

Physics 3705: Thermophysics Laboratory

Course Outline

Description: (From the course catalog) “Experimental work designed to supplement PHYS 3705. Three hours per week.”

This course is part of the technical writing requirement for the physics major/minor. Each report in this course will require draft writing and proof reading. Thus there will be considerable emphasis placed on the format of the lab report and the writeup. The report should follow, as closely as possible, the format of articles published in *The Physical review*. More on what that means later; templates for the format in TeX will be provided.

Prerequisites: (From the course catalog) Prerequisite or concurrent PHYS 3705.

Textbook: There is no textbook per-se for this course. Handouts for each of the laboratories will be given.

Attendance: Attendance will be recorded for each of the laboratory groups and sections. At the beginning of each laboratory section we will be meeting in the seminar room, each Monday before going to the Laboratory from 2pm-5pm in room WB 2016 unless instructed otherwise.

All students in each group must be present in the laboratory during the entire laboratory and take part otherwise the lab cannot be done.

Laboratory Report: Once each Week; there is need for only one writeup per group (three folks per group). On each laboratory one of the group members (on a rotating basis) will be the *principal investigator* of that lab report. It is the responsibility of the principal investigator to divide up the work in the lab, collect the final results for the draft and to turn the draft and final copies in on time. The rough draft for each report is due one week after the experiment is performed. The more complete the rough draft the more comments can be made to the draft and the more refined will be the final copy. A rough draft will be graded out of 20 points and the final report will be graded out of the remaining 80 points, so it is really imperative that you complete the draft on time and that it is done as well as can be.

The draft grade will comprise completeness, physical review format, description of how the error analysis is going to be computed and the legibility of the raw data table.

The final draft grade will be on completeness, format, how completely corrections from draft that are addressed in the final copy, the cogency of the analysis, the rigor and application of the error analysis to the conclusions of the lab.

You must turn in the rough draft with the final draft, stapled together.

Grading Policy: The grade will consist entirely of your laboratory grades. There will be 15 total laboratories.

Thus, at the conclusion of the semester each person in the class will have 4-5 reports on which they were director and 10 on which they were contributing authors.

The overall course grade will be computed from a composite of the 4 reports on which you were director and the 8 remaining laboratories in a 60-40 mix, respectively.

The grading scale will be

85+ A
75-85 B
60-75 C

50-60 D

50- F

This means that it is up to you to make sure that your group is functional, but that if your group is non-functional you can still pass the class (with a D) if you do outstandingly well on all your reports as director.

There is strong evidence indicating that mixed gender lab groups typically lead to better overall outcomes (learning, quality of experience, grades) than non-mixed.

Lab List: We will complete 15 labs in thermo-physics over the course of the semester. Some of them will be chosen from this list more or less in the order listed.

- 0) Temperature and Calorimetry
- 1) Gas Law and estimate of absolute zero
- 2) Mechanical/electrical equivalent of heat
- 3) Clement-deSorome experiment
- 4) Heat engine/refrigerator lab
- 5) Clausius-Clapeyron
- 6) Critical Opalescence lab
- 7) Ferromagnetic phase transition lab
- 8) Transistor determination of k_B
- 9) BBrad with vacuum filament and Richardson-Dushman
- 10) BBrad determination of \hbar/k_B
- 11) BBrad and Stefan-Boltzmann law
- 12) Johnson Noise
- 13) High T_c superconductor lab

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Office Hours: Monday 11-12, Tuesday 11-12 and 3-4pm, Thursday 4-5pm but any(day-)time by appointment!

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Course Web Site: <http://mjcrescimanno.people.yzu.edu/thermolab/>

What is on the web site? Old daatsets and lots of good stuff.

Writing Intensive Course Statement: This course is one of the two General Education Requirements-Writing Intensive courses in our department. The grades in the course are entirely determined by the students' ability to express their work and reasoning through technical writing in the field. As such, the course integrates General Education Goals 1 (to write and speak effectively), 2 (to acquire, process and present quantitative and qualitative information using appropriate technologies, including computers) and 3 (to reason critically, both individually and collaboratively, to draw sound conclusions from information, idea and interpretations gathered from various sources and disciplines).

Mandatory Statement of Non-Discrimination from the University: Youngstown State University does not discriminate on the basis of race, color, national origin, sex, sexual orientation, gender identity and/or expression, disability, age, religion or veteran/military status in its programs or activities. Please visit www.yzu.edu/ada-accessibility for contact information for persons designated to handle questions about this policy.

Students with Disabilities: In accordance with University procedures, if you have a documented disability and require accommodations to obtain equal access in this course; please contact me

privately to discuss your specific needs. You must be registered with the Center for Student Progress Disability Services, located at 36 West Wood Street, and provide a letter of accommodation to coordinate reasonable accommodations. You can reach CSP Disability Services at 330-941-1372.

Class Cancellation: If this class is being cancelled for any one day due to instructor illness, or other reasons, an e-mail will be sent to the student's YSU e-mail account as soon as possible, and a cancelled class notice will be put on the classroom door. University-wide class cancellation is a decision made by the President's Office, and officially announced via the YSU homepage and on WYSU (88.5 FM) radio. Students may also register at the YSU Portal System to receive a text message about University-Wide closures via the Emergency Alert Notification System.

Incomplete Grade Policy: An incomplete grade of I may be given to a student who has been doing satisfactory work in a course, but, for reasons beyond the control of the student and deemed justifiable by the instructor, has not completed all requirements for a course when grades were submitted. A letter grade MAY NOT be changed to an I (Incomplete) after the term has ended and grades have been recorded. For Fall Term courses, the final date to complete an I will be March 1 of the following term; for Spring Term courses, September 1; for Summer Term courses, October 1. These dates can only be extended with the approval of the instructor and the Dean of the College where the course is taught. Forms for extension of the deadline may be obtained in the Physics & Astronomy office and after obtaining the proper signatures, this form must be to the University Records office 24 hours before the original deadline (i.e. for Fall Term courses, March 1 of the following term).

Center for Student Progress (CSP): The Marion G. Resch Center for Student Progress is a resource on Campus established to help students successfully complete their University experience. Please phone 330-941-3538 or visit the Center for assistance in tutoring or for individualized assistance with social and academic success. The main Center is located in Kilcawley West below the bookstore.