

## Faculty of Engineering & Technology

### Energy Systems

#### Information :

**Course Code :** EPR 341

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Electrical Engineering

#### Instructor Information :

Title	Name	Office hours
Professor	Hossam Eldin Abdallah Talaat	
Teaching Assistant	Mohammed Ashraf Abdulhamid Abdulfatah Seyam	

#### Area Of Study :

Upon successful completion of the course, the student should be able to:

1. Understand and differentiate between different energy resources.
2. Know the structure and performance of electrical transmission lines.
3. Identify the different protective schemes used in electrical power systems.

#### Description :

Energy resources and electric power generation, Power system structure: generation, transmission and distribution, Power system components: generators, transformers, transmission lines and circuit breakers. Fault analysis and Power flow.

#### Course outcomes :

##### **a.Knowledge and Understanding: :**

1 -	a-1- Demonstrate knowledge and understanding of the construction of electric machines
2 -	a-2- Demonstrate knowledge and understanding of the principles and theories of the characteristics of different types of generators and transformers
3 -	a-3-Explain the techniques of protections in power systems
4 -	a-4-Explain the power flow and stability of power systems

##### **b.Intellectual Skills: :**

1 -	b-1-Suggest solutions to control power output of synchronous machines
2 -	b-2-Compare different power flow methods of power systems
3 -	b-3-Modify the protection of different components of power systems

##### **c.Professional and Practical Skills: :**

1 -	c1-Calculate the transformer equivalent circuit parameters from tests data
2 -	c2-Suggest appropriate decisions for selecting the parameters of transmission lines
3 -	c3-Evaluate methods of protection in different components of power system

##### **d.General and Transferable Skills: :**

1 -	d1. Collaborate effectively within team.
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2 -	d2. Effectively manage tasks, time, and resources.
3 -	d3. Communicate effectively.

### **Course Topic And Contents :**

<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Introduction&Three-phase systems	5	3	2
Synchronous Alternators	12	6	6
Transformers	15	9	6
Transmission Lines	15	9	6
Protection	13	9	4
Power Flow	5	3	2
Fault Analysis	5	3	2
Stability	5	3	2

### **Teaching And Learning Methodologies :**

Interactive teaching (via lectures and tutorials)
Discussions and participation (via tutorials)
small group team work (via laboratories)

### **Course Assessment :**

<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
Final Written exam	40.00	15	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving with different techniques studied
Laboratory Tutorials	10.00	6	to assess the ability of implementing a simple electric circuit that shows knowledge and understanding of different technical issues.
Mid-term 1	15.00	7	to assess the skills of problem solving, understanding of related topics
Mid-term 2	15.00	11	to assess the skills of problem solving, understanding of related topics
Participations	10.00	14	
Quiz 1	5.00	5	to assess the skills of problem solving, understanding of related topics
Quiz 2	5.00	5	to assess the skills of problem solving, understanding of related topics

### **Recommended books :**

- 1- Theodore Wildi, "Electrical Machines, Drives and Power Systems", 6th Edition, Pearson 2005 (Text Book)
- 2- Stephen J. Chapman, "Electric Machinery Fundamentals", 5th edition BAE System Australia, 2012.
- 3- Hadi Saadat, "Power System Analysis", 2nd edition, McGraw Hill electrical and electronic engineering series, 2004.
- 4- Ruben D. Garzon, "High voltage circuit breakers: design and applications", Marcel Dekker, 2002.
- 5- William D. Stevenson, "Elements of Power System Analysis", McGraw Hill electrical and electronic engineering series, 4th edition, 1990.