

GENERAL INFORMATION

Course information	
Name	Seminars and Workshops
Code	MRE-501
Degree	Official Master's Degree in Research in Engineering Systems Modeling (MRE)
Year	All
Semester	Annual (taught throughout the entire academic year)
ECTS credits	3 ECTS
Type	Compulsory
Department	
Area	
Coordinator	Eugenio Sánchez Úbeda

Instructor	
Name	Eugenio Sánchez Úbeda
Department	Industrial Organization
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DETAILED INFORMATION

Contextualization of the course

Contribution to the professional profile of the degree

This course is not focused on any particular subject, but it provides mostly general knowledge about different topics related to engineering research. In particular, during the seminars an expert presents a particular issue related to research in engineering such as scientific production, research management or the knowledge transfer from the university to industry through real examples of successful research projects. In the other hand, the students will get practical experience on some useful tools that may be useful for the development of the doctoral thesis.

Prerequisites

CONTENTS

Contents
SEMINARS
<ul style="list-style-type: none">1.1 Doing science today1.2 Doctoral research in Comillas1.3 Solving complex problems by means of statistics1.4 Cloud computing1.5 Big data1.6 Energy efficiency in Railways1.7 Smart grids, business models and the utility of the future1.8 Financial instruments for the energy sector
WORKSHOPS
<ul style="list-style-type: none">2.1 Visual basic for applications2.2 Graphic visualization with Matlab2.3 Complex networks2.4 Information security

Competences and Learning Outcomes

Competences

Basic and General Competences

CB3. Knowing how to evaluate and select the most appropriate scientific theoretical framework and methodology from their fields of study to formulate opinions on the basis of incomplete or limited information including, when necessary and appropriate, their views on social responsibility issues or the ethical repercussions linked to the solution proposed in each case.

Specific Competences

CE7. Knowing how to use the essential tools to cover a research topic.

CE8. Having a global perspective of the main research challenges in the context of engineering systems.

Learning outcomes

By the end of the course students should be able to:

- RA1. To know and understand the basics of the organization and management of research in the context of engineering
- RA2. To know and apply some of the tools that may be useful for the development of the doctoral thesis.
- RA3. To know and apply some of the tools that may be useful for subsequent scientific career.
- RA4. To know about successful research projects in the context of engineering.

TEACHING METHODOLOGY

General methodological aspects	
<p>The teaching method focus on providing students with general knowledge about main research topics, as well as increasing the critical thinking on engineering research. Thus, teaching objectives require the active participation of the student.</p>	
In-class activities	Competences
<ul style="list-style-type: none"> ▪ Seminars (18 hours): The lecturer, an expert in the particular subject, will present the research topic, providing useful information and insight. Active participation will be encouraged by raising open questions to foster discussion. 	CB3, CE7, CE8
<ul style="list-style-type: none"> ▪ Workshops (12 hours): Under the instructor's supervision, students will practice using particular software application to get experience that may be useful for research. 	CB3, CE7, CE8
<ul style="list-style-type: none"> ▪ Tutoring for groups or individual students will be organized upon request. 	-
Out-of-class activities	Competences
<ul style="list-style-type: none"> ▪ Personal study of the course material (15 hours). 	CB3, CE7, CE8
<ul style="list-style-type: none"> ▪ Seminars and workshops assessment. Carried out individually after each session. A brief description of the talk, assessing the personal relevance of the seminar or workshop (15 hours). 	CB3, CE7, CE8
<ul style="list-style-type: none"> ▪ Final project. Carried out individually (30 hours). 	CB3, CE7, CE8

ASSESSMENT AND GRADING CRITERIA

Assessment activities	Grading criteria	Weight
Final report	<ul style="list-style-type: none"> ▪ Understanding of general concepts. ▪ Application of these concepts to problem-solving. ▪ Written communication skills. 	70%
Performance evaluation <ul style="list-style-type: none"> • Seminars and workshops assessment. • Attendance and active participation in class. 	<ul style="list-style-type: none"> ▪ Understanding of general concepts. ▪ Synthesis skills. ▪ Written communication skills. 	30%

GRADING AND COURSE RULES

Grading
Regular assessment
<p>In order to pass the course, the mark obtained must be greater or equal to 5 out of 10 points.</p> <p>The student can use till two periods of final evaluation during one academic year. The regular assessment will be carried out at the end of the course (end of the second semester).</p> <p>In case that the course was not passed, the student has another opportunity of final assessment at the end of the academic year. The dates for these evaluation periods will be announced in the web page.</p> <p>The final grade of the course will be obtained by addition of the following criteria for any evaluation period:</p> <ul style="list-style-type: none"> • 70% final report. • 20% individual seminars and workshops assessment. • 10% attendance to the seminars and workshops.
Retakes
See previous section.
Course rules
<ul style="list-style-type: none"> ▪ Class attendance is mandatory according to Article 93 of the General Regulations (Reglamento General) of Comillas Pontifical University and Article 6 of the Academic Rules (Normas Academicas) of the ICAI School of Engineering. Not complying with this requirement may have the following consequences: <ul style="list-style-type: none"> - Students who fail to attend more than 15% of the lectures may be denied the right to take the final exam during the regular assessment period. <p>Students who commit an irregularity in any graded activity will receive a mark of zero in the activity and disciplinary procedure will follow (cf. Article 168 of the General Regulations (Reglamento General) of Comillas Pontifical University).</p>

WORK PLAN AND SCHEDULE¹

In and out-of-class activities	Date/Periodicity	Deadline
Seminars and Workshops	Weekly	
Review and self-study of the concepts covered in the lectures	After each lesson	
Session assessment report writing	After each lesson	Next week
Final report	During the last weeks of the course	End of the course

STUDENT WORK-TIME SUMMARY			
IN-CLASS HOURS			
Seminars	Workshops		
18	12		
OUT-OF-CLASS HOURS			
Personal work of the student	Homework for session assessment	Final project	
15	15	30	
ECTS credits:			3 (90 hours)

BIBLIOGRAPHY

<ul style="list-style-type: none"> ▪ Notes prepared by the instructors (available in Moodle). ▪ Each seminar and workshop provides specific bibliography.

¹ A detailed work plan of the subject can be found in the course summary sheet (see last page). Nevertheless, this schedule is tentative and may vary to accommodate the rhythm of the class.

Week	In-class activities		Out-of-class activities			Learning outcomes
1	Course presentation & Doing science today (2h)	Seminar		Self-study and session assessment (2h)		RA1
2	Visual basic for applications (I) (2h)	Workshop		Self-study and session assessment (2h)		RA2, RA3
3	Visual basic for applications (II) (2h)	Workshop		Self-study and session assessment (2h)		RA2, RA3
4	Doctoral research in Comillas (2h)	Seminar		Self-study and session assessment (2h)		RA1
5	Big data (2h)	Seminar		Self-study and session assessment (2h)		RA2, RA3
6	Energy efficiency in Railways (2h)	Seminar		Self-study and session assessment (2h)		RA4
7	Information security (2h)	Workshop		Self-study and session assessment (2h)		RA2, RA3
8	Graphic visualization with Matlab (I) (2h)	Workshop		Self-study and session assessment (2h)		RA2, RA3
9	Graphic visualization with Matlab (II) (2h)	Workshop		Self-study and session assessment (2h)	Final report development (5h)	RA2, RA3
10	Smart grids, business models and the utility of the future (2h)	Seminar		Self-study and session assessment (2h)	Final report development (5h)	RA4
11	Complex networks (I - theory) (2h)	Seminar		Self-study and session assessment (2h)	Final report development (5h)	RA2, RA3
12	Complex networks (II - practice) (2h)	Workshop		Self-study and session assessment (2h)	Final report development (5h)	RA2, RA3
13	Financial instruments for the energy sector. A brief Guide (2h)	Seminar		Self-study and session assessment (2h)	Final report development (5h)	RA2, RA3
14	Solving complex problems by means of statistics (2h)	Seminar		Self-study and session assessment (2h)	Final report development (5h)	RA2, RA3
15	Cloud computing (2h)	Seminar		Self-study and session assessment (2h)	Final report submission	RA1, RA2, RA3, RA4, RA5