

INQ 250 PH: Take a Dive – How Things Work

Fall 2019: MWF 12:00 pm – 2:10 pm

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Office Hours: by appointment

Required Materials:

Text: INQ250PH: Take a Dive: How Things Work Coursepack, based on *Explorations in Physics*; Jackson, Laws & Franklin; Wiley & Sons, Inc., 2003

Supplies: Binder/folder used for homework, class notes and papers; a bound lab notebook with sewn graph paper pages to use in lab; basic calculator that is not on a phone or computer; *A Writer's Reference* by Diana Hacker.

Course Content Description and Teaching Methods:

This scientific reasoning course is based on the theme of sky diving and deep sea diving, designed to address the fundamental questions “why study motion and what factors contribute to the motion of an object?” The basic laws of physics applicable to motion will be investigated through experimentation. Very little formal lecturing will take place; instead the class will have a hands-on approach. To that extent, classes will consist primarily of experiments, computer-based activities, interactive discussions, exploratory worksheets, and other cooperative learning group activities. The emphasis is on understanding and not memorizing.

Intended Learning Outcomes:

All sections of INQ 250 share a common set of learning outcomes related to the skills students will develop in this course. These outcomes are:

- Students will be able to describe and apply scientific methodologies appropriate for the course's discipline and topic, including the ability to design and conduct simple experiment and to draw conclusions based upon data.
- Students will be able to write about course topics clearly and effectively.
- Students will be able to interpret quantitative information related to the course topic.

In this particular section of INQ 250, the common set of learning objectives will be developed into specific activities and assignments, so that at the completion of this course, successful students will be able to

- understand how a scientific theory relating forces and motion can be developed from experimental observations
- observe, classify, and describe physical phenomena using words, pictures, graphs, and equations
- use the scientific method to devise their own experiments to test the validity of hypotheses
- become familiar with computer-interfaced sensors and equipment
- communicate their scientific findings through reports, class discussions, and oral presentations
- demonstrate their ability to create, correctly analyze and interpret graphical data
- describe the challenges in experimental methodologies to collect unbiased data

Expectation:

This course expects you to spend at least 12 hours of work each week inside and outside of class.

Attendance:

Students are expected to attend every class. Attendance is checked at each meeting. Since this course uses a hands-on approach to learning, it is very important for each student to be present for every class. If a student accumulates four absences during the semester, a warning letter will be sent. If the fifth absence occurs, for any reason, the student may be dropped from the course with a DF. If the student is not dropped after having five or more absences, their final course grade will be

lowered one letter grade. For example, if their final grade was an 84 B, then the final grade they receive would be a 74 C.

A student will be marked as tardy if they come to class late, from one to five minutes after the posted beginning time, and will be marked as absent if they come to class after 10 minutes of the posted beginning time. If the student is tardy two times, then it will count as an absence.

Participation:

Being marked present assumes that the student has come to fully participate in class. If the student does not bring the required materials to class, sleeps in class, uses their cell phone to text or to communicate electronically with others, checks personal emails or Internet sites, wastes class time by talking with other students concerning matters not related to this course, or simply does not engage in the daily activities, then their participation grade will reflect their lack of commitment.

10 points	Comes prepared to work, with working calculator that is not a cell phone or computer; engages with group to complete the daily work on time; does not access cell phone during class
5 points	Works with group members, but does not bring all required materials or complete the daily work
0 points	Cell phone is not placed out of sight; cell phone is checked during class; student's focus is not on completing the daily work

Lab Notebook:

Each student is to purchase and bring a bound notebook with graph paper pages to lab each week. A Table of Contents will be created on the first two pages of the notebook. The third page will begin the lab activities, and each new lab will begin on the right hand page with the **lab title, date of the experiment, and page number**. You should record all answers to questions, any recording of the data, written neatly in table format, results in table format, all sample calculations for the results and error analysis in your lab notebook. Units should be included in all column headers and with all results. Graphs printed while in lab should be pasted on the left side of the page, printed so that they fit on the page without extending past the edge of the page.

Each student will have their notebook checked before leaving lab and will be graded as follows:

10 points	Your notebook entries are organized and thorough, with correct formatting for pages, tables, graphs, and written answers. All work is legible and neat.
5 points	Something is missing from the required entries, such as: no date at the top; missing activity title, notebook entries are haphazard, illegible, with units missing; data / graphs were presented in a haphazard manner; too many scratches; unclear work.
0 points	Student did not bring lab notebook, did not record data/results into notebook, or did not submit notebook before leaving lab..

Due to the time limitations during lab, the notebook check will be brief and each week a different part of the lab information will be checked. When absent from class, the student is still responsible for the work and should copy the data/and or graphs from lab partners, and complete any other work in their lab notebook within one class day of their return to class. It is the student's responsibility to complete the work and to ask to have their lab notebook checked after being absent; failure to do so will result in a zero being recorded for the notebook check.

Daily Assignments:

Daily assignments incorporate several areas: class work, homework, and quizzes. Each assignment is worth 20 points, and all types of daily assignments are weighted equally.

Class work may be graded individually or as a group. Included in class work are daily questions concerning lab activities, class worksheets, and graphing activities. If absent when a class assignment is graded, a zero is recorded. So it is important to be in class!

Homework is assigned weekly and is graded. Each assignment is due at the beginning of class on, and is to be submitted individually. You may seek and receive additional assistance for each

homework assignment without violating any academic integrity policies. If you are absent when an assignment is due, the assignment is still due at the beginning of class and it can be submitted electronically or sent via another student.

Quizzes will be on Fridays when announced and no makeup quizzes will be given. It is possible to schedule to take a quiz early, if you are going to be absent for a college function, but arrangements for taking the quiz must be made two class periods before the absence will occur. Each quiz will be taken individually and the work is subject to the college's academic integrity policies. When calculating the daily assignment average for the semester, the **four lowest grades** will be dropped.

Exams:

There will be two unit exams and one final exam. The final exam is cumulative. Please refer to the course schedule for the exam dates.

Make-up exams will be given only at the discretion of the instructor. Make-ups will be considered only in the event of **prior notification of the absence**. Otherwise, a missed exam (which is worth 15% of the semester grade) results in the final exam counting an additional 10%.

Electronic Devices Usage Policy:

Computers in the lab are networked and you are required to log onto them with your username and password. **Do not save any work to the desktop**, because it will be erased when logging off the computer at the end of class. **Save all work to your Z drive.** Printing graphs will be necessary throughout the semester for lab notebooks, and the printers in the lab are to be used for that purpose. Documents for other classes or for personal use are not to be printed from the computer in the room. **Computers, including laptops, are not to be used to check email or access the Internet for personal reasons during class.** Also, MP3 players, cameras and other personal devices are not to be used during class, except cameras may be helpful during project time. Personal laptops and calculators may be used as directed.

Out of courtesy to others, **all cell phones should be silenced** upon arrival to class and should be out of sight, preferably in a backpack or personal bag. This means that you are **to refrain from texting** while in class, since your cell phone will not be out of your backpack or personal bag.

MCSP Conversation Series:

The Math/Computer Science/Physics professors will be presenting talks to Roanoke College students throughout the semester. The schedule is located online at <http://cs.roanoke.edu/MCSPSeries/> You are required to attend one session for the entire length of the talk and questioning time, listen attentively, and write a one page summary paper, that also includes your justified critique of the talk. **To receive credit for attending the talk, the written assignment is to be received within 2 class days of that lecture.** Attending a talk and submitting a paper within the required 2 class days will provide you with 5 extra points added to your next exam score. Up to three lectures may be attended and extra credit given, provided the papers are submitted within the allotted time. Failure to attend a lecture, or to submit an adequately written paper within the allotted time will result in no additional points being added.

Projects: During this semester, you will participate in two group projects. It is expected that each individual member of the group will share equally in the work. A document explaining the required elements of the project will be given to all students closer to the start of projects.

Grading : At the end of the semester, grades will be determined as follows:

Grade Determination:

Daily Assignments	20 %
Lab Notebook	10%
Participation/Lab Work	5%
2 Unit Exams	15 % each
Unit A Project	10 %
Unit D Project	5 %

Grading Scale:

A: ≥ 93	A-: 90-92.9	B+: 87-89.9
B: 83-86.9	B-: 80-82.9	C+: 77-79.9
C: 73-76.9	C-: 70-72.9	D+: 67-69.9
D: 63-66.9	D-: 60-62.9	F: <60

Students With Special Academic Needs:

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Laura Leonard, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Laura Leonard at your earliest convenience to schedule an appointment. You need to discuss your accommodations with her before they can be implemented. Also, please note that arrangements for extended time on exams in a distraction-reduced environment must be made with the Center for Learning & Teaching at least 2 weekdays (M-F) *before every exam*.

Course Restrictions:

Be aware that if you have received credit for any other higher level physics courses at Roanoke College, you cannot receive credit for this course.

Food, Drink, and Tobacco Use:

No food items should be brought into the lab, as the lab surfaces are not sanitized and food particles may damage the lab equipment. Bottled water may be brought into the lab as long as the bottle is capped when resting on the lab table. Chewing tobacco is not allowed in the lab.

Inquire:

Log-in to Inquire on the College website. This will give you access to the syllabus, homework assignments, other useful documents, and any class announcements. Make sure to check the Inquire website regularly!!! No excuses can be made and no extensions can be granted if you miss a deadline that was posted on Inquire.

Academic Integrity:

The College academic integrity policies are vigorously enforced. All quizzes and exams are to be your individual work, without assistance from any other source. Projects and class activities are to be a collaborative work between individuals within your group. Outside assistance may be sought on homework, but the work submitted for a grade must reflect your understanding of the material and not exact answers copied from another's work.

Course Outline:

	Topic
Aug 28	Intro to the course
Aug 30-Sept 25	11 Unit A Activities, and Exam Review (Sept 25)
Sept 27	Unit A Exam
Sept 30-Oct.11	Unit A Project (6 class periods)
Oct 14-18	Fall Break – No Classes
Oct 21	Report Writing/Presentation Preparation
Oct 23	Unit A Project Presentations
Oct 25-Nov 13	8 Unit D Activities (no class on Nov. 4, I'm out of town)
Nov. 15	Unit D Exam review
Nov. 18	Unit D Exam
Nov 20-Dec 2	Unit D Projects (4 class periods)
Nov. 27-29	Thanksgiving break – no classes
Dec 4	Unit D Presentations
Dec. 6	Last Day of Class/Review for Final Exam
Final Exam	(Block 5) Wed, Dec. 11 2-5 PM