

## Faculty of Engineering & Technology

### Electric Drives

**Information :**

**Course Code :** EPR 551

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Specialization of Electrical Power Engineering

**Instructor Information :**

Title	Name	Office hours
Professor	Hany Mohamed Hasanien Mohamed	4
Professor	Naggar Hassan Saad Hemdan	
Assistant Lecturer	Mohamed Abdallah Mahmoud Shaheen	5
Teaching Assistant	Abeer Tharwat Said Awad	
Teaching Assistant	Shahd Muhammed Anwer Muhammed Hamed	

**Area Of Study :**

Enable the students to identify the main components of modern electric drives systems.  
 Help the students comprehend the relation between the electric motor characteristics and the load characteristics  
 Help the students to analyze different methods that can be used to control the speed of DC and AC motors

**Description :**

Characteristics of Motors & Loads, Equation of Motion, Four quadrants for drives systems, Speed control of DC motors: armature voltage control - armature resistance control - flux control, Braking of DC motors: plugging . Á regenerative braking . Á dynamic braking, Speed control of DC motors using rectifiers and DC choppers, Speed control of induction motors: voltage control - frequency control - V/f control - rotor resistance - slip power recovery, Braking of induction motors, Speed control of special motors.

**Course outcomes :**

**a.Knowledge and Understanding: :**

1 -	Define the main components of modern electric systems
2 -	Identify the relation between the motor and load characteristics
3 -	Explain speed control methods for DC drives
4 -	Identify speed control methods for AC drives

**b.Intellectual Skills: :**

1 -	Analyze the performance of DC drives under different operating conditions
2 -	Select suitable methods for speed control of DC drives
3 -	Assess the performance of speed control methods for AC drive systems
4 -	Select suitable methods for speed control of AC drives

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

1 -	Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results.
2 -	Apply safe systems at work and observe the appropriate steps to manage risks
3 -	Perform experiments related to electric drives under different loading conditions.
4 -	Prepare technical reports.

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

1 -	Collaborate effectively within multidisciplinary team.
2 -	Work in stressful environment and within constraints.
3 -	Communicate effectively.
4 -	Effectively manage tasks, time, and resources.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Characteristics of Motors & Loads, Equation of Motion	5		
Review of DC motors	5		
Classical speed control and braking of DC motors	20		
Introduction	5		
Speed control of DC motor using power electronic converters	15		
Review of AC motors	5		
Speed control and braking of AC motors	20		

**Teaching And Learning Methodologies :**

Interactive lectures
Problem-based learning
Experiential learning
Report writing

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	5.00		
Final Exam	40.00		
Lab Exper.	10.00		
Mid- Exam I	15.00		
Mid- Exam II	15.00		
Participation	5.00		
Quizzes	10.00		

**Course Notes :**

No course notes are required

**Recommended books :**

- 1) M. H. Rashid. Power Electronics: Circuits, Devices, and Applications, 4th ed. Pearson Education Inc., 2013.
- 2) Mohamed A. El-Sharkawi, Fundamentals of Electric Drives, Cengage Learning, 2000
- 3) Syed A. Nasar and Ion Boldea, Electric Drives, 3rd Edition, CRC Press, 2016