60566 - Rural facilities and roads

Información del Plan Docente

Academic Year	2018/19
Subject	60566 - Rural facilities and roads
Faculty / School	201 - Escuela Politécnica Superior
Degree	546 - Master in Agricultural Engineering
ECTS	6.0
Year	1
Semester	Second semester
Subject Type	Compulsory
Module	---

1.General information

1.1.Aims of the course

This course and its expected outcomes respond to the following approaches and objectives:

That the student acquires the knowledge and technical skills that will allow him/her to be able to perform the dimensioning and justificatory calculations associated with some of the following rural facilities: small dams and irrigation pools for agricultural use, rural roads, electric power transforming stations (distribution substations) and low-voltage power distribution grids.

1.2.Context and importance of this course in the degree

The Master in Agricultural Engineering degree confers on the holder the professional attributions related to the calculation of rural facilities linked to their field of work. Therefore, this course is essential for the training of an engineer, since the acquired knowledge will be fundamental for the development of the profession in terms of ensuring the safety and proper functioning of this type of facilities.

1.3.Recommendations to take this course

Update previous knowledge related to resistance of materials, calculation of structures and electrical engineering and electrical installations. Having pursued the *Rural Infrastructures* course in the first semester is strongly encouraged.

2.Learning goals

2.1.Competences

Upon passing this course, the students will be more competent to...

- Develop and apply technology related to the management of equipment and installations that are integrated into agri-food production processes and systems.
- Develop and apply technology related to agroindustrial constructions, infrastructures and rural roads.
- Develop and apply technology related to study, intervention and management stages.

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- Apply the acquired knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
- Possess the learning skills that will allow them to continue studying in a way that will be largely self-directed or autonomous.
- Design, project and execute infrastructure works, buildings, facilities and the equipment necessary for the efficient performance of productive activities carried out in agri-food companies.
- Transmit their knowledge and the conclusions of their studies or reports, using the means that communication technology allows and taking into account the level of knowledge of the receiving public.

2.2.Learning goals

To pass this course, the student must demonstrate the following results...

- Describe and justify -from a technical point of view- the elements that constitute a small reservoir.
- Determine the stability of compacted soil slopes.
- Describe and technically justify the elements that constitute a rural road.
- Technically justify the components of a high-voltage/low-voltage transformer substation.
- Technically justify an aerial low-voltage power distribution grid.
- Technically justify an underground low-voltage power distribution grid.

2.3.Importance of learning goals

The learning outcomes from this course will allow the student to justify the calculation of some of the most used rural facilities in the field of Agricultural Engineering, in line with one of the specific competences that must be acquired by a Master in Agricultural Engineering degree holder with professional attributions.

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he/she has achieved the anticipated learning outcomes through the following assessment activities:

The evaluation system will be based on a final global test.

This final global test will be similar in the two official calls available per academic year and the scheduled dates will be established by the Center in the academic calendar.

The final global test will consist of two differentiated evaluation activities:

- *Activity 1* (A1): written test with short-answer or multiple-choice questions. This activity will be graded from 0 to 10 points and will constitute 25% of the final grade of the course. It is necessary to obtain at least 3.5 out of 10 points in this activity to pass the course. The test will be carried out without any supporting documentation.
- *Activity 2* (A2): problem-solving written test. This activity will be evaluated from 0 to 10 points and will constitute 75% of the final grade of the course. It is necessary to obtain at least a 4.0 out of 10 points in this activity to pass the course. The test can be done with supporting documentation (notes, books, etc.). The use of computers, mobile phones, or internet access is not allowed.

Grading system

The final grade of the course (FG) will be determined by the following equation:

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FG = 0.25 * grade A1 + 0.75 * grade A2

In order to pass (FG>=5) it is essential that: NA1 >= 3.5; NA2 >= 4.0

In the event that the requirements of the previous section are not met, the final grade will be obtained in the following manner:

If FG >= 4, the final grade will be: Fail (4.0)
If FG <4, the final grade will be: Fail (FG)

In each call the student will be assessed of 100% of the contents of the course (evaluation activities 1 and 2).

Evaluation criteria

The following criteria will be considered:

- The precision and correctness in the answers.
- The correct use of units.
- The chosen approach in the resolution of problems.
- The accuracy of numerical results, as well as their tidiness, presentation and interpretation.
- The clarity in the diagrams, figures and graphic representations.
- Misspellings.
- The absence of explanations and justifications in the development of problems.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as theory sessions (lectures), problem-solving based learning and the use of specific software tools.

4.2.Learning tasks

This is a 6 ECTS course which includes the following learning tasks:

- Lectures.
- Problem-solving sessions.
- Lab sessions (using software tools).
- Autonomous work.
- Assessment activities.

4.3.Syllabus

The course will address the following topics:

Theoretical contents:

1. Electrical substations.

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2. Low-voltage power distribution grids.
3. Compacted soil slope stability.
4. Lighting and interior wiring systems
5. Concrete reservoirs.
6. Small reservoirs for agricultural usage. Pools and dams.
7. Rural roads.

Practical contents:

Usage of specific software related to:

- Electrical substation design.
- Technical justification of low-voltage distribution networks.
- Compacted soil slope stability assessment.
- Case of study of a real rural road.

4.4.Course planning and calendar

Provisional course planning

Week	Theory sessions (h)	Practice sessions (h)	Autonomous work (h)	Total (h)
1	2	2	6	10
2	2	2	6	10
3	2	2	6	10
4	2	2	6	10
5	2	2	6	10
6	2	2	6	10
7	2	2	6	10
8	2	2	6	10
9	2	2	6	10
10	2	2	6	10
11	2	2	6	10

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12	2	2	6	10
13	2	2	6	10
14	2	2	6	10
15	2	2	6	10
Total (h)	30	30	90	150

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class.

4.5.Bibliography and recommended resources

BB	Dal-Ré Tenreiro, Rafael. Caminos rurales : proyecto y construcción / Rafael Dal- Ré Tenreiro . Madrid : Mundi-Prensa : IRYDA, 1994
BB	Manual para el diseño, construcción, explotación y mantenimiento de balsas / [Centro de Estudios y Experimentación de Obras Públicas (CEDEX)] . 1ª ed. Madrid : Comité Nacional Español de Grandes Presas, 2010
BB	Pequeños embalses de uso agrícola / coordinador y director, Rafael Dal-Ré Tenreiro ; con la participación como autores de, Francisco Ayuga Téllez...[et al.] . Madrid [etc.] : Mundi-Prensa, 2003
BB	Sanz Serrano, José Luis. Instalaciones eléctricas : resumen del Reglamento Electrotécnico de Baja Tensión (BOE 2002) : esquemas, aplicaciones y ejercicios resueltos de acuerdo con el R.E.B.T. / José Luis Sanz Serrano. Madrid [etc.] : Thomson Paraninfo, D.L. 2003
BC	Bacigalupe Camarero, Fernando. Líneas aéreas de media y baja tensión : cálculo mecánico / Fernando Bacigalupe Camarero Madrid : Paraninfo, cop. 2000
BC	Cruz Gómez, José Manuel de la.. Instalaciones de puesta a tierra y protección de sistemas eléctricos / José Manuel de la Cruz Gómez, Jacinto Gallego

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BC

Calvo, Tarsicio Trujillo del Campo. [Libro electrónico] Barcelona : Ediciones Experiencia, [2005]
Villalba Clemente, Carlos.. Ejercicios prácticos resueltos con dmELECT, CIEBT-VIVI [recurso electronico] Carlos Villalba Clemente, Jesús Suárez Vivanco, Sergio Valero Verdú. [Libro electrónico]

LISTADO DE URLs:

Cárcel Carrasco, F.J., Sánchez Rodríguez, J.M. (2015). Centros de transformación MT/BT integrado en obra civil. Valencia: Universitat Politècnica - [http://www.3ciencias.com/libros/libro/centros-de-transformacion-mtbt-integrados-
Centros de Transformación MT/BT (2000). Barcelona: Schneider Electric. Publicación Técnica : PT-004 - [http://umh2223.edu.umh.es/wp-content/uploads/sites/188/2013/02/04-II-Master-C
Nuevo Reglamento de Instalaciones Eléctricas de Alta Tensión. Real Decreto 337/2014 de 9 de junio de 2014 - [http://www.boe.es/boe/dias/2014/06/09/pdfs/BOE-A-2014-6084.pdf]
UNESA (1989). Método de cálculo y proyecto de instalaciones de puesta a tierra para centros de transformación conectados a redes de tercera categoría. Asociación Electrotécnica y Electrónica Española - [http://www.uco.es/electrotecnia-etsiam/reglamentos/Normativa_Sevillana/2_DOC

The updated recommended bibliography can be consulted in:
http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=9696