INGE1121 Mathematics II: algebra and matrix calculus

[30h+30h exercises] 4 credits

Teacher(s): Camille Debiève, Yves Félix
Language: French
Level: First cycle

Aims

This mathematics course 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.

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) ?
- Linear algebra: vectors and matrices
- Determinants and matrix inversion
- Linear independence and matrix rank
- Eigen values and vectors
- Multi-variable functions and quadratic forms
Each topic is discussed using examples and using illustrations from Economics and Management Science.

Content and teaching methods

The course comprises:
- lectures (the teacher defines the concepts, demonstrates the results, and illustrates them through a concrete application),
- practical exercise sessions (the teacher gives students applications/problems and suggests possible ways of solving them),
- active student participation through reading, independent problem resolution, case resolution reports, tests#

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

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.
Evaluation: The evaluation takes into account the reports submitted during the course, the results of the tests and the results of a written examination.

Other credits in programs

INGE11BA	Première année de bachelier en ingénieur de gestion	(4 credits)	Mandatory