



### A. Basic Information

**Course Title:** Electrical machine

**Code:** EP312

**Lecture:** 4

**Tutorial:** 2

**Practical:** -

**Total:** 6

**Program on which the course is given:** BSc Electrical Engineering (Electrical Power and machines)

**Major or minor element of program:** NA

**Department offering the program:** Electrical Engineering Department

**Department offering the course:** Electrical Engineering Department

**Academic year / level:** Third Year / First Semester

**Date of specifications approval:** 10/5/2006

### B. Professional Information

#### 1. Overall aims of course

By the end of the course the students will be able to:

- Understand the construction of ac machine ,
- study the different types of ac windings
- study EMF, MMF of ac machine and its harmonics
- Supply the graduates with sufficient information about three phase synchronous and induction machines)

#### 2. Intended Learning outcomes of Course (ILOs)

##### a. Knowledge and Understanding:

- a1) Concepts and theories of mathematics and sciences, appropriate to the discipline
- a3) Characteristics of engineering materials related to discipline
- a4) Principles of design including elements design, process and/or a system related to specific disciplines
- a5) Methodologies of solving engineering problems, data collection interpretation



- a8) Current engineering technologies as related to disciplines
- a13) Analytical and computer methods appropriate for electrical power and machines engineering
- a14) Design methods and tools for electrical power and machines equipment and systems
- a18) Theories and techniques for calculating short circuit, motor starting and voltage drop

**b. Intellectual Skills**

- b2) Select appropriate solutions for engineering problems based on analytical thinking
- b3) Think in a creative and innovative way in problem solving and design
- b4) Combine, exchange, and assess different ideas, views, and knowledge from a range of sources
- b5) Assess and evaluate the characteristics and performance of components, systems and processes
- b7) Solve engineering problems, often on the basis of limited and possibly contradicting information
- b11) Analyze results of numerical models and appreciate their limitations
- b12) Create systematic and methodic approaches when dealing with new and advancing technology
- b13) Identify and formulate engineering problems to solve problems in the field of electrical power and machines engineering

b14) Analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical power and machines

**C. Professional and Practical Skills**

- c1) Apply knowledge of mathematics, science, information technology, design, business context and engineering practice to solve engineering problems
- c5) Use computational facilities and techniques, measuring instruments, workshops and laboratories equipment to design experiments, collect, analyze, and interpret results
- c7) Apply numerical modeling methods to engineering problems
- c11) Exchange knowledge and skills with engineering community and industry

**d. General and Transferable Skills**



- d1) Collaborate effectively within multidisciplinary team  
d3) Communicate effectively

### 3. Contents

No	Topic	No of hours	ILOs	Teaching / learning methods and strategies	Assessment method
1	Construction of three-phase machines	6	a1, a3, b2, b3, c2, c5	Presentation board, computer and data show	Home Assignments, Quizzes
2	Winding of alternating current machines	6	a5, a8, b4, b5, c5, c7	Presentation board, computer and data show	Home Assignments, Quizzes
3	double-layer winding	6	a8, a13, b5, b7, c1, c7	Presentation board, computer and data show	Home Assignments, Quizzes
4	double-layer winding	6	a14, a18, b12, b13, c7, c11	Lectures	Home Assignments, Quizzes
5	EMF of ac machines and its harmonics	6	a18, b12, b13, c7, c11	Lectures	Home Assignments, Quizzes
6	MMF of ac machines	6	a18, b14, c11	Lectures	Home Assignments, Quizzes
7	Synchronous machines	6	a1, a3, b2, b3, c2, c5	Presentation board, computer and data show	Home Assignments, Quizzes
8	Mid term exam				
9	Synchronous Generator	6	a8, a13, b5, b7, c1, c7	Lectures	Home Assignments, Quizzes
10	Synchronous motor	6	a18, b14, c11	Lectures	Home Assignments, Quizzes



11	Induction machines	6	a4, a5, b5, b7	Lectures	Home Assignments, Quizzes
12	Induction motor	6	a14, a18, b12, b13, c7, c11	Lectures	Home Assignments, Quizzes
13	Induction generator	6	a8, a13, b5, b7, c1, c7	Lectures	Home Assignments, Quizzes
14	Building up of the voltage and voltage regulation	6	a4, a5, b5, b7	Lectures	Home Assignments, Quizzes
15	Final exam				
16					

#### 4. Teaching and Learning Methods

Lectures  
Class activity  
Case study  
Assignments / homework

#### 5. Student Assessment Methods

Assignments to assess knowledge and intellectual skills  
Quiz to assess knowledge, intellectual and professional skills  
Mid-term exam to assess knowledge, intellectual, professional and general skills  
Oral exam to assess knowledge and intellectual skills  
Final exam to assess knowledge, intellectual, professional and general skills

#### 6. Assessment schedule

Assessment 1 on weeks 2, 5, 9, 11  
Assessment 2 Quizzes on weeks 4, 6, 10, 12  
Assessment 3 Mid-term exam on week 8  
Assessment 4 Final exam on week 15



### 7. Weighting of Assessments

Mid- Term Examination	10%
Final- Term Examination	60%
Oral Examination	00%
Practical Examination	00%
Semester Work	20%
<u>Other</u>	<u>10%</u>
Total	100%

### 8. List of References

#### 8.1 Course Notes

Prepared by instructor

#### 8.2 Essential Books (Text Books)

Lecture material and experimental sheets

#### 8.3 Recommended Books

- Course notes by Prof Dr Mohsen Z El -sherif...
- MG Say, "Alternating current machines"
- Hindmarch, "Electrical machines and their applications"
- AEFitzgeraled, "Electrical machinery"
- Alexander S Langsdrof, " Theory of alternating current machinery"
- M, Kostenko andLPiotrovsky, " ELECTRICAL MACHINES"



8.4 Periodicals Web sites, etc

Researchcom, www Googlecom

**9. Facilities Required for Teaching and learning**

Presentation board, computer and data show

Laboratory

**Course coordinator:** Prof Dr MOHSEN Z EL-SHERIF  
**Course instructor:** Dr SAMIA MANSOUR  
**Head of department:** Prof Dr Mousa Abd-allah

7/ 12 / 2011