed. by Giancoli (Publisher: Pearson)

Mastering Physics Online Homework System:
Be sure that your textbook is sold bundled with a Mastering Physics student access code card. You can also buy the student access code card separately either from NJIT bookstore or online. Homework assignments will be posted on-line. Students login, download and solve the assigned problems, and submit answers to the automated grading system. Instruction can be found on the student access code card. **To enroll for this section of the course, use course ID "kane80309"**.

Email:
NJIT email will be routinely used for announcements and to distribute material. Be sure check the NJIT email every day.

Attendance will be taken at all classes and exams. More than 3 unexcused absences (in total) is excessive. If you have excusable absences contact your instructor or the Dean of Students (973.596.3466, Room 255 Campus Center). Students may sign in only for themselves on attendance sheets; do not sign in for absent students.

Attendance sheets are the official university documents; signing the attendance sheet on behalf of another student is considered as "Misuse of Documents". No student shall intentionally furnish false information nor shall a student forge, alter, destruct, or misuse any university documents or data. https://www.njit.edu/dos/sites/njit.edu.dos/files/Code%20of%20Student%20Conduct-Updated%20October%202022.pdf

Reading Assignments
The text readings are listed below. You should read the assigned sections of the text before the lecture covering that material.

Homework
It is almost impossible to succeed in this course without working a lot of problems: do the homework. Each student must download the weekly homework assignments from Mastering Physics online homework system, work the problems, and submit the solutions online before each assignment is due. Late work will not be accepted. See Course Materials section above.

Help
Students are encouraged to meet with their instructor during their office hours. Physics Department also offers tutoring as posted on http://physics.njit.edu/, for which students do not need to sign up but just can go to open sessions provided in the schedule.

Grading

Final grades will be based on a composite score for the term's work that includes two common exams, the final exam, homework score, and in-class quizzes.
The approximate weights we expect to use in calculating the composite score are:

- **40%** for all two common exams (20% each)
- **34%** for the final exam
- **13%** for the total of homework work
- **13%** for the in-class quizzes

The cutoff percentages for various letter grades will be in the range of 84.0% for A, 76.0 % for B+, 68.0% for B, 60.0% for C+, 52.0% for C, 44.0% for D, F below 44.0 %.
A grade of C or better is required to take further physics courses. If you earn a grade of D in Physics 102, you cannot take the next level physics course.

Exams

There will be three Common Exams plus a comprehensive Final Exam. The schedule is:

• **Common Exam 1**: Wednesday, February 14, 2024; 4:15 -- 5:45 PM
• **Common Exam 2**: Wednesday, March 20, 2024; 4:15 -- 5:45 PM

- Comprehensive Final Exam TBA, 2.5 hours long

The final exam will emphasize the work covered after common exam 3, but also re-caps the whole course.
Note: Common Exams and Final Exam are all going to be Multiple-Choice questions. Students are going to submit exam questions and scantron cards to be collected at the end of each exam. There is not going to be any partial credit for multiple-choice questions, however students are required to show work to support their answers.
It is the student's responsibility to take the exam in the class that is scheduled.

In-class quizzes covering the preceding or current work may be given during lectures and/or recitations. Those scores count toward your final course grade. **There are no make-ups for in class activities**. Students missing a quiz will receive a grade of zero for that item.

Missed Exams
The general policy is that students who miss a common exam will receive a score of zero for that Exam. That score will be included in the calculation of your final grade. Students that miss two common exams automatically fail the course. Students who anticipate an absence from a common exam should discuss their situation with the Dean of Students PRIOR TO their absence. In order to be qualified to receive an "excused absence" for the common exam (a very rare occurrence), the student should present documentation for not being able to take the test as scheduled. As is the standard policy of NJIT, the student should present this document to the **Dean of Students - (973) 596-3466, Room 255 Campus Center** for evaluation. BOTH the Physics 102 instructor and Dean of Students must concur in permitting a "excused absence" for the common exam. Students who miss common exams that do not present documentation within 7 days of the common exam will receive a score of zero for the common exam.
In the event that the above qualification is met, a separate make-up test for the missed common quiz will not be offered. Instead, the final exam grade will be considered for giving a grade for the missed test. The instructor will evaluate the final exam questions from those chapters and normalize this portion of the student's grade for the missed common exam.
Conflict common exams are usually held from 6:00 to 7:30 PM on exam days; contact Ms. Oertel (christine.a.oertel@njit.edu) for arrangements.

Course Policies
It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course.
Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by

cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"

- Students are required to agree to the NJIT Honor Code on each exam.
- Please do not eat, drink, or create noise in class that interferes with the work of other students or instructors.

Interfering with an instructor's ability to conduct the class or the ability for other students to learn is considered as "Disruptive Conduct".
https://www.njit.edu/dos/sites/njit.edu.dos/files/Code%20of%20Student%20Conduct-Updated%20October%202022.pdf

The use of any internet services other than following the instructor's course notes and e-textbook is disruptive for the instructor and the other students.

- Turn off all phones, wireless devices, laptops, and messaging devices of all kinds during classes and exams.

- Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.

- **Student recordings**: Unauthorized student recordings of class sessions are prohibited. If a student needs to record a class because of accommodation, they need to reach out to the Office of Accessibility Resources and Services (OARS).

https://www.njit.edu/registrar/njit-policy-recording-classes

- If the student cannot be continuously present in the exam room for the entire duration of the scheduled exam for any physical/medical reason, the student needs to seek accommodation through OARS in order to take the exam separately.

- Needless to say, do not contact any "tutoring services" for help during an exam.

Withdrawal: If you must withdraw from the course, do it officially through the Registrar before the last withdrawal date. If you simply stop attending and taking exams your instructor will have to assign a failing grade in the course.

Physics 102 (Section) Class Schedule for Spring 2024

Weeks	**Lecture Topics**	**Text Reading**
Week 1	Math Review, Introduction Measurement and Units	Appendix A-4, Ch 1, Sec 1-6
Week 2	Motion in One Dimension	Ch 2, Sec 1-8

Week 3	Vectors and Two-Dimensional Motion	Ch 3, Sec 1-6
Week 4	The Laws of Motion - Forces and Newton's Laws	Ch 4, Sec 1-5
Common Exam 1 - February 14		**Covers: Math Review, Chapters 1, 2 and 3**
Week 5	The Laws of Motion - Applications of Newton's Laws	Ch 4, Sec 6-8
Week 6	Circular motion	Ch. 5, Sec. 1, 2, 4
Week 7	Energy -Work, Kinetic Energy, Work-Energy Theorem	Ch. 6, Sec. 1, 3
Week 8	Energy -Potential Energy, Mechanical Energy, Energy conservation, Power	Ch. 6, Sec. 4-7, 9, 10
Common Exam 2 - March 20		**Covers: Chapters 4, 5 (sec. 1-4) and 6**
Week 9	Momentum and Collisions -Momentum, Impulse, Conservation of Momentum	Ch. 7, Sec. 1-3
Week 10	Momentum and Collisions -Collisions	Ch 7, Sec. 4-8, 10
Week 11	Rotational Motion, Rotational Dynamics I	Ch 8, Sec 1-3
Week 12	Rotational dynamics II	Ch.8, Sec. 4-8
Week 13	Static Equilibrium	Ch. 9, Sec. 1-4
Week 14	The Law of Gravity	Ch 5, Sec. 5-7 (excluding Kepler's Laws)
Date to be announced	**Final Exam**	Everything learned in class

*** The professor will discuss changes to the syllabus during class if they arise.**

Spring 2024 Academic Calendar

January	15	Monday	Martin Luther King, Jr. Day
January	16	Tuesday	First Day of Classes
January	20	Saturday	Saturday Classes Begin
January	22	Monday	Last Day to Add/Drop a Class
January	22	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	23	Tuesday	W Grades Posted for Course Withdrawals
January	29	Monday	Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date
February	12	Monday	Last Day for 50% Refund, Full Withdrawal
March	4	Monday	Last Day for 25% Refund, Full Withdrawal
March	10	Sunday	Spring Recess Begins - No Classes Scheduled – University Open
March	16	Saturday	Spring Recess Ends
March	29	Friday	Good Friday - No Classes Scheduled – University Closed
March	31	Sunday	Easter Sunday - No Classes Scheduled – University Closed
April	1	Monday	Last Day to Withdraw
April	30	Tuesday	Friday Classes Meet
April	30	Tuesday	Last Day of Classes

May	1	Wednesday	Reading Day 1
May	2	Thursday	Reading Day 2
May	3	Friday	Final Exams Begin
May	9	Thursday	Final Exams End
May	11	Saturday	Final Grades Due