

### COURSE RECORD

Code	<b>ECE 655</b>
Name	<b>Transient in Power System</b>
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Fall-Spring
Type	Elective
Location	In Class
Prerequisites	ECE 652
Special Conditions	
Coordinator(s)	Assoc. Prof. Dr. Ahmet Onen
Webpage	
Content	<ul style="list-style-type: none"> <li>• Time Domain Simulation</li> <li>• Transformer Energisation</li> <li>• Capacitor Switching</li> <li>• Transient Recovery Voltage (TRV) Analysis</li> <li>• Overhead Line and Cable Models for EMT-Simulations</li> <li>• Line Switching</li> <li>• Lightning Transients</li> </ul>
Objectives	To learn principles of transient analysis, overvoltages and currents and how these effects on power systems. To simulate travelling waves and lightning transients and their effects on power system will be aim of the course.
Learning Outcomes	LO-1. learn the time domain simulation logic LO-2. learn the energization of transformer and inrush currents LO-3. learn the energization of capacitors and events behind that LO-4. learn how to calculate overvoltage and currents LO-5. learn to calculation of overvoltage on circuit breaker (TRV) LO-6. learn how to design cable and transmission line based on overvoltage LO-7. learn how to energize the transmission lines LO-8. learn how to behave during lighting transients
Requirements	Expected requirements of the course.
Reading List	Greenwood, Allan, "Electrical Transients in Power Systems", 2nd Edition, John Wiley and Sons, 1991.
Ethical Rules and Course Policy	Will be announced during the class.

### LEARNING ACTIVITIES

Activities	Number	Weight (%)
Lecture	3	25%
Group Works	8	25%
Presentations	7	25%
Site Visits	1	25%
	Total	100

### ASSESSMENT

Evaluation Criteria	Weight (%)
Quizzes	15%
Weekly Assignments	20%
Group Project Assignments & Presentations	10%
Attendance/Participation	05%
Final Exam/Submission	50%

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Total 100%

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For a detailed description of grading policy and scale, please refer to the website <https://goo.gl/HbPM2y> section 28.

**COURSE LOAD** *Please, use this one as a reference for your course*

Activity	Duration (hour)	Quantity	Work Load (hour)
In class activities	2	14	28
Lab	1	7	7
Group work	2	12	24
Research (web, library)	2	12	24
Required Readings	2	10	20
Pre-work for Presentation	2	7	14
Lab reports	1	7	7
<b>General Sum</b>			<b>124</b>

**ECTS: 4** (Work Load/25-30)

**CONTRIBUTION TO PROGRAMME OUTCOMES\***

	P01	P02	P03	P04	P05	P06
L01	1	3	4	5	4	3
L02	5	5	4	5	4	3
L03	3	4	2	2	4	1
L04	1	3	4	5	4	3
L05	5	5	4	5	4	3
L06	3	4	2	2	4	1
L07	5	5	4	5	4	3
L08	3	4	2	2	4	1

\* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

**WEEKLY SCHEDULE**

W	Topic	Outcomes
1	Fundamental knowledge of transient in power systems	L01, L02
2	Transformer Energisation Simulation of Inrush Current during transformer energization	L01, L02, L03
3	Capacitor Switching Ferroresonance and events after that	L01, L03
4	MIDTERM EXAM-1	
5	Calculation of overvoltage on circuit breaker (TRV) Calculation of overvoltage on circuit breaker (TRV)	L01, L02, L03
6	Overvoltages and current during short circuit in power systems	L04, L05
7	Overhead Line and Cable Models for EMT-Simulations	L05, L06
8	Overhead Line and Cable Models for EMT-Simulations	L04, L05
9	Overhead Line and Cable Models for EMT-Simulations	L06, L07
10	MIDTERM EXAM-2 or presentation of review	L07, L08
11	Overhead Line and Cable Models for EMT-Simulations and Energization	

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12	Overhead Line and Cable Models for EMT-Simulations and Energization	L04, L05
13	Lightning Transients	L01, L02
14	MIDTERM EXAM-3 or presentation of review	L01, L02
15	Lightning Transients	L01, L02

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Date  
22.05.2019