

# Thermodynamics and Statistical Mechanics (PHYS 486) Syllabus

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## 1 How to Find Me

The best way to reach me is **e-mail**, [edis@truman.edu](mailto:edis@truman.edu). My office phone is 785-4583, but I don't check messages often.

My office is MG 3004, and I will have office hours on Tuesdays and Thursdays: 13:30–14:50, Wednesdays: 16:30–18:00. If you want to see me then, come knock on my office door, which I will keep closed. Don't worry, you won't interrupt anything important. Then go and hang around the blackboard immediately outside my office door. I will put my mask on and come out, and talk with you outside my office, using the blackboard.

I'm available remotely at a lot of other times as well. Check my **calendar** ([edis.sites.truman.edu/schedule/](https://edis.sites.truman.edu/schedule/))—any time in which I am not actually teaching or have another meeting scheduled, I might be able to talk to you on Zoom as well. Emailing me ahead of time is best: that way, we can set up a time that is good for both of us, and I'll put it on my calendar so that others can see that it's not available. In any case, my Zoom meeting ID is 711 943 0930.

If campus shuts down and everything becomes remote due to the virus getting out of hand, all my office hours will become remote office hours.

I will be using the web to post course-related notices and documents. Bookmark the course page: [edis.sites.truman.edu/thermo/](https://edis.sites.truman.edu/thermo/).

## 2 Course Description

Thermodynamics is one of the most practical areas of physics. It involves macroscopic quantities that are experimentally accessible and described by a mostly familiar mathematical apparatus. And then there is statistical mechanics, which roots thermodynamics in the microscopic and quantum mechanical behavior of vast numbers of particles. This is more conceptually challenging. This course will go deeper into both thermodynamics and statistical mechanics, building on what you have seen in your previous courses. As always, physics demands plenty of math, but if you have a good understanding of what you learned in Mathematical Methods (PHYS 382), that should be good enough.

## 3 Schedule

**Class:** Tuesday and Thursday 16:30–17:50, MG 1099.  
Wednesday 15:30–16:20, MG 1099.

If the virus forces us all to go remote, we will have some options. We can meet on Zoom instead of in person, but I don't like that, so I may even consider hauling a whiteboard outside and teaching in the open air.

## 4 Course materials

Your textbook will be Daniel V. Schroeder, *Thermal Physics*. I am not going to follow every detail—I picked it as a textbook so that you can see a slightly different approach than what I will present in lectures. Between me and the book I hope you will find something that will work for you.

## 5 Homework and Recitations

Your homework assignments will determine 25% of your final grade. The list of assignments follows; I will announce when each is due in class—normally about a week after we are done with each particular chapter.

I do not mind you discussing the homework with one another as well as with me. I will give hints if you come by my office and ask. However, I

expect you to turn in the results of your own efforts—not group solutions, and certainly not solutions directly taken from someone else. If I find homeworks too similar to each other, especially if they make the same mistakes, you will have some explaining to do.

Before each homework set is due, we will also solve the recitation problems in class. I won't grade you on the recitations, though I will ask you to come up and solve them before the class. You don't have to get them right, and getting stuck is fine—I'll be there to help. The idea is to have me see you how you approach these things and help set you on the right path.

We will negotiate who gets which recitation problem during class.

Chapter	Recitation	Homework
1.	21, 25, 34, 41	19, 24, 33, 44, 45, 55
2.	17, 24, 27, 33	8, 16, 23, 28, 35
3.	11, 23, 31, 36	10, 25, 34, 37
4.	2, 18	1, 16
5.	8, 35, 47, 50	9, 12, 14, 32(no d), 48, 51
6.	12, 16, 31, 48	6, 18, 19, 20(no a), 39, 42, 47
7.	16, 23, 33, 40	17, 24, 34, 43, 44
7.	52, 67, 62, 73(no c)	51, 53, 64, 66

## 6 Exams

The default option is three take-home exams with somewhat lengthy questions, each determining 25% of your final grade. If you prefer another arrangement, we can discuss alternatives. I'm flexible.

**I expect you to work on all exams strictly alone, without *any* discussion with others inside and outside of class. I also expect you not to use online resources such as web sites and discussion groups to give you hints or solutions. *In contrast, I encourage and expect you to discuss the questions with me.***

In other words, I expect your exam process to include a dialogue with me. Don't keep quiet; ask questions. Exams are not supposed to be an ordeal but an opportunity for you to learn physics.

## 7 Final grades

If you get less than 50% in your overall grade, you will certainly fail, and 90% or better will certainly be an A, but otherwise, I don't want to declare rigid boundaries such as "65%–77% is a C" and so forth. This is a small class and I will get to know how you do physics fairly well. What will matter most for your grade is my professional judgment about how well you come to understand the fundamentals of thermodynamics and statistical physics.

If you want to know how you are doing, or what sort of performance on the final you would need for an A, or have similar grade-related concerns, just ask me. I should be able to give you a fair estimate of where you stand.

## 8 Attendance Policy

You will need to be present in the classroom to do well in this course. But it's *your* responsibility to make sure you do well. I will not spend time keeping track of your attendance, and if you're not there, I will assume you have good reason to be absent. For example, if you are sick, please stay home! You don't need to tell me when you expect not to be present.

It is very hard to arrange for make-ups for exams or homework in a course like this. So I expect you will do everything possible to turn your work in on time, and so avoid later hassle for both me and yourself.

Nevertheless, you may find you have missed something because of a legitimate excuse like being badly sick or a death in your family. In this case, get in touch with me, and I will decide, on a case-by-case basis, how to make up what you have missed. I will typically assign you some appropriate extra work, have you take a make-up exam, or something similar.

## 9 Academic Integrity

I care about maintaining academic integrity, and I will apply all Truman policies concerning **academic dishonesty**. I expect you to be familiar with the **Student Conduct Code**.

Do not present something that is not your own work as your own, whether you get it from another student or online.

## 10 Lawyer Avoidance

Truman policy and federal regulations require that students demonstrate that they are academically engaged in the courses they take. You must meet this requirement within the first calendar week of the semester, beginning at 12:00 am on Monday, August 23 and ending 11:59 pm Saturday August 28. Failure to do so, or to provide an explanation of an extenuating circumstance by that date and time will result in your removal from the course. Under certain circumstances, removal could impact your scholarship eligibility or financial aid. For the purposes of this class, establishing academic engagement requires, at a minimum, showing up at a lecture or lab.

Consistent with guidance for higher education institutions from the Centers for Disease Control and to help us reduce the possible spread of COVID-19, when this class meets, or you attend office hours, you will be required to wear a face covering that completely covers your nose and mouth. You will be expected to keep the covering on at all times while we are meeting. In the event you arrive to class without a face covering, you will be asked leave until you are able to obtain one and return. Thank you for your help in containing this virus and helping to protect your peers.

The minimum investment of time by the average Truman student necessary to achieve the learning goals in this course are not less than one hour (50 minutes) of classroom instruction and a minimum of two hours of out of class student work each week per credit hour awarded or at least the equivalent of three hours (2:50) of laboratory work, internships, practica, and other academic work each week per credit hour awarded. This average time per week for an average student may have weekly variations.

To obtain disability-related academic accommodations students with documented disabilities as soon as possible. Truman complies with ADA requirements. For additional information, refer to the [Office of Student Access and Disability Services website](#). You may also contact OSA by phone at (660) 785-4478 or email [studentaccess@truman.edu](mailto:studentaccess@truman.edu).

In each classroom on campus, there is a [poster of emergency procedures](#) explaining best practices in the event of an active shooter/hostile intruder, fire, severe weather, bomb threat, power outage, and medical emergency. Students should be aware of the classroom environment and note the exits for the room and building. For more detailed information, please consult the [Emergency Guide for Academic Buildings](#). A [six-minute video](#) provides some basic information on how to react in the event there is an active shooter in your location.

Truman students, faculty, and staff can sign up for the TruAlert emergency text messaging service via TruView. TruAlert sends a text message to all enrolled cell phones in the event of an emergency at the University. To register, sign in to TruView and click on the “Truman” tab. Click on the registration link in the lower right of the page under the “Update and View My Personal Information” channel on the “Emergency Text Messaging” or “Update Emergency Text Messaging Information” link. During a campus emergency, information will also be posted on the [TruAlert website](#).

Truman State University and its faculty are committed to supporting our students and fostering an environment that is free from bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g., sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member is a “mandated reporter” and must notify Truman State University’s Title IX Coordinator (Violette Hall 1308, 785-4354) and share the basic facts of your experience. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with resources both on and off campus. If you would prefer to have a confidential conversation about an experience, the counselors at University Counseling Services are *not* mandated reporters and they can be reached at 660-785-4014. For after-hours crisis counseling, call 660-665-5621. For more information regarding Truman’s policies and procedures relating to any form of gender discrimination, please consult Truman’s [Non-discrimination Policy](#) and [Complaint Reporting and Resolution Procedure](#).

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containing this virus and helping to protect your peers.

Education records are subject to the Family Education Right to Privacy Act (**FERPA**). As a result, course grades, assignments, advising records, etc. cannot be released to third parties without your permission. There are, however, several exceptions about which you should be aware. For example, education records can be disclosed to employees or offices at Truman who have an “educational need to know.” These employees and offices may include your academic advisor, the Institutional Compliance Officer, the Registrar’s Office, or Student Affairs depending on the type of information.

Behavior that persistently or flagrantly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students’ ability to learn and an instructor’s ability to teach. A student responsible for disruptive behavior may be asked to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Conduct.

As part of the mindless nonsense that is required for a syllabus, I’m supposed to provide learning outcomes. Your learning outcome for this course: learning the fundamentals of statistical mechanics and thermodynamics, evidenced by a passing grade.