Faculty of Applied Sciences

FSAB1102   Mathematics 2

[45h+45h exercises] 9 credits

This course is taught in the 2nd semester

Teacher(s):   Camille Debiève, François Glineur (supplée Roland Keunings), Roland Keunings, Enrico Vitale (coord.)

Language: French
Level: First cycle

Aims

After completing this course, students will be able to:
Handle functions of several real variables.
Master advanced notions in linear algebra.
Conduct mathematical reasoning and write short proofs in a rigorous manner.
Understand and use different proof techniques.
Deal with problems, exercises and proofs for which not all data is provided
explicitly.
Interpret a problem, exercise or statement from various points of view
(e.g. algebraic point of view or geometric point of view).
Model mathematical situations involving random elements.
Solve exercises and understand results whose difficulty warrants formal
definitions and advanced theorems.
Approach theories whose formalism exceeds the framework of intuitive
examples and which require abstraction.

Main themes

Functions of several real variables ; vector analysis ; linear algebra ;
linear differential equations with constant coefficients ; introduction to
data analysis and reasoning in a context of random uncertainty.
Study and handling of the above-mentioned concepts for their use in later
courses. Training in the domains of rigor and abstraction by studying
important proofs in calculus or algebra, and by constructing proofs
featuring interaction between several different concepts or notions.
Resolution of problems or exercises requiring the use of several
mathematical tools.

Content and teaching methods

Functions of several real variables: surfaces, level curves ; limit and
continuity ; directional derivatives, differentiability, tangent plane,
Jacobian ; derivatives of composite functions ; higher order derivatives ;
implicit functions ; extremums ; multiple integrals.
Vector analysis: gradient, divergence, curl ; line and surface integrals ;
integral theorems (Green's theorem, Stokes' theorem, divergence theorem).
Linear algebra: Euclidean spaces ; eigenvalues ; quadratic forms and
geometrical interpretation ; linear differential equations with constant
coefficients ; linear regression and interpretation.
Methods used will favor the students' active learning. The actual
implementation details of the students' active participation in their
training are left to
the course holders, while respecting the Faculty's teaching orientations.

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

Other credits in programs

ARCH11BA	Première année de bachelier en sciences de l'ingénieur, orientation ingénieur civil architecte	(9 credits)	Mandatory
ARCH12BA	Deuxième année de bachelier en sciences de l'ingénieur, orientation ingénieur civil architecte	(9 credits)	
FSA11BA	Première année de bachelier en sciences de l'ingénieur, orientation ingénieur civil	(9 credits)	Mandatory
FSA12BA	Deuxième année de bachelier en sciences de l'ingénieur, orientation ingénieur civil	(9 credits)	