

EE-603

**Transient and dynamic analysis of electric power systems**

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Cursus	Sem.	Type
Electrical Engineering		Opt.
Energy		Opt.

Language of teaching	English
Credits	3
Session	
Exam	Written
Workload	90h
<b>Hours</b>	<b>42</b>
Courses	34
TP	8
<b>Number of positions</b>	

**Frequency**

Every 2 years

**Remark**

Next time: Winter 2021

**Summary**

The learning outcome is to increase the knowledge of simulation methods and the role of computers in the management and the operation of electric power systems.

**Content**

- Dynamic phenomena:
  - Frequency range
  - Power system components modeling
  - General mathematical formulation
  - Transient stability: direct approach, time domain approach, ...
  - Small signal stability: eigenvalues, eigenvectors, participation factors, poorly damped modes, ...
  - Long term stability: load frequency control, automatic generation control, ...
  - Examples of applications
  
- Transient phenomena:
  - Sources of disturbances and transients in power systems.
  - Generalized transmission line theory for a multiconductor line
  - Parameters of a multiconductor transmission line
  - Effect of losses due to the ground finite conductivity and corona
  - Interaction with an external electromagnetic field
  - Solution methods in time and frequency domains (FDTD method and BLT equations)
  - Treatment of frequency dependence in a time domain algorithm
  - Treatment of nonlinearities in a frequency domain algorithm
  - Examples of application

**Learning Prerequisites****Recommended courses**

Power Systems, Electromagnetism