UCLouvain

wsbim1001

2017

MATHEMATICAL METHODS IN BIOMEDICAL SCIENCES

5 credits	45.0 h + 20.0 h	Q2

Teacher(s)	Bieliavsky Pierre ;Nauts André ;Robert Annie ;
Language :	French
Place of the course	Bruxelles Woluwe
Main themes	The course is intended for students with an elementary background in calculus as given in the basic course of physics in BAC1. It contains: -an introduction to linear algebra with emphasis on the computation of solutions to systems of linear equations, matrix algebra, eigenvalues, eigenvectors and diagonalization of matrices; -an introduction to the study of functions of several variables (partial derivatives, differentials, gradients, maxima and minima, Lagrange multipliers, multiple integrals) and systems of differential equations with a view on applications; -an introduction to analytical geometry, in particular to the equations and properties of straight lines, conics and quadrics; -a good deal of illustrations and applications to pharmacokinetics, chemical and enzymatic kinetics, genetics, statistics, themodynamics
Aims	1 The objective of this course is to introduce the students to the fundamental notions of linear algebra, calculus and analytical geometry in order to provide them with the basic mathematical tools essential for the biomedical sciences - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Content	-Linear algebra : systems of linear algebraic equations, solution procedures by Gauss-Jordan elimination, matrix algebra, rank theory, inversion, eigenvalues, eigenvectors and diagonalization of matrices; -Complex numbers and periodic functions, limits, indeterminate forms, L'Hôpital's rule, Taylor series, functions of several variables, Lagrange multipliers, multiple integrals, systems of differential equations; -Analytical geometry: equations and properties of the straight line, the plane, conics and quadrics; -Applications to pharmacokinetics, chemical and enzymatic kinetics, genetics, statistics, thermodynamics' ; METHODS: Lectures and supervised practical works (in small groups) are organized weekly. The pracrical works, in close connexion with the lecture of the week, are not restricted to mere applications of recipes but require an active involvement of the students, who are encouraged to establish the link between theory and practice
Other infos	PREREQUISITE : Background in mathematics as given in the course of physics (BAC 1). ASSESSMENT : Written and oral examination. TEACHING AIDS : Notes written by the teacher, overhead transparencies, practical works supervised by the teacher and one or two assistants
Faculty or entity in charge	SBIM

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Biomedicine	SBIM1BA	5		
Bachelor in Medecine	MD1BA	5		
Master [240] in Medecine	MED2M	5		