

Information and Entropy

Instructor: Prof. Dr. Taylan Akdoğan

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Course assistant: TBA

Office hours: 1) A fixed time will be announced after the semester begins. 2) By appointment. 3) You can also stop by my office without an appointment; I will see you if I am not in hurry.

Course schedule: TBA according to the schedules of students.

Course page: http://www.phys.boun.edu.tr/~akdogan/Taylan_Akdogan/Phys_150.html
Problem sets, exams, and general course information will be found here.

About the course: This is a course intended for freshmen of science and engineering departments. The course starts with the introduction of bits and codes. Then, information theory is explored further. The relation between the information theory and physical systems will conclude the course. The course will include homework assignments, two midterm examinations, and a final. Subjects to be covered:

- Bits and codes
- Compression
- Noise and errors
- Probability
- Communications
- Processes
- Inference
- Maximum entropy principle
- Physical systems
- Energy and temperature

Prerequisites: Consent of instructor. It is recommended that the prospected students had completed PHYS 101 and MATH 101, and completed PHYS 102/130 or taking PHYS 102/130 in parallel to this course. Basic knowledge of calculus and algebra will be assumed.

Required text: “*Information and Entropy: Introduction Lectures*” provided by open course-ware of Massachusetts Institute of Technology.

<http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-050j-information-and-entropy-spring-2008/>

The PDF file is also provided at

http://www.phys.boun.edu.tr/~akdogan/Taylan_Akdogan/Phys_150_files/phys497.pdf

Attendance: I expect you to come to class regularly and on time. You should be prepared to discuss the textbook material and to have worked on the assigned homework problems. I reserve the right to adjust your final course score up or down by a grade step based on the quality and extent of your contributions.

Homework: This will be an integral part of the learning process. Please staple the pages securely and leave them on my desk when you **enter** the classroom (i.e., do not work on the problem set during the class). The solutions will be discussed briefly during the problem sessions. No homework will be accepted once the solutions are given. Late homework can be accepted without penalty only if you have a valid excuse and the solutions are not discussed.

I encourage you to work collaboratively on the problems but you should understand that when you write up solutions the work is to be your own (i.e., *do not just copy someone's solution*). Do not be shy about coming to me or course assistants for help with the homework.

Exams: There will be two 50-minute midterms, and a 90-minute final exam. All exams will be closed book/closed notes. Calculators are allowed. **You** can prepare a single-sided cheat-sheet of size A4 to be used during the exams, but you cannot share it with your friends.

Grading: The weights that will determine the cumulative grade are as follows:

	Contribution
Homework	15%
Midterm I	25%
Midterm II	25%
Final	35%

Those who can not gather 50% average of homework and midterm exams will not be allowed to take the final exam. The final grades will be determined according to the distribution of cumulative grades and the classroom contributions.