Jordan University of Science and Technology

Faculty of Engineering

Electrical Engineering Department

EE740 Advanced Analysis Of Electrical Machines - JNQF Level: 9

Second Semester 2023-2024

Course Catalog
3 Credit Hours. Unbalanced duty of 3-phase transformers. Asymmetrical steady state duties of 3- phase synchronous generators. Unbalanced duty of induction machines. Transients of transformers: inrush current, sudden short circuit, mechanical forces at short circuit. Transients and the generalized theory of electrical machines. Transients and dynamics of DC and AC machines (synchronous and induction).
Teaching Method: Blended

Text Book	
Title	Analysis of Electric Machinery and Drive Systems
Author(s)	P. Krause, O. Wasynczuk, S. Sudhoff
Edition	2nd Edition
Short Name	Ref #1
Other Information	Wiley-IEEE Press, 2002

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Control of Electrical Drives	W. Leonhard	3rd Edition	Springer-Verlag, 2001
Ref #3	Electric Machinery	A. E. Fitzgerald, C. Kingsley, Jr., S. D. Umans	6th Edition	New York, McGraw-Hill. 2003
Ref #4	Dynamic Simulations of Electric Machinery: Using MATLAB/SIMULINK	C. Ong	1st Edition	Prentice Hall, New Jersey, 1998
Ref #5	AC Motor Control and Electrical Vehicle Applications	K. H. Nam	2nd Edition	CRC Press, 2018
Ref #6	Advanced Electrical Drives: Analysis, Modeling, Control	R.D. Doncker, D. W. Pulle & A. Veltman	2nd Edition	Springer, 2020

Instructor	
Name	**Dr. Ibrahim Allafi**
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Office Hours	
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Class Schedule & Room
Section 1: Lecture Time: Tue : 08:30 - 10:30 Room: LAB

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
The student will be able to demonstrate the practical implementation of the electromagnetic principles in energy conversion systems, such as electric machines and transformers, to examine their operational characteristics under balanced and unbalanced voltage sources. [1SO1] [1L9K1]	20%	Midterm Exam, Project, Final Exam
The student will be able to develop the dynamic model of DC and AC machines at different reference frames to examine their transient and steady-state performance. [1SO6] [1L9S1]	25%	Midterm Exam, Project, Final Exam
The student will be able to develop drive control schemes of DC and AC machines based on their dynamic models to examine their transient and steady-state characteristics under feedback control systems. [1SO6] [1L9S1]	25%	Midterm Exam, Project, Final Exam
The student will be able to develop observer models for sensorless control systems to examine the impact of their estimation errors on the operation of the drive systems. [1SO6] [1L9S1]	15%	Midterm Exam, Project, Final Exam
The student will be able to model the nonlinearities in the machine and the power conditioning units to compensate their impact on the drive performance. [1SO6] [1L9S1]	15%	Midterm Exam, Project, Final Exam

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
20					80	

Relationship to NQF Outcomes (Out of 100%)	
L9K1	L9S1
20	80

Evaluation	
Assessment Tool	**Weight**
Midterm Exam	25%
Project	25%
Final Exam	50%

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