- Faculté des sciences
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Coding Theory (3MT2057)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en mathématiques	**Cours: 2 ph** **Exercice: 2 ph**	**oral: 30 min**	6

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Automne

Equipe enseignante:

Elisa Gorla and Alberto Ravagnani

Objectifs:

In this course, we will study the mathematical theory of error-correcting codes. Error-correcting codes enable us to controll errors in data transmission over unreliable or noisy communication channels. The central idea is that the sender encodes their message in a redundant way. The redundancy allows the receiver to detect a limited number of errors that may occur anywhere in the message, and often to correct these errors without asking for a retransmission.

Contenu:

Main topics will be: introduction to the problem of error-correction in data transmission, linear codes over finite fields, Hamming distance and minimum distance decoding, Singleton and sphere-packing bounds, perfect and MDS codes, Hamming codes and syndrome decoding, codes constructions. A large portion of the course will be devoted to the study of families of codes and their decoding, in particular we will study: Golay codes, cyclic codes, BCH and Reed-Solomon codes.

Forme de l'évaluation:

oral exam of 30 minutes on the content of the lectures and exercises

Pré-requis:

Knowledge of linear algebra and basic algebra notions (e.g., polynomials in one or two variables, finite fields).

Forme de l'enseignement:

ex cathedra