

**COURSE DATA****Data Subject**

<b>Code</b>	33976
<b>Name</b>	Mathematics
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	6.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1103 - Degree in Food Science and Technology	Faculty of Pharmacy and Food Sciences	1	First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1103 - Degree in Food Science and Technology	4 - Mathematics	Basic Training

**Coordination**

<b>Name</b>	<b>Department</b>
ARIZA RUIZ, DAVID	15 - Mathematical Analysis
MOLL CEBOLLA, JOSE SALVADOR	15 - Mathematical Analysis

**SUMMARY**

Providing basic math skills needed in order to successfully deal with the degree in Science and Food Technology.

**PREVIOUS KNOWLEDGE****Relationship to other subjects of the same degree**

There are no specified enrollment restrictions with other subjects of the curriculum.



### Other requirements

Numerical Sets: natural numbers, integers, rational numbers and real numbers. Differences between each of the previous sets, properties and basic computing skills to operate with fractions and radicals without the use of the calculator.

Knowledge of the concept of function and related concepts: domain, path, algebraic expression, graphical representation of a function in a Cartesian system, symmetry, growth and decline, asymptotic behavior of a function, basic operations with functions, composition of functions.

## OUTCOMES

### 1103 - Degree in Food Science and Technology

- Soltura en cálculos básicos.
- Acquire the knowledge needed to solve derivatives, integrals and differential equations.
- Be able to set out problems with differential equations.
- Saber interpretar resultados.
- Know how to reason, structure and solve problems with a mathematical basis.
- Saber utilizar estos esquemas de razonar, estructurar y resolver o tomar decisiones en otras cuestiones.

## LEARNING OUTCOMES

### Understanding:

- Understand and differentiate the concepts of natural number, integer, rational and real.
- Understand the concept of absolute value.
- Mastery of graphic representation of functions.
- Understand the notions of continuous function and differentiable.
- Understand the definite integral and primitive.
- Understand the functions of several variables and their representation.
- Representing curves and surfaces.
- Understand the concept of differential functions of several variables.
- Understand the significance of ordinary differential equations.

### Calculus:



- Calculation of the real line regions defined from algebraic expressions including or not absolute values.
- Recognition of graphs of elementary functions.
- Calculation of derivatives and application of related theorems.
- Distinguish different types of indefinite integrals.
- Know how to calculate areas of simple sets of the plan.
- Calculation of speed, acceleration curves and tangent to tangent plane.
- Calculation of surfaces.
- Knowing how to find contours in parallel planes and sections to XY, YZ and ZX.
- Solve basic ODE.

## DESCRIPTION OF CONTENTS

### 1. Basic Concepts

Basic Concepts. Symbols and basic notation. Functions and Examples. Injective functions, surjective and bijective functions. Composition of functions and inverse functions. Concept of continuous function.

### 2. Differential Calculus

Concept of derivative. Geometric interpretation, tangent. Derivatives of elementary functions. Algebraic properties of the calculus of derivatives, chain rule. Taylor polinomyal

### 3. Integral Calculus

Indefinite integration. Calculus of immediate primitives. Integration by parts. Integration by change of variable. Integration of rational functions. Definite integration. Applied calculus.

### 4. Ordinary Differential Equations

Basic concepts of Ordinary Differential Equations. Resolution of ODE by separation of variables. Linear ODE. Applications.

### 5. Functions of Several Variables

Basic Concepts of the Euclidean space  $R^3$ , and of functions of several variables. Partial and directional derivatives. Tangent plane.



## WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	40,00	100
Computer classroom practice	8,00	100
Seminars	4,00	100
Tutorials	4,00	100
Development of group work	10,00	0
Study and independent work	20,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	20,00	0
Preparation of practical classes and problem	15,00	0
<b>TOTAL</b>	<b>141,00</b>	

## TEACHING METHODOLOGY

The teaching of the subject is taught with 40 hours of theory classes, 8 sessions of practical computer science classes, 4 seminar sessions, and 4 tutorials sessions that are part of working hours in the classroom by classroom planning adapted to EEES.

The distribution for each week is different.

The theory sessions are held throughout the class group and the exhibition will be devoted to the subject matter of the course: concepts, results, basic/intuitive demonstrations, applications, examples and exercises.

The practical sessions will be devoted to computer science to solve exercises related to the concepts given in the course and to visualize the results with the help of written symbolic calculation program.

Tutorials sessions will be devoted to discuss and resolve doubts and difficulties that arise when doing exercises work. In the seminar we will do supplementary exercises and group work.

## EVALUATION

Students will have the official exam for the evaluation. An exam may consist of questions of theoretical and problems according to the level of the imparted education. Coordinate Seminar influence 10%. Influence of the final exam: 70%. Influence of the practical sessions: 10%. The 10% remaining corresponds to a partial test to be hold in the middle of the semester. For other considerations about coordinate seminars see the rules of the CAT.



## REFERENCES

### Basic

- Marsden, J., Tromba, A.,J., Cálculo Vectorial, Addison-Wesley Ib.,1991.
- Larson, R.; Hostetler, R.P. y Edwards, B.H., Cálculo I, McGraw-Hill, 2006.
- Claudia Neuhauser: Matemáticas para Ciencias. Pearson. 2004

### Additional

- Simmons, G. F.: Ecuaciones Diferenciales Ed. McGraw-Hill. 1993
- Salas, ; Hille ; Etgen, G.J.: Calculus. Una y varias variables. Ed. Reverté, 2002
- Ortega, J.M. Introducció a l'Anàlisi Matemàtica. Manuals de la Universitat Autònoma de Barcelona, 1993