

**1. General information****Course:** ENGINEERING PROJECTS**Type:** CORE COURSE**Degree:** 353 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING (CR)**Center:** 602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL**Year:** 4**Main language:** Spanish**Use of additional languages:****Web site:** <https://campusvirtual.uclm.es/>**Code:** 56329**ECTS credits:** 6**Academic year:** 2021-22**Group(s):** 20 21**Duration:** First semester**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** JAVIER CONTRERAS SANZ - Group(s): 20

Building/Office	Department	Phone number	Email	Office hours
Edificio Politécnico 2-D12	MECÁNICA ADA. E ING. PROYECTOS	Vía Teams	Javier.Contreras@uclm.es	Any time of the week, upon request via e-mail, according to availability and diary.

Lecturer: GREGORIO MUÑOZ DELGADO - Group(s): 21

Building/Office	Department	Phone number	Email	Office hours
Edificio Politécnico 2-D06	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	Vía Teams	Gregorio.Munoz@uclm.es	Any time of the week, upon request via e-mail, according to availability and diary.

2. Pre-Requisites

For students to achieve the learning objectives described is highly recommended to have passed the subjects of the preceding courses that allow them to have an idea of the whole, especially those of technological scope related to the calculation, design, and development of an engineering project.

Likewise, it is advisable to have knowledge of English, at least at a basic level.

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

We are faced with a discipline and a subject different from those dictated throughout the course of the degree, it can be said that it is atypical within the set of subjects, but nevertheless very typical within the engineering profession.

We are facing a very formative subject, in which the student has to work as a team, must provide dedication, and in which he/she can glimpse something of what his/her profession is going to be.

It is a subject without fixed rules, where only recommendations or advice are given, in some cases not well defined, that can only be achieved by its usefulness and the way to use them when doing a job.

In this discipline the student can and should contribute with something; his/her attitude should not be passive, nor exclusively receptive, but should move to a creative phase where personal initiative is an important element, and even preponderant.

It is not only that the student learns specific works that could be done throughout the course, what is involved is that he/she learns some methods, a way of working, a way of doing things that allows him to perform other different specific works. In addition, It is intended to acquire some qualities, a behavior and, why not say, a suitable temperament to work in the world of project engineering.

4. Degree competences achieved in this course**Course competences**

Code	Description
A0	Promote respect, Human Rights and the principles of universal accessibility and design for everyone in accordance with the provisions in the final part of Law 51/2003, of 2 December, Equal Opportunities, non-discrimination and universal accessibility for disabled people.
A02	To know how to apply knowledge to work or vocation in a professional manner and possess the competences that are usually demonstrated by the formulation and defence of arguments and the resolution of problems in the field of study.
A03	To have the capability to gather and interpret relevant data (normally within the area of study) to make judgements that include a reflection on themes of a social, scientific or ethical nature.
A07	Knowledge of Information Technology and Communication (ITC).
A08	Appropriate level of oral and written communication.
A09	Ethical and professional commitment.
A10	Ability to produce and develop projects in the field of industrial engineering and automation aimed at, and in accordance with the knowledge acquired as established in section 5 of Order CIN/351/2009, the construction, remodelling, repair, conservation, demolition, manufacturing, installation, assembly or use of: structures, mechanical equipment, power installations, electrical and electronic installations, industrial plants and installations and processes of manufacture and automatization.
A11	Ability to manage engineering project activities described in the previous competency.
A13	Ability to take the initiative to solve problems, take decisions, creativity, critical reasoning and ability to communicate and transmit knowledge, skills and abilities in Mechanical Engineering.

A14	Knowledge to undertake measurements, calculations, evaluations, appraisals, studies, give expert opinions, reports, work plans and similar tasks.
A15	Ability to work to specifications and comply with obligatory rules and regulations.
A16	Ability to analyse and evaluate the social and environmental impact of technical solutions.
A18	To have organization and planning skills used in businesses and other institutions and organizations.
A19	Ability to work in a multilingual and multidisciplinary environment.
C12	Knowledge and ability to organize and manage projects. To be familiar with the structural organization and functions of a project office.
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Knowledge of the different tasks carried out in a project office

Know all the functions of the works' management, their functions and their responsibilities

Knowledge of the main information applications used in the production, processing and control of projects

Know the general aspects related to environmental and sustainable technologies

Ability to analyze and compare different alternatives put forward from the economic point of view of a project

Awareness of the necessity to adapt engineering projects to ensure the least damage possible to the surroundings and environment

Ability to design, write and manage all of the documents that make up the structure of an industrial project or any technical document that this type of professional has to produce. Fundamental documents: reports, plans, specifications, budgets, health and safety documents, environmental documents, control of deadlines and times.

Ability to express and defend ideas, problems and solutions in the field of engineering projects

Ability to manage any type of project

Understand and interpret the importance of current regulations and legislation applied to industrial engineering works and their implementation in industrial projects

6. Units / Contents

Unit 1: INTRODUCTION TO THE PROJECT. DOCUMENTS. CONTENTS AND ELLABORATION

Unit 2: ECONOMIC AND FINANCIAL EVALUATION

Unit 3: PLANNING, PROGRAMMING AND CONTROL OF A PROJECT

Unit 4: TIME AND COST MANAGEMENT TECHNIQUES OF A PROJECT

Unit 5: PROJECT'S RESOURCES MANAGEMENT

Unit 6: LEGAL PROCESSING AND INDUSTRIAL PROPERTY RIGHTS. LEGISLATION, QUALITY, SECURITY AND ENVIRONMENT

ADDITIONAL COMMENTS, REMARKS

CONTENTS OF VERIFIED MEMORY	TOPICS
Introduction to the Project. Documents. Contents and Ellaboration	1
Economic and Financial Evaluation	2
Legislation, Quality, Security, and Environment.	6
Human Resources and Property Rights.	5
Legal Processing of Projects.	6
Execution and Management of Projects.	4
Planning, Programming, and Control of Projects.	3

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	A0 A02 A03 A08 A09 A10 A11 A13 A15 A16 A18 A19 C12	0.8	20	Y	N	Participatory master class, with blackboard and projector
Problem solving and/or case studies [ON-SITE]	Project/Problem Based Learning (PBL)	A0 A02 A03 A08 A09 A10 A13 A15 A18 A19	0.4	10	Y	N	Solving problems in the classroom in a participatory manner, with traditional tools and realization of project work
Computer room practice [ON-SITE]	Work with simulators	A0 A02 A03 A07 A08 A09 A10 A11 A13 A15 A18 A19	0.6	15	Y	Y	Computer Classroom, through specific programs
Practicum and practical activities report writing or preparation [OFF-SITE]	Work with simulators	A0 A02 A03 A07 A08 A09 A10 A11 A13 A15 A18 A19	0.4	10	Y	Y	Writing the report of the practice after its realization
Workshops or seminars [ON-SITE]	Workshops and Seminars	A0 A02 A03 A07 A08 A09 A13 A19	0.2	5	N	-	Talks and / or seminars given by professionals with experience in the realization of engineering projects
Writing of reports or projects [OFF-SITE]	Group Work	A0 A02 A03 A07 A08 A09 A10 A11 A13 A14 A15 A16	3.2	80	Y	Y	Autonomous personal study of the student and supervised work.

Group tutoring sessions [ON-SITE]	Group tutoring sessions	A0 A02 A03 A07 A08 A09 A10 A11 A13 A14 A15 A16 A18 A19 C12	0.2	5	N	-	Group tutorials (or individualized if necessary). Direct interaction teacher-student
Progress test [ON-SITE]	Assessment tests	A0 A02 A03 A07 A08 A09 A10 A11 A13 A14 A15 A16 A18 A19 C12	0.06	1.5	Y	N	Written tests, practical laboratory tests and presentation and defense of individual or group academic works
Final test [ON-SITE]	Assessment tests	A0 A02 A03 A07 A08 A09 A10 A11 A13 A14 A15 A16 A18 A19 C12	0.14	3.5	Y	Y	Exam / Test / Final Defense
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
Laboratory sessions	15.00%	15.00%	In continuous assessment it consists of the delivery of the practical exercises carried out in the sessions as well as taking a test of the contents of the practices. In non-continuous assessment, it consists of taking a test of the contents of the practices. Minimum mark: 4.0
Progress Tests	40.00%	50.00%	In continuous assessment, it consists of several tests including theoretical-practical exercises similar to those carried out in the training activities throughout the course. In non-continuous assessment, it consists of taking a single evaluation test of the same contents. Minimum mark: 4.0
Projects	35.00%	35.00%	In continuous assessment, it consists of the completion and delivery of academic work done outside of class, presented in class and supervised by the teacher individually or in small groups. In non-continuous assessment, it consists of the completion of an academic work done outside of class individually that will be delivered and presented on the day of the exam. Minimum mark: 4.0
Assessment of problem solving and/or case studies	10.00%	0.00%	In continuous assessment, it consists of the completion and delivery of practical exercises by students. In non-continuous assessment, the corresponding percentage will be included in the progress tests.
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:

Continuous evaluation of all training processes that will be weighted to obtain a final grade between 0 and 10 according to the current legislation (Real Decreto 1125/2003 de 5 de septiembre). The evaluation of the student is the result of the course follow-up and / or the exam or written test that will consist of theoretical questions and practical exercises. The course follow-up is based on:

- Evaluation of the acquisition of practical skills through an ad-hoc built profile of competences that considers the documentation submitted by the student, individually or in small groups, through reports, the work developed, and the skills and attitudes shown during assessments and guided practical activities.
- Evaluation of the assimilation of concepts and procedures through written tests.
- Evaluation of academic work carried out by students outside of class and supervised by the professor, individually or in small groups. The student must make, deliver, and defend before the professor a report with some of the proposed exercises. The professor will assess the presentation, exhibition, defense, and difficulty of the chosen exercises.
- Evaluation of laboratory practices in the computer room with application of specific software by assessing the attendance to the practices, the delivery of the work done in class, and the realization of a practical test in the same classroom.

The final grade of the student is from 0 to 10 points, with the following nuances:

- The grade obtained in the progress tests (partials) is saved until the ordinary call. To pass and be able to weight the subject of each partial, a minimum grade of 4 points must be obtained.
- The grade obtained in the elaboration of reports of practices is saved until the extraordinary call.
- The grade obtained in the elaboration of reports or works (the project of the subject) is saved until the extraordinary call.
- Regular attendance to the practical classes is compulsory both to be able to pass through continuous assessment and to save the grade of the different

partial exams until the ordinary call.

Non-continuous evaluation:

As in the continuous assessment except for the assessment of problem solving and/or case studies, whose weight becomes part of the final exam. The rest of works and exercises that count for the final qualification can be performed remotely, since the software will be accessible free of charge for its individual installation.

Specifications for the resit/retake exam:

Students who have not passed the subject (grade 5 or higher) will attend it. To pass the subject in the extraordinary call, they must pass the practical test, deliver and defend the project of the subject and take the final test that will include all the contents of the subject.

Students who do not attend the extraordinary session will be considered as NOT PRESENTED.

Specifications for the second resit / retake exam:

As in the extraordinary call.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Computer room practice [PRESENCIAL][Work with simulators]	15
Practicum and practical activities report writing or preparation [AUTÓNOMA][Work with simulators]	10
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	5
Writing of reports or projects [AUTÓNOMA][Group Work]	80
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	5
Progress test [PRESENCIAL][Assessment tests]	1.5
Final test [PRESENCIAL][Assessment tests]	3.5
Unit 1 (de 6): INTRODUCTION TO THE PROJECT. DOCUMENTS. CONTENTS AND ELLABORATION	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Project/Problem Based Learning (PBL)]	2
Unit 2 (de 6): ECONOMIC AND FINANCIAL EVALUATION	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Project/Problem Based Learning (PBL)]	2
Unit 3 (de 6): PLANNING, PROGRAMMING AND CONTROL OF A PROJECT	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Project/Problem Based Learning (PBL)]	2
Unit 4 (de 6): TIME AND COST MANAGEMENT TECHNIQUES OF A PROJECT	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Project/Problem Based Learning (PBL)]	2
Unit 5 (de 6): PROJECT'S RESOURCES MANAGEMENT	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Project/Problem Based Learning (PBL)]	2
Unit 6 (de 6): LEGAL PROCESSING AND INDUSTRIAL PROPERTY RIGHTS. LEGISLATION, QUALITY, SECURITY AND ENVIRONMENT	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Global activity	
Activities	hours
Practicum and practical activities report writing or preparation [AUTÓNOMA][Work with simulators]	10
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	5
Writing of reports or projects [AUTÓNOMA][Group Work]	80
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	5
Progress test [PRESENCIAL][Assessment tests]	1.5
Final test [PRESENCIAL][Assessment tests]	3.5
Problem solving and/or case studies [PRESENCIAL][Project/Problem Based Learning (PBL)]	10
Class Attendance (theory) [PRESENCIAL][Lectures]	20
Computer room practice [PRESENCIAL][Work with simulators]	15
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Avraham Shtub, Jonathan F. Bard, Shlomo Globerson	PROJECT MANAGEMENT: ENGINEERING, TECHNOLOGY, AND IMPLEMENTATION	Prentice Hall	New Jersey, EEUU	0-13-556458-1	1994	Engineering project management
Carl Chatfield, Timothy Johnson	Microsoft Project 2016 Step by Step	Microsoft Press	Redmond, Washington	978-0735698741	2016	Practice book with examples and cases to learn the management of the MS Project 2016 program

Javier Contreras Sanz, José Ignacio Muñoz Hernández	PROYECTOS COMPREHENSIVE PROJECT MANAGEMENT: INTEGRATING OPTIMIZATION MODELS, MANAGEMENT PRINCIPLES, AND COMPUTERS	UCLM	Ciudad Real	978-84-608-0640-0	2007	Project engineering
Adedeji B. Badiru, P. Simin Pulat		Prentice Hall	New Jersey, EEUU	978-0130309259	1994	Engineering project management
Roberto Soriano Domènech	Project 2016. Curso práctico paso a paso	Altaria		978-84-944776-4-5	2016	Practice book with examples and cases to learn the management of the MS Project 2016 program