

ECTS Information Package: Degree Programme

Master's degree in

TECHNICAL MAINTENANCE OF BUILDINGS

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A - General Description

Programme Title - Mestrado em Manutenção Técnica de Edifícios

Qualification awarded - Master's degree in Technical Maintenance of Buildings

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 ESTA-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 ESTA-IPT as appropriate to access the programme.

Specific

Holders of a bachelor's degree in mechanical, electronics, civil, chemical and environmental engineering or related areas from the School of Technology at Tomar or the School of Technology at Abrantes (IPT) are accepted for direct entry onto the master's degree in Technical Maintenance of Buildings.

Without prejudice to the general entry requirements, the following candidates are accepted for entry onto the master's degree in Technical Maintenance of Buildings subject to admission quotas:

- Holders of a bachelor's degree (licenciatura) or equivalent awarded by another national higher education institution in such areas as technical maintenance of buildings, mechanical engineering, electronics engineering, civil engineering, chemical engineering, environmental engineering or related areas;
- Holders of a foreign higher degree awarded on completion of a first-cycle programme organised by a foreign country in the framework of the Bologna Process;
- Holders of a foreign higher degree which is deemed to meet the requirements of a licenciado degree by ESTA/IPT Technical/Scientific Committee;
- Holders of a bachelor degree in technical maintenance of buildings, mechanical engineering, electronics engineering, civil engineering, chemical engineering, environmental engineering or related areas whose scientific and professional curriculum is deemed by ESTA-IPT Technical/scientific Committee as appropriate to access second-cycle programmes.
- Holders of an academic, scientific or professional curriculum which is deemed by the ESTA-IPT Technical/Scientific Committee as appropriate to access second-cycle programmes.

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 ESTA-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

Accrual of credits to individuals holding a licenciado degree in mechanical, electronics, civil and chemical 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 Abrantes-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 student work.

Profile of the program:

This course of study includes:

- A master's programme organised into modules corresponding to 75 ECTS credits;
- An original project or a professional internship including final report corresponding to 45 ECTS credits. This master's degree was designed so as to develop skills in the following technical-scientific areas: Technical Maintenance of Buildings (69 compulsory ECTS); Energy and Fluid Technologies (29 compulsory and 11 optional ECTS); Mechanical Project (6 compulsory and 12 optional ECTS); Electronics (23 optional ECTS).

Key learning outcomes:

Holders of a master's degree in Technical Maintenance of Buildings should be able to:

- Ensure an interdisciplinary intervention in the various specialities of building facilities and equipments including heating, ventilation and air-conditioning, fluid networks, electrical installations, domotics, data and communications networks, protection and security, acoustics, lighting and others from project design to construction and maintenance stages;
- contribute to improve the quality of buildings and its equipments in terms of operation, comfort, safety and rational use of energy;
- Meet market demands on specialised labour by delivering professionals with a comprehensive profile in engineering areas related with installations and equipments in buildings;
- Launch spinoffs or start-ups capable of fostering and supporting the development of innovative corporate projects;
- Join project or research teams involved in process development and promote interdisciplinary tasks;
- Promote the development of sustainable processes, clean technologies and rational energy use;
- Design, implement, manage and optimise industrial maintenance plans for service buildings and support services;
- Evaluate from the technical, economical and environmental point of view, new maintenance solutions and technologies;
- Apply the quality control procedures to installations and equipments;
- Plan, draw up, implement and coordinate quality control methodologies;
- Acquire individual and teamwork methodologies that will allow them to engage in lifelong learning activities;
- Be able to communicate conclusions and associated reasoning both to specialists or non-specialists.

Occupational profiles of graduates with examples:

Holders of the master's degree in Technical Maintenance of Buildings are prepared, among others, to perform as:

- Maintenance managers or assistant managers in industry and service buildings;
- Managers or assistant managers of industrial premises and equipments of service buildings;
- Part of multidisciplinary teams in such areas as design, creation, implementation or optimisation within industries and/or service buildings;
- Maintenance directors or middle managers.

Access to further studies:

The master's degree in Technical Maintenance of Buildings gives access to third-cycle programmes in such engineering areas as mechanics, electronics, chemistry, biology, environment and food and other related areas according to applicable access regulations.

Course structure diagram with credits

Course Title	Year	Semester	Credits
Air Conditioning and Refrigeration Installations	1	S1	6
Building Protection and Security	1	S1	6
Energy and Environment	1	S1	6
Option I (Year1 Sem1)	1	S1	6
op: Electrical Installations (*)	1	S1	
op: Mechanical Mechanisms and Components (*)	1	S1	
Technical Management of Buildings	1	S1	6
Noise	1	S2	6
Option II (Year 1 Sem 2)	1	S2	6
op: Maintenance (*)	1	S2	
Power Generation and Thermal Systems	1	S2	6
Special Technical Installations	1	S2	6
Thermal Performance of Buildings	1	S2	6
Industrial and Domestic Ventilation	2	S1	5
Option III (Year 2 Sem 1)	2	S1	4
op: Systems Control and Domotics (*)	2	S1	
Project or Internship (Year 3)	2	S1	12
op: Internship/Placement (Sem3) (*)	2	S1	
op: Project (Sem3) (*)	2	S1	
Technical Building Inspection	2	S1	5
Project or Internship (Semester 4)	2	S2	30
op: Internship/Placement (Sem4) (*)	2	S2	
op: Project (Sem4) (*)	2	S2	

(*) 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 ESTA-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 ESTA-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 must 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 the program requires a pass in all its constituent modules including the preparation and public defence of project work or internship report so as to accumulate 120 ECTS credits, of which 104 are compulsory and 16 are selected among optional modules available in the curriculum in compliance with general and specific assessment regulations.

Mode of study:

Full- or part-time.

Program director or equivalente

Director: Flávio Rodrigues Fernandes Chaves

Erasmus coordinator: Flávio Rodrigues Fernandes Chaves

ECTS coordinator: Flávio Rodrigues Fernandes Chaves

B - Description of individual course units

Course unit title	Air Conditioning and Refrigeration Installations
Course unit code	30574
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)	Flávio Rodrigues Fernandes Chaves
Learning outcomes of the course unit	The students will consolidate and expand their knowledge in the field of Air Conditioning and Refrigeration Installations.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	1. Fundamentals of thermodynamics and psychrometrics 2. Characterization of design conditions 3. Calculation of thermal loads 4. HVAC systems 5. Pipe sizing for AC 6. HVAC design 7. Cooling Theory 8. Cooling cycles 9. Refrigerants 4. Study of the main components of air-conditioning equipment 5. Calculation of air-conditioning installations.
Recommended or required Reading	- Stocker, W.(1998). <i>Industrial Refrigeration Handbook</i> . .: McGraw-Hill
Planned learning activities and teaching methods	Lectures and practical classes complying with applicable legislation on air-conditioning and refrigeration project. Case study analysis.
Assessment Methods and criteria	Compulsory practical experimental projects. Final Mark=0.25xWork1+0.25xWork2+0.25xWork3+0.25xWork4
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Building Protection and Security
Course unit code	30572
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)	Maria de Lurdes Belgas da Costa José António Dias Nogueira
Learning outcomes of the course unit	The students will be familiar with fire protection techniques and materials in different types of structures and be able to draw up fire safety, prevention and emergency plans.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1. Introduction 2. Functional requirements of buildings. 3.Fire Safety in Buildings. 4. Fire Safety Plans
Recommended or required Reading	- Castro, C. e Abrantes, J. (2009). <i>Manual de Segurança Contra Incêndio em Edifícios</i> . . : .
Planned learning activities and teaching methods	Lectures. Tutorials focused on the development of practical projects complying with applicable legislation. Preparation of safety plans and case study analysis.
Assessment Methods and criteria	Comprehensive written closed-book test and practical project work.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Energy and Environment
Course unit code	30571
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)	Rui da Costa Marques Sant'Ovaia João António Clemente Antunes Maria Isabel Martins Simões Ludovino
Learning outcomes of the course unit	The students should be able to identify the key environmental impacts related with the production and use of energy, develop good practices and be familiar with legal requirements of health and safety at work.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1.Key environmental impacts associated with energy management. 2.Sustainable management of water consumption and waste in a building. 3.Indoor air quality in accordance with the regulation of energy systems and air conditioning of buildings. 4.Health and safety at work basics. 5.Industrial hygiene. 6.Introduction to environmental management systems and Health and safety at work.
Recommended or required Reading	- Sérgio, A.(2010). <i>Manual de Higiene e Segurança no trabalho</i> . portugal: Porto editora
Planned learning activities and teaching methods	Lectures supported by computer resources.
Assessment Methods and criteria	Assessment: Part 1: written test (PE1) and practical assignment (TP1), Part 2: Written test (PE2). Final mark: $NF = 0.7x (PE1 \times 0.5 + TP1 \times 0.5) + 0.3 \times PE2$
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Electrical Installations (*)
Course unit code	30577
Type of course unit	Optional
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 Orlando José Das Neves Nunes
Learning outcomes of the course unit	The students will develop skills in terms of design, calculation and evaluation of electrical and telecommunications installations in buildings.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contentes	O1 - Types of diagrams and symbols 2 - The steps of an electrical project 3 - Electrical cabling 4 - Low-voltage electrical equipment, command / control, isolation, protection and cutting 5 - Overloads 6 - Calculation of low-tension cabling 7 - Safety of people and equipments 8 - Electrical feeding and control cabinets 9 -Lighting project
Recommended or required Reading	- Regras Técnicas das Instalações Eléctricas de Baixa Tensão.(2006, de ---). <i>Portaria nº949-A</i> ,
Planned learning activities and teaching methods	Lectures and practical classes complying with applicable legislation on electrical projects. Resolution of exercises and case study analysis.
Assessment Methods and criteria	Practical project developed throughout the semester (60%) and written exam (40%).
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

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

B - Description of individual course units

Course unit title	Mechanical Mechanisms and Components (*)
Course unit code	30576
Type of course unit	Optional
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)	Bruno Miguel Santana Chaparro
Learning outcomes of the course unit	The students will be familiar with the mechanisms and mechanical components used in industrial machinery and laboratory and be able to calculate the size of drives and electrical/electronic controls.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contentes	1. Introduction to mechanisms and mechanical components. 2. Adaptation of speed and torque. 3. Clutches and brakes. 4. Connection and fastening systems. 5. Motion transmission through belts and chains. 6. Mechanical couplings. 7. Guiding of moving parts. 8. Device instrumentation 9. Computer tools for developing mechanical mechanisms.
Recommended or required Reading	- Sclater, N. e P. Chironis, N. (2009). <i>Mechanisms and mechanical devices</i> . (Vol. .). : McGraw-Hill
Planned learning activities and teaching methods	Lectures and practical classes focused on the preparation of practical projects applying mechanical components and general machinery. Problem solving and case study analysis.
Assessment Methods and criteria	Final assessment consists of a practical written test.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

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

B - Description of individual course units

Course unit title	Technical Management of Buildings
Course unit code	30573
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)	Maurício Batista Carlos
Learning outcomes of the course unit	The students will acquire knowledge in such areas as management, investment project evaluation, technical solution analysis, primary and auxiliary energy consumption ratios and energy savings.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	1. Thermal Power Plants with Boiler 2. Thermal Power Plants with Chiller 3. Water Systems 4. Air Treatment Systems 5. And air conditioning unit HVAC 6. Air leakage in buildings 7. Building insulation 8. Control and use of natural light 9. Artificial lighting 10. Autonomous systems and components 11. Energy audits
Recommended or required Reading	- Cabral, J.(2009). <i>Gestão da Manutenção de Equipamentos, Instalações e Edifícios</i> . .:
Planned learning activities and teaching methods	Lectures and practical classes complying with applicable legislation on technical building maintenance. Audit plans and case study analysis.
Assessment Methods and criteria	Written theoretical practical test. Final mark = written test (60%) + practical project work (40%).
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Noise
Course unit code	305711
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)	Anabela Mendes Moreira António Jorge Martins de Araújo Gomes
Learning outcomes of the course unit	The students will acquire the necessary skills to draw up noise control projects complying with applicable legislation.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	1. Fundamentals of acoustics 2. Legal and regulatory framework- noise at the workplace 3. Legal and regulatory framework - environmental noise 4. Elements of architectural acoustics 5. Legal and regulatory framework - Building acoustics. 6. Acoustics project and simulated practical training.
Recommended or required Reading	- ., „Enquadramento legislativo e normativo. .: .
Planned learning activities and teaching methods	Lectures. Practical classes focused on the preparation of practical projects and field measurements. Problem-solving and case study analysis.
Assessment Methods and criteria	Final assessment is based on a written project work with oral presentation. Final Grade =0.5xWW +0.5xOP WW-Written Work OP-oral presentation
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Maintenance (*)
Course unit code	305714
Type of course unit	Optional
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 Afonso Antunes
Learning outcomes of the course unit	The students will acquire skills and tools in the field of building maintenance, familiarise themselves with legislation and standardisation issues on maintenance and understand the concepts, techniques and tools for maintenance management.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contentes	1. Maintenance Management: Standards, Terminology, definitions and concepts, maintenance strategies; Maintenance management indicators. 2. Building maintenance: legal requirements, management goals and indicators, consumption monitoring and energy efficiency. 3. Organising the management system: Registration of equipment and plans, work planning and management.....
Recommended or required Reading	- Saraiva, J.(2009). <i>Gestão da Manutenção de Equipamentos, Instalações e Edifícios</i> . : Lidel
Planned learning activities and teaching methods	Lectures. Practical classes focused on preparing practical projects. Problem-solving and case study analysis.
Assessment Methods and criteria	Final assessment includes a technical paper with oral presentation. Final mark= 0.5xWW+0.5xOP WW-Written Work OP-oral presentation
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

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

B - Description of individual course units

Course unit title	Power Generation and Thermal Systems
Course unit code	30579
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)	Hugo Ricardo Barbosa Maganão
Learning outcomes of the course unit	The students will develop theoretical and practical skills in the field of renewable power generation with application in buildings.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	1. Heliotechnics 2. Solar Thermal Systems. 3. Solar Photovoltaic Systems. 4. Wind Energy Conversion systems. 5. Complementary Thermal Systems.
Recommended or required Reading	- , Felix a. Y Remmers, Karl Heinz y Schauss, Martin, P.(2009). <i>Sistemas Solares Termicos: diseño e instalacion</i> . (Vol. .). ∴ .
Planned learning activities and teaching methods	Lectures and practical classes focused on problem solving.
Assessment Methods and criteria	Two compulsory tests (T) and a final project (P). The final grade (FG) is calculated according to the following formula: $FG = 0.5 \times [(FG1 + FG2) / 2] + 0.5 \times TP$
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Special Technical Installations
Course unit code	305710
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)	Bruno Miguel Santana Chaparro Orlando José Das Neves Nunes
Learning outcomes of the course unit	The students will expand their knowledge in the field of mechanical and electrical equipments in different types of buildings. They will be able to draw up, select and explore systems in several types of facilities such as restaurants, laundries, lifts, central vacuum and transformer stations.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	1. Restaurant equipment and facilities. 2. Laundry equipment and systems. 3. Lifts and hoists. 4. Central vacuum systems. 5. Transformer stations and lightning protection devices. 6. Capacitor banks and harmonic filters. 7. Cavas and disruption of stress: Uninterruptible Power Supply. 8. Automatic fire detection and intrusion systems(SADI).
Recommended or required Reading	- , , .. <i>Regulamentos nacionais, Catálogos de fabricantes e instaladores.</i> (Vol.). . : .
Planned learning activities and teaching methods	Lectures. Practical classes focused on the completion of practical projects. Problem-solving and case study analysis.
Assessment Methods and criteria	Final assessment includes completion of a technical assignment (mechanical component) and a written test (electrical component). $NF = 0.5 \times Trab + 0.5 \times PE$
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Thermal Performance of Buildings
Course unit code	30578
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)	Flávio Rodrigues Fernandes Chaves Ana Carla Vicente Vieira
Learning outcomes of the course unit	The students will know the regulations concerning indoor air quality, be able to use spreadsheets to determine nominal needs of primary energy for the housing sector as well as the appropriate software to determine the needs for sanitary warm water.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contentes	1. Purpose and scope. 2. Climatic zoning 3. Definition of surrounding area 4. Thermal characterization and minimal requirements. 5. Implications for constructive solutions. 6. Heating and cooling needs. 7. Ventilation and infiltration. 8. Nominal DHW needs. 9. Nominal global needs for primary energy. 10. RSECE specifications.
Recommended or required Reading	- ..(2006). <i>Decretos Lei 78/2006 (SCE); DL79/2006 (RSECE) e DL 80/2006 (RCCTE)</i> .. ∴ .
Planned learning activities and teaching methods	Lectures. Practical classes focused on the preparation of practical projects with the aid of calculation and sizing software. Problem-solving and case study analysis.
Assessment Methods and criteria	Final assessment is based on one technical project.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Industrial and Domestic Ventilation
Course unit code	305715
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	5
Name of Lecturer(s)	José Manuel Ferreira Gaspar
Learning outcomes of the course unit	Students should be afamiliar with the methods to control air contamination in industrial environments and in general. They should be able to study and examine general and local ventilation.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1. Introduction and basic concepts 2. National legislation 3. Concepts of Industrial Ventilation 4. Pipe sizing 5. Fans 6. Operation of local exhausting systems 7. Assessment of ventilation, ckeck and measurement systems 8. Control and treatment of captured emissions. 9. Project presentation.
Recommended or required Reading	- Roriz., L.(2006). <i>Climatização – Conceção, Instalação e Condução de Sistemas.</i> .: .
Planned learning activities and teaching methods	Lectures and practical classes focused on carrying out practical assignments. Problem solving and case study analysis.
Assessment Methods and criteria	Final assessment is based on a ventilation project. The final grade is calculated according to the following formula: $(NF = 0.5 \times NT + 0.5 \times NA)$ where NF - final grade; NT - mark of project and NA -mark of oral presentation.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Systems Control and Domotics (*)
Course unit code	305719
Type of course unit	Optional
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	4
Name of Lecturer(s)	Paulo Manuel Machado Coelho Nelson Filipe Ferreira Gonçalves
Learning outcomes of the course unit	On completion of this unit the students should be familiar with such issues as the standardisation of communication networks, interoperability between manufacturers and the technological processes for the manufacturing of several types of equipment.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contentes	1. System Control and Domotics. 2. System control 3. Automation Systems 4. Sensors in intelligent buildings 5. Introduction to communication networks 6. Communication networks for intelligent buildings 7. User interaction 8. An approach to engineering design in intelligent buildings.
Recommended or required Reading	- ., <i>S.Intelligent Buildings and Building Automation</i> . (Vol. .). : Spon Press
Planned learning activities and teaching methods	Lectures and practical classes supported by the resolution of practical problems and case study analysis.
Assessment Methods and criteria	Final assessment is based on a final assignment. The final grade will be calculated according to the following formula: $(NF = 0.7 \times NT + 0.3NA)$ where NF - final mark; NT - mark of assignment and NA - mark of presentation
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

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

B - Description of individual course units

Course unit title	Internship/Placement (Sem3) (*)
Course unit code	305726
Type of course unit	Optional
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	12
Name of Lecturer(s)	Flávio Rodrigues Fernandes Chaves Maurício Baptista Carlos Bruno Miguel Santana Chaparro Mário Helder Rodrigues Gomes Teresa Leonor Cardoso Morgado
Learning outcomes of the course unit	Through Placement/Internship the students will: a) be aware of industrial/institutional reality as opposed to school reality which will facilitate their integration in the labour market. b) have the opportunity to apply the knowledge and practical skills acquired in their course.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	Adapted on a case-to-case basis.
Recommended or required Reading	- , <i>The reading list and study elements provided are in accordance with the individual internship plans..</i> (Vol.). :
Planned learning activities and teaching methods	a) Placement/internship consists of a period in which the student develops a practical activity that serves as a complementary training. b) Placement/internship has a minimum duration of 1215 hours.
Assessment Methods and criteria	Assessment will comply with placement/internship specifications.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	In a firm or organisation.

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

B - Description of individual course units

Course unit title	Project (Sem3) (*)
Course unit code	305725
Type of course unit	Optional
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	12
Name of Lecturer(s)	Flávio Rodrigues Fernandes Chaves Maurício Baptista Carlos Bruno Miguel Santana Chaparro Mário Helder Rodrigues Gomes Teresa Leonor Cardoso Morgado
Learning outcomes of the course unit	The students should be aware of the industrial/institutional reality as opposed to school reality, be able to give clear and critical accounts of the the work developed and present innovative technical-scientific solutions for real problems.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	Adjusted in each case
Recommended or required Reading	- , <i>The reading list and study elements provided are in accordance with the individual internship plans.</i> (Vol.). :
Planned learning activities and teaching methods	The project component is subject to the same rules given for the internship, yet it is suitable for realization in laboratory or institutional context. a) The internship consists of a period in which the student develops an activity complementary practice of education. It is intended to provide the student experience and environment for proper factory / enterprise or institution, you instill the importance of timetable and the need to plan, understand and report on its activities. b) The internship will have a minimum of 1215 hours reference. These correspond to the actual working hours in the company / institution, study hours, contact hours with the teacher and supervisor, hours of report writing, etc.. Each supervisor shall, depending on the type of work the student performs, distribute working hours.
Assessment Methods and criteria	The evaluation is done according to regulation internships
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

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

B - Description of individual course units

Course unit title	Technical Building Inspection
Course unit code	305716
Type of course unit	Compulsory
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	5
Name of Lecturer(s)	Pascoal Martins Faísca Paulo Manuel Gonçalves Gil
Learning outcomes of the course unit	The students will be able to interpret the regulations on technical installations and check the compliance of all power-consuming systems as well as control the quality of indoor air.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1. Evolution of power consumption in buildings. 2. The new legal framework 3. Audits on buildings 4. Power Efficiency, Renewable Energy in Buildings 5. IAQ Instrumentation 6. Preventive Maintenance Plan 7. Construction, Testing and Receipt of HVAC equipments 8. Periodic audits 9. Regular inspections on AVAC systems 10. IAQ audits
Recommended or required Reading	- ., ..NT-SCE_02 – Metodologia para auditorias periódicas de QAI em edifícios de serviços existentes no âmbito do RSECE. .: .
Planned learning activities and teaching methods	Lectures and practical classes focused on applying applicable regulations. Preventive maintenance plans and case study analysis.
Assessment Methods and criteria	Assessment is based on a final assignment. Final grade is calculated according to the following formula: $(NF = 0,5 \times NT + 0,5 \times NA)$ where NF – final mark; NT – assignment mark and NA - oral presentation.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Internship/Placement (Sem4) (*)
Course unit code	305728
Type of course unit	Optional
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	30
Name of Lecturer(s)	Flávio Rodrigues Fernandes Chaves Maurício Baptista Carlos Bruno Miguel Santana Chaparro Mário Helder Rodrigues Gomes Teresa Leonor Cardoso Morgado
Learning outcomes of the course unit	Through Placement/Internship the students will: a) be aware of industrial/institutional reality as opposed to school reality b) have the opportunity to apply the knowledge and practical skills acquired in their course.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	Adapted on a case-to-case basis.
Recommended or required Reading	- , <i>The reading list and study elements provided are in accordance with the individual internship plans.</i> (Vol.). :
Planned learning activities and teaching methods	a) Placement/Internship consists of a period in which the student develops complementary training b) Placement/Internship will have a minimum duration of 1215 hours.
Assessment Methods and criteria	Assessment complies with Placement/Internship specifications.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	In a firm or organisation.

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

B - Description of individual course units

Course unit title	Project (Sem4) (*)
Course unit code	305727
Type of course unit	Optional
Level of Course unit	Second Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	30
Name of Lecturer(s)	Flávio Rodrigues Fernandes Chaves Maurício Baptista Carlos Bruno Miguel Santana Chaparro Mário Helder Rodrigues Gomes Teresa Leonor Cardoso Morgado
Learning outcomes of the course unit	The students should be aware of the industrial/institutional reality as opposed to school reality and be able to apply the knowledge and skills acquired during their course in the resolution of day-to-day problems of a firm/institution.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme components	Not applicable.
Course contents	Adapted on a case-to-case basis.
Recommended or required Reading	- , <i>The reading list and study elements provided are in accordance with the individual internship plans.</i> (Vol.). :
Planned learning activities and teaching methods	Project complies with the same regulations as placement/internship: a) students develop complementary practical training. b)project has a minimum duration of 1215 hours.
Assessment Methods and criteria	Assessment complies with placement/internship specifications.
Language of Instruction	Portuguese Mentoring in English
Work placement(s)	Not applicable.

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

