

**ATTACHMENT 5.**

**Kingdom of Saudi Arabia**

**The National Commission for Academic Accreditation &  
Assessment**

**T6. Course Specifications  
(CS)**

## Course Specifications

Institution	Date
Najran University	8/11/1437
College/Department	

### A. Course Identification and General Information

1. Course title and code: Electrical Machines 325EE3			
2. Credit hours 3 ( 2 , 2 , 1 )			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Bachelor of Electrical Engineering			
4. Name of faculty member responsible for the course Dr. Ayman Taher Hindi			
5. Level/year at which this course is offered 7 th Level Forth year			
6. Pre-requisites for this course (if any) 212EE Electromagnetism ( 1 ), 214EE Electric Circuit Analysis			
7. Co-requisites for this course (if any)			
8. Location if not on main campus			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			

## B Objectives

1. What is the main purpose for this course?
1. Analyze Single-phase transformers, auto – transformers and three-phase transformers
2. Analyze three-phase induction machines
3. Calculate the performance and speed control of the three-phase induction machines
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

## C. Course Description (Note: General description in the form used in Bulletin or handbook)

<p><b>Course Description:</b></p> <p>Transformers (construction, operation of single-phase transformers, equivalent circuit, voltage regulation and efficiency, auto – transformers, three-phase transformers), AC machinery fundamentals, three-phase induction machines (construction, operation, equivalent circuit, performance calculations, starting of induction motors, speed control), small AC motors (single-phase induction motors, reluctance and hysteresis motors, universal motors, servo motors, stepper motors).</p>
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1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Review of principles of operation; construction; review of equivalent circuit, elements of a transformer.	Week 1	4
The ideal transformer, practical transformers, open circuit test, short circuit test, efficiency , regulation	2,3	8
Practical transformer, three-phase connections	4,5	8

Measurement in three-phase, auto-transformer, taps, instrument transformer, parallel operation.	6	4
Basic theory and construction of squirrel-cage and wound-rotor motor	7,8	8
Equivalent circuit, losses, power flow, efficiency.	9,10	8
Analysis of machine equations; speed/torque curves, starting performance, starting methods	11,12	8
Single phase machines, reluctance shaded-pole, universal, permanent magnet, servo motors, stepper motors.	13,14	8

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	28	14	28	None		70
Credit	2	1	2			3

3. Additional private study/learning hours expected for students per week.	5
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy			
On the table below are the five NQF Learning Domains, numbered in the left column.			
<b>First</b> , insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). <b>Second</b> , insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. <b>Third</b> , insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)			
Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Define operation principles of electrical machines.	Lecture	Exams
1.2			
2.0	Cognitive Skills		
2.1	Analyze fundamental characteristics of various	Lecture	Exams, Quiz

	types of machines.		
2.2	Evaluate equivalent circuit and characterize different electrical machines.	Lecture	Exams, HW, Quiz
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1			
3.2			
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Demonstrate experiments on machine operations.	Lab	Exams, Report, Practical
4.2			
<b>5.0</b>	<b>Psychomotor</b>		
5.1			
5.2			

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)

Course LOs #	Program Learning Outcomes (Use Program LO Code #s provided in the Program Specifications)								
	1.1	1.2		2.1		3.2		4.1	
1.1	√								
2.1				√					
2.2						√			
4.1								√	

6. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Quiz-1	3	2
2	Quiz-2	5	2
3	HW-1	2	1
4	Test-1	7	15
5	Test-2	13	15
6	Lab assessment	14	15

7	Final	End of semester	50
8			

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- Teaching staff are available weekly for all the students and can answer any query that rises, beside the students can email their enquiries to the main lecture. Beside students have Open general discussions with other class mates.
- 5 hours per week and can be arranged according to the student needs.

#### E Learning Resources

##### 1. List Required Textbooks

Stephen J Chapman, Electrical Machinery Fundamentals, Publisher: McGraw-Hill Higher Education, 2005, Fourth Edition.

##### 2. List Essential References Materials (Journals, Reports, etc.)

- Denis O'Kelly, Performance and Control of Electrical Machines, Publisher: Mc-Graw Hill Book Company, 1991
- Karsai, D Kerény, L Kiss, Studies in Electrical and Electronic Engineering 25, Large Power Transformers, Publisher: Elsevier, 1987
- A E Fitzgerald, Charles Kingsley, Stephen D Umans, Electric Machinery, Sixth Edition, Publisher: Mc-Graw-Hill Higher Education, 2002]
- Charles I Hubert, Electric Machines, Theory, Operation, Application, Adjustment and Control, Publisher: Macmillan Publishing Company, 1991
- Dino Zorbas, Electric Machines, Principles, Applications, and Control Schematics, Publisher: West Publishing Company, 1989

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. <a href="http://lib.nu.edu.sa/DigitalLibrary.aspx">http://lib.nu.edu.sa/DigitalLibrary.aspx</a>
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom, Laboratory with adequate daylight equipped with data projector
2. Computing resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
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<ul style="list-style-type: none"> <li>• Complete course evaluation questionnaire by the students.</li> <li>• Open discussion for the students to touch their weak and strong points in the subject.</li> <li>• Feeding back from the mid-term exam records.</li> </ul>
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• Written feedback from a classroom observation that details judgment on teaching.</li> <li>• Written feedback that details judgment on course materials such as syllabi, handouts and exams.</li> <li>• Written documentation that details teaching contribution to the department.</li> </ul>
<p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• Learning form students feedback</li> <li>• Learning from instructor and department feedbacks</li> <li>• Learning/Using various teaching methods (lecturing, discussions, workshops, exams...)</li> <li>• Learning/Using various teaching medias (projector, whiteboard, videos, educational visits )</li> </ul>
<p>4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)</p>
<p>5 Describe the planning arrangements for periodically reviewing course effectiveness and</p>



planning for improvement.

- Ongoing updating and improving (during the course).
- Annual updating and improving (during summers).

Name of Instructor: \_\_\_\_Dr. Ayman Hindi

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Signature: \_\_\_\_\_ Date Report Completed: \_8/11/1437

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Name of Course Instructor \_\_\_\_\_

Program Coordinator: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_