



MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering



Course Syllabus
Study Plan 2017: Communication Track

Course Code	Course Name	Credits	Contact Hours
0401375	Electric Machines	3	3 T

INSTRUCTOR/COORDINATOR

Name	Dr. Ziyad S. Almajali
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Office Hours	9:00-10:00 (Sun, Tues, Thurs)

TEXTBOOK

Title	Electric machinery fundamentals
Author/Year/Edition	S. Chapman/ 5 th edition / McGrawHill
Other Supplemental Materials	
Title	Principles of Electrical Machines and power electronics
Author/Year/Edition	P. C. Sen/2 nd edition/ John Wiley

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

This course is offered for the electrical engineering students communication track. To provide the fundamentals of electric machines, which are transformers, synchronous machines, induction machines and DC machines.

The students are introduced to principle of operations, constructions, and some analysis on steady state performance of the electric machines. The course also introduces special motors and their applications

B. Pre-requisites (P) or Co-requisites (C)

Electric Circuits (2) (0401212) (P)

C. Course Type (Required or Elective)

Required

SPECIFIC GOALS

A. Course Learning Outcomes (CLOs)

CLO1: The ability to understand the principles of operation of electrical machines [1].

CLO2: Ability to understand the fundamental characteristics of various types of machines [1].

CLO3: Understand the concept of equivalent circuit [1].

B. Student Learning Outcomes (SOs) Addressed by the Course

1	2	3	4	5	6	7
✓						

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Introduction to electric machines.	1	3
Electromagnetism: Magnetic field concepts; Magnetic circuits; Laws of electromagnetism	1	3
Electromagnetism: Faraday's Law, Hysteresis and Eddy currents	1	3
DC Generators and Motors: Construction, field excitation and armature reaction.	1	3
DC Generators and Motors: Classification, shunt, series and compound dc motors. Speed - torque characteristics,	1	3
DC Generators and Motors: motor starters, Speed control and power flow diagrams	1	3
Transformers: Ideal transformers; Induced voltages and currents, Practical transformers; Open and	1	3
Transformers: Short circuit tests; equivalent circuits, voltage regulation;	1	3
Transformers: efficiency; concepts of three phase transformers.	1	3
Synchronous Generators: Construction, equivalent circuits, phasor diagrams, voltage regulation.	1	3
Synchronous Motors: Principles of motor operation, starting of synchronous	1	3
Synchronous Motors: motors, power, losses and efficiency calculations. V-curves, phasor diagrams, power factor correction	1	3
Induction Motors: Three-phase Induction Motors: Rotating magnetic field, slip and rotor speed, equivalent circuits and phasor diagrams, speed control and speed regulation	1	3
Special machines	1	3

EVALUATION		
Assessment Tool	Due Date	Weight (%)
Mid Exam	According to the university calendar	30
Course Work (Homeworks, Quizzes, Projects, ...etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)		
	Relationship to program outcome	
ABET 1-7		
1.	✓	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2.		an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3.		an ability to communicate effectively with a range of audiences.
4.		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5.		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6.		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7.		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.