

DEPARTAMENTO DE MATEMÁTICAS

OFRECIMIENTOS DE CURSOS

2018-10

Nivel del Curso 4: posgrado X 3: final de carrera X 2: mitad de carrera ____ 1: inicio de carrera ____	Nombre completo del curso en español: Teoría de la información
	Nombre completo del curso en inglés: Information Theory
	Nombre abreviado en español (Máx. 30 caracteres contando espacios): Teoría de la información
	Profesor: David Karpuk
Descripción del curso en español:	
Descripción del curso en inglés: This is a first course in Information Theory, intended to familiarize students with the mathematics underlying modern communications. This course builds on material developed in a basic probability course, but the most important requirement is mathematical maturity. The course will be taught in English.	
Prerrequisitos: Any basic course in probability. Additionally, students are expected to have taken vector calculus and linear algebra, for example both MATE-1105 (Algebra Lineal 1) and MATE-1207 (Calculo Vectorial), or MATE-1253 (Calculo 3 y Algebra Lineal 1).	
Objetivos: To quantify how much information can be transmitted through a noisy channel. At the end of the course, students will be able to describe the fundamental limits of some basic communications channels, and also understand the mathematics of how to pass information through such channels as efficiently as possible.	
Contenido: Review of random variables, entropy and mutual information of random variables, entropy rates of stochastic processes, data compression, coding theory, channel capacity, the capacity of the Additive White Gaussian Noise channel. Time permitting, additional topics may include, e.g., distributed data storage, private information retrieval, and lattice coding.	

Forma de Evaluación: Homework assigned every other week (worth 75% in total), and a final project (worth 25%), consisting of reading a relevant research article, writing a short report, and giving a short presentation to the class. There are no exams.

Bibliografía: *Elements of Information Theory, Second Edition*, by Cover and Thomas. We plan on covering Chapters 1-7 and 9.