ECTS Information Package: Degree Programme

Master\'s degree in

CONTROL AND INDUSTRIAL ELECTRONICS

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A - General Description

Programme Title - Mestrado em Controlo e Electrónica Industrial

Qualification awarded - Master\'s degree in Control and Industrial Electronics

Level of qualification - Second-cycle degree, EQF Level 7; ISCED Level 5

Specific admission requirements

General

According to the Portuguese Law, the following candidates are eligible for entry to the course of study leading to the *Mestre* degree:

- Holders of a *licenciado* degree or legally equivalent corresponding to the first cycle of higher education;
- Holders of a foreign higher degree awarded on completion of a first-cycle programme organised in the framework of the Bologna Process;
- Holders of a foreign higher degree which is deemed by the Technical-Scientific Committee of ESTT-IPT to meet the requirements of a *licenciado* degree.
- Holders of an academic, scientific or professional curriculum which is deemed by the Technical/Scientific Committee of ESTT-IPT as appropriate to access the programme.

Specific

Holders of a pre-Bologna degree (3-year Bacharelato or 5-year Licenciatura) or a Bologna Licenciatura in Electronics Engineering or related areas (Physical Engineering, Mechanical Engineering, Computer Engineering and others).

Holders of an academic, scientific or professional curriculum which is deemed by ESTT?s Scientific Committee to meet the necessary requirements to access this study program.

Specific arrangements for recognition of prior learning (formal, non-formal and informal)

General
Granting of credits from prior learning is regulated by the Portuguese Law taking into account the level of credits and the field of study where they have been earned and is subject to the recognition of ESTT-IPT Technical/Scientific Committee.

- Training undertaken in the context of other higher education programmes of study from national or foreign HE establishments or organised in the framework of the Bologna Process or other prior learning can be credited towards the present programme of study;
- Credits earned from postgraduate studies can also be credited towards this programme of study;
- Professional experience or other training, different from the abovementioned ones, can also be credited towards this programme of study.

Specific

Allocation of credits to individuals holding a licenciado degree in electronics engineering or similar programs prior to Bologna with a duration equivalent to 300 ECTS credits (5 years of study) is formally analysed on a case-to-case basis.

Qualification requirements and regulations:

The master's degrees are regulated by Portuguese Law and applicable program regulations established by the School of Technology-IPT.

In order to complete the master's degree it is necessary to accumulate 120 ECTS credits distributed throughout 4 curricular semesters as according to the course curriculum.

Each ECTS credit corresponds to 27 hours of work.

Profile of the program:

This Mastercourse presents a new educational approach, where areas of specialization in Industrial Electronics and Control, are transverse, and intend to provide the master?s student with a professional profile that can respond to the demands of the vast and diverse business/industries community, from the smallest to largest company / industry.

The Master course in Control and Industrial Electronics aims to contribute to enhance quality, efficiency, flexibility, safety and competitiveness of industrial proceedings. Provides Training of professional and specialized nature that can respond to increasing demands of the labour market towards the training of technicians in a growing area of technical requirement. Provides abilities and skills in state-of-the-art and new developments in intelligent control systems, sensors and actuators, in industrial electronics and associated technologies and methodologies. It will also provide skills in the optimization and maintenance of these systems improving students? critical and analytical thinking on these issues. Following the 1st cycle course in Electrical Engineering, allowing the continuation of studies for the enhancement and enrichment in the area of professional specialized training and postgraduate education.

Therefore, this master course qualify professionals with the skills to detect, analyze and resolve complex issues in new and emergent areas of expertise,and also with the ability to apply innovative methods and techniques in problem solving, as well as withentrepreneurshipskills enabling them to create technology-based companies.

This course of study includes:

- A set of course units corresponding to 66 ECTS credits;

- An original project or a professional internship including final report corresponding to 54 ECTS credits.

Key learning outcomes:

Graduates from this program are expected to be able to apply relevant concepts and techniques of intelligent control systems, sensors and actuators and industrial electronics.

They should also have skills in optimization and maintenance of these systems which will allow them to increase analysis and critical abilities in these domains.

Occupational profiles of graduates with examples:

Holders of the master\\\'s degree in Industrial Control and Electronics are prepared to perform in:

- Renowned national public bodies and enterprises engaged in activity sectors such as Energy, mobile communications and telecommunications, industrial production.

- Enterprises needing specialised technicians in areas such as control, automation and robotics; electrical vehicles; monitoring and remote control; power electronics and electrical engines; medical electronics and consumption electronics among others.

Access to further studies:
The master\\\'s degree in Industrial Control and Electronics gives access to third-cycle programs in areas such as electronics engineering, control and electronics and other related areas according to applicable admission regulations.

Course structure diagram with credits

Course code	Course Title	Year	Semester	Credits
30022	Digital Control	1	S1	6
30023	Distributed Control Systems	1	S1	6
300215	Electronics of Energy	1	S1	6
300216	Energy Generation and Storage	1	S1	6
30024	Intelligent Sensors and Actuators	1	S1	6
300217	Digital Electronics	1	S2	6
300210	Industrial Management Systems	1	S2	6
30028	Mathematics Modelation and Simulation	1	S2	6
30027	Optimal and Adaptive Control	1	S2	6
30029	Signals Analysis and Processing	1	S2	6
300211	Entrepreneurship and Business Strategy	2	A	6
300212	Project or Internship	2	A	54

(*) This course may not be available in certain academic years. Please confirm availability with the Erasmus coordinator.

Examination regulations, assessment and grading

General
Assessment of course units complies with the Academic Regulations in force at ESTT-IPT, except for the Dissertation, Project and Internship, to which apply the provisions set out in the regulations for the master's degrees offered by the ESTT-IPT.

- Dissertation, Project and Internship have only two assessment seasons and the students are free to choose only one.
- The assessment calendar for the Dissertation, Project and Internship is proposed by the Programme Coordinating Committee to the Technical/Scientific Committee at the beginning of each academic year.
- The general grade improvement scheme does not apply to the Dissertation, Project and Internship.

The overall grade of the master's programme is the arithmetic weighted average rounded off to the ones of the number of ECTS credits and the grades of the course units that form part of the programme of study.
The 10-20 mark expressed on a 0-20 scale is converted into its equivalent in the European grading scale with the awards Satisfactory, Good, Very Good or Excellent.

Specific
The students should develop an original project or undertake professional internship and associated report. Both the project and the internship report must be submitted for appreciation to an examination panel appointed for that purpose.

Graduation requirements:

Completion of this course of studies requires a pass in all its constituent modules, including the public defence of project work or internship report so as to gain a total of 120 accumulated ECTS credits in accordance with general and specific assessment regulations.

Mode of study:
Full- or part-time. Evening program.

Program director or equivalente

Director: Paulo Manuel Machado Coelho
Erasmus coordinator: Jorge Manuel Correia Guilherme

B - Description of individual course units

Course unit title	Digital Control
Course unit code	30022
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Paulo Manuel Machado Coelho
Learning outcomes of the course unit	On completion of this course unit the students will be able to design and analyse digital control projects.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	Discrete systems analysis; Z-transform; Discrete systems analysis using Z-transform; Sampling; digital controller design; state-space models; controllability, attainability and observability; state-space design; estimators.
Recommended or required Reading	- Powell, J. e Workman, M. e Franklin, G. (1998). *Digital Control of Dynamic Systems*. USA: Addison-Wesley - Ogata, K.(1994). *Discrete-time Control Systems*. USA: Prentice-Hall - Astrom, K. e Wittenmark, B. (1998). *Computer-controlled systems: theory and design*. USA: Prentice-Hall
Planned learning activities and teaching methods	Lectures incorporating illustrative cases. Theoretical-practical classes focused on concept application and problem-solving.Practical works are proposed to the students.
Assessment Methods and criteria	Exam (50%) and practical assignments (50%).
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Distributed Control Systems
Course unit code	30023
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Manuel Fernando Martins de Barros
Learning outcomes of the course unit	The aim of this unit is to study the fundamental concepts of distributed control systems (DCS) with special focus to the applications of modern control systems as well as the architectures, the DCS communication models and protocols, the main industry fieldbus and SCADA systems.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1) Introduction 2) Embedded systems 3) Control Systems 5) Industrial communication networks 6) Distributed systems communication networks 7) The CAN and FIP bus 8) Real time systems (RTS) 9) System test and modelling
Recommended or required Reading	- Mackay, S. e Deon Reynders, D. (2005). *Practical Industrial Data Communications ? Best Practice Tecnhiques*. USA: Elsievier - Ibrahim, D.(2008). *Advanced PIC Microcontroller Projects in C*. USA: Elsevier - Bennett, S.(1994). *Real-Time Computer Control: An Introduction*. USA: Prentice-Hall
Planned learning activities and teaching methods	Lectures, Problem solving classes and Laboratory classes;
Assessment Methods and criteria	Written exam (40%), lab coursework (25%) and mini project (35%).
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Electronics of Energy
Course unit code	300215
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Raul Manuel Domingos Monteiro Francisco José Alexandre Nunes
Learning outcomes of the course unit	Provide students with a solid basis on the power electronic circuits, its control, and the components used; ability to design and assembly, through simulation, build and study a power electronic converter with control.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Circuit analysis, Electromagnetism, Electronics I, Electronics II, Power Electronics.
Recommended optional programme componentes	Not applicable.
Course contentes	Introduction. Power semiconductor devices. Switch-mode power converters. Reference to resonant converters. Rectifiers with sinusoidal input current (power factor corrected). Voltage mode control and current mode control. Drives for power semiconductor devices. Fundamentals of Electromagnetic Compatibility. Magnetic components project.
Recommended or required Reading	- Maksimovíc, D. e W. Erickson, R. (2012). *Fundamentals of Power Electronics*. Springer: Springer - Mohan, N. e M. Undeland, T. e P. Robbins, W. (2002). *Power Electronics: Converters, Applications and Design*. Wiley: John Wiley & Sons - Nunes, F. e Monteiro, R. (0). *Sebenta de Eletrónica de Energia*.Acedido em20 de setembro de 2011 em http://www.e-learning.ipt.pt/course/category.php?id=84
Planned learning activities and teaching methods	Lectures and practical sessions focused on problem solving, demonstrations and laboratory experiments. Individual tutorial guidance.
Assessment Methods and criteria	Design, simulation, construction and implementation of control in a power electronic converter; detailed written report and oral discussion of the Project. Minimum pass grade: 9.5/20.
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Energy Generation and Storage
Course unit code	300216
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Mário Helder Rodrigues Gomes José Filipe Correia Fernandes
Learning outcomes of the course unit	The students will learn about the generation of power through renewable sources, especially: mini-hydro, photovoltaic and wind systems as well as power storage systems.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	PV systems: characteristics, operation, assembly, sizing calculations, design and operation. Wind Energy: conversion limits, performance, power regulation, conversion systems and their characteristics. Wind farms, sizing and production control of active and reactive power. Energy storage systems: batteries, supercapacitors, flywheels, fuel cells, pumping ...
Recommended or required Reading	- Castro, R.(2011). *Uma Introdução às Energias Renováveis: Eólica, Fotovoltaica e mini-hídrica*. Lisboa: IST Press - Ter-Gazarian, A.(1994). *Energy Storage for Power Systems*. .: Peter Peregrinus
Planned learning activities and teaching methods	Lectures supported by class debates. Practical sessions focused on problem solving and laboratory demonstrations.
Assessment Methods and criteria	Written test.
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Intelligent Sensors and Actuators
Course unit code	30024
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Jorge Manuel Correia Guilherme Carlos Alberto Farinha Ferreira
Learning outcomes of the course unit	Get familiar with the different types and technologies of intelligent sensors and actuators available in the market as well as its modes of operation and application domains; Be able to choose, apply and maintain intelligent sensors and actuators; Integrate sensors into distributed systems.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	General characteristics of sensors: potentiometric, extensometric, photoresistive, thermoresistive, magnetoresistive, capacitive, inductive (LVDT and RVDT), hall-effect sensors; thermocouples and pyrometers; auto-resonant sensors; CCD and ultrasonic sensors; linear and angular encoders; optical fibre and optical sensors; microsensors and multisensors; micro and nanoelectronics.
Recommended or required Reading	- Bell, D.(1994). *Electronic Instrumentation and Measurements*. (Vol. 1). US: Prentice Hall - Morris, A.(1993). *Principles of Measurement and Instrumentation*. (Vol. 1). US: Prentice Hall - Bouwens, A.(1996). *Digital Instrumentation*. (Vol. 1). US: McGraw-Hill - Wilson, J.(2005). *Sensor Technology Handbook*. (Vol. 1). US: Elsevier Inc
Planned learning activities and teaching methods	Lectures wsupported by illustrative cases. Theoretical-practical classes focused on concept application and problem-solving.
Assessment Methods and criteria	Practical assignments during the semester.
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Digital Electronics
Course unit code	300217
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Jorge Manuel Correia Guilherme Pedro Daniel Frazão Correia
Learning outcomes of the course unit	Students will familiarise themselves with the technologies used in the manufacturing of integrated circuits; design methodologies and tools used in microelectronics, hardware description languages and the design of integrated circuits using CMOS technology.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	An introduction to integrated circuits; technology concepts; digital CMOS circuits; Programmable devices; Digital CMOS systems; Introduction to the design of digital systems using programmable logic devices; an intriduction to VERILOG and VHDL hardware description language.
Recommended or required Reading	- Martin, K.(2000). *Digital Integrated Circuit Design*. (Vol. 1). US: Oxford University Press - Razavi, B.(2001). *Design of Analog CMOS Integrated Circuits*. (Vol. 1). US: McGraw-Hill - Baker, J.(2005). *CMOS Circuit Design, Layout and Simulation*. (Vol. 1). US: IEEE Press - Silva, M.(1999). *Circuitos com Transístores Bipolares e MOS*. (Vol. 1). Lisboa: Gulbenkian
Planned learning activities and teaching methods	Lectures supported by illustrative cases. Theoretical-practical classes focused on concept application and problem-solving.
Assessment Methods and criteria	Practical project. 40% Teoric 60% practical
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Industrial Management Systems
Course unit code	300210
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Natércia Maria Ferreira dos Santos Pedro Manuel Granchinho de Matos
Learning outcomes of the course unit	Students will be able to associate the production function with other functional areas of an enterprise, apply models, techniques and fundamental methods developed within the production management, implement SPC systems and use computer tools for production management.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1.The evolution of production systems and the production function. 2.Competitiveness factors. 3.Methods engineering and process design. 4.Quality Management. 5.Statistical Process Control - SPC. 6. Forecasting 7. Aggregate Planning 8. Inventory Control 9. Material Requirements Planning - MRP 10. Simulation
Recommended or required Reading	- Jacobs, F. e Aquilano, N. e Chase, R. (2003). *Operations Management for Competitive Advantage*. Irwin: McGraw-Hill - Winston, W.(2003). *Operations Research ? Applications and Algorithms*. USA: Duxbury Press - Courtois, A. e Pillet, M. e Martin-Bonnefous, C. (2007). *Gestão da Produção*. Lisboa: Lidel - Ribeiro, J. e Roldão, V. (2007). *Gestão das Operações ? Uma Abordagem Integrada*. Lisboa: Monitor
Planned learning activities and teaching methods	Lectures and theoretical-practical classes focused on the analysis and resolution of practical cases with the aid of microsoft excel tools.
Assessment Methods and criteria	Written test with two parts: theorical and theoretical-practical. Each component is worth 50% of the overall mark. The final grade is the average mark of two parts. Minimum pass mark: 10/20.
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Mathematics Modelation and Simulation
Course unit code	30028
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Cristina Maria Mendes Andrade
Learning outcomes of the course unit	The students will acquire knowledge about mathematical models, calculation techniques and methods: -analysis of a real situation, its interpretation and simplification -design and mathematical modelling of real models -analysis, interpretation and evaluation through simulation.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	-Mathematical analysis -Linear algebra -Programming (optional)
Recommended optional programme componentes	Not applicable.
Course contentes	1. Introduction do Mathematical modelation 2. Introduction to Matlab programming 3. Topics of numerical methods 3.1. Linear equations systems 3.2. Non-linear equations 3.3. Polinomial interpolation 3.4. Numerical integration 3.5. Numerical methods for ordinary differential equations 3.6. Differential equations of partial derivatives 4. Simulation: analysis of practical cases
Recommended or required Reading	- Heinz, S.(2011). *Mathematical modelling*. New York, USA: Springer - Heath, M.(2002). *Scientific Computing: an Introductory survey*. New York, USA: McGraw-Hill - Faires, J. e Burden, R. (2011). *Numerical analysis*. Boston, USA: Brooks/Cole, Cengage Learning - Han, W. e Atkinson, K. (2003). *Elementary numerical analysis*. USA: John Wiley
Planned learning activities and teaching methods	Theoretical-practical classes oriented to the use of Matlab and supported by interactive class debates.
Assessment Methods and criteria	Continuous assessment: -2 projects (Matlab programming) 40% -1 written test 60% Final Assessment: written summative examination - regular season - make-up season - examination period for employed students
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Optimal and Adaptive Control
Course unit code	30027
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Paulo Manuel Machado Coelho Ana Cristina Barata Pires Lopes
Learning outcomes of the course unit	General knowledge of control, including most used techniques and methods in MIMO control (multivariable) and state-space approaches; analysis and design skills through practical applications of the different techniques such as state estimate using Kalman Filter; design optimal and adaptive systems.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	State estimate; Kalman filter; optimal control; optimal estimate; adaptive control systems; optimising control systems; parameter estimate; system identification techniques.
Recommended or required Reading	- Wittenmark, H. e Astrom, K. (1998). *Computer-controlled systems: theory and design*. USA: Prentice-Hall - Workman, M. e Powell, D. e Franklin, G. (1998). *Digital Control of Dynamic Systems*. USA: Addison-Wesley - Ogata, K.(1994). *Discrete-time Control Systems*. USA: Prentice-Hall
Planned learning activities and teaching methods	Lectures supported by illustrative cases. Theoretical-practical classes focused on concept application and problem-solving.Practical works are proposed to the students.
Assessment Methods and criteria	Exam (50%) and practical assignments (50%).
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Signals Analysis and Processing
Course unit code	30029
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Manuel Fernando Martins de Barros Gabriel Pereira Pires
Learning outcomes of the course unit	On completion of this course, the students should be able to simulate, design and implement digital signal processing systems. Main focus will be on the implementation of digital filters.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1- Discrete signal and systems 2- Characterisation of random signals and random processes 3- Sampling of continuous and discrete signals 4- Discrete Fourier transform and spectral estimation methods 5- Design and implementation of FIR and IIR filters
Recommended or required Reading	- Lathi, B.(2000). *Signal Processing and Linear Systems* .. USA: Oxford University Press - Smith, S.*The Scientist & Engineer's Guide to Digital Signal Processing*. USA: California Technical Publishing - online
Planned learning activities and teaching methods	Lectures, Problem solving classes, Laboratory classes.
Assessment Methods and criteria	Written exam (25%), homework (25%), final project (50%).
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Entrepreneurship and Business Strategy
Course unit code	300211
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Anual
Number of ECTS credits allocated	6
Name of Lecturer(s)	
Learning outcomes of the course unit	The students are expected to develop strategic management skills, understand the role of entrepreneurship as a value generation process, be aware of the importance of innovation within organisations and be able to draw up, analyse and implement projects.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1. Strategic management 2. Entrepreneurship and business creation 3. The financial plan 4. Creating a business plan.
Recommended or required Reading	- Freire, A.(2008). *Estratégia ? Sucesso em Portugal*. Lisboa: Editorial Verbo - Kaplan e Norton, R.(2006). *Balanced Scorecard: Translating Strategy into Action*. Boston: Harvard Business School Press - Mariotti, S.(2007). *Entrepreneurship ? Starting and operating a small business*. New Jersey: Pearson Prentice Hall - Neves, C.(2007). *Análise financeira: técnicas fundamentais*. Lisboa: Texto Editores
Planned learning activities and teaching methods	Theoretial and practical classes focused on the resolution of practical cases.
Assessment Methods and criteria	Project consisting of a strategic plan for a company (40% of overall grade). Project consisting of a business plan for a company (60% of overall grade).
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.