

Energy and Environment - Procedure for Access to the PhD (39th cycle)

Titles and project (max 60 points) will be evaluated according to the following evaluation grid:

Curriculum studiorum (max 20 points)

For students who have already graduated at the time of the assessment of their qualifications, the Final Mark of the Master in Science Degree is considered, while for students who will discuss their thesis after the assessment of their qualifications, the Grade Point Average (GPA) obtained in the courses supported in the master's degree will be taken into consideration.

The score will be calculated in a linear proportion between 0 and 20 based on the MSc degree (from 66 to 110 laude) or the average of the exams (from 18 to 30).

Other titles (max 5 points)

Based on the submitted documentation and the CV, 0.5 or 1 point for each qualification considered valid (e.g. second Master's Degree or Specialization or Professional Course, each year of research grants or documented research experiences, internships, publications, documented participation in conferences, computer skills, certificates of professional courses, certifications of foreign language knowledge – different from the mother tongue -, etc.) up to a maximum of 5 total points.

Research Project (max 35 points)

The submitted project by the applicant must demonstrate her/his propensity to carry out research and her/his ability to organize the various phases of the project independently. The project document shall not exceed a length of 12,000 characters (including spaces). This project, which must be submitted by candidates in order to take part to the call, will not be considered compulsory for the research activity of winner participants. The Examination Committee will evaluate: knowledge of the state of the art (max 10 points); originality and innovative content (max 10 points); clarity and completeness of the presentation of the objectives, methodologies and potential results (max 10 points); coherence of the project with the training objectives of the PhD (max 5 points).

Applicants with a score of at least 40/60 are admitted to the oral interview.

Interview (max 60 points)

Presentation of the applicant to evaluate motivations, interests and aptitude for research, as well as knowledge of the English language (max 30 points).

Discussion of the submitted project (max 10 points)

Verification of basic knowledge with a question on a topic chosen by the candidate among the following eleven proposals (max 20 points).

Syllabus:

- 1- Principles of Thermodynamics (thermodynamic systems, thermodynamic transformations, properties of pure substances, heat and work, the first law of thermodynamics, the second law of thermodynamics, entropy, thermodynamic potentials).
- 2- Heat transmission (conduction; natural, forced and mixed convection; radiation);
- 3- Thermo-hygrometric, visual and acoustic comfort in the built environment;
- 4- Thermodynamic modeling of energy conversion processes and critical evaluation of the performance of different systems (steam power plants, reciprocating internal combustion engines, gas turbines, combined cycles, cogeneration plants, turbomachinery);
- 5- Production of energy from renewable sources (solar, wind and ocean, bioenergy);
- 6- Applications of nuclear energy for a secure and sustainable future (non-power applications, medical or industrial applications);
- 7- Innovation in power production systems based on nuclear energy;

8- Distributed micro-generation, micro-generation plants for buildings, intelligent energy grids and storage systems;

9- Energy efficiency of buildings, near Zero Energy Buildings, BACS;

10- Design of orbits for missions dedicated to energy and the environment (satellite constellations, minimum energy transfers, satellite monitoring, space environment and perturbations);

11- Remote sensing, image analysis, positioning and navigation applied to energy and environmental monitoring (Earth observation, image processing, GNSS, navigation techniques).

The oral exam is considered passed if the candidate has obtained at least the mark of 40/60.

The minimum overall score for potential admission to the PhD is 80/120.

Language: ITALIAN, ENGLISH

5-members Examination Committee