UCL Université catholique de Louvain

LMAT1322

2013-2014

Measure theory

3.0 credits	22.5 h + 15.0 h	1q

Teacher(s) :	Roselli Paolo ;
Language :	Français
Place of the course	Louvain-la-Neuve
Prerequisites :	Analysis 1, 2 and 3.
Main themes :	Chapter I. Lebesgue outer measure ; Chapter II. Measures on a sigma-algebra; Chapter III. Integration ; Chapter IV. Product measures ; Tonelli's and Fubini's theorems ; Chapter V. Lebesgue decomposition theorem (and the Radon-Nikodym theorem) ; Chapter VI. Riesz representation theorem.
Aims :	this teaching unit should bring its students to acquire an expertise, in an abstract setting, of the fundamental theorems related to integration which have already be taught during the previous courses in analysis, in the special case when the underlying space is the n-dimensional Euclidean space ; it should also give to its students an experience in the specific techniques of measure theory. *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods :	a final oral assignment will be divided in two parts ; the first part will test the students on the content of the weekly lectures, on a basis of three questions (one of which concerning either convergence theorems, Tonelli's or Fubini's theorems or Riesz representation theorem) ; the second part will count two exercise assignments, and students will be required to solve one of them.
Teaching methods :	The lectures (22h30) will be taught at an hebdomadary rythm of 2 hours. Besides those, exercise assignments (15h) will be given to the students twice a month.
Content :	we shall start from historical motivations and from the example of the outer Lebesgue measure on the real line, and prove in this context various results which generalize easily to arbitrary measures. Afterwards, we shall introduce the abstract notion of measure, keeping in mind our previously acquired experience in the Lebesgue setting. The most famous and useful integration theorems will then be proved in this new context.
Bibliography :	The approach we shall use is close in spirit to H.L.Royden 'Real Analysis', to G.B.Folland 'Real Analysis', and to D.L.Cohn 'Measure Theory'.
Cycle and year of study :	> Bachelor in Information and Communication > Bachelor in Philosophy > Bachelor in Pharmacy > Bachelor in Computer Science > Bachelor in Economics and Management > Bachelor in Motor skills : General > Bachelor in Human and Social Sciences > Bachelor in Sociology and Anthropology > Bachelor in Political Sciences: General > Bachelor in Mathematics > Bachelor in Biomedicine > Bachelor in Engineering > Bachelor in Religious Studies > Master [120] in Statistics: General
Faculty or entity in charge:	MATH