UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: MATHEMATICS FOR BUSINESS II
Type: BASIC
Degree: 329 - UNDERGRADUATE DEGREE PROGRAMME IN BUSINESS MANAGEMENT AND ADMINISTRATION (TA)
Center: 15 - FACULTY OF SOCIAL SCIENCES AND INFORMATION TECHNOLOGIES
Year: 1
Main language: Spanish
Use of additional languages:
Web site:

Code: 54305
ECTS credits: 6
Academic year: 2022-23
Group(s): 60
Duration: C2
Second language:
English Friendly: Y
Bilingual: N

Lecturer: **ALVARO MARTINEZ PEREZ** - Group(s): **60**

Building/Office	Department	Phone number	Email	Office hours
Despacho 2.9	ANÁLISIS ECONÓMICO Y FINANZAS	926051370	alvaro.martinezperez@uclm.es	First semester: Tuesdays and Fridays from 9 to 11 and from 15 to 17. Second semester: Tuesdays and Fridays from 10 to 11 and from 13 to 14.

2. Pre-Requisites

In general, to overcome sucessfully subjects like Mathematics it is necessary a basic skill in calculation operations and properties of powers, roots and logarithms and certain ability solving any type of ecuation (linear or not, irrational, exponential, logarithmic, trigonometric) or inequaility with on or more variables.

It is also essential to know how to compute the derivative of a function and, in particular, being able to aply the general rules of derivation (derivation of a sum, product, quotient and chain rule).

It is important to remember the graphic reperesentation of the usual functions (linear, parabola, hyperbola) since it will help the student to lern how to represent subsets of R2 and level curves of a scalar function, necessary both for optimization and for integration of functions with multiple variables.

Furthermore, it is recommended having passed Mathematics for Business I given that:

-In the analysis of scalar and vectorial fields and the search of optima we shall need vectors and vectorial subspaces of R^n .

-It will be necessary many times to compute the limit of real valued functions with indeterminations and L'Hôpital rule.

-To compute optima of a function (with or wirhout restrictions) It will be necessary knowing how to clasify quadratic forms using differente criteria (Jacobi and eigenvalues).

3. Justification in the curriculum, relation to other subjects and to the profession

Mathematics subjects generally have a broadly instrumental profile in this grade. It is important that the student understands the need to use mathematical concepts and results to successfully approach and follow other disciplines of the curriculum, such as those related to Statistics, Production Management, Economic Analysis, Accounting Analysis and Finance. Frequently, the resolution of problems of different kinds requires an approach, an analysis and the possible search for a solution in mathematical terms, to finally make an adequate interpretation of the context in which it was initially formulated.

It is also important to highlight that the use of mathematical language, as it is a logical language, allows the student's reasoning ability to be developed and with this, it is tried to avoid that they only seek to apply the formula or algorithm in question.

In addition, by promoting in our students the use of the computer to facilitate the correction of their own exercises and the possibility of expanding to larger dimensions than those normally handled in the folio, we encourage autonomous work a nd daily study, which are fundamental requirements for their self-learning.

The Mathematics for Business II course is part of the Quantitative Methods for Business module. Specifically, it aims to link the knowledge acquired in the first semester subject Mathematics for Business I related to Differential Calculus and Optimization of numerical functions with Differential Calculus and Optimization of functions of several variables (scalar and vector). The last part is devoted to the Integral Calculation of both single-variable and multi-variable functions.

As it is a basic first-year subject and due to its instrumental nature of supporting other subjects that we have already mentioned, the relationship with the profession is not so immediate. However, with the contents studied here, it is intended to delve into the analysis of specific functions of economic environments and contribute to the study of models for business decision-making, as well as models of economic forecasting. With the methodologies used and the learning activities formulated, our intention is for the student to develop their systemic reasoning capacity when they have to solve problems, to be autonomous and feel responsible for their own learning and to learn to work in groups and manage well their time.

4. Degree competences achieved in this course

Course competences

Code	Description
E07	Understand the economic environment as a result and application of theoretical or formal representations on how the economy works. To do so, it will be necessary to be able to understand and use common handbooks, as well as articles and, in general, leading edge bibliography in the core subjects of the curriculum.
E13	Ability to make logical representative models of the business reality
G01	Possession of the skills needed for continuous, self-led, independent learning, which will allow students to develop the learning abilities needed to undertake further study with a high degree of independence.
G04	Ability to use and develop information and communication technologies and to apply them to the corresponding business department by using specific programmes for these business areas.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Work out problems in creative and innovative ways.

Know the tools and methods for the quantitative analysis of the company and its environment, including models for business decision making as well as economic forecast models.

Additional outcomes

1.-Adquire mathematical language and instruments which are increasingly inevitable in the process of mathematization of the economy. 2.- Provide the student with the necessary quantitative instruments in order to rigorously pose and analyze economic problems. 3.- Acquire the necessary quantitative knowledge for the formulation of applicable predictions in econometrics and that require the knowledge developed in the three parts of the subject. 4.- Know the tools and methods for the quantitative analysis of business and its environment, including models for business decision-making as well as economic forecasting models. 5.- Develop the capacity for analysis and problem solving, through logical-deductive reasoning, for the management of mathematical programming techniques for optimal decision-making

6. Units / Contents

Unit 1: Indefinite Integral
Unit 2: Definite Integral
Unit 3: Multivariable Calculus
Unit 4: Multiple Integrals
Unit 5: Introduction to Optimization Theory
Unit 6: Classical Mathematical Programming

ADDITIONAL COMMENTS, REMARKS

The contents of this teaching guide have been agreed by the mathematics area and therefore are similar in every campus in the UCLM where this degree is offered.

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	E07 E13 G01 G04	1.33	33.25	N	-	Teaching the subject by lecturer (MAG)
Class Attendance (practical) [ON-SITE]	Problem solving and exercises	E07 E13 G01	0.67	16.75	N	-	Worked example problems and cases resolution by the lecturer and the students (PRO)
Other on-site activities [ON-SITE]	Assessment tests	E07 E13 G01 G04	0.1	2.5	Y	Y	Other evaluation activities (EVA)
Progress test [ON-SITE]	Assessment tests	E07 E13 G01	0.1	2.5	Y	Y	Test on Integrals (EVA)
Final test [ON-SITE]	Assessment tests	E07 E13 G01	0.1	2.5	Y	Y	Final test of the complete syllabus of the subject (EVA)
Other off-site activity [OFF-SITE]	Problem solving and exercises	G01	0.2	5	N	-	Self study (EST)
Study and Exam Preparation [OFF-SITE]	Self-study	G01	1.4	35	N	-	Self study (EST)
Group tutoring sessions [ON-SITE]	Group tutoring sessions	E07 E13 G01	0.1	2.5	N	-	Individual or small group tutoring in lecturer's office, classroom or laboratory (TUT)
Other off-site activity [OFF-SITE]	Self-study	E07 G01 G04	2	50	N	-	Self study (EST)
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4					**Total class time hours: 60**
		Total credits of out of class work: 3.6					**Total hours of out of class work: 90**

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Other methods of assessment	20.00%	0.00%	Non-compulsory activity that can be retaken. To be carried out before end of teaching period
Final test	80.00%	100.00%	Final test of the hole syllabus.
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

The course follows an evaluation system based on the assessment of various training activities and an exam. The student is required to obtain a 4 (out of 10) in the final evaluation test to make an average with the grade obtained in the rest of the proposed training activities.

Any student may change to the non-continuous assessment mode as long as they have not participated during the teaching period.

Classes in assessable activities that together account for at least 50% of the total evaluation of the subject and, in that case, must communicate it before the end of the class period.

Regarding the evaluation in case of illness or other special circumstances see article 7 of the Student Evaluation Regulation of the University of Castilla-La Mancha.

Aditional note: The rules of the Mathematics Area for the realization of any exam (partial, ordinary or extrarodinary) are the following: it is forbiden to carry and/or use any cell phone (or calculator) during the exam. In case a student carries and/or uses a cell phone (or calculator) during the exam, will immediately fail with a 0 score in base of Article 9 of the Student Evaluation Regulations.

Non-continuous evaluation:

The final exam will consist of the necessary tests (written or oral) to validate the competencies on the subject.

Regarding the evaluation in case of illness or other special circumstances see article 7 of the Student Evaluation Regulation of the University of Castilla-La Mancha.

Specifications for the resit/retake exam:

Assessment test/s that represent 100% of the final grade for the subject

Note: As in the ordinary convocatory, if the final exam score is less than a 40%, the continous evaluation will not be considered and the final grade of the course will be the grade of the final exam.

Specifications for the second resit / retake exam:

It will be a final test which gives the 100% of the final grade.

Note: The rules of the Mathematics Area for the realization of any exam (partial, ordinary or extrarodinary) are the following: it is forbiden to carry and/or use any cell phone (or calculator) during the exam. In case a student carries and/or uses a cell phone (or calculator) during the exam, will immediately fail with a 0 score in base of Article 9 of the Student Evaluation Regulations.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	33.25
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	16.75
Other on-site activities [PRESENCIAL][Assessment tests]	2.5
Progress test [PRESENCIAL][Assessment tests]	2.5
Final test [PRESENCIAL][Assessment tests]	2.5
Other off-site activity [AUTÓNOMA][Problem solving and exercises]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	35
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2.5
Other off-site activity [AUTÓNOMA][Self-study]	50

Global activity

Activities	hours
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	16.75
Other on-site activities [PRESENCIAL][Assessment tests]	2.5
Progress test [PRESENCIAL][Assessment tests]	2.5
Final test [PRESENCIAL][Assessment tests]	2.5
Class Attendance (theory) [PRESENCIAL][Lectures]	33.25
Other off-site activity [AUTÓNOMA][Problem solving and exercises]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	35
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2.5
Other off-site activity [AUTÓNOMA][Self-study]	50
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Fernando Coquillat	Cálculo integral: metodología y problemas	Tebar Flores			1997	
Alpha Chiang	Métodos fundamentales de economía matemática	McGraw Hill			2006	
J. Aira y R. Lardner	Matemáticas aplicadas a la administración y a la economía	Pearson-Prentice Hall			2002	
J.L. LLorens	Aplicaciones de Derive: Análisis Matemático I	Universidad Politécnica: servicio de publicaciones			1993	
M. Besada y otros	Cálculo en varias variables.Cuestiones y ejercicios resueltos	Pearson			2001	
Marvin Bittinger	Cálculo para ciencias económico-administrativas	Prentice Hall			2002	
P. Hammond y K. Sydsaeter	Matemáticas para el análisis económico	Prentice Hall			1996	
R. Barbolla, E. Cerdá y P. Sanz	Optimización: cuestiones, ejercicios y aplicaciones a la economía	Prentice Hall			2001	
Susana Blanco Garcia	Matemáticas empresariales II: enfoque teórico práctico	AC			2001	