FALL 2020

ECE7560 Principles of Signal Compression and Coding

COURSE DESCRIPTION: This course covers the fundamentals of lossy compression (also known as data compression, or more correctly rate-distortion coding) of continuous-valued signals such as audio, video, and sensor measurements.

COURSE OBJECTIVE: To provide an in-depth understanding of rate-distortion coding of signals and related problems arising in sensing, processing, communication, and storage of information.

PRE-REQUISITES: Undergraduate level courses in signal processing and probability theory, ability to program in a language such as Matlab, Mathematica, Python, C, or similar.,

CONTACT HOURS: 3-hours per week

COURSE CONTENT: Review of probability theory, random processes, and estimation theory; Theory of optimal quantization; Quantizer design algorithms; High-rate theory of quantization; Elements of rate-distortion theory; Entropy coded quantization; Principles of predictive coding and its generalizations to tree and trellis coding; Principles of transform coding;

HOMEWORK: Assignments to be handed-in

TEXTBOOK:

1. W. A. Pearlman and A. Said, “Digital Signal Compression”, Cambridge University Press, 2011

2. A. Gersho and R. M. Gray, “Vector Quantization and Signal Compression,” Kluwer Academic Press/Springer, 1992

GRADE ANNOUNCEMENTS:

TBA – Due to COVID-19, this date to be announced by the Registrar’s Office

EVALUATION: Your final course grade is determined by your performance in the components list below in the Evaluation Table (seminar, assignments, project, mid-term, and a final examination. Students must receive a minimum of 50% on the final examination and must complete and pass all components in the course in order to be eligible to receive a passing grade.

Each component is weighted as follows:

COMPONENT	NO	VALUE %	TOTAL VALUE	DETAILS / ADDITIONAL INFO
Assignments	3	30%	30	
Project	1	20%	20	
Final Examination	1	50%	50	
TOTAL			100	

GRADE SCALE:

LETTER	MARK	LETTER	MARK	LETTER	MARK	LETTER	MARK
A+	95-100	B+	80-84	C+	65-69	D	45-54
A	85-94	B	70-79	C	55-64	F	<45

INSTRUCTOR INFO:

Name: ..... Pradeepa Yahampath

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Office Hours:..... By appointment

VOLUNTARY WITHDRAW:

November 23, 2020

REQUIREMENTS/REGULATIONS

Student Responsibilities: It is the responsibility of each student to contact the instructor if he/she is uncertain about his/her standing in the course and his/her potential for receiving a failing grade. Students should also familiarize themselves with Sections 4 and 6 of the Regulations dealing with, among others, incomplete term work, deferred examinations, attendance and withdrawal, etc.

Lectures: Attendance at lectures is essential for successful completion of this course. Students must satisfy each evaluation component in the course.

ACADEMIC INTEGRITY

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations and Requirements of the University of Manitoba, Section 7.1, students are reminded that plagiarism* or any other form of cheating is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university) regardless of media

- examinations
- assignments
- laboratory reports
- term exams

A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty

Please refer any questions regarding Academic Integrity to your course instructor.

***Plagiarism:** to steal and pass off (the ideas or words of another) as one's own; use (another's production) without crediting the source