EE 614: Data Compression

Course Information

Contact

Instructor: Dr. W. David Pan
Office: ENG 263A
Email Address: pand@uah.edu
Phone Number: 256-824-6642
Availability/Office Hours: Monday and Wednesday, 11:00 am – noon, 4:00 pm – 5:00 pm.

Details

Course Name: Data Compression
Mode of Delivery: Traditional Course
Credit Hours: 3
Semester/Year: Spring/2025
Meeting day, time, and location: Monday and Wednesday, 1:00 PM – 2:20 PM, ENG 134
Prerequisites: Graduate standing (Matlab Programming required)

Overview

Introduction to the fundamental theories and techniques of lossless and lossy data compression. Topics include Huffman codes, arithmetic codes, Golomb-Rice code, context-based compression, quantization, transform coding, wavelets, compression standards, and selected advanced topics of data compression.

Materials

- Major Reference:
  Introduction to Data Compression, 4th edition, by Khalid Sayood, Elsevier, 2012. ISBN: 978-0-12-415796-5.
- Papers in the literature

Course Outline (tentative)

- Introduction
- Information Theory for Lossless Compression
- Huffman Codes
- Golomb Codes
- Arithmetic Codes
- Information Theory for Lossy Compression
- Quantization
- Lossy Compression Techniques
- Compression Standards
- Selected Topics

Evaluation and Grading

The following grading scheme will apply in this course:

A = 90%–100%
B = 80%–89%
C = 70%–79%
D = 60%–69%
F = 0%–59%

Assignment Types You'll See in this Class	What to Expect	Percentage
Homework	Some problems require programming using Matlab.	40%
Midterm Exam March 3, 2025 (Monday) 1:00 pm – 2:20 pm	The Midterm Exam will be a comprehensive test of all the material covered in roughly first half of the course.	25%
Final Exam April 28, 2025 (Monday) 3:00 pm – 5:30 pm	The Final Exam will be a comprehensive test and will cover all of the topics and materials in this course.	35%

Technology Statement

This course will use UAH's learning management system, Canvas, as well as other technology tools. Students will be expected to have access to a computer with internet capabilities in order to fully participate in this course.

Homework Submission

Homework assignments will be posted on Canvas. Homework must be electronically submitted to Canvas. It is recommended that all homework should be typeset using a word processor. If your work is in handwriting, you must scan in the pages and convert the images to a single PDF file for submission to Canvas. You might also need to submit accompanying source codes. It is your responsibility to ensure the image quality is good enough in order for any scanned-in work to receive a fair and accurate grading. **Scanned images of unsatisfactory quality that hampers grading may result in points (up to 10% of the overall grade) being deducted.**

Missed Assignments/Make-Ups/Extra Credit

The tests and final exam are very important for the course. There will be NO late exams arranged.

Timely submission of homework is also very important. After homework solutions are posted, NO late homework will be accepted.

If the solutions have not been discussed or posted, late homework submissions can be accepted with penalty within 24 hours after the due date/time.

The penalty is 10% for late submission with less than 24 hours past the due date/time.

Any work submitted after 24 hours past the due date/time, or submitted after the solutions have been discussed or posted, will NOT be accepted. The work will get a permanent zero.

There will be NO extra credit being offered.

Attendance Policy

Regular class attendance is expected. If absence is necessary for health and safety reasons, you are responsible for staying on track with all course materials and lecture recordings posted on Canvas.

Communication & Instructional Continuity

In this class, the official mode of communication is through Canvas/UAH email. Students can expect a response from the instructor within a 24 -- 48 hour timeframe.

In the event a regular scheduled course is unexpectedly interrupted, course requirements, due dates, and grading policy are subject to change when necessitated by revised course delivery, semester calendar, or other instances. Information about changes in this course can be obtained from the Canvas course webpage or by contacting me. If I do not respond within 24 -- 48 hours, please contact my department at ece.@uah.edu or the college dean at coedean@uah.edu.

If our regular scheduled class meeting is interrupted or the campus should unexpectedly close, students should immediately log onto Canvas and read any course announcements. Students are encouraged to continue the readings and other assignments as outlined on the course syllabus until otherwise advised. Any student who does not could fall behind in the course.

Course Conduct

All students must treat others with civility and respect and conduct themselves in a way that does not unreasonably interfere with the opportunity of other students to learn. All communication between student/instructor and between student/student should be respectful and professional.

AI Policy

The use of artificial intelligence models for assistance in completion of work for this course is strictly prohibited. Students who violate this policy will be subject to disciplinary action for academic misconduct.

Academic Honesty

Your written assignments and examinations must be your own work. Academic misconduct will not be tolerated. Examples of unacceptable behavior include plagiarism/use of prior work/use of Chegg and other online problem-solving sites, etc. To ensure that you are aware of what is considered academic misconduct, you should review carefully the Forms of Academic Misconduct in the Academic Misconduct Policy. If you have questions in this regard, please contact me without delay.

Copyright <David Pan> <2025>

Discussion of Concerns

If you have difficulties or concerns related to this course, your first action should be to discuss them with your instructor. If such a discussion would be uncomfortable for you or fails to resolve your difficulties, you should contact the ECE Department Chairperson. If you are still unsatisfied, you should contact Associate Dean of the College of Engineering.

College/Department Information

COE Laptop requirement:

https://www.uah.edu/images/colleges/engineering/CUE2%20Files/Forms/coelaptoprequirements_2022.pdf.

Subject to Change

Every effort is made to follow the guidelines in the syllabus; however, if needed, the syllabus will be amended. You will be notified if changes are made.