RELLIS · Natural Sciences · Physics - PHYS

# University Physics I

## PHYS-2325

Spring 2020 Section C12 CRN-26074 3 Credits 01/21/2020 to 05/14/2020 Modified 01/21/2020

## Meeting Times

### Lecture

Monday, Wednesday, Friday, 9:00 AM to 9:50 AM, SCHW 298

## Contact Information

### Professor: Dr. Terrence Honan

**Email:** thonan@blinn.edu
**Office:** SCHW 430H
**Phone:** 979-209-7420

### Office Hours

Monday, Wednesday, Friday, 10:00 AM to 10:50 AM, SCHW 430H

Tuesday, Thursday, 9:40 AM to 10:25 AM, SCHW 430H

Tuesday, Thursday, 3:00 PM to 4:00 PM, SCHW 430H

## Description

**3 lecture hours per week; 48 total contact hours. Credit: 3 semester hours.**

Fundamental principles of physics, using calculus, for science, computer science, and engineering majors; the principles and applications of classical mechanics, including harmonic motion, physical systems and thermodynamics; and emphasis on problem solving.

**Requisites**

**Prerequisites:** MATH 2413.

## Core Curriculum Statement

This course is not a core curriculum course.

## Outcomes

1. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration.
2. Solve problems involving forces and work.
3. Apply Newton's laws to physical problems.

4. Identify the different types of energy.
5. Solve problems using principles of conservation of energy.
6. Define the principles of impulse, momentum, and collisions.
7. Use the principles of impulse and momentum to solve problems.
8. Determine the location of the center of mass and center of rotation for rigid bodies in motion.
9. Discuss rotational kinematics and dynamics and the relationship between linear and rotational motion.
10. Solve problems involving rotational and linear motion.
11. Define equilibrium, including the different types of equilibrium.
12. Discuss simple harmonic motion and its application to real-world problems.

# Materials

- **Required Textbook:** Young and Freedman, University Physics, 15th edition. The full two-semester e-book including Mastering Physics may be purchased for around $110 through the Mastering Physics link in eCampus.
- **Required Homework System:** Students must purchase an access key to Mastering Physics, the textbook publisher's online homework system. This is bundled with the textbook at the Blinn bookstore. Students should log in through eCampus and those who need to purchase a copy can do so through the eCampus link.
- **Scientific Calculator:** Students must have a proper scientific calculator with them for every class.
- **Interactive Lecture Notes:** Lecture notes will be provided in two formats. For printing a standard .pdf format file will be posted. An interactive version will also be available as an .cdf file format; to open these one must have a computer (Windows, OS X or Linux) with *Wolfram CDF Player* installed on it. To download this *free* player go to: www.wolfram.com/cdf-player/ . Students may bring notebook computers to class but must use them only for following these notes.
- **Other Web resources:** problems with solutions, the exam formula list and previous exams with answers.
- **Mathematica and Wolfram Alpha Pro:** Blinn now has an unlimited site license to Mathematica and to Wolfram Alpha Pro. Students may download free copies of these programs for their personal computers. The download links can be found here: Mathematica/AlphaPro Download

# Course Requirements

There will be four major exams, several take-home group quizzes, online homework and a cumulative final.

- **Major Exams and Final:** The four major exams and final will be closed book/closed note tests. A formula list will be provided; the exam formula list can be found at the web site.
- **Take-home Group Quizzes:**The quiz grade will consist of 30 point quizzes. There will be no make-up quizzes, for any reason. At least 20% of the quiz grades will be dropped. Quizzes will typically be open book / open note. After dropping, all the remaining quiz grades will be added and rescaled to 100 points.
- **Online Homework:** We will use the textbook publisher's online homework system, Mastering Physics. Each assignment will have a due date. One assignment will be dropped, the one that gives the student the maximum benefit. Mastering Physics will not be reopened at the end of the semester; assignments must be completed by the due date for credit. The final point total for the semester will be rescaled to 100 points.

# Evaluation

**Criteria for Grading**

There will be 4 major exams, each worth 12%. The take-home group quiz grade is 18% and the homework grade is 12%. The remaining 22% is the final. An alternative method is provided to partially alleviate a poor performance on one major exam; half of the lowest (curved) exam grade is replaced with the curved final exam grade. The final average is calculated both ways; the grade will be the higher of the two.

| Category | Normal | Alternative |
|---|---|---|

| | | |
|---|---|---|
| Four Major Exams | 12% ×4 | 12% ×3 + 6% |
| Take-home Quiz | 18% | 18% |
| Online Homework | 12% | 12% |
| Final Exam | 22% | 28% |

| The grading system of Blinn College is as follows*: | | |
|---|---|---|
| A | 90 - 100 | Superior |
| B | 80 - 89 | Above Average |
| C | 70 - 79 | Average |
| D | 60 - 69 | Passing |
| F | < 60 | Failing |
| *from Board Policy Manual EGA(LOCAL) | | |

# Blinn College Policies

All policies, guidelines, and procedures in the Blinn College Catalog (http://catalog.blinn.edu/), Blinn College Board Policies (http://pol.tasb.org/Home/Index/1204), and the Blinn College Administrative Regulations (https://www.blinn.edu/administrative-regulations/) are applicable to this course.

Specific information on civility, attendance, add/drop, scholastic integrity, students with disabilities, final grade appeal, alternative retailers, campus carry and proctoring arrangements and cost. (http://www.blinn.edu/syllabus-policies/)

Notice of any action taken under these protocol and procedures, by Blinn College or its employees, may be delivered by hand, through the U.S. Postal Service, or electronically to the student's Blinn Buc e-mail account. Notice shall be deemed received upon actual receipt, on deposit in the U.S. Mail, or upon entering the information processing system used by Blinn College for Blinn Buc e-mail accounts, whichever first occurs.

# Course Policies

**Attendance Policy Reminder**: Attendance will be taken each class. Not being in class when attendance is taken constitutes an absence. For classes that meet three times a week during the semester, three absences counts as one week's absence. Students accumulating two week's worth of absences (six unexcused absences) will be dropped.

**Conflict Resolution:** To resolve any conflict students must follow a chain of command. First you should deal directly with your professor, then the Department Head (Ms. Rachel Sanchez rachel.sanchez@blinn.edu (mailto:rachel.sanchez@blinn.edu)), then the Assistant Dean (Dr. Beverly Clements bclement@blinn.edu) and finally the Dean (Dr. Elmer Godeny elmer.godeny@blinn.edu (mailto:elmer.godeny@blinn.edu))

**Eating and Drinking:** Eating and drinking are not allowed in classrooms.

**Electronic Devices:** It is never acceptable to leave a class to answer a cell phone. Texting during class is totally unacceptable. Any use of a cell phone or other wireless device during an exam will be considered a major incident of scholastic dishonesty.

**Credit for Work:** On the major exams, final and all quizzes, all work must be shown and clearly documented for any show-your-work problem. The starting point in problem solving *must* be some expression on the official exam formula list for the class. Memorized intermediate expressions will receive no credit unless their derivation is included.

**Grading and Regrading:** On the major exams, final and all quizzes, partial credit will typically be available for show-your-work problem. For each problem I find a grading scheme that is appropriate for that problem and then do my best to apply that scheme uniformly across all the exam papers. It is a priority to maintain consistency across all test papers. Inaccurate grading, relative to that scheme, will be regraded to maintain fairness. Any regrading requests must be made promptly (within two weeks) after a test is returned in class to be considered.

# Schedule

**Course Content and Approximate Schedule**

| Chapter from Lecture Notes | Textbook Chapter |
|---|---|
| A - Units and Dimensions | 1.1-1.6 |
| B - One Dimensional Kinematics | 2 |
| C - Vectors and Two Dimensional Kinematics | 1.7-1.9, 3 excluding 3.4 |
| D - Newton's Laws and Applications | 4, 5.1-5.3 |
| E - Circular Motion and More Applications | 3.4, 5.4, 5.5 |
| F - Work and Energy | 1.10 (Scal. Prod.), 6, 7 |
| G - Momentum and Systems of Particles | 8 |
| H - Rotational Kinematics and Energy | 9 |
| I - Rotational Dynamics and Equilibrium | 1.10 (Vec. Prod.), 10, 11.1-11.3 |
| J - Universal Gravitation | 13 |
| K - Oscillatory Motion | 14.1-14.6 |
| L - Waves | 15.1-15.5 |
| M - Temperature and Heat | 17.1-17.3, 17.5-17.6 |
| N - Ideal Gases and the First Law of Thermo. | 18.1, 18.2, 19.1-19.5 |
| O - Entropy and the Second Law of Thermo. | 20 |

| Wk. | Day/Date | Material Covered | Lec. Mins. | Weekly Contact Hours |
|---|---|---|---|---|
| 1 | Mon. 1/20 | **Holiday - MLK Day** | 50 | 3 |
| | Wed. 1/22 | Review Syllabus, Start Chapter A | 50 | |
| | Fri. 1/24 | Chapter A, Start Chapter B | 50 | |
| | Mon. 1/27 | Continue Chapter B | 50 | |

| 2 Wk. | Day/Date | Material Covered | Lec. Mins. | Weekly Contact Hours |
|---|---|---|---|---|
| | Wed. 1/29 | Continue Chapter B | 50 | |
| | Fri. 1/31 | Finish B, Start Chapter C | 50 | |
| 3 | Mon. 2/3 | Continue Chapter C | 50 | |
| | Wed. 2/5 | Continue Chapter C | 50 | 3 |
| | Fri. 2/7 | Finish C, Start Chapter D | 50 | |
| 4 | Mon. 2/10 | Chapter D thru. D.4 | 50 | |
| | Wed. 2/12 | Continue Chapter D | 50 | 3 |
| | Fri. 2/14 | **Test 1 – Chapters A through D.4** | 50 | |
| 5 | Mon. 2/17 | Finish Chapter D | 50 | |
| | Wed. 2/19 | Start Chapter E | 50 | 3 |
| | Fri. 2/21 | Finish Chapter E | 50 | |
| 6 | Mon. 2/24 | Start Chapter F | 50 | |
| | Wed. 2/26 | Continue Chapter F | 50 | 3 |
| | Fri. 2/28 | Finish Chapter F | 50 | |
| 7 | Mon. 3/2 | Start Chapter G | 50 | |
| | Wed. 3/4 | Continue Chapter G | 50 | 3 |
| | Fri. 3/6 | **Test 2 – Chapters D.5 through F** | 50 | |
| | 3/9 - 3/13 | **Spring Break** | | |
| 8 | Mon. 3/16 | Continue G | 50 | |
| | Wed. 3/18 | Finish G, Start Chapter H | 50 | 3 |
| | Fri. 3/20 | Continue Chapter H | 50 | |
| 9 | Mon. 3/23 | Finish Chapter H | 50 | |
| | Wed. 3/25 | Start Chapter I | 50 | 3 |
| | Fri. 3/27 | Continue Chapter I | 50 | |
| 10 | Mon. 3/30 | Continue Chapter I | 50 | |
| | Wed. 4/1 | Continue Chapter I | 50 | 3 |
| | Fri. 4/3 | Finish I, Start Chapter J | 50 | |
| 11 | Mon. 4/6 | Continue Chapter J | 50 | |
| | Wed. 4/8 | **Test 3 – Chapters G through I** | 50 | |
| | Fri. 4/10 | **Holiday - Good Friday** | 50 | 3 |

| Wk. | Day/Date | Material Covered | Lec. Mins. | Weekly Contact Hours |
|---|---|---|---|---|
| 12 | Mon. 4/13 | Continue Chapter J | 50 | 3 |
| | Wed. 4/15 | Finish J, Chapter K | 50 | |
| | Fri. 4/17 | Finish Chapter K | 50 | |
| 13 | Mon. 4/20 | Chapter L | 50 | 3 |
| | Wed. 4/22 | Start Chapter M | 50 | |
| | Fri. 4/24 | Continue Chapter M | 50 | |
| 14 | Mon. 4/27 | Finish Chapter M, Start Chapter N | 50 | 3 |
| | Wed. 4/29 | Chapter N | 50 | |
| | Fri. 5/1 | **Test 4 – Chapters J through M** | 50 | |
| | Fri. 5/1 | **Last Day to Drop with a Q** | | |
| 15 | Mon. 5/4 | Finish Chapter N | 50 | 3 |
| | Wed. 5/6 | All Chap. O | 50 | |
| | Fri. 5/8 | Finish Material | 50 | |
| 16 | Wed. 5/13 | **Cumulative Final - SCHW 298, 10:15-12:30** | 150 | 3 |
| | | | **Total** | 48 |

*Note: In the Carnegie Hours system, 50 minutes = 1 contact hour.