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| |  | | --- | | **Course Information** |  |  |  | | --- | --- | | Course title | Information Theory | | Semester | 108-1 | | Designated for | COLLEGE OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE  GRADUATE INSTITUTE OF ELECTRICAL ENGINEERING | | Instructor | [I-HSIANG WANG](https://nol2.aca.ntu.edu.tw/nol/coursesearch/teacher.php?op=s2&td=942022) | | Curriculum Number | EE5028 | | Curriculum Identity Number | 921 U1190 | | Credits | 3.0 | | **Course Syllabus** | | | **Please respect the intellectual property rights of others and do not copy any of the course information without permission** | | | Course Description | Information Theory is a senior (undergraduate) level course designed for students who are interested in the quantitative fundamental limits of information. What is information and how to quantify information? What is the ultimate data compression rate and what is the ultimate transmission rate of communication? In this course, we introduce the fascinating theory originated from Claude E. Shannon, which addresses the above fundamental questions in communication theory. We will develop methods and coding techniques to achieve these fundamental limits. Finally, we will also demonstrate the application of information theory to other fields, including statistics (hypothesis testing and estimation) and statistical inferences. | | Course Objective | 1. Introduce basic topics in information theory, including measures of information, source coding theorem, channel coding theorem, and source-channel separation. 2. Develop methods and coding techniques to achieve these fundamental limits. 3. Show applications of information theory beyond communications, especially in high dimensional statistics and statistical inferences. | | Course Requirement | Prerequisite: Probability, Linear Algebra, Optional: Random Processes, Communication Systems Homework (30%), Midterm (30%), Final (40%) | | Office Hours |  | | References | 1. T. Cover and J. Thomas, Elements of Information Theory, Second Edition, Wiley-Interscience, 2006. 2. R. Gallager, Information Theory and Reliable Communications, Wiley, 1968. 3. I. Csiszar and J. Korner, Information Theory: Coding Theorems for Discrete Memoryless Systems, Second Edition, Cambridge University Press, 2011. |  |  | | --- | | **Progress** |  |  |  |  | | --- | --- | --- | | Week | Date | Topic | | No data | | | |

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