

## Course

# SNEE - Electrical Power Grids for Renewable Energy

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### ^ General information

Long name	Electrical Power Grids for Renewable Energy
Approving CModule	<a href="#">SNEE MaET</a>
Responsible	Prof. Dr. Eberhard Waffenschmidt Professor Fakultät IME
Level	Master
Semester in the year	summer semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr. Eberhard Waffenschmidt Professor Fakultät IME
Requirements	Basics of electrical Engineering, especially alternating current calculations with complex numbers and three phase systems
Language	German, English if necessary
Separate final exam	No

### ^ Lecture

#### Learning goals

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Knowledge

- The students name different grid topologies, components and are able to use terms related to electrical power grids.
- They consider their knowledge of relevant technical and legal requirements for the connection of decentralized generators to the power grid.
- They know different calculation methods for the analysis of electrical power grids and apply the suitable method for a particular problem.
- They consider the basics for the control of electrical power grids using suitable control methods.
- Summarizing it includes the following topics:
  - Grid topologies and components
  - Calculation and simulation of power grid
  - Fault management
  - Grid control
  - Gridconnection of decentralized generators

Based on these competencies the students perform project works (see "Projektarbeit").

## Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Tutorial (voluntary)	0

## Separate exam

### Exam Type

interview (discussion) about special issues in scenario, project assignment or literature research

### Details

oral exam (40% of the final grade)

using picture cards, which show content of lecture presentations.

This allows the testing of higher valued competences like analysis and judgement as well as the ability to put facts into a complex context.

### Minimum standard

Grade 4.0

## ^ Project

## Learning goals

### Skills

Based on the knowledge of the lectures the students perform a project. They create simulation models of electrical power grids working in teams of 3 to 4 persons. They analyze the simulation results according to frame conditions and evaluate the results along self generated goals.

Project topics are:

Future loads of electrical power grids due to

- Photovoltaics
- Electromobility

- Electrical heat usage
  - Electrical heat storages
- under different requirements as e.g. settlement areas
- city
  - suburban
  - rural

The project work is performed during the presence time with moderation of the lecturer and as homework.

## Expenditure classroom teaching

Type	Attendance (h/Wk.)
Project	2
Tutorial (voluntary)	0

## Separate exam

### Exam Type

working on projects assignment with your team e.g. in a lab)

### Details

Presentation of project results (30% of the final grade):

Each team presents its results in a mutual presentation. Each teammember contributes to the presentation. Individual grades will be assigned to each presenter.

And:

Writing a report about the project results (30% of the final grade):

The report is written by the whole team as a scientific paper with maximal 4 pages. A common grade will be assigned to all members of a team.

### Minimum standard

grade 4.0