UCLouvain

lmat2940

2021

Advanced topics in mathematics 4

5.00 credits	0 h + 22.5 h	Q2

This biannual learning is being organized in 2021-2022

Teacher(s)	Claeys Tom ;
Language :	English
Place of the course	Louvain-la-Neuve
Prerequisites	Depending on the subject, mathematics skills at the level of the end of the Bachelor in Mathematics or first year Master in Mathematics.
Main themes	The topic considered varies from year to year depending on the research interests of the course instructor.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 Contribution of the course to learning outcomes in the Master in Mathematics programme. By the end of this activity, students will have made progress in: • Show evidence of independent learning. • Analyse a mathematical problem and suggest appropriate tools for studying it in depth. • Begin a research project thanks to a deeper knowledge of one or more fields and their problematic issues in current mathematics. He will have made progress in: • Develop in an independent way his mathematical intuition by anticipating the expected results (formulating conjectures) and by verifying their consistency with already existing results. • Ask relevant and lucid questions on an advanced mathematical topic in an independent manner. Learning outcomes specific to the course. The course aims to initiate research in the field under consideration. Specific learning outcomes vary depending on the field.
Evaluation methods	Written + oral examination to assess the practical and theoretical skills acquired by the students.
Teaching methods	Lectures with active participation from the students. Some exercises will be suggested during the course and discussed in class if the students wish.
Content	1. Broad introduction to Random Matrix Theory. 2. Random matrix models with unitary symmetry and their relation to Orthogonal Polynomials. 3. Brief introduction to Determinantal Point Processes. 4. Steepest descent method for contour integrals in the complex plane, applications to Airy and Hermite functions. 5. The Gaussian Unitary Ensemble: Wigner's semicircle law, local statistics in the bulk and at the edge of the spectrum. 6. Riemann-Hilbert approach to Orthogonal Polynomials and Universality for random matrix models with unitary symmetry.
Inline resources	Moodle page
Faculty or entity in charge	MATH

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Mathematics	MATH2M	5		🔍