

Infrastructure financing

1. Datos generales

Máster MUSIC	Código UPM	Créditos	Carácter	Especialidad	Idioma	
		4.5	Optional	Transport	English	
	Nombre en inglés	Infrastructure Financing				
	Materia	Especialización en Transporte y Territorio				
	Departamento	Ingeniería Civil: Transporte y Territorio				
Web asignatura	http://moodle.upm.es/titulaciones/oficiales					

2. Profesorado

Nombre y apellidos	Tribunal	Grupo	Horario tutorías	Lugar	Correo electrónico
José Manuel Vassallo	Chair	All	Mo, 8:30-11:30 Tu, 8:30-11:30	TRANSyT	<i>josemanuel.vassallo@upm.es</i>
Óscar Martínez	Member	All	Fr, 9:30-15:30	Cátedra de Ttes.	<i>oscar.martinez@upm.es</i>
Juan Gómez Sánchez	Secretary	All	Mo, 8:30-11:30 Tu, 8:30-11:30	TRANSyT	<i>juan.gomez.sanchez@upm.es</i>

NOTA. El profesor que figura en primer lugar es el coordinador de la asignatura.

3. Conocimientos previos

Asignaturas que debe haber cursado previamente:

Otros resultados de aprendizaje necesarios:

Basic knowledge on civil engineering, economics, finance, business management and accounting.

4. Competencias asignadas y nivel de adquisición

Código	Competencia
CB6	
CB7	
CB8	
CB9	
CB10	
CG6	
CG7	
CG8	
CG10	
CG11	

Código	Competencia
CE-A1	
CE-A5	
CE-A6	
CE-A7	
CE-A8	
CE-11	

5. Resultados de aprendizaje (RA) de la asignatura

Código	Resultado del aprendizaje (RA)	Competencias asociadas
RA1	The student is able to apply methodologies to determine the advantages and disadvantages of private financing mechanisms compared to governmental ones.	All previous
RA2	The student is able to make a straightforward financial assessment of civil engineering projects.	All previous
RA3	The student knows the different private financing sources available in the market and determine their feasibility to finance infrastructure projects.	All previous

6. Indicadores de logro

Código	Básico	Descripción del indicador de logro	RA asociado
IL1	Yes	The student distinguishes the different infrastructure and public services management mechanisms.	RA1
IL2	Yes	The student distinguishes the different legal and economic concepts related to infrastructure pricing, and understands the main price regulation mechanisms.	RA1
IL3	Yes	The student knows the main infrastructure financing sources in the European Union.	RA1
IL4	Yes	The student understands the advantages and disadvantages of PPPs compared to conventional procurement approaches.	RA1
IL5	Yes	The student knows the main procurement mechanisms for PPPs, and distinguishes their advantages and disadvantages.	RA1
IL6	Yes	The student knows the main project risks in infrastructure financing.	RA1 and RA2
IL7	Yes	The student understands the "cash-flow" and "capital cost" concepts.	RA2
IL8	Yes	The student understands the advantages of "project finance" compared to other financing mechanisms.	RA2
IL9	Yes	The student identifies different infrastructure financing sources and knows their feasibility for different projects.	RA3

NOTA. Básico: Indicador de logro que deben superarse de forma individual para aprobar de la asignaturas.

7. Pruebas de evaluación y sus criterios de calificación

Código, nombre de la prueba de evaluación y breve descripción de las actividades evaluables, de sus criterios de calificación y del momento y lugar en que se realizarán Peso

7.1. Mediante “evaluación continua”

PE1. Attendance and Participation in class **15%**

Description: The student attendance and participation during the lectures, assignments and professional sessions will be assessed in both a quantitative and a qualitative way.

Evaluation criteria: The teacher will grade the students on the basis of the students' participation and interest.

Place and period: In class, throughout the course.

PE2. Class assignments **15%**

Description: Class assignments about theoretical or practical aspects will be delivered to the students during class hours.

Evaluation criteria: Each assignment will be graded from 0 to 10. The final grade will be the arithmetic mean of all exercises done during the course.

Place and period: In class, throughout the course.

PE3. Group work **20%**

Description: This work consists of producing a paper about a subject related to the contents of the course. The group will be led by a professional working in the infrastructure financing field. This paper will be concluded with an oral presentation.

Evaluation criteria: The paper will be graded from 0 to 10 on the basis on its quality and the effort of the members of the group.

Place and period: In class, throughout the course and final presentation of the papers.

PE4. Final exam **60%**

Description: The final exam will include both theoretical questions and practical exercises related to the topics taught throughout the course.

Evaluation criteria: The exam will be graded from 0 to 10.

Place and period: To be determined by the Head of Studies.

Result of the evaluation through “continuous assessment”

The final grade will be the highest of the following:

- PE1 (15%), PE2 (15%), PE3 (20%) and PE4 (60%), provided that the student got at least 4 points out of 10 in P4.
- PE4 (100%), this is the grade obtained by the student in the “final exam only” method described afterwards.

The student will pass the subject if the final grade is equal to or higher than 5.

Those students who got a grade lower than 5 in the “continuous assessment procedure” will not pass, but they will have another opportunity in the “extraordinary exam”, which will have similar characteristics as the evaluation “final exam only”.

7.2. Mediante “sólo prueba final”

Description: The exam will be the same final exam done by the students under “continuous assessment” (PE4).

Evaluation criteria: Each exercise will be graded from 0 to 10.

Place and period: To be determined by the Head of Studies.

Código, nombre de la prueba de evaluación y breve descripción de las actividades evaluables, de sus criterios de calificación y del momento y lugar en que se realizarán Peso

Result of the evaluation through “final exam only”

The final grade will be the one obtained by the student in the final exam.

The subject will be passed if the final grade is equal to or higher than 5.

8. Contenido del Curso

Capítulo, Tema, Apartados y Descriptores	Indicador de Logro asociado
Lesson 1. Infrastructure, public services and market economy	IL1, IL2
1.1. Market failures	
1.2. Government interventionism and liberalization	
1.3. Management and regulation approaches	
Lesson 2. Infrastructure financing mechanisms	IL1, IL2
2.1. Initial sources of financing	
2.2. Ultimate sources of income	
2.3. Direct vs. indirect management	
Lesson 3. Infrastructure and public deficit	IL1, IL2
3.1. Macroeconomic perspectives in Spain, Europe and the World	
3.1. SEC 95 of EUROSTAT	
3.2. Accounting infrastructure assets built by public entities	
3.3. Accounting infrastructure assets built through PPPs	
3.4. Practical case studies	
Lesson 4. Revenue, prices, fees and subsidies	IL1, IL2
4.1. Economic and legal concept	
4.2. Price setting and its contractual indexation	
4.3. Price regulation principles	
Lesson 5. EU funding and TEN-T	IL3
5.1. Trans-European Networks	
5.2. Budget funding (Structural funds, cohesion funds and Connecting Europe Facility)	
5.3. The European Investment Bank	
Lesson 6. Concept and main characteristics of PPPs	IL4, IL5
6.1. Features and types	
6.2. <i>Value for money</i> analysis	
6.3. PPPs in the world	
6.4. Preparatory actions	
6.5. Procurement and tender approaches	
6.6. Economic and quality regulation	
Lesson 7. Risk allocation	IL6
7.1. General principles of risk allocation	
7.2. Risk quantification	
7.3. Construction and operation risk	
7.4. Income risk	
7.5. Financial risk	
7.6. Political and regulatory risk	
7.7. Insurance	
Lesson 8. Financial evaluation of projects	IL7
8.1. Principles of finance	

Capítulo, Tema, Apartados y Descriptores	Indicador de Logro asociado
<ul style="list-style-type: none"> 8.2. Capital cost 8.3. Cash flow analysis 8.4. Accountability and fiscal aspects 8.5. Profitability criteria 8.6. Practical case studies 	
Lesson 9. Project finance	IL8
<ul style="list-style-type: none"> 9.1. Characteristics 9.2. Advantages and disadvantages over corporate finance 9.3. Financial contracts 9.4. Practical case studies 	
Lesson 10. Private financing sources	IL9
<ul style="list-style-type: none"> 10.1. Banking 10.2. Capital markets 10.3. Securitisation 10.4. Monoline insurance and financial guarantees 10.5. Infrastructure funds 10.6. Multilateral banking 	
Lesson 11. Business strategy in PPP projects	All
<ul style="list-style-type: none"> 11.1. Tender 11.2. Renegotiation 11.3. Partner finding 11.4. International investment 	

9. Descripción de los métodos de enseñanza empleados

Theory lessons:

The teacher will explain the concepts required to understand the lessons of the course in order that the student achieves the expected goals. The teacher will use appropriate practical examples and logical reasoning to develop the scientific and technical abilities of the student. The participation of students will be encouraged by means of discussions on the topics taught.

Practice lessons:

Practice lessons will be aimed at solving assignments or problems that will complement lectures in order to correctly understand the subject. During practice lessons, all the knowledge acquired will be applied to real situations. This way, the student is expected to acquire skills on the problem statement and the resolution of similar problems that she/he will find during professional life. The student will work over similar problems as those solved by the teacher. Sometimes, students will have to work over a problem that would be solved by the teacher afterwards.

Laboratory classes:

A group work will be conducted over the first nine weeks of the course. This work will end up with an oral presentation the ninth week of the course. Groups will work on their project, assisted by a professional presently working in the field of infrastructure financing. Students will devote one hour a week over eight weeks.

Independent work:

Students shall study the content explained in the lectures and shall strive to solve the exercises and case studies given in class.

Professional sessions:

Professionals who are currently working in the field of infrastructure financing will be invited to class to give 2 h sessions about practical applications related to the content of the course.

Office hours

Office hours are intended as a complement for the students to ask questions on the content of the course. Further details are listed at the beginning of this guide for each teacher.

10. Recursos didácticos

Basic literature:

Izquierdo, R. y Vassallo, J.M. (2004) Nuevos sistemas de gestión y financiación de Infraestructuras de transporte. Colección Señor 35. Colegio de Ingenieros de Caminos, Canales y Puertos..

Vassallo, J.M. e Izquierdo, R. (2010). Iniciativa pública y participación privada: conceptos y experiencia en América y España. CAF. Banco de Desarrollo de América Latina.

Vassallo, J.M. (2015). Asociación Público Privada en América Latina: Aprendiendo de la Experiencia. CAF. Banco de Desarrollo de América Latina.

Additional literature:

Finnerty, J.D (1996) *Project Financing: Asset-based Financial Engineering*. John Wiley and Sons, Inc., New York.

Gómez-Ibáñez, J.A. (2003). *Regulating Infrastructure. Monopoly, Contracts, and Discretion*. Harvard University Press. Cambridge, Massachusetts.

OECD (2008) *Transport Infrastructure Investment: Options for Efficiency*. International Transport Forum. OECD, Paris, France.

Guasch, J.L. (2004) *Granting and Renegotiating Infrastructure Concessions Doing it Right*. WBI Development Studies. The World Bank, Washington D.C.

Yescombe, E.R. (2007) *Public-Private Partnerships: Principles of Policy and Finance*.

Butterworth-Heinemann, Oxford (UK).

Web resources:

Website of the subject, virtual platform (MOODLE).

Specific equipment:

Tabla 11. Cronograma (puede diferir ligeramente entre los diferentes grupos que se imparten)

Week (see Note 1)	Lectures	Practice lesson	Workshop	Independent work	Evaluation activities	Other activities	Hours
1	Lesson 1 and 2 3 h		Group work 1 h	Study Lesson 1 4 h			7 h
2	2 1 h		Group work 1 h	Study Lesson 2 3 h		Professional session 2 h	7 h
3	Lessons 3 and 4 2 h	Unit 3 1 h	Group work 1 h	Study Lesson 3 3 h			7 h
4	Lessons 4 and 5 2 h		Group work 1 h	Study Lesson 4 4 h			7 h
5	Lessons 5 and 6 3 h		Group work 1 h	Study Lesson 5 3 h			7 h
6	Lesson 6 and 7 3 h		Group work 1 h	Study Lesson 6 4 h			7 h
7	Lesson 7 1 h		Group work 1 h	Study Lesson 7 3 h		Professional session 2 h	7 h
8	Lesson 7 2 h		Group work 1 h	Study Lesson 7 4 h			7 h
9	Lesson 8 1 h		Presentations 2 h	Study Lessons 7 and 8 4 h			7 h
10	Lesson 8 1 h	Unit 8 2 h		Study Lesson 8 4 h			7 h

Week (see Note 1)	Lectures	Practice lesson	Workshop	Independent work	Evaluation activities	Other activities	Hours
11	Lesson 9 2 h	Unit 9 1 h		Study Lesson 9 4 h			7 h
12	Lesson 9 1 h	Unit 9 2 h		Study Lesson 9 4 h			7 h
13	Lesson 10 1 h			Study Lesson 10 4 h		Professional session 2 h	7 h
14	Lesson 10 1 h			Study Lesson 10 4 h		Professional session 2 h	7 h
15	Lesson 11 1 h			Independent study and preparation for final exam 4 h		Professional session 2 h	7 h
To the exam				Independent study and preparation for final exam 6 h	Final exam 4 h		10 h
Hours	24 h	6 h	9 h	62 h	4 h	10 h	115 h

NOTE 1. Precise dates are shown in the academic calendar.

