SUBJECT PROGRAMME IN MATHEMATICS

Academic course: 2017-2018

Identification and characteristics of the subject					
Code	501120			ECTS Credits	6
Denomination	**Mathematics I**				
Denomination (Spanish)	Matemáticas I				
Degree	FOOD SCIENCE AND TECHNOLOGY DEGREE				
Centre	Agricultural Engineering School				
Semester	First (1°)	Character		Compulsory	
Module	Basic Formation				
Matter	Mathematics				
Professor/s					
Name		Room	e-mail	Web link	
Conchita Marín Porgueres		D718 Building "Valle del Jerte"	concha@unex.es	www.unex.es	
Field of knowledge	Applied Mathematics				
Department	Mathematics				
Coordinator (In case there is more than one professor)					

Lessons and contents
Short description of the content
Differential and Integral Calculus.
Syllabus (Big Group Activities)
Lesson 1: Real valued functions   Contents: Real numbers. Real functions of a single real variable: limit and continuity, graphic representation. Real functions of several variables: limit and continuity, graphic representation.   Developed skills: CEB1.   Learning results: RA1, RA2.
Lesson 2: Differential calculus.   Contents: Definition of derivative of a function of a single real variable. The algebra of differentiable functions. Optimization. Partial derivatives. Critical points.   Developed skills: CEB1.   Learning results: RA1, RA2.

Lesson 3: Integral calculus.
Contents: The integral of a continuous function on a closed bounded interval. Properties of the integral. Multiple integrals: Two dimensions. Numerical integration.
Developed skills: CEB1.
Learning results: RA1, RA2.

Lesson 4: Differential equations.
Contents: Ordinary differential equations (ODE). General linear homogeneous ODEs. First and second order linear ODEs with constant coefficients. Simple examples. Partial differential equations.
Developed skills: CEB1.
Learning results: RA1, RA2.

Practical syllabus

Practical lesson 1: Real functions of a single real variable. Differential calculus.
Practical lesson contents: Real functions of a single real variable. Differential calculus.
Developed skills: CEB1, CT1.
Learning results: RA1, RA2, RA3.

Practical lesson 2: Real functions of two variables. Differential calculus.
Practical lesson contents: Real functions of two variables. Differential calculus.
Developed skills: CEB1, CT1.
Learning results: RA1, RA2, RA3.

Practical lesson 3: Geometrical applications of integral calculus: areas of plane figures.
Practical lesson contents: Geometrical applications of integral calculus: areas of plane figures.
Developed skills: CEB1, CT1.
Learning results: RA1, RA2, RA3.

Practical lesson 4: Geometrical applications of integral calculus: volumes.
Practical lesson contents: Geometrical applications of integral calculus: volumes.
Developed skills: CEB1, CT1.
Learning results: RA1, RA2, RA3.

Practical lesson 5: Numerical integration.
Practical lesson contents: Numerical integration.
Developed skills: CEB1, CT1.
Learning results: RA1, RA2, RA3.

Practical lesson 6: Solving differential equations.
Practical lesson contents: Solving differential equations.
Developed skills: CEB1, CT1.
Learning results: RA1, RA2, RA3.

Learning Activities

Student workload in hours		Lectures Activities	Practical Activities	Tutorial Activities	Homework
Lesson	**Total**	**GG**	**O**	**T**	**EP**
1		10	2,5	1	16
2		10	2,5		16
3		10	2,5	1	16
			2,5		
			2,5	1	
4		10	2,5		16
Final Exam		2			26
Total	**150**	**42**	**15**	**3**	**90**

GG: Lectures (100 students)
O: Computer (30 students)
T: Small group (10 students)
EP: Homework

Assessment criteria

CEB1: Capacity to solve mathematical problems in engineering contexts. Ability to apply knowledge about linear algebra, geometry, differential geometry, differential and integral calculus, differential equations, partial differential equations, numerical methods, numerical algorithms, statistic and optimization.

Learning results. Objectives

Learning results:
RA1. Understanding of the contents involved in the subject.
RA2. Solving problems related to the contents involved in the subject, using critical thinking, a systematic way, and creativity.
RA3. Communication and transmission of knowledge through group-work.

Objectives:
1. To understand and master basic concepts of differential and integral calculus.
2. To understand the usefulness of basic calculus methods to solve mathematical and physical problems in engineering contexts.
3. To learn how to express themselves, orally and writing, with rigour and accuracy.
4. To learn how to extract conclusions, starting with an assumption and thinking logically.
5. To master basic mathematical concepts in order to keep learning different subjects.
6. To use creative skills to solve problems.

Assessment system

Assessment criteria:

Each assessment activity will be evaluated according to next criteria:

– Be able to demonstrate the understanding of the concepts involved in the course.
– Be able to demonstrate the ability to identify the area of each problem.
– Be able to demonstrate the ability to identify the required mathematical skills to solve each problem.
– Be able to solve problems by applying properly theoretical concepts and practical skills.
– Be able to achieve the right answers for the problems.
– Be able to obtain right conclusions from the results of a problem.
– Be able to expose clearly and rigorously each reasoning, both orally and writing.
– Be able to write and speak properly without orthographic nor grammar mistakes.
– Attend to more than 80% of practical lessons. (*)

Ongoing assessment activities

Ongoing assessment and fruitful attendance to lectures and practical activities	• Practical activities in classroom and computer room according to assessment criteria. (25%) • Active participation according to assessment criteria in the learning activities. (5%)	30%
Final Evaluation of knowledge	• Final exam with theoretical questions and practical problems.	70%
Attendance to learning activities	• Attendance to more than 80% of practical lessons is essential to pass the course. • Submission of every practical assignment is essential to pass the course. • If attendance to practical lessons is lower than 80% the student must pass an extra exam.	

(*) Students who attended to the subject in the previous course may keep their practical marks for the current one. It will never be kept more than one course.

Alternative global assessment system (**)

Final exam: It contains two parts. The first one (70%) are theoretical questions and practical problems. In the second one (30%) the student must solve some exercises by using the software used in practical lessons.

(**)The student must inform the instructors in writing the kind of assessment selected during the first three weeks of each semester. The instructors will send the corresponding lists to the quality committee of the degree. If the student does not communicate any choice, the continuous assessment will apply. Once the type of assessment is selected, the student will not be able to change it.

Bibliography

GARCÍA, A. y otros (1994). ``*Teoría y problemas de Análisis Matemático en una variable´´,* Ed. Clagsa, Madrid.

BURGOS, J., (1995). ``*Cálculo infinitesimal de una variable´´,* Mc Graw Hill, Madrid.

MARÍN PORGUERES, C. (2006). ``*Fundamentos Matemáticos de la Ingeniería: 100 problemas resueltos´´,* Tebar, Madrid.

Other teaching and material resources

Virtual Campus of the Universidad de Extremadura http://campusvirtual.unex.es.

Tutorship schedule

The schedule and location of tutorship will be published, according to the procedure established.

Recommendations

- – It is strongly recommended both attending the theoretical classes and tutorship.
- – It is recommended visiting frequently web site of the subject in the virtual campus.
- – It is strongly recommended studying over the course in a continuous way.