Electrical Machines

Basic Course Specification		
Course Title	**Course Code**	**Program on which the course is given**
Electrical machines	EE329T	Bachelor
Academic Year	**Specialization** (hr/week)	**Pre-Requisites**
2020 - 2021	• Theoretical (2) • Application (1) • Practical (2) • Credit (3Cr.)	EE239

Overall Course Objectives

- Provide non-electrical engineering students with basic understanding of the principles of operation, construction and applications of direct and alternating current machines and transformers.
- Understand the theory and concept of Electric Machines (AC & DC).
- Deriving equivalent circuit of electrical machines.
- Studying performance and characteristics of machines (AC & DC).

Course Learning Outcomes. By successful completion of the course each student will be able to:

Topic	Linking to PLOs	7th Week Assessment	12th Week Assessment	Class Activities	Final Exam
1) Apply electric and magnetic circuit solving principles to solve various electric and magnetic circuit configuration	**d,c, f**			x	x
2) Calculate the input, output characteristics of dc machines, transformers, three phase induction motor and synchronous Machine	**c,e**	x		x	x
3) Experiment in the laboratory with characteristics and parameters of dc machine, transformer, three phase induction motor and synchronous machine	**d, f**		x	x	x
4) Sketch the construction of dc machine and induction motor.	**d, f**			x	x

Course Content

Lec./ Week #	Topic	Hrs. #	Theoretical	Application	Practical
1	- Review electric circuits. - Review electric circuits.	5	2	1	2
2	- Magnetic circuits.	5	2	1	2
3	- DC Machines (1): DC machines: construction-applications-theory of operation.	5	2	1	2
4	- DC Machines (2): DC machines: equivalent circuit-excitation-voltage control.	5	2	1	2
5	- DC Machines (3): DC motors: starting-characteristics.	5	2	1	2
6	- DC Machines (4): DC motors: performance and speed control.	5	2	1	2
7	- **7th week exam** + Transformers (1): construction-applications.	5	2	1	2

Course Content					
Lec./ Week #	**Topic**	**Hrs. #**	**Theoretical**	**Application**	**Practical**
8	- Transformers (2): theory- equivalent circuits-tests.	5	2	1	2
9	- Transformers (3): voltage regulation- efficiency	5	2	1	2
10	- Three Phase Induction Motors (1): construction-applications.	5	2	1	2
11	- Three Phase Induction Motors (2): rotating magnetic field-theory of operation-equivalent circuit.	5	2	1	2
12	- **12th week** + 3-phase induction motor (3): characteristics-performance-starting.	5	2	1	2
13	- Synchronous Machine (1): construction-applications-equivalent circuit.	5	2	1	2
14	- Synchronous Machine (2): synchronous alternator: theory of operation-characteristics-Synchronization.	5	2	1	2
15	- Synchronous Machine (3): synchronous motor.	5	2	1	2
16	**Final Exam.**				
	Total Hours	**60**	**30**	**15**	**30**

Teaching & Learning Methods	Facilities Required for Teaching & Learning Methods
• Lectures • Tutorials • Assignments & sheets • Experiments	• White board and data show • Library • Electrical Laboratory

Students Assessment Methods	
Assessment Schedule	
Assessment#1	Week 7
Assessment#2	Week 12
Assessment#3	Class Activities
Assessment#4	Week 16

Grading Method		
7th Week Assessment	Written Exam	**30%**
12th week Assessment	Written Exam	**20%**
Laboratory Activities	Open discussion - Experiments	**10%**
Final Exam	Written Exam	**40%**
	Total	**100 %**

Staff Requirements	
Marine Chief Engineer/ Ph.D.	
Course Notes	**Essential Books**
Lecturer notes, sheets and experiments	Gerling, Dieter. *Electrical Machines*. Springer-Verlag Berlin An, 2015.

Recommended Books	**Periodicals and Publications**
B. S. Guru, "Electric Machinery and Transformers", Oxford Uni. Press, 2001	None
IMO References	
None	

Accreditation Bodies
*Egyptian Authority for Maritime Safety (EAMS)
*European Commission (EC)
*ISO (9001 – 2015) DNV-GL
*Central Evaluation and Accreditation Agency Hanover, Germany (ZEVA)
*Ministry of Education (KSA)
*Ministry of Higher Education (Greece)
*Ministry of Higher Education (Oman)
*Commission for Academic Accreditation (CAA), Ministry of higher Education (UAE)
*University of Plymouth, United Kingdom (dual degree)

Prepared by: Course Coordinator **Reviewed by: Head of Department**

Hamdy 17/12/2020

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