

Course guide

250451 - PLAEXOXACA - Road Network Planning and Operation

Last modified: 03/10/2023

Unit in charge:	Barcelona School of Civil Engineering		
Teaching unit:	751 - DECA - Department of Civil and Environmental Engineering.		
Degree:	MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Optional subject).		
Academic year: 2023	ECTS Credits: 5.0	Languages: Spanish	

LECTURER

Coordinating lecturer:	ADRIANA HAYDEE MARTINEZ REGUERO
Others:	TERESA LÓPEZ MONTERO, ADRIANA HAYDEE MARTINEZ REGUERO, JOSE RODRIGO MIRO RECASENS

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

8169. The ability to plan, manage and operate civil engineering infrastructure.

Transversal:

8559. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding the mechanisms on which scientific research is based, as well as the mechanisms and instruments for transferring results among socio-economic agents involved in research, development and innovation processes.

8560. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.

8561. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

TEACHING METHODOLOGY

The course consists of 1,5 hours per week of classroom activity (large size group) and 0,8 hours weekly with half the students (medium size group).

The 1,5 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 0,8 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

LEARNING OBJECTIVES OF THE SUBJECT

Specialization subject in which knowledge on specific competences is intensified.

Knowledge and skills at specialization level that permit the development and application of techniques and methodologies at advanced level.

Contents of specialization at master level related to research or innovation in the field of engineering.

STUDY LOAD

Type	Hours	Percentage
Hours large group	25,5	20.38
Hours medium group	9,8	7.83
Self study	80,0	63.95
Hours small group	9,8	7.83

Total learning time: 125.1 h

CONTENTS

1. Road networks. Planning, financing and management in Spain.

Description:

Introduction
The Spanish road network. Organization, financing and management

Full-or-part-time: 2h 24m

Theory classes: 1h
Self study : 1h 24m

2. Pavements. Basic principles.

Description:

Road pavements. Types and characteristics
Distress mechanisms and factors
Pavement types and distress modes

Full-or-part-time: 4h 48m

Theory classes: 2h
Self study : 2h 48m



3. Pavement surface characteristics

Description:

Introduction
Adherence
Noise produced by vehicle circulation
Surface roughness
Optical characteristics

Full-or-part-time: 10h 48m

Theory classes: 3h 30m
Laboratory classes: 1h
Self study : 6h 18m

4. Pavement design

Description:

Structural pavement design
Experimental and analytical methods
Exercises of flexible and rigid pavement design

Full-or-part-time: 26h 24m

Theory classes: 2h
Practical classes: 6h
Laboratory classes: 3h
Self study : 15h 24m

5. Pavement auscultation

Description:

Auscultation
Visual inspection
Determination of pavement surface characteristics
Determination of pavement mechanical characteristics

Full-or-part-time: 6h

Theory classes: 2h 30m
Self study : 3h 30m

6. Maintenance of flexible pavements

Description:

Pavement condition, diagnosis and decision making
Ordinary conservation. Local repairs and small failures
Pavement reinforcement exercises

Full-or-part-time: 24h

Theory classes: 2h
Practical classes: 5h
Laboratory classes: 3h
Self study : 14h



7. Maintenance of rigid pavements

Description:

Introduction
Repair of local failures
Surface rehabilitation
Reinforcement and structural rehabilitation

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

8. Pavement recycling

Description:

Introduction
Cold in place recycling
Hot mix asphalt in plant recycling

Full-or-part-time: 3h 35m

Theory classes: 1h 30m

Self study : 2h 05m

9. Pavement management systems

Description:

Pavement management systems
Structure of a management system
Benefits of implementation
Exercises of management systems

Full-or-part-time: 25h 12m

Theory classes: 2h 30m

Practical classes: 5h

Laboratory classes: 3h

Self study : 14h 42m

GRADING SYSTEM

The grade for the subject will be obtained on the basis of the marks obtained in two partial evaluations and some directed activities carried out during the course.

The directed activities, which may be both individual and group, of an additive and formative nature, will be carried out during the course, both inside and outside the classroom.

The final mark will be the weighted arithmetic average with 40% of the mark for each partial assessment and 20% for the directed activities.

In order to pass the course, the grade must be equal to or higher than 5 (five).

In addition, once the course has been completed, there will be a re-evaluation exam to which students who, having obtained a numerical mark for the subject, do not obtain a mark equal to or higher than 5.0 will be entitled.

Grading criteria and admission to the re-evaluation: students failed in the ordinary assessment who have regularly taken the assessment tests of the failed subject will have the option of taking a re-evaluation test in the period set in the academic calendar. Students who have already passed the re-evaluation test of a subject and students who have been marked as failed may not take the re-evaluation test of a subject. The maximum grade in the case of taking the re-evaluation exam shall be five (5.0) and shall be the grade obtained only in the re-evaluation exam. The non-attendance of a student summoned to the re-evaluation test, held in the fixed period, may not give rise to the holding of another test at a later date. Extraordinary assessments will be carried out for those students who, due to accredited reasons of force majeure, have been unable to take any of the continuous assessment tests.

These tests must be authorised by the corresponding Head of Studies, at the request of the teacher responsible for the subject, and will be held within the corresponding academic period.

EXAMINATION RULES.

Failure to perform a supervised activity or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

BIBLIOGRAPHY

Basic:

- Pérez, F.E.; Miró, R.; Martínez, A. Proyecto, conservación y gestión de firmes. Madrid: Asociación Española de la Carretera, 2007. ISBN 975-84-89875-71-5.
- Huang, Y.H. Pavement analysis and design. 2nd ed. Upper Saddle River: Pearson Prentice Hall, 2012. ISBN 9780132726108.
- Dirección General de Carreteras. Norma 6.1 IC: secciones de firmes [on line]. Madrid: MOPU. Secretaría General Técnica. Centro de Publicaciones, 2003 [Consultation: 20/04/2020]. Available on: https://www.mitma.gob.es/recursos_mfom/1010100.pdf.
- Ministerio de Fomento. Rehabilitación de firmes: instrucción de carreteras: Norma 6.3 IC [on line]. Madrid: Ministerio de Fomento. Dirección General de Carreteras, 2003 [Consultation: 20/04/2020]. Available on: https://www.mitma.gob.es/recursos_mfom/1020100.pdf. ISBN 8449806968.

Complementary:

- Yoder, E.J.; Witczak, M.W. Principles of pavement design. New York, [NY] [etc.]: John Wiley & Sons., 1975. ISBN 0471977802.