

# COSC 5P01 – Coding Theory

## Winter 2020

### Class Presentation

**Topic Description Due: Tuesday, 25<sup>th</sup> February, 9:30am (at the latest).**

**Presentation Dates: between 10<sup>th</sup> March and 31<sup>st</sup> March**

**The class presentation accounts for 15% of your final grade.**

All students will choose one advanced topic to teach to their fellow students. The student should expect to take 1 full class to teach this topic, and so should plan for a 60-75 minute presentation.

The topic is to be chosen in consultation with the instructor. Students are invited to discuss possible topics with the instructor at any time, but must finalize their choice by providing the instructor with a 1 page (maximum) topic description by no later than 9:30am on Tuesday, 25<sup>th</sup> February. Topics will be approved on a first-come, first-served basis *only* once the topic description has been turned in.

Some possible topics include:

- Coding theory and biology / bioinformatics – examples include:
  - Information theory as a foundation of biology
  - Codeword libraries for use in DNA computing
  - Codeword libraries for use as DNA “tags”
- Coding theory in cryptography – examples include:
  - Codes for use in steganography
  - Codes as a basis for a cryptosystem (e.g. McEliece)
- Coding theory and complexity theory
- Specific classes/types/uses of codes – examples include
  - Reed-Solomon Codes
  - Low Density Parity Check (LDPC) Codes
  - Turbo Codes
  - Cyclic codes (general, or various types)
  - Self-dual codes (general, or various types)
  - Covering Codes
  - Quantum codes
- Connections of coding theory to other branches of mathematics and/or other fields

The above list is certainly *not* exhaustive. If you have another topic in mind, feel free to discuss this with the instructor.

The exact presentation schedule will be determined by the instructor according to topic. The instructor will attempt to schedule according to students’ preferences. Such requests will be handled on a first-come, first-served basis, and *only* once the student has handed in an acceptable topic description. Once determined, the schedule will be posted on the course webpage.

**Also note:** each student will write a term paper (due during the exam period) on the same topic as they covered in their class presentation. Full instructions on the term paper will be provided at a later date, but students may wish to keep this in mind when selecting a topic.

**Mark Distribution:**

- Presentation: 10%
  - Presentation should be approximately 60-75 minutes in length. Students are strongly encouraged to practise their presentation ahead of time to ensure that it will be of the right length.
- Class “notes”: 5%
  - Typed complete notes are to be provided to the instructor and other students on the day of the presentation. These should be complete to the point that fellow students can use them for the purpose of studying for the oral exam. References *must* be provided.

**Submission Requirements:**

1. A 1 page topic description, due *no later than* Tuesday, 25<sup>th</sup> February at 9:30am. This must include a full description of the topics to be covered and a list of references that will be used. This can be submitted via e-mail or as a hard copy.
2. Class notes, due on the day of the presentation. Hard copies must be provided to the instructor and all fellow students.
3. Class notes must also be submitted electronically to the instructor and may be checked for plagiarism. References *must* be provided. Full instructions on how to submit your notes electronically will be provided at a later date.