UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course:	POSTGRAUDATION DISSERTATION	**Code:**	310260
Type:	PROJECT	**ECTS credits:**	12
Degree:	2351 - MASTER DEGREE PROGRAMME IN PHYSICS AND MATHEMATICS-FISYMAT	**Academic year:**	2019-20
Center:	602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL	**Group(s):**	20
Year:	1	**Duration:**	SD
Main language:	Spanish	**Second language:**	English
Use of additional languages:		**English Friendly:**	Y
Web site:		**Bilingual:**	N

Lecturer: **HELIA DA CONCEICAO PEREIRA SERRANO** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Margarita Salas/Despacho 327	MATEMÁTICAS	926052237	heliac.pereira@uclm.es	L M X J V 13:00H-14:00H Por email se puede concertar cita fuera del horario establecido.

2. Pre-Requisites

The Final Master's Project must be evaluated once there is proof that the student has passed all the remaining subjects of the curriculum and therefore has all the necessary credits to obtain the Master's degree, except those corresponding to the work itself (article 2.3 of the Regulations on the elaboration and defense of Master's Thesis at the University of Castilla-La Mancha).

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

The Master's Final Project must be adjusted to one of the following types:

- Research work, analysis, field data collection, laboratory, etc.
- Design of a program or a scientific professional project.
- Deepening the state of the question and critical review of a specialized topic.

4. Degree competences achieved in this course

Course competences

Code	Description
CB06	Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.
CB07	Apply the achieved knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to the area of study
CB08	Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of knowledge and judgments
CB09	Know how to communicate the conclusions and their supported knowledge and ultimate reasons to specialized and non-specialized audiences in a clear and unambiguous way
CB10	Have the learning skills which allow to continue studying in a self-directed or autonomous way
CE01	Solve physical and mathematical problems, planning their solutions based on the available tools and time and resource constraints
CE02	Develop the ability to decide the appropriate techniques to solve a specific problem with special emphasis on those problems associated with the Modeling in Science and Engineering, Astrophysics, Physics, and Mathematics
CE03	Have the ability to build and develop advanced mathematical reasoning, and delve into the different fields of mathematics
CE04	Have the ability to build and develop advanced physical reasoning, and delve into the various fields of physics and astrophysics
CE05	Know how to obtain and interpret physical and/or mathematical data that can be applied in other branches of knowledge
CE06	Prove the necessary capacity to perform a critical analysis, evaluation and synthesis of new and complex results and ideas in the field of astrophysics, physics, mathematics and biomathematics
CE07	Ability to understand and apply advanced knowledge of mathematics and numerical or computational methods to problems of biology, physics and astrophysics, as well as to build and develop mathematical models in science, biology and engineering
CE08	Ability to model, interpret and predict from experimental observations and numerical data
CG01	Know how to work in a multidisciplinary team and manage work time
CG02	Ability to generate and independently develop innovative and competitive proposals in research and professional activity in the scientific field of Physics and Mathematics
CG03	Present publicly the research results or technical reports, to communicate the conclusions to a specialized court, interested persons or organizations, and discuss with their members any aspect related to them
CG04	Know how to communicate with the academic and scientific community as a whole, with the company and with society in general about Physics and/or Mathematics and its academic, productive or social implications
CG05	Gain the ability to develop a scientific research work independently and in its entirety. Be able to search and assimilate scientific literature, formulate hypotheses, raise and develop problems and draw conclusions from the obtained results
CG06	Gain the capacity for dialogue and cooperation with scientific and business communities from other fields of research, including social and natural sciences
CT01	Promote the innovative, creative and enterprising spirit

CT03	Develop critical reasoning and the ability to criticize and self-criticize
CT04	Understand and reinforce the ethical and deontological responsibility and commitment in the performance of the professional and research activity and as a citizen
CT05	Autonomous learning and responsibility (analysis, synthesis, initiative and teamwork)

5. Objectives or Learning Outcomes

Course learning outcomes

Description

6. Units / Contents

Unit 1: The student choose a research topic among those offered

ADDITIONAL COMMENTS, REMARKS

The topic of the Final Master's Project will be chosen from the following subjects:
1. Biomathematics cellular and tumor dynamics. Formation of patterns. Ecology.
2. Fluid mechanics. Numerical modeling of biological and geophysical fluids.
3. Numerical resolution of equations in partial derivatives. Non-linear equations and numerical methods.
4. Optimization and variational methods. Non-linear analysis and partial differential equations. Topological methods.
5. Probabilistic analysis, inference in stochastic processes and optimal design of experiments.
6. Dynamic systems. Hamiltonian dynamics. Qualitative theory of differential equations.
7. Discrete Mathematics. Differential geometry.

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	R	Description
Individual tutoring sessions [ON-SITE]	Guided or supervised work		0.8	20	Y	Y	Y	
Writing of reports or projects [OFF-SITE]	Self-study		8.16	204	Y	Y	Y	
Study and Exam Preparation [OFF-SITE]	Individual presentation of projects and reports		3	75	Y	Y	Y	
Final test [ON-SITE]	Assessment tests		0.04	1	Y	Y	Y	
		Total:	**12**	**300**				
		Total credits of in-class work: 0.84						**Total class time hours: 21**
		Total credits of out of class work: 11.16						**Total hours of out of class work: 279**

As: Assessable training activity
Com: Training activity of compulsory overcoming
R: Rescheduling training activity

8. Evaluation criteria and Grading System

	Grading System		
Evaluation System	**Face-to-Face**	**Self-Study Student**	**Description**
Oral presentations assessment	100.00%	0.00%	20 minutes oral presentation evaluated according the following criteria.
Total:	**100.00%**	**0.00%**	

Evaluation criteria for the final exam:

The evaluation of the Final Master's Project is based fundamentally on two types of criteria:
1. general criteria related to the structure and clarity of the memory as well as the oral presentation of the work (35%);
2. specific criteria related to the research work carried out (65%).

The weighting of each criterion on the final note of the Master's Thesis is as follows:

1.1. Structure and clarity of the memory: 10%
1.2. Ability to focus oral exposition on the essential and significant aspects of memory: 5%
1.3. Control of the established time for the oral presentation: 5%
1.4. Comprehensiveness and accuracy of answers to the questions of the members of the court: 15%

2.1. Originality of the research work and deepening of the state of the question: 25%
2.2. Rigor in the methodology and mathematical formulation used, as well as consistency in the notation used in the report: 30%
2.3. Exhaustiveness in the bibliography and references to previous works: 10%

Specifications for the resit/retake exam:

The same as the final exam.

Specifications for the second resit / retake exam:

The same as the final exam.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	**hours**
Unit 1 (de 1): The student choose a research topic among those offered	
Group 20:	
Initial date: 30-09-2019	**End date:** 30-06-2020

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Hélia Serrano	Guía del TFM de Fisymat campusvirtual.uclm.es				2018	