

**EEE3018 POWER DISTRIBUTION SYSTEMS 3+0+2 ECTS: 5**

<b>Year / Semester</b>	Spring (Fall for 100% English Program)
<b>Course Level</b>	Undergraduate 3rd year
<b>Compulsory / Elective</b>	Compulsory
<b>Department</b>	Electrical and Electronics Engineering
<b>Prerequisite</b>	Power Systems
<b>Education system</b>	Face to face
<b>Course Duration</b>	14 weeks – (3h theoretical + 2h lab) per week
<b>Faculty Member</b>	Prof. Dr. İsmail H. ALTAŞ
<b>Alternative Faculty Member</b>	None
<b>Language of Instruction</b>	English
<b>Internship</b>	None

**OBJECTIVES OF THE COURSE**

Having the students to get sufficient knowledge about power distribution networks, distribution system planning, load characteristics and load power concepts, distribution transformers, overhead line and cable characteristics, voltage drop and power loss calculations, capacitor applications, power quality, and distribution network design. Besides, having them to learn a basic knowledge in distributed networks and renewable energy.

**Learning Outcomes**

Upon successful completion of the course, the students will be able to :

	<b>CTPO</b>	<b>MEM</b>
LO - 1 : Distribution system planning	3,4	6
LO - 2 : Load characteristics and load power concepts	4	1
LO - 3 : Distribution transformers, overhead line and cable characteristics	2,3,4	1
LO - 4 : Voltage drop and power loss calculations	3,4	1
LO - 5 : Capacitor applications and power quality	3,4	1
LO - 6 : Distribution network design.	2,3,4,9	6
LO - 7 : Distributed networks and renewable energy.	2,3	3
LO - 8: Experimental tests of power distribution systems	5	4

*CTPO: Contribution to department program outcomes, MEM: Measurement and evaluation method (1: Written Exam, 2: Oral Exam, 3: Homework, 4: Laboratory Study/Exam, 5: Seminar / Presentation, 6: Term Paper / Project), LO: Learning Outcome.*

**Contents of the Course**

power distribution networks, distribution system planning, load characteristics and load power concepts, distribution transformers, overhead line and cable characteristics, voltage drop and power loss calculations, capacitor applications, power quality, and distribution network design. basics of distributed networks and renewable energy, and laboratory experiments in related topics.

## Teaching Plan

### Week Subject

Week 1	AC circuits, phasors, AC power and power measurement, transformer and transmission line models
Week 2	Distribution system planning, load characteristics and load power types
Week 3	Distribution transformers and pu concept
Week 4	Overhead line characteristics
Week 5	Power cable characteristics and lab experiment
Week 6	Types of distribution networks and lab experiment
Week 7	Voltage drop calculations and lab experiment
Week 8	Power loss calculations and lab experiment
Week 9	<b>Midterm exam</b>
Week 10	Distribution network design and lab experiment
Week 11	Distribution network design and lab experiment
Week 12	Capacitor applications and lab experiment
Week 13	Power quality and lab experiment
Week 14	Distributed networks and renewable energy and lab experiment
Week 15	Project evaluations and lab experiment
Week 16	<b>Final exam</b>

## Text Book / Course material

- İsmail H. Altaş, unpublished lecture notes

## Additional resources

- Turan Gönen, "Electric Power Distribution Engineering", CRC Press, 2014, 3ed.
- Theodore R. Bosela, "Introduction to Electrical Power System Technology", Prentice Hall, 1997
- Yetkin Saner, "Güç Dağıtımı I - Dağıtım Dizgeleri, Senkeron Generatör", Birsen Yayınevi.
- Yetkin Saner, "Güç Dağıtımı II - Dağıtım Transformatörleri", Birsen Yayınevi.
- Yetkin Saner, "Güç Dağıtımı III - Enerji Dağıtımı", Birsen Yayınevi.
- Yetkin Saner, "Güç Dağıtımı IV - Kısadevre Hesapları", Birsen Yayınevi.
- Yetkin Saner, "Güç Dağıtımı V - Kesit Hesapları", Birsen Yayınevi.
- Yetkin Saner, "Güç Dağıtımı VI - Ölçme ve Koruma", Birsen Yayınevi.
- Yetkin Saner, "Güç Dağıtımı VII - Topraklama Güvenlik", Birsen Yayınevi.
- Yetkin Saner, "Güç Dağıtımı VIII - Güç Koppanzasyonu", Birsen Yayınevi.
- Yetkin Saner, "Şehir Şebekeleri Elektrik Proje Uygulamaları", Birsen Yayınevi.
- Yetkin Saner, "YG/AG Elektrik Tesisleri Proje Uygulaması - Aygıtlar ve Malzemeler", Birsen Yayınevi.
- Yetkin Saner, "YG/AG Elektrik Tesisleri Proje Uygulamaları - Bağlama Modelleri", Birsen Yayınevi.
- Yetkin Saner, "Güç İletimi - Enerji Taşınması", Birsen Yayınevi.

## Evaluation Method

Method	Week	Date	Duration (Hour)	Contribution (%)
Midterm	9		2	25
Lab	5-15		2	15
Project+Homework	10-15		2	10
End of term exam	16		2	50

### Student Work Load and its Distribution

Type of work	Duration (hours pw)	Number of weeks
Lectures (face to face teaching)	3	14
extracurricular work	2	10
Preparation for the Midterm Exam	2	7
Midterm	2	1
Homework	1	2
Project	2	5
End of term exam	2	10
Other 1	2	1
<b>Total Work Load</b>	<b>16</b>	<b>50</b>