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Programme Handbook

Master in Energy Efficient Buildings

General Entry

Study Programme

Indicate the full name (i.e. no acronyms) of the study programme (SP).

Master in Energy Efficient Buildings

Cycle /Level

Indicate the cycle/level of the qualification according to the National Qualifications Framework (where available), the Qualification Framework for European Higher Education Area (QF for EHEA) and the European Qualification Framework for Lifelong Learning (EQF for LLL).

National Qualification Framework: 2nd cycle;

Qualifications Framework for the European Higher Education Area (QF for EHEA): 2nd cycle;

European Qualifications Framework for Lifelong Learning (EQF for LLL): Level 7

Qualifications Framework for the Algerian Higher Education : 2nd cycle

Type of Degree & Duration

Identify the type of degree, for example whether the degree is the result of a programme offered by a single institution or whether the degree is the result of a joint programme (joint degree or double / multiple degree).

Indicate the duration of the SP in ECTS-credits, and/or - if applicable - national/institutional credits and/or years of study.

Single degree (120 ECTS credits, 2 years).

The degree is the result of a programme offered by a single Institution.

Institution(s)

Give the official name of the awarding institution(s) and the country where it is based. In case of joint SPs, indicate also which is the coordinating institution.

If the name is not in Latin alphabet, provide a transliteration or transcription. In addition, provide also an English translation (if applicable) in italics. If there is an official English translation available, use the official one.

University of AbouBakr Belkaid, Tlemcen, Algeria

Purpose

Provide, in a few sentences, a summary - a 'synthetic view'- of the overall purpose of the programme.

To prepare graduates with a strong background in energy efficiency and able to conceive, design, implement and operate energy efficient buildings, contributing to the improvement of the life quality and to the energy development sustainability.

Discipline(s) / Subject area(s)

Indicate the main discipline(s) / subject area(s) of the SP.

If the programme is multi- or interdisciplinary, indicate the relative weight of the major components, if applicable (for instance: politics, law and economics - 60:20:20).

Main disciplines of the SP are those in thermal sciences, materials sciences, simulation and financial/project management – 40:10:40:10

General / Specialist Focus

This section aims to provide the reader with information on whether the degree is aimed towards a more general academic education or a specialism, or a combination of the two. A general SP focuses on the breadth of the subject area(s). A specialist programme focuses in greater depth on a particular subject or subjects. In many cases, there could be a combination. For example: a programme in international relations might be broad but also be focussed, for instance, on a particular region or subject, or problem such as conflict resolution.

Specify and provide a short description of the general and/or specialist focus of the SP. If the SP includes a specialism, please provide a brief statement of the specialism(s).

The SP is a specialist programme focused on the subject of efficient buildings.

Orientation

Outline the orientation of the SP. For example: whether the degree is primarily research, practically based, professional, applied, related to designated employment, etc.

The SP is a professional and applied programme, related to specific employment opportunities.

Teaching & Learning Approaches

This section aims to provide the reader with information about the educational style. Examples of teaching approaches include: student focused, teacher centred, teacher guided, self-directed study. Examples of learning approaches include: problem based learning, task based learning, research based learning, learning through laboratory practice, reflective learning, work placements, group work, individual study and autonomous learning.

Indicate in few lines the main teaching and learning strategies and methods.

The teaching approach is teacher guided.

Main teaching and learning methods are: lectures, seminars, laboratory classes, workshops, traineeship, practical work, individual study based on text books and lecture notes but also group work.

Assessment Methods

This section aims to provide information about the main assessment methods in the programme. Examples of assessment methods include: oral and written examinations, essays, presentations, reports, project work, case studies, portfolio.

Indicate in few lines the main assessment methods.

Written exams (mid-term and final), oral presentations, written essays, laboratory reports, case studies, project work, traineeship reports.

Distinctive Features

Indicate, in a few sentences, any additional features that distinguish this SP from other similar SPs. For example: if the programme includes a compulsory international component, a work placement, a specific environment or is taught in a second language.

The SP is taught in English and/or French.

Educational needs of the labour market and other stakeholders

Educational needs of the labour market

Indicate the organisations representative of the production, services and professions world and/or the employers consulted in order to identify the educational needs of the labour market and describe the consultations method/s and schedules.

Notes

The educational needs of the labour market of reference may be identified in many ways. They may be:

- mentioned in documents, studies, labour market analysis of the external stakeholders (Ministries, organisations representative of the production, services and professions world, etc.);
- identified through direct contacts with organisations representative of the production, services and professions world and/or employers (e.g. through meetings of working groups composed by representatives from University and from the labour market of reference, surveys by questionnaires, interviews, focus groups, etc.);
- identified through the relationships with organisations for carrying out training periods outside the University (in companies, etc.) by students;
- identified through the results of the graduates' placement in the labour market.

List the identified educational needs of the labour market of reference.

In order to identify the educational needs of the labour market, a survey by questionnaire was carried out among organizations involved at different levels in the field of energy efficient buildings.

The investigation was carried out in the period 1st June – 1st July 2017. The organizations who answered the questionnaire were 43 from Tunisia, Algeria and Morocco.

Both the characteristics of the consulted organization and the questionnaire used for the consultation are reported in the document *Stakeholders' Report*, available on the Master web site (http://www.uniproemed.it/masterin_EEBs/Stakeholders'Report_2017).

Also the identified educational needs and expectations of the labour market of reference are documented in the *Stakeholders' Report*. In synthesis, the Master graduates in Energy Efficient

Buildings are requested to have:

Specific skills

- Strong background in thermodynamics / heat transfer
- Skills in material science
- Skills in the field of heating plant and building modelling
- Background about energy savings in buildings
- Skills in the field of renewable energy
- Skills regarding energy auditing of buildings
- Skills in the field of project management
- Skills in the field of economics and investment evaluation
- Skills in the field of thermo-economic analysis

Soft skills

- Good reading/writing skills in English
- Good with numbers
- General computer skills (e.g. office automation, internet, etc.)
- Communication skills
- Ability to work in team
- Analytical and problem-solving skills
- Decision-making skills
- Planning and organizational skills

Educational needs of other stakeholders

List the other stakeholders consulted and their identified educational needs.

The educational needs of the labour market are considered by far the most important for the definition of educational objectives of a Master in Energy Efficient Buildings. Consequently, no other stakeholders outside of those of the labour market have been consulted.

Educational objectives

List the established educational objectives of the SP.

Notes

The educational objectives of the SP should be established in terms of functions students are to be prepared for and required key competences, subdivided between subject-specific and generic ones.

The established educational objectives should be consistent with the mission of the institution the SP belongs to and the identified educational needs.

Main aim of the Master to prepare graduates with a strong background in energy efficiency and able to conceive, design, implement and operate energy efficient buildings.

In order to enable graduates to achieve this aim, students should develop and obtain a set of competences – intended as the capacity to use knowledge and professional and soft skills in work situations – that have been identified in agreement with the identified educational needs of the labour market of reference and the resources available to the awarding institution as follows:

- ability to apply knowledge and understanding of engineering disciplines underlying Energy Efficient Buildings subject area, with specific reference to the following disciplines: Heat transfer, Thermodynamics, Thermal Measurements, Renewable Energy Systems, Acoustics, materials sciences (local materials) to solve / design / investigate / conduct complex problems / products, processes and systems / issues / activities in the subject area;
- ability to analyse and solve complex problems, to design complex products (devices, artefacts, etc.), processes and systems, to investigate complex issues, in the Energy Efficient Buildings subject area, with specific reference to the following topics: HVAC Systems, Heat Pumps and Refrigeration Systems, Renewable Energy Systems, Thermal Design and Optimization.
- ability to implement and conduct complex activities using and applying practical knowledge,

by identifying both societal, health and safety, environmental impact and risks and economic, industrial and managerial implications, taking appropriate decisions, and to meet deliverable, schedule and budget requirements, while fulfilling all legal and regulatory requirements.

List the main areas in which graduates can find employment and the level of responsibility they are qualified to take.

The main areas in which graduates can find employment and level of responsibility they are qualified to take can be identified as follows: positions in companies/small enterprises and institutions (research, quality assurance, commerce) from energy using technological sector, energy saving in enterprises, environmental sector. Positions in energy audit. Teaching positions.

Learning outcomes

List the learning outcomes of the SP.

Note

The learning outcomes should be defined in terms of what a student is expected to know, understand and/or be able to demonstrate after completion of the learning process. They should be 'S.M.A.R.T.': SPECIFIC (*for the SP*), MEASURABLE (*properly detailed in order to favour the understanding of the depth and extent of expected learning and objectively assessable*), ACHIEVABLE (*consistent with the institutional context and the available resources*), RELEVANT (*only the 'key' learning outcomes should be established at programme level*), TIME-RELATED (*plannable and achievable in the available time*). Of course, the learning outcomes should be adequate to the reference cycle of the SP and consistent with the national qualification framework, if any, and with the established educational objectives.

In order to enable students to achieve the programme educational objectives, the following programme learning outcomes – intended as what a student is expected to know, understand and/or be able to demonstrate after completion of the learning process - have been established:

- demonstrate knowledge and understanding of energy efficiency and energy saving innovation technologies at the fundamentals level;
- demonstrate knowledge and understanding of sustainable energy development, energy audit, environmental protection;
- demonstrate knowledge and understanding of materials sciences especially local materials used for energy efficiency and environmental protection;
- demonstrate knowledge and understanding of engineering disciplines underlying Energy Efficient Buildings, at a level necessary to achieve the other programme outcomes, having some awareness at their forefront;
- identify, formulate, analyse and solve complex problems related to Energy Efficient Buildings that may be unfamiliar and involve non-technical – societal, health and safety, environmental, economic and industrial – constraints;
- conceive and design complex civil products (devices, artefacts, etc.), processes and systems related to Energy Efficient Buildings that may be unfamiliar and non-technical – societal, health and safety, environmental, economic and industrial – constraints;
- carry out numerical simulation, in order to pursue detailed investigations and research of complex technical issues in Energy Efficient Buildings subject area;
- design and conduct experimental investigations, critically evaluate results and draw conclusions, in Energy Efficient Buildings subject area;
- implement and conduct complex activities related to Energy Efficient Buildings by identifying societal, health and safety, environmental impact and risks and acting appropriately, and meet deliverable, schedule and budget requirements, while fulfilling all legal and regulatory requirements;
- manage complex work contexts related to Energy Efficient Buildings, take decisions and formulate judgments demonstrating critical awareness of the ethical and social responsibilities.

It is assumed that skills such as:

- good reading/writing skills in English
- good with numbers
- general computer skills (e.g. office automation, internet, etc.)
- communication skill

- ability to work in team
- have been already acquired by students in Bachelor programmes. However, the Master's educational process is also finalized to strengthen these skills.

Curriculum

Provide the curriculum.

Notes

At least: list of the course units, their sequence (*year and semester of delivery*), number of ECTS credits associated to each unit.

The curriculum of the Master in Energy Efficient Buildings for the academic year 2018-19 is shown in attachment (Tables "Curriculum - Academic Year 2018-19").

For each course unit of the curriculum the following information are shown:

- Year and semester of delivery;
- ECTS credits;
- Lecturer (s).

The curriculum was approved by the Council of the Master, the scientific committee of civil engineering department and the scientific council of the faculty of technology. .

Course Units

Characteristics of the course units

Provide the characteristics of all the course units of the curriculum.

Notes

For each course unit, at least:

- name;
- number of ECTS credits;
- course year and teaching period of delivery;
- learning outcomes specific of the course unit and consistent with the established learning outcomes of the SP;
- contents;
- teaching and learning methods (*face to face education, paper-based distance education, ICT-based distance education*), also in terms of hours/credits for each form, and typologies of educational activities or teaching techniques (*e.g.: lectures, practical classes, project classes, laboratory sessions, seminars, etc.*), also in terms of number of hours/credits for each technique;
- assessment methods (*e.g.: written examinations, oral examinations, etc.*) and assessment criteria (*descriptions of what the learner is expected to do and to what level, in order to demonstrate that a learning outcome has been achieved and to what extent*); criteria for measuring students' learning or assessment metrics (*e.g.: attribution of a final grade, fitness declaration, etc.*) and criteria of attribution of the final grade, if any;
- preparatory course units, if any;
- educational material of reference (*e.g.: textbooks, lecture texts, etc.*).

The characteristics of the course units are reported in attachment (Table "Curriculum - Academic Year 2018-19. Characteristics of the Course Units").

For each course unit, the following information are shown:

- name;
- number of ECTS credits;
- course year and teaching period of delivery;
- learning outcomes specific of the course unit;
- contents;
- teaching and learning methods, also in terms of hours/credits for each form;
- typologies of educational activities or teaching techniques, also in terms of number of hours/credits for each technique;
- assessment methods;
- assessment criteria;
- assessment metrics;
- criteria of attribution of the final grade, if any;
- preparatory course units, if any;

- educational material of reference.

The definition of the characteristics of the course units is coordinated by the Council of the Master, particularly in order to avoid gaps or superimpositions in the definition of the specific learning outcomes and contents and to assure the suitability of the assessment methods to a correct assessment of the students' learning.

Characteristics of the graduation exam

Provide the characteristics of the graduation exam.

The characteristics of the graduation exam are shown in attachment (Table "Characteristics of the Graduation Exam").

The following information are specified:

- workload, in terms of ECTS credits;
- requirements to be fulfilled by the final work;
- criteria for the attribution of the graduation grade.

Admission, Recognition, Progression and Attestation

Admission

Provide the required qualifications and the established requirements and criteria for the admission to the SP, the methods of assessment of the possession of the admission requirements by students.

All the students who have overcome a Bachelor-graduating examination of the Department of civil engineering, Mechanical Engineering (option energy), physics (option: materials sciences) and architecture can be admitted to the Master in Energy Efficient Buildings.

Recognition

Provide the rules established for the recognition of higher education qualifications, periods of study and prior learning.

The SP has not established rules for the recognition of higher education qualifications and periods of study and prior learning. The Council of the Master assesses higher education qualifications and periods of study and prior learning, including non-formal and informal learning, case by case. The assessment consists in the comparison of the acquired contents and of the achieved learning outcomes with the contents and learning outcomes of the Master. The Council decides, with respect of the Algerian Higher Education rules, whether and how many credits can be recognized for the applicants on the basis of the results of the comparison.

Progression

Provide the established management criteria of the students' progression in their studies.

Students' progression in their studies is regulated by the following criteria.

Frequency of the didactic activities

Frequency of the course units is compulsory.

Admission at the successive course year

To be admitted at the 2nd course year students must have accumulated all 60 ECTS credits of the 1st course year.

Training periods outside the University

For carrying out training periods outside the University, students must have accumulated at least 30 ECTS credits.

Admission to the graduation exam

To be admitted to the graduation exam students must have accumulated all the ECTS credits

established in the curriculum, except the credits attributed to the graduation exam and the internship.

Students who cannot attend the didactic activities for a long period for causes independent from their will

The Council of the Master regulates, with respect of the Algerian Higher Education rules, admission to the exams of students who cannot attend the didactic activities for a long period for causes independent from their willing time by time.

Attestation

Make available the documentation provided to graduates after the completion of their studies.

After the completion of the studies, the Master provides the graduates with the ‘Diploma’s Supplement’, which explains the qualification gained, including the achieved learning outcomes and the context, level, content and status of the pursued and successfully completed studies.

Teaching staff

List the SP teaching staff and provide at least the following information for each lecturer:

- academic or professional qualification;
- list of the course units he/she is in charge of.

Make available the CV of each lecturer, with the description of the scientific and/or professional interests, activities and results.

The teaching staff of the programme is shown in attachment (Table “Teaching Staff - Academic Year 2018-19”).

For each member of the academic staff, the following information are shown:

- name;
- qualification;
- course units given in the Master;
- course units given in other programmes.

Facilities

Laboratories

List the laboratories (PC rooms included) utilised by the SP and provide at least the following information for each of them:

- equipment and/or personal computers and software of interest for the educational activities of the SP available.

The laboratories of the Department of civil and Mechanical Engineering used by the students of the Master are:

1. Laboratory of Thermodynamics and Heat Mass Transfer
2. Laboratory of construction materials;
3. Laboratory of materials sciences
3. Laboratory of Simulation

For each of these laboratories, Table “Laboratories” in attachment provides the following information:

- available didactic equipment;
- work places and number of student per work place;
- available technical staff.

Libraries

List the libraries utilised by the students of the SP and provide at least the following information for each of them:

- availability of updated bibliographical material of interest for the educational activities of the SP;
- services offered (consultation of books and journals, book rent, bibliographical researches, access to data bases, etc.).

The students of the Master utilize the library of the faculty of Technology, Tlemcen, Algeria. Table “Library” in attachment provides the following information:

- Bibliographical material of interest for the didactic activities of the Master;
- Web Connections;
- Services offered;
- Opening time and access rules;
- Librarian staff available.

Partnerships

Partnerships for carrying out training periods outside the University

Make available the list of the active partnerships for carrying out training periods outside the University.

The list of the active partnerships for carrying out training periods outside the University is shown in attachment (Table “Partnerships for carrying out training periods outside the University”).

Partnerships for carrying out mobility periods

Make available the list of the active partnerships for carrying out mobility periods.

The list of the active partnerships for carrying out mobility periods is in attachment (Table “Partnerships for carrying out international mobility periods”).