Physics 106 Course Syllabus - Spring 2011

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Lecture: Thursday 08:30-10:25 am (THL-1, Sec-008, 010)
Recitation: Monday 10:00-11:25 am (Tier-321B, Sec-008), Tuesday 08:30-10:00 am (Tier-321B, Sec-010)
Office Hour: Tuesday and Thursday 1:00-5:00 pm, other time by appointment
Course website: http://web.njit.edu/~cao/106.htm

Pre- and Co-requisite Courses:

- Prerequisite: Phys 105 and Math 108, 109, or 110 with grade "C" or better. Co-requisite: Math 111 or an equivalent calculus course. Physics 106 will use vector operations including cross product, some differential calculus, and some elements of integral calculus.
- All students must register for a lecture and recitation section, a section of the workshop course (Physics 106W), and a section of the laboratory course Physics 106A. **If you drop any one of Physics 106, 106A, or 106W you automatically drop all three courses.**
- ***Laboratory - Physics 106A:*** The laboratory must be taken along with Physics 106 unless you passed it previously. The Lab is a totally separate course from Physics 106 but with coordinated experiments. Students receive separate lab grades and the lab instructors set the requirements and policy. The lab manual can be purchased at the bookstore; you can check the lab schedule at:

  http://physics.njit.edu/students/lab-handbook.php

Workshop – Physics 106W: You must register for a section of Physics 106W workshop and attend regularly. In the workshops you solve problems in informal, collaborative groups, aided by faculty and student TA's. Your workshop grade is counted in your overall Physics 106 grade. A letter grade of S or U for the workshop will appear on your transcript.

Course Materials:

- **Primary text (abbreviation SJ):** "**Physics for Scientists and Engineers", 8th Edition,** authors **Serway** and **Jewett**, (Thomson 2010). **We use chapters 10 - 15**. There is a custom NJIT version of this book titled "NJIT Physics 105/106" that is sold in the NJIT bookstore, as well as hardbound and paperback versions. Any version of the 8th edition with "Scientists and Engineers" in it's title that includes the chapters listed is OK. You do not need to use the publisher's on-line study and homework systems, although they might be useful.
- **University of Texas "Quest" Homework System**. You can re-use existing UT EIDs and passwords or get new ones. Students must "enroll" in this course using the 5 digit UT course number provided by their instructors. Homework assignments will be posted on-line in Quest. Students login, download assignments, solve the problems, and submit their answers to the automated grading system. More specific information is on page 2 below and will also be provided by the instructors.
- **Classroom Response System:** We will be using **"iClickers".** Each student must have an iClicker (about $40 new at the bookstore, less if bought used) which can be sold back or used for other courses like Physics 121. Students must bring them to each class. Make sure your iCLicker is marked with a serial number you can read.
- **Web Sites:** Instructors may use web sites for posting lecture notes, problems, exam results, study materials, etc. Check these sites often.
- **Email** is routinely used for announcements and to distribute material: be sure your instructor has your NJIT or another working email address that you check frequently.

Exams: There will be three Common Exams and a comprehensive Final Exam that tests for knowledge equivalent to that expected of Physics 111 students. The exam schedule is:

Common Exam 1: Friday, February 18	**8:30 – 9:45 am**
Common Exam 2: Friday, March 25	**8:30 – 9:45 am**
Common Exam 3: Friday, April 15	**8:30 – 9:45 am**
Comprehensive Final Exam: during May 5 to 11	**2.5 hours**

The exams use multiple choice questions with the requirement that you **show your work.** In-class quizzes covering the preceding week's work may be given during lectures and/or recitations. These count toward final course grades. There will be no make-up quizzes and usually no makeup common exams.

Grading: Final grades will be based on a **composite score** for the term's work that includes the common exams, the final exam, the term's homework score, short quizzes, and workshop scores. The approximate weights we plan to use in calculating the **composite score** are:

- **48% for all three common exams (16% for each)**
- **32% for the final exam**
- **8% - 12% for the total homework grade**
- **8% - 12% for the total of workshop + in-class quiz + participation grades**

Extra credit may be given for optional exam problems, for active class participation, etc. Negative credit may be applied for lateness, creating noise, or otherwise interfering with class work.

Assignments: The text readings, homework assignments, and practice assignments are listed in the one-page **schedule** on page 3. It is almost impossible to succeed in this course without working a lot of problems: do the homework.

- You should read the assigned sections of the text (Serway & Jewett) before the lecture covering that material. Download lecture notes and bring them to class.
- "Practice Problem" sets with solutions (distinct from the homework problems) are posted for you on-line. They will not be graded but are a good way to get up to speed before doing the online homework. The url is: **http://web.njit.edu/~janow/Physics 106 Spring 2011/Phys 106Janow Spring 2011.html**.
- Each student must download the weekly homework assignments from the University of Texas homework system, work the problems, and submit the solutions online before each assignment is due. Late work will not be accepted.

Attendance: Attendance will be taken at all classes and exams. More than 3 unexcused absences from lecture and recitation in any combination is excessive and may result in a notification to the Dean. If you have excusable absences contact your instructor or the Dean of First year Students. If you withdraw from the course, do it officially through the Registrar; do not simply stop attending and taking exams. Students who withdraw unofficially force the instructor to assign a course grade of "F".

Honor Code Violations or Disruptive Behavior: NJIT has a zero-tolerance policy for cheating of any kind and for student behavior that disrupts learning by others. Incidents will be immediately reported to the Dean of Students. The penalties for violations range from failure in the course with disciplinary probation up to expulsion from NJIT. Avoid any situation where your own behavior could be misinterpreted, even if it is honorable. **Students are required to agree to the NJIT Honor Code on each exam.**

Turn off all cellular phones, wireless devices, computers, and messaging devices of all kinds during classes and exams. Please do not eat, drink, or create noise in class that interferes with the work of students or instructors.

Study Groups: Many students find it helpful to form small groups that study & work on homework together. Talking about the concepts, logic, problem-solving methods, etc. with others makes it much easier to learn.

Help: If you are having difficulty, visit or email your instructor: do not simply hope for a "miracle" and fall further behind. Tutoring may be available through NJIT. The Physics Dept. office on the 4th floor of Tiernan has more specific schedule information.

Specific information for the UT QUEST homework system:

If you already have a University of Texas (UT) Guest login ID and password, you can continue to use it. Your instructor will announce the 5 digit course number you need to use when you "enroll" in Physics 106 in the UT system.

UT EID Registration, Passwords, Problems: **https://idmanager.its.utexas.edu/eid_self_help/**
Quest Student Login (Univ. of Texas): **https://quest.cns.utexas.edu/student/main**
UT Help Desk email request form: **http://www.utexas.edu/its/help/forms/mailform.html**

Fill out the following for your own future reference, and keep it someplace where you can find it:

- The unique 5 digit course number announced by your instructor: _____
- Your Login ID on the UT system (generated when you register with UT; case sensitive!): _____
- Your own password (selected upon registration with UT; confidential!): _____
- **Note that NJIT instructors can not access your UT password.**

Spring 2011 Physics 106 Assignments Draft02

Weeks start on Tuesdays. Each lecture starts a homework & recitation unit	**Text (SJ) Readings 7th or 8th Ed.**	**Homework & Other Assignments (exact due dates to be announced)**	**Labs**
Week 01: January 18-24 Rotation concepts & variables. Rotational kinematics.	**Sections 10.1 to 10.3**	**Begin HW01, due 1/24** **Practice Problem Set 01****	**Intro**
Week 02: January 25-31 Rotational dynamics I. Rotational KE. rotational inertia, torque	**Sections 10.4 to 10.6**	**Begin HW02, due 1/31** **Practice Problem Set 02**	**113**
Week 03: February 1-7 Rotational dynamics II – 2nd law & examples	**Section 10.7**	**Begin HW03, due 2/7** **Practice Problem Set 03**	**130.1-3**
Week 04: February 8-14 Rotational work & energy. Rolling. Dynamics and energy conservation applied to rolling.	**Sections 10.8 to 10.9, 11.1**	**Begin HW04, due 2/14** **Practice Problem Set 04**	**119**
Common Exam 1: February 18, Friday 08:30 - 9:45 P. M.	**Covers Lectures 1 - 3**	**Covers Sec. 10.1 to 10.7**	
Week 05: February 15-21 Cross Product, torque using vectors, angular momentum. Newton's 2nd Law again.	**Sections 11.2 t0 11.3**	**Begin HW05, due 2/21** **Practice Problem Set 05**	**132**
Week 06: February 22-28 Systems, plane rotation, conservation of angular momentum, problems.	**Section 11.4**	**Begin HW06, due 2/28** **Practice Problem Set 06**	**127.1**
Week 07: March 1-7 Equilibrium I: statics, center of gravity.	**Sections 12.1 to 12.3**	**Begin HW07, due 3/07** **Practice Problem Set 07**	**127.2**
Week 08: March 8-21 Static Equilibrium II: methods, problems.	**Sections 12.1 to 12.3**	**Begin HW08, due 3/21** **Practice Problem Set 08**	**118**
Spring Recess: March 14 to 20	**No Classes**		
Common Exam 2: March 25, Friday 08:30 - 9:45 A. M.	**Covers Lectures 4 - 6**	**Covers Sec. 10.8 – 10.9, 11. 1 to 11.4**	
Week 09: March 22-28 Gravitation I: Newton's Law of Gravitation force, potential energy, escape velocity.	**Sections 13.1 to 13.2 13.4 to 13.5**	**Begin HW09, due 3/28** **Practice Problem Set 09**	**121**
Monday, March 28		**Last Day to Withdraw**	
Week 10: March 29 – April 4 Gravitation II: Kepler's laws, celestial motion.	**Sections 13.3, 13.6**	**Begin HW10, due 4/04** **Practice Problem Set 10**	**120**
Week 11: April 5-11 Oscillations I. SHM and pendulums	**Sections 15.1 to 15.3, 15.5**	**Begin HW11, due 4/11** **Practice Problem Set 11**	**114**
Common Exam 3: April 16, Friday 08:30 - 9:45 A. M.	**Covers Lectures 7 - 10**	**Covers Sec. 12.1 to 12.3, 13. 1 to 13.6**	
Week 12: April 12-18 Oscillations II: phasors, pendulums, examples, resonance. damping	**Read Sections 15.4, 15.6, 15.7**	**Begin HW12, due 4/18** **Practice Problem Set 12**	**B**
Good Friday: April 22	**No Classes**		
Week 13: April 19-25 **Fluids: car lifts, diving, floating, flow**	**Sections 14.1 to 14.5**	**Begin HW 13, due 4/25**	**C**
Week 14: April 26 – May 2 Physics 105 & 106 Review	**Review Chaps. 1-15**	**Begin review problem sets**	**7**
Makeup day: Tuesday, May 3 Final Exam Review	**Friday Schedule**	**Last day of classes**	
Reading Day: May 4 (Wed)		**Optional Review Sessions**	
Final Exams May 5 to 11 **Grades due May 12**		**Comprehensive final exam covers all course material**	

***** posted on http://web.njit.edu/~janow***

Highlights of Spring 2011 NJIT Academic Calendar

Monday	**January 17**	**Martin Luther King's Birthday - No Classes Scheduled**
Tuesday	**January 18**	**First Day of Classes**
Monday	**January 24**	**Last Day to Add a Course**
Tuesday	**February 1**	**Last Day for a Refund Based on a Partial Withdrawal**
Sunday-Saturday	**March 13-19**	**Spring Recess - University Open - No Classes**
Monday	**March 28**	**Last Day to Withdraw from Course(s)**
Friday	**April 22**	**Good Friday- No Classes**
Tuesday	**May 3**	**Last day of NJIT Classes – Follow Friday Schedule**
Wednesday	**May 4**	**Reading Day**
Thurs - Wed	**May 5 - 11**	**Final Exam period**

Physics 106 Course - Lab Coordination - Spring 2011 rev1

Lectures	Labs
Week 01: January 18-24 Rotation concepts & variables. Rotational kinematics.	**Intro**
Week 02: January 25-31 Rotational dynamics I. Rotational KE. rotational inertia, torque	**113 Linear motion: Atwood's machine; measure a**
Week 03: February 1-7 Rotational dynamics II – 2nd law & examples	**130.1-3 Rotation: falling M; measure I**
Week 04: February 8-14 Rotational work & energy. Rolling. Dynamics and energy conservation applied to rolling.	**119 Rotation: Atwood's machine, heavy pulley**
Common Exam 1: February 18, Friday	
Week 05: February 15-21 Cross Product, torque using vectors, angular momentum. Newton's 2nd Law again.	**132 Rolling projectiles; conservation of E**
Week 06: February 22-28 Systems, plane rotation, conservation of angular momentum, problems.	**127.1 Rotation: falling M; measure τ, ω**
Week 07: March 1-7 Equilibrium I: statics, center of gravity.	**127.2 Rotation: falling M; measure K**
Week 08: March 8-21 Static Equilibrium II: methods, problems.	**118 Rotation: falling M; friction**
Spring Recess: March 14 to 20	
Common Exam 2: March 25, Friday	
Week 09: March 22-28 Gravitation I: Newton's Law of Gravitation force, potential energy, escape velocity.	**121 Torques on a strut**
Monday, March 28	
Week 10: March 29 – April 4 Gravitation II: Kepler's laws, celestial motion.	**Week 10: March 29 – April 4** Gravitation II: Kepler's laws, celestial motion.
Week 11: April 5-11 Oscillations I. SHM and pendulums	**114 Rotation: Satellite and gravity simulation**
Common Exam 3: April 16, Friday 08:30 - 9:45 A. M.	
Week 12: April 12-18 Oscillations II: phasors, pendulums, examples, resonance. damping	**B Simple oscillations**
Good Friday: April 22	
Week 13: April 19-25 **Fluids: car lifts, diving, floating, flow**	**C Physical pendulum**
Week 14: April 26 – May 2 Physics 105 & 106 Review	**7 Archimedes**