

| <b>Course information</b> |  |
|---------------------------|--|
| <b>Name</b>               | Investing and Financing in Technology and Industry   |
| <b>Code</b>               | DOI-MBA-612  |
| <b>Degree</b>             | Máster en Ingeniería Industrial (MII), Máster en Ingeniería de Telecomunicación (MIT), Máster in Business Administration (MBA) |
| <b>Year</b>               | 2 <sup>nd</sup>  |
| <b>Semester</b>           | 1 <sup>st</sup> (Fall)   |
| <b>ECTS credits</b>       | 3 ECTS   |
| <b>Type</b>               | Basic  |
| <b>Department</b>         | Organización Industrial  |
| <b>Area</b>               | Economics and Business Administration  |
| <b>Coordinator</b>        | Pedro Sánchez Martín   |

| <b>Instructor</b>   |                                       |
|---------------------|---------------------------------------|
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| <b>Area</b>         | Economics and Business Administration |
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| <b>Instructor</b>   |                                 |
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| <b>Office hours</b> | Arrange an appointment by email |

## COURSE SPECIFICS

### Context of the course

#### Contribution to the professional profile

This course introduces the basic concepts of large scale, capital intensive projects valuation and finance, bringing together skills and techniques previously learnt in the degree.

The infrastructure industry is one of the most relevant for engineers and several industrial and financial players demand finance engineering capabilities: sponsors, finance providers, infrastructure funds, EPC-contractors and others.

Upon course completion, students will have a real-world working knowledge of project finance, which will enable them to effectively put the concepts and frameworks into practice in real life projects.

More specifically, the contributions of this course to the professional profile are the following:

- Understand the different sources of finance available in the market for large scale, capital intensive projects and their cost and main features
- Understand project finance structure as a value-creation tool for this type of projects, as well as the modelling techniques for this type of financing.
- Overview of the infrastructure industry from several angles: sponsor, financing provider, infrastructure funds, asset management and others
- Be able to compare not only one project with another, but all business proposals with our cost of capital and, therefore, assess and measure whether they are value-added or value-destroyed projects.

#### Pre-requisites

Previous knowledge of corporate finance (cost of capital and project valuation) is required, although they will be reviewed and revisited during the course.

### Competences and Learning Outcomes

#### Competences

##### General Competences

CG01 Acquire appropriate capabilities of analysis and their application to specific business situations

CG02. Manage data and information as a key element in the decision making process, as well in problem solving

CG03. Be able to solve problems and take decisions at a strategic, tactic and operational level within a company, taking into account the interrelation among different functional and business areas

##### Specific Competences

CE09. Acquire the quantitative, analysis and modelling capabilities necessary to solve company problems, and be able to apply them to business forecast and specific situations simulation

##### Learning Outcomes

RA01. Determine the relevant Project Cash Flow, quantifying the project's ability to produce and consume cash on a yearly basis

RA02. Evaluate the economic attractiveness of a Project for a Company, choosing and calculating the appropriate criteria

RA03. Identify and evaluate the different sources of fund for a large scale project

RA04. Understand different financing structures, in qualitative and quantitative terms

RA05. Understand the rationale and basic terms of Project Finance

RA06. Understand the modelling of a Project Finance, identifying and quantifying the different parts of the cash flow waterfall

RA07. Understand the infrastructure industry, including main players and financing and valuation criteria and methodologies

## CONTENTS AND MODULES

| <b>Contents</b>                                    |  |
|--|--|
| <b>1 INTRODUCTION</b>                              |  |
| 1.1  | Evaluation and funding of Projects   |
| 1.2  | Evaluating a Project   |
| 1.3  | Financing of a Capital Project   |
| <b>2 COST OF CAPITAL</b>                           |  |
| 2.1  | Introduction   |
| 2.2  | Cost of Equity   |
| 2.3  | Cost of Debt   |
| 2.4  | WACC   |
| <b>3 FINANCING OF CAPITAL PROJECTS</b>             |  |
| 3.1  | Overview of Capital Projects   |
| 3.2  | Sources of Finance   |
| 3.3  | Dividend Policy  |
| 3.2  | Financial Securities   |
| 3.1  | Comparison of Equity and Debt Financing                                      |
| <b>4 PROJECT FINANCE</b>                           |  |
| 4.1  | The rationale for Project Finance: project financing versus direct financing |
| 4.2  | Analysis of Project Feasibility  |
| 4.3  | Financing modelling  |
| 4.3  | Financing Plan and Capital Structure   |
| 4.4  | Debt sizing and structure  |
| 4.5  | Cash flow waterfall  |
| <b>5 PROJECT EVALUATION</b>                        |  |
| 5.1  | Creating value for the investor  |
| 5.2  | Criteria overview  |
| 5.2  | Discounted Cash flow techniques  |
| <b>6 CAPITAL / INFRAESTRUCTURE PROJETS MARKETS</b> |  |
| 6.1  | Infra-asset business models  |
| 6.2  | Valuation of infrastructure projects   |
| <b>7 START-UP FINANCING</b>                        |  |
| 7.1  | Overview   |
| 7.2  | Main concepts and sources of finance   |

## TEACHING METHODOLOGY

### General methodological aspects

In order to achieve the learning objectives stated above, the course will focus on the students' activity and on their active learning. Therefore, the methodology will be oriented towards a more active role of the student.

### In-class activities

- **Lectures:** the instructor will introduce the fundamental concepts of each session, including some recommendations and examples to illustrate the concepts. This will help students to identify the basic elements and to face related problems.
- **Practice exercises:** under the instructor's supervision, students –individually or divided into small groups-, will apply the concepts and techniques covered in the lectures to short application exercises to be solved in class.
- **Problem solving/Case discussion:** In these sessions, tasks previously given to students (problems and case studies) will be discussed and solved. In order to participate in these sessions the student must previously work and prepare his own intake of the problem/case.
- Active participation will be encouraged by rising open questions to foster discussion.

### Out-of-class activities

The objective of non-classroom activities is to work through the concepts and methodologies described in class, and to apply them to the different problems or case studies presented in the classroom or given by the instructor.

- Personal study of the course material and resolution of the proposed exercises
- Case preparation to make the most of in-class time

## ASSESSMENT AND GRADING CRITERIA

| Assessment activities                   | Grading criteria   | Weight |
|---|--|--------|
| Mid-term test                           | <ul style="list-style-type: none"> <li>▪ Understanding of the theoretical concepts.</li> <li>▪ Application of these concepts to problem and case solving.</li> <li>▪ Critical analysis of numerical exercises' results.</li> </ul> | 20%    |
| Final exam                              | <ul style="list-style-type: none"> <li>▪ Understanding of the theoretical concepts.</li> <li>▪ Application of these concepts to problem and case solving.</li> <li>▪ Critical analysis of numerical exercises' results.</li> </ul> | 50%    |
| Class participation and Case Resolution | <ul style="list-style-type: none"> <li>▪ Class participation.</li> <li>▪ Case intake (Pre and post discussion in class).</li> </ul>  | 30%    |

## COURSE RULES

### Course rules

- 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 Académicas) of the ICAI School of Engineering. Not complying with this requirement may have the following consequences:
  - 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.

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).

## WORK PLAN AND SCHEDULE<sup>1</sup>

| In and out-of-class activities                                | Date/Periodicity                                  |
|---|---|
| Mid-term test   | Week 10   |
| Final exam  | December  |
| Case sessions   | Week 9  |
| Review and self-study of the concepts covered in the lectures | After each chapter                                |
| Problem-solving   | After each chapter which requires problem solving |
| Practice preparation (Test)                                   | Before every practice                             |
| Final exam preparation  | December  |

| STUDENT WORK-TIME SUMMARY |                                 |                                 |                     |
|---------------------------|---------------------------------|---------------------------------|---------------------|
| IN-CLASS HOURS            |                                 |                                 |                     |
| Lectures                  | Problem-solving                 | Case sessions                   | Test & exam         |
| 18                        | 7                               | 2                               | 3                   |
| OUT-OF-CLASS HOURS        |                                 |                                 |                     |
| Self-study                | Problem preparation and solving | Case preparation and evaluation | Practice            |
| 40                        | 14                              | 6                               |                     |
| ECTS credits:             |                                 |                                 | <b>3 (90 hours)</b> |

<sup>1</sup> A detailed work plan of the subject can be found in the course summary sheet. Nevertheless, this schedule is tentative and may vary to accommodate the rhythm of the class.

## BIBLIOGRAPHY

### Basic bibliography

- Notes and slides prepared by lecturer

### Complementary bibliography

- Crundwell, F.K. (2008). Finance for Engineers. Evaluation and Funding of Capital Projects. Springer.
- Brealey, R., Myers, S. and Marcus, A. (2012) Fundamentals of Corporate Finance, 7th Edition. McGrawHill.
- Higgins, R.C. (2011) Analysis for Financial Management, 10th Edition. McGrawHill.
- Ross, S. Westerfield, R. and Jordan, B. (2014) Essentials of Corporate Finance, 8th Edition. McGrawHill.
- Bodmer, E. (2014) Corporate and Project Finance Modeling: Theory and Practice. Wiley Finance

**INVESTING AND FINANCING IN TECHNOLOGY AND INDUSTRY (2015-16)**

| INVESTING AND FINANCING IN TECHNOLOGY AND INDUSTRY (2015-16) |        |         |   |                           |  |   |  |  |
|--|--------|---------|---|---------------------------|--|---|--|--|
| IN-CLASS ACTIVITIES  |        |         |   | OUT-OF-CLASS ACTIVITIES   |  |   |  |  |
| Week   | MF     | Session | Contents                                      | Activity                  | Self-study                             | Cases and Project                             |  |  |
| 1  | 03-sep | 1       | Presentation+ Overview                        | Initial test + Lecture    | Review, self-study and problem-solving |   |  |  |
|  | 03-sep | 2       | Company lyfe cycle                            | Lecture                   |  |   |  |  |
| 2  | 10-sep | 3       | Sources of funds                              | Lecture                   | Review, self-study and problem-solving |   |  |  |
|  | 10-sep | 4       | Dividend policy                               | Lecture                   |  |   |  |  |
| 3  | 17-sep | 5       | Cost of equity and debt                       | Lecture                   | Review, self-study and problem-solving |   |  |  |
|  | 17-sep | 6       | Cost of equity and debt                       | Short exercises           |  |   |  |  |
| 4  | 24-sep | 7       | WACC  | Lecture                   | Review, self-study and problem-solving |   |  |  |
|  | 24-sep | 8       | WACC  | Short exercises           |  |   |  |  |
| 5  | 01-oct | 9       | Finance engineering projects                  | Lecture                   | Review, self-study and problem-solving |   |  |  |
|  | 01-oct | 10      | Rationale / value creation of project finance | Lecture                   |  |   |  |  |
| 6  | 08-oct | 11      | Project cash flows analysis                   | Lecture                   | Review, self-study and problem-solving |   |  |  |
|  | 08-oct | 12      | Project cash flows analysis                   | Short exercises           |  |   |  |  |
| 7  | 15-oct | 13      | Project finance capital structure             | Lecture                   | Review, self-study and problem-solving |   |  |  |
|  | 15-oct | 14      | Project finance debt modelling                | Short exercises           |  |   |  |  |
| 8  | 22-oct | 15      | Cash flow waterfall                           | Lecture                   | Review, self-study and problem-solving | Project finance case asesment and preparation |  |  |
|  | 22-oct | 16      | Cash flow waterfall                           | Short exercises           |  |   |  |  |
| 9  | 29-oct | 17      | Project finance case                          | Case solving              | Review, self-study and problem-solving |   |  |  |
|  | 29-oct | 18      | Project finance case                          | Case solving              |  |   |  |  |
| 10   | 05-nov | 19      | Mid term test                                 | Test                      | Review, self-study and problem-solving |   |  |  |
|  | 05-nov | 20      | Project valuation: relevant cash flows        | Lecture                   |  |   |  |  |
| 11   | 12-nov | 21      | Project valuation                             | Lecture                   | Review, self-study and problem-solving | Project valuation exercise preparation        |  |  |
|  | 12-nov | 22      | Project valuation                             | Short exercises           |  |   |  |  |
| 12   | 19-nov | 23      | Project valuation exercise                    | Exercise solving          | Review, self-study and problem-solving |   |  |  |
|  | 19-nov | 24      | Infra-assets market                           | Lecture + short exercises |  |   |  |  |
| 13   | 26-nov | 25      | Valuation of infra projects                   | Lecture + short exercises | Review, self-study and problem-solving |   |  |  |
|  | 26-nov | 26      | Valuation of infra projects                   | Lecture + short exercises |  |   |  |  |
| 14   | 03-dic | 27      | Technology / internet financing / start ups   | Lecture                   | Review and self-study                  |   |  |  |
|  | 03-dic | 28      | Technology / internet financing / start ups   | Lecture                   |  |   |  |  |
| 15   | 10-dic | 29      | Review  | Lecture + short exercises | Review, self-study and problem-solving |   |  |  |
|  | 10-dic | 30      | Review  | Lecture + short exercises |  |   |  |  |
| 16   | 17-dic | 31      | Exam  |                           |  |   |  |  |
|  | 17-dic | 32      |   |                           |  |   |  |  |