INGE1215 Mathematics: Applied Mathematics and Optimisation

[30h+15h exercises] 4 credits

Teacher(s): Bernard Fortz
Language: French
Level: First cycle

Aims

This mathematics course is the third part of the Mathematics course given in BAC1. This part deals with optimisation and differential equations.
The course has thee main components and aims to teach students:
" how to use 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 basic concepts used in 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 teaches mathematical formalisation in Economic, Political and Social science in general, with particular focus on management applications. It aims to equip students to study specific and state of the art quantitative analytical and decision-making models in a range of management fields.

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) ?

Content and teaching methods

Topics of Part III: Applied Mathematics and Optimisation
- Optimisation without constraints
- Optimisation with constraints
- Linear programming
- Difference Equations
- Differential equations

Each topic is discussed using examples and using illustrations in Economic and Management Science
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 solving, case reports, tests.

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

Autres éléments d'information
Course entry requirements: Students should have taken the BAC 1 INGE1114 and INGE1121 courses
Evaluation: The evaluation takes into account the reports submitted during the course, the results of the tests and the results of a written examination.
Course materials: Mathematics for Economic analysis by K. Sydsaeter et P.J. Hammond, Prentice Hall, 1995

Other credits in programs

INGE12BA	Deuxième année de bachelier en ingénieur de gestion	(4 credits)	Mandatory