

## EE 422 Electrical Machines (3)

### COURSE INFORMATION

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Lab.	
EE 322 -	4	7	2	2	2	3

### COURSE AIM

To investigate the different aspects of three phase transformers.  
 To study the generation of A.C. voltage from synchronous generators.  
 To study the characteristics of synchronous motors and their applications.

### COURSE WEEKLY CONTENTS

- 1 Synchronous generator construction
- 2 EMF & Equivalent circuit
- 3 Power equation and efficiency calculation for the synchronous generators
- 4 Load angle definition and operation stability limits
- 5 Voltage regulation in synchronous generators
- 6 Synchronization, parallel operation and load sharing of synchronous generators
- 7 Automatic voltage regulation and excitation techniques + Midterm Exam
- 8 Synchronous Motor V-curves
- 9 Starting methods of the synchronous motors
- 10 Saliency effect in synchronous machines
- 11 Synchronous reluctance motor
- 12 Permanent magnet synchronous generator construction, theory of operation, equivalent circuit and governing equations
- 13 Permanent magnet synchronous generators applications
- 14 Synchronous machine rating selection
- 15 Field testing and maintenance requirements

### STUDENT GRADING & ASSESSMENT

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	20 Midterm	←	10	M A R K S		→	30
To be freely distributed among possible assessments							
8 to 12	←		20	M A R K S		→	20
13 to 15	←		10	M A R K S		→	10
16 or 17	40 Final						40
<b>Total</b>	<b>Exams</b>	<b>Assign.</b>	<b>Quizzes</b>	<b>Reports</b>	<b>Present.</b>	<b>Lab.</b>	100

### REFERENCES

Textbook Stephan J. Chapman, "Electric Machinery Fundamentals" Mcgraw-Hill  
 Other C. Hubert, "Electric Machines" Maxwell Macmillan.