This module is split in two parts. The first one is the Mini Project and the second is the Wind Farm Study.

During the mini-project students are skilled in preparation, writing and presentation of a scientific project, of their choice. They learn how to make a bibliographic research, organise their references, focus on a special topic, describe the problem, collect data, and draw conclusions. Finally, they gain experience on presentations. Students are encouraged to connect their mini-project topic with their internship.

In parallel, during the wind farm study, students make their own study on the design of a wind farm. Individual data are provided, together with the necessary computational tools to be used in the various steps of the study (Wind data, wind turbine, energy calculations, Wind farm layout, Integration issues and financial evaluation).

1. Mini Project

Students are encouraged to realize a mini project in a subject of their interest. Through this project, students are focus on a special topic of wind energy:
- Aerodynamics / Aero-elasticity / Aero-acoustics / Loads,
- Wind forecasting / capacity credit (short term – long term),
- Hybrid solutions for isolated systems,
- Wind farms design / wake effect,
- Small scale wind turbines for rural/urban applications
- Financial issues / External costs / Green certificates / CO2 Emissions taxes
- Control
- Analysis of market development
- Off shore (design, development, wind assessment)
- Measuring methods and monitoring
- Grid integration / electrical issues
- Operation and damages
- Environmental issues

The typical form of the mini-project’s report submitted is:
- Abstract – key words
- Introduction / scope /objectives
- Bibliographic research
- Methodology
- Computational part
- Results
- Discussion / conclusions

2. Wind Farm study

The steps of the wind farm study is consists of:
- Wind data analysis (statistics, wind rose design),
- Wind turbine design for the specific site using Blade Element Momentum theory
- Energy calculations for the specific wind turbine and wind data, using a cost model for the minimization of the LCOE
- Wind farm’s layout and wake effect calculation
- Integration issues for specific autonomous power system (wind energy curtailment, capacity credit)
- Financial evaluation (IRR, NPV, PBP)

Reader’s advisory


Links

Language of instruction

English
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<thead>
<tr>
<th><strong>Duration (semesters)</strong></th>
<th>1 Semester</th>
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<tr>
<td><strong>Module frequency</strong></td>
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<td><strong>Module capacity</strong></td>
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<td><strong>Modulart</strong></td>
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<tr>
<td><strong>Final exam of module</strong></td>
<td>Mini Project: Submission deadline end of May Wind Farm Study: Submission deadline end of April</td>
<td>Mini Project (50%): Written report up to 3,500 words, Presentation (15-20 minutes presentation plus discussion) Wind Farm Study (50%): Written report (15-20 pages)</td>
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