FUNDAMENTALS OF MATHEMATICS (2015-16)

GENERAL INFORMATION

Code 26511

ECTS Credits 6

Departments and areas

Department	Area	Area	Report R.
MATHEMATICS	MATHEMATICAL ANALYSIS		
MATHEMATICS	STATISTICS AND OPERATIONS RESEARCH	YES	YES

Studies

DEGREE IN BIOLOGY

Context of subject

Mathematics are a fundamental tool for the study of experimantal sciences. Its location in first course inside the common teachings of basic formation in Biology degree allows to consolidate the knowlegde that students should have adquiared in High School, and, moreover, it gives the basic tools for the elaboration, study and simulation of different biological dinamic models.

OBJECTIVES

Subject objectives/competences (2015-16)

CONTENTS

Theoretical and practical contents (2015-16)

B0: INTRODUCTION
T1: Introduction to mathematical language. Notation. Elemental notions of propositional logic.
B1: ALGEBRA
T2: Matrices and systems of linear equations. 2.1 Matrices. 2.2 Determinants. Range. 2.3 Solvability of linear systems. Gauss method. 2.4 Cramer method.
T3: Vectorial spaces and linear mappings. 3.1 Linear mappings. 3.2 Properties of the linear mappings. 3.3 Algebraic operations with linear mappings. 3.4 Applicability of the matrix calculus to the study of the linear mappings. 3.5 Basis change. 3.6 Similar matrices. 3.7 Determinants. 3.8 Proper values and proper vectors. 3.9 Diagonalization of a matrix.

B2: ANALYSIS
T4: Real variable functions: continuity and limits. 4.1 Concept of function. Domain and range. 4.2 Limits y continuity. 4.3 Continuous functions theorems.
T5: One variable differential calculus. 5.1 Derivative of a function. 5.2 Calculus of derivatives. Chain rule. 5.3 Derivable functions theorems. 5.4 Derivative interpretation. 5.5 Study of functions. Increasing, decreasing , maxima and minima. Concavity and convexity. Graphic representation of functions. 5.6 l'Hôpital rule. Undeterminations. 5.7 Aplications to optimization problems . 5.8 Taylor formula.

T6: Integral calculus in one variable. 6.1. Calculus of primitives. 6.2 Defined Integral . 6.3 Surfaces. Concept of defined integral. 6.4 Properties of defined integrals. 6.5 Fundamental calculus theorem. 6.6 Aplications of the defined integral. Volumes. Arc length of a curve and area of a revolution surface.

T7: Differential equations. 7.1. Definition of a differential equation (D.E.) Nomenclature and examples. 7.2. D.E. classification. 7.3 Solvability technics of D.E. of first order. 7.4 Particular study of D.E. of second order.7.5 Linear D.E. of order n. Solvability technics. 7.6 Generalizations about systems. Definition and nomenclature. Classification of linear systems. 7.7 Solvability methods. 7.8 Predator-prey models:Lotka-Volterra systems.

EVALUATION

Instruments and criteria of Evaluation 2015-16

The exams will be done taking into account the real development of the subject
We name:

NC: Average of the exams, marked from 0 to 10.

EF: Final exam mark, from 0 to 10.

The final mark of the subject, which must be equal or greater than 5 to pass it, will be calculated in the following way: 0.5NC+0.5EF,

Whenver EF is equal or greater than 4. In the case that EF is less than 4, the final mark will be EF.
For the students who do not pass the subject, in the extraordinary exam of july, they will be able to repeat the final exam and the continuous evaluation exams. If the subject is still failed, the continuous evaluation mark can not be preserved for the following academic course.

Type	Criterion	Description	Ponderation
FINAL TEST			50
ACTIVITIES OF EVALUATION DURING THE SEMESTER			50