Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
MAT351	Measure Theory	6	3	0	0	3	5

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Elective
Course Level	Bachelor Degree
Objective	To introduce the fondamentals of measure theory, with its applications to integration theory and probability theory.
Content	Measures and sigma-algebras, Borel and Lebesgue measurable sets, Measurable functions, Lebesgue measure on R^n, Lebesgue integral, Convergence theorems: Monotone Convergence Theorem (MCT), Fatou's Lemma, Dominated Convergence Theorem (DCT)
References	Mesure, Intégration, Eléments d'Analyse Fonctionelle, lecture notes of Petru Mironescu, Université Claude Bernard Lyon 1: https://math.univ-lyon1.fr/~mironescu/resources/complet_mesure_integration.pdf

Theory Topics

Week	Weekly Contents
1	Review of Riemann Integral, Motivation for the need of a more general theory
2	sigma-algebras, Borel sets
3	Measurable functions
4	Measures
5	Negligable sets, Lebesgue measure
6	Constrution of Lebesgue measure
7	Integral of a measurable function
8	Midterm
9	Integral of a measurable function, Monotone Convergence Theorem
10	Integration
11	Fatou's Lemma, Dominated Convergence Theorem
12	Product measure
13	Fubini-Tonelli Theorem
14	Fubini-Tonelli Theorem