linge1114
2021

Mathematics I: analysis

UCLouvain

5.00 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Olbermann Heiner ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	Course entry requirements: The course does not have any entry requirements other than the knowledge acquired during a Mathematics programme of at least 4 hours per week in the final years of secondary school.
Main themes	The course places particular emphasis on modelling skills, and on solving applications and problems in Management Science using mathematical methods or formal logic. It aims to equip students with a systematic approach to analysis and problem-solving, prompting them to ask questions such as: how can this problem be expressed in quantitative terms, which model correctly represents the question put? which are the most useful tools to use? Have the application conditions been adhered to? How can the tools be used to solve the problem, how can the model be solved? What is the answer to the question first put (in the context of the initial question, not in terms of mathematical abstraction or logic) ? - Themes for the calculus part : mathematical modeling process - Set theory, relations, logic, notions of mathematical proofs - Functions, planar geometry, graphs of functions - Linear and polynomial functions, exponential functions, logarithmic functions, sequences - Limits, continuity, series, derivation - Optimisation of single variable functions - Integration. Each theme is introduced with examples and illustrations from economics and management science.
Learning outcomes	**At the end of this learning unit, the student is able to :**
	1 This mathematics course is primarily a general introduction to the use of mathematics in Management Sciences and the study of the "real functions of a real variable". The second part is given over to algebra and matrix calculus and Part three to optimisation and differential equations. The course has thee main components and aims to teach students: " the apparatus of Mathematics (an aim which involves acquiring a whole body of knowledge). Students should be able to acquire a reasonable capacity to handle the concepts studied in the course, which are the concepts underlying the quantitative models and methods in Economic and Management Science. " How to reason in a formalised and rigorous way (a more difficult skill to acquire and one which requires practical mathematical modelling skills) " To become independent in their work and study. This course deals with mathematical formalisation in Economic, Political and Social Science in general, with particular focus on management applications. It aims to prepare students for studying specific or "state of the art", quantitative analytical and decision-making models in various fields of management.
Evaluation methods	Students will be evaluated in a written exam at the end of the course.
Content	• Logics, sets, real numbers • Sequences, series, limits • Real-valued functions: Classical functions, graphs, limits, continuity • The derivative and its applications • Optimisation in one variable • Integration • Ordinary differential equations • Mathematical proofs
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=7508
Faculty or entity in charge	ESPO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor : Business Engineering	INGE1BA	5		🔍
Minor in Statistics, Actuarial Sciences and Data Sciences	MINSTAT	5		🔍
Master [120] in Data Science : Statistic	DATS2M	5		🔍