Philadelphia University
Course Outline

Course Title	**Small Electrical Machines, Electrical Micromachines**	**610488+610383 +610384**
Prerequisite	**Electrical Machines (1), Electromagnetic(1)**	**610381, 650241**
Text Book	**Principles of Electrical Machines and power Electronics, P.C.Sen, Second Edition , John Wiley & Sons,1997**	
Providing Dept.	**Electrical Engineering**	
Instructor	**Dr. Mahmoud Zeidan**	
Credit Hours	**3**	**Level** 4th year
Office hours	**9-10**	

Course Goals:
To understand the construction, operation and control of electrical machines used in Microsystems. Also, to make the student be familiar with the basics of open and close loop control of the electrical machines.

Time Schedule:

Duration:	16 weeks	**Lectures:**	3 hours / week
Tutorial:	----------	**Laboratories:**	----------

Objectives:
At completing this module the student should be able to:
1- Understand the basic components of machine control system.
2- Understand the construction and operation of machines applied in control system.
3- Understand the principles of sensing and controlling the speed and position of rotating and traveling actuators.

Course Contents

		Week
	1- Microsystems Components, Transducers (Sensors and Micro actuators).	3
	2- DC Machines: Construction, Principle of Operation, dc motors and their control.	3
	3- Synchronous Machines: Construction, Operation and Control.	3
	4-- Servomotors, DC and AC Servomotors	
	5- Brushless and PM dc motors: Construction, Operation and Control.	3
	6- Stepping Motors: Construction, Operation and Control.	2
	7- Linear Motors: Construction, Operation and Control.	2

Mode of Assessment

1	**First Exam**	**20%**
2	**Second Exam**	**20%**
3	**Reports\Homeworks\ and or Projects.**	**10%**
4	**Final Exam)**	**50%**

References

1 JW Gardner, " Microsensors: Principles and Applications", John Wiley & Sons,1994.
2 T. jebhi & S.Naeamories, " Permanent- Magnet and Brushless DC Motors', Clarendon Press, Oxfird,1985.
3 P. Acanley," Stepping Motor: A Guide to Modern Theory and Practice', Peter Peregrines Ltd,1982
4 S.B. Dewan , G.R.Steman, A.Straughen', Power Semiconductor Drives, John Wiley & Sons,1984