FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

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	Said Fouad Mohamed Mekhemar	2
Teaching Assistant	TOAA ABDELSALAM ELSAYED MOHAMED	2
Teaching Assistant	Abeer Tharwat Said Awad	

Area Of Study :

- Develop the student's knowledge about nature and properties of different energy resources.
- Supply the students with basics about the structure and performance of electrical machines and transmission lines.
- Train the students to analyze the transmission lines and transformer problems as two port networks.
- Prepare the students to evaluate and classify different protective relays used for electrical power system protection.

Description :

Electrical energy resources, Magnetically coupled circuits, The per-unit system, Two-port networks, Three phase loads: advanced concepts, Power system structure: generation, transmission and distribution, Power system components: generators, transformers, transmission lines and circuit breakers.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Identify the construction of electric machines
2 -	Describe different two port networks showing how to use it for machines and transmission lines modeling.
3 -	Explain the techniques of protection in power systems
4 -	Summarize the different fault types showing its dangerous effects on power systems
b.Intellectual Skills: :	
1 -	Evaluate the per unit values of power system parts to extract the per unit impedance diagram.
2 -	Compare different types of faults as well as different protective schemes.
3 -	Analyze the transmission line and/or electrical machines to find the appropriate two port network model and parameters.
c.Professional and Practical Skills: :	
1 -	Select appropriate ranges for ammeters, voltmeters, and other measuring devices that are connected in a short circuit or open circuit test applied to electrical machines.
2 -	Perform experiments on single-phase transformer.
3 -	Prepare technical reports.

d.General and Transferable Skills: :	
1 -	Collaborate effectively within multidisciplinary team
2 -	Communicate effectively
3 -	Effectively manage tasks, time, and resources

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction & Two Port Networks	5	3	2
Fundamentals of Energy Systems	12	6	6
Fundamentals of Electrical Machines	15	9	6
Transmission Lines	15	9	6
Modeling of Transmission Lines and Electrical Machines as Two Port Networks	13	9	4
Concepts of Power System Protection	5	3	2
Introduction to Power Flow	5	3	2
Basics of Fault Analysis	5	3	2

Teaching And Learning Methodologies :

Interactive teaching/learning (via lectures and tutorials)
Discussions and participation (via tutorials)
Small group team work (via laboratories)

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	10.00		
Final Exam	40.00		
Lab Experiment	10.00		
Mid- Exam I	15.00		
Mid- Exam II	15.00		
Quizzes	10.00		

Recommended books :

1. Nava Raj Karki , Rajesh Karki , Ajit Kumar Verma , Jaeseok Choi , " Sustainable Power Systems ", Springer; 1st edition, 2017.
2. Stephen J. Chapman, "Electric Machinery Fundamentals", 5th edition BAE System Australia, 2012.
3. Hadi Saadat, "Power System Analysis", 3rd edition, McGraw Hill electrical and electronic engineering series, 2010.
4. OZA, " Power System protection &Switchgear", Tata McGraw-Hill Education, 2009.