

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: Introducción a la teoría de los grandes desvíos
	Nombre completo del curso en inglés: Introduction to large deviations theory
	Nombre abreviado en español (Máx. 30 caracteres contando espacios): Grandes desvíos
	Profesor: Michael Anton Hoegele
Descripción del curso en español:	
Descripción del curso en inglés: This class is an introductory class to the theory of large deviations. In a first part motivate the edifice of large deviations theory mainly in finite spaces in several examples, where it turns out to be extremely useful. Applications are finite type convergence, Markov chains with finite states, etc. In a second part we shall study general Large deviations principle, and their applications to dynamical systems perturbed by Brownian motion, known as Freidlin-Wentzell theory, the asymptotic first exit time and locus. The class will be taught in English.	
Prerrequisitos: Probabilidad de honores.	
Objetivos: To understand the rates of convergence in the weak law of large numbers, to understand the origin and utility of large deviations principle, being able to identify good rate functions as Fenchel-Legendre transforms, to navigate safely in the edifice of the theory, to be able to apply this theory in a discrete setting and draw conclusions.	
Contenido: Review of measure theory and probability, limit theorems, exponential estimates, Hoeffding's inequality, Chernov bounds, the large deviations principle in different spaces, weak and strong, the Method of types, Sanov's theorem, Cramér's theorem, Varadhan's lemma, the contraction principle, Fenchel-Legendre transforms and their dual.	

Forma de Evaluación: 3 ejercicios cada uno un 22% y un proyecto final de un 34% que consiste en la elaboración de un ejemplo con una implementación, el resumen de un artículo de investigación con ejemplos propios etc.

Bibliografía:

Dembo, Zeitouni: Large Deviations Techniques and Applications (Springer, 2010).

Cerf: On Cramer's Theory in Infinite Dimensions (Société mathématique de France, 2007)

Imkeller: Lecture notes on large deviations theory