

PHYSICS 161L  
SPRING 2021

Prof. Gene Bickers

Email: bickers@usc.edu

Synchronous lecture hours: TuTh 2–3:50 PM PST

Synchronous office hours: TuTh 4–6 PM PST and by appointment

NOTES

This is the first course in a three-semester introductory honors sequence in physics. Math 126 (Calculus II) is a prerequisite and Math 226 (Calculus III) is a corequisite. Both differential and integral calculus will be used throughout the course. The statics and dynamics of particles and rigid bodies, wave motion, relativistic kinematics, and elementary thermal physics will be covered this semester.

TEXTS:

Kleppner and Kolenkow: *An Introduction to Mechanics*

Second Edition, Cambridge University Press

Bickers notes on oscillations, waves and thermal physics

Physics 151L/161L Laboratory Manual (online)

ONLINE COURSE SUPPORT:

The PHYS 161 home page is on Blackboard (<https://blackboard.usc.edu>). Under the home page you will find a copy of this lecture syllabus and schedule; homework and quiz assignments; scanned images of solutions for completed homework; copies of examinations from previous semesters; and webcasts for help with the problem sets.

HOMEWORK:

Homework will be assigned every seven to ten days. **Use of solutions from previous semesters or online sources is an academic integrity violation.** Two or three take-home “quizzes” (essentially pledged homeworks sets) will be assigned over the course of the semester. **No outside help or collaboration is allowed on these quizzes.**

Each homework set or quiz has a target date. If an assignment is submitted online before 9 AM Pacific time on the day following the target date, it is considered on-time. If the assignment is turned in later than that, “late days” are assessed. Note that Blackboard automatically records a date stamp.

**Everyone is allowed up to ten late days over the course of the semester with no point penalty.** You may choose to use late days on homework sets or quizzes as you see fit. Weekends and holidays do not count toward the late-day total.

Your late day total will be updated online whenever you turn in an assignment. Once the tenth day is reached, any subsequent assignment must be turned in by the target date in order to receive full credit. If you turn in an assignment that pushes your late-day total to exactly eleven days, that one assignment will receive half-credit. Any assignment after that must be turned in by the target date to receive any credit.

The homework problems are generally very challenging. Help with homework problems is provided in an online video directory. **It makes sense to try working problems first before turning to a video for clarification.** Homeworks will be graded online, and homework solutions will be posted.

#### LABORATORY:

The Physics Department is providing at-home lab kits this semester. **The plan is for labs to begin the week of February 1.** There is nothing to purchase for the lab. I'll let you know more as soon as I hear.

The laboratory grade determines 20% of the final course grade. Questions concerning the laboratory should be referred to your TA or the laboratory director Dr. Gökhan Esirgen (esirgen@usc.edu).

#### EXAMS:

There will be two midterm exams and a final exam. **All exams will be open-book, with several days allowed for completion.** Midterm 1 will be posted on **Thursday, February 18**, and Midterm 2 on **Thursday, March 25**. The final exam will be posted on **Wednesday, May 5**. The course grade will be based on classroom and laboratory grades – 80% from the classroom and 20% from the lab.

The classroom grade will be based on the following distribution of points:

Midterms	$2 \times 200 =$	400
Homework		200
Quizzes		150
Final		250
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	Total:	1000

Please seek assistance immediately if you are having difficulty with the course. Help is available from me and any of the teaching assistants.

## TENTATIVE SCHEDULE

Week	Start date	Chapter	Subject
1	1/19	1	vectors, kinematics
2	1/26	1	kinematics, polar coordinates, tension
3	2/2	2, 3	Newton's Laws, gravity, friction
4	2/9	3, 4	Newton's Laws, momentum
5	2/16	4	mechanical systems, center of mass
6	2/23	5	work, kinetic and potential energy
7	3/2	6	conservation laws, collisions
8	3/9	7	rigid body motion, angular momentum
9	3/16	7, 8, 11	angular momentum, oscillations (free and damped)
10	3/23	Bickers notes, 12	traveling and standing waves, interference, introduction to Special Relativity (SR)
11	3/30	12	Lorentz transformations, 4-vectors
12	4/6	13, Bickers notes	Doppler effect, relativistic momentum and energy, thermodynamic variables
13	4/13	Bickers notes	collision time in gases, specific heat, First Law
14	4/20	Bickers notes	heat cycles, efficiency
15	4/27	Bickers notes	entropy, Second Law, REVIEW

## IMPORTANT DATES

Midterm Exam #1 posted – Thursday, February 18

Midterm Exam #2 posted – Thursday, March 25

Last day to drop with a “W” or change to Pass/No Pass – Friday, April 30

Last day of class – Thursday, April 29

Final Exam posted – Wednesday, May 5

#### STUDENTS WITH DISABILITIES:

Students who need to request accommodations based on a disability are required to register each semester with the Office of Disability Services and Programs (DSP). In addition a letter of verification to the instructor from DSP is needed for the semester you are enrolled in this course. If you have any questions concerning this procedure, please contact the instructor and DSP.

#### ACADEMIC INTEGRITY:

Homework assignments may be done in collaboration with other students, and help is also available as noted above. **Under no circumstances should students seek out homework solutions from alumni of Physics 161 or from any other printed or online source.**

Quizzes are essentially PLEDGED homework sets. **Collaboration on quizzes is not allowed.** The other rules for homework hold for quizzes.

Failure to abide by these rules will result in an automatic zero for the assignment and a report to the Office for Academic Integrity.

#### OMBUDSMAN SERVICE:

All courses in the Department of Physics & Astronomy have an assigned Student Ombudsman to serve students as a confidential, neutral, informal and independent resource when they wish to discuss issues concerning their course without directly confronting their instructor. The Student Ombudsman for this course is

Professor Chris Gould  
gould@usc.edu  
213-740-1101  
SSC 204.

#### SUPPORT SYSTEMS:

Student Counseling Services ([studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)) - (213) 740-9355. Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline ([suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)) - 1 (800) 273-8255. Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services ([studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)) - (213) 740-9355 on call 24/7. Free and confidential therapy services, workshops and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity and Title IX ([eeotix.usc.edu](http://eeotix.usc.edu)) - (213) 740-5086. Works with faculty, staff, visitors, applicants and students around issues of protected class.

Office of Disability Services and Programs ([dsp.usc.edu](http://dsp.usc.edu)). Provides certification for students with disabilities and helps arrange relevant accommodations.

Campus Support and Intervention ([campussupport.usc.edu](http://campussupport.usc.edu)). Assists students and families in resolving complex issues adversely affecting student success (personal, financial, and academic).

Diversity, Equity and Inclusion ([diversity.usc.edu](http://diversity.usc.edu)). Information on events, programs and training, diversity representatives for each school, chronology, participation and student resources.

USC Emergency Information ([emergency.usc.edu](http://emergency.usc.edu)). Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety ([dps.usc.edu](http://dps.usc.edu)) - UPC: (213) 740-4321 - HSC: (323) 442-1000. 24-hour emergency or to report a crime. Provides overall safety to USC community.