Evaluation criteria for admission to the PhD programme in Energy and Environment (40th cycle)

The oral exam will be evaluated on the basis of the following evaluation grid:

Oral exam (max 60 points)

Presentation of the applicant to evaluate motivations, interests and aptitude for research, as well as knowledge of the English language (max 20 points).

Description and discussion of the submitted project clarity of presentation, ability to synthesize (max 20 points)

Verification of basic knowledge with two questions on topics 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, cogeneration);
7- 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).

Candidates who score at least 40 points out of 60 in the evaluation will pass the oral exam.

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