



Faculty of  
Engineering at  
Shoubra

## Model No.12

# Course Specifications : Electrical power and Machines

**University :** Benha university

**Faculty :** Faculty of Engineering at Shoubra

**Department :** Electrical Engineering Department

### 1- Course Data

Course Code : EPE381      Course Title : Electrical power and Machines      Study Year : Third Year

Specialization :

Teaching Hours:

Lecture : 3

Tutorial : 1

Practical :

### 2- Course Aim

For students undertaking this course, the aims are to:

- 2.1- Describe the basic principles of Power Engineering.
- 2.2- Demonstrate the basic principles of Electromagnetism.
- 2.3- • Analyze the behavior of D.C. Machines and Electrical Transformers.

### 3- Intended Learning Outcomes of Course (ILOS)

#### a- Knowledge and Understanding

On completing this course, students will be able to:

- a- 1 - know concepts and theories of mathematics and sciences, appropriate to electrical power and machines. (a1)
- a- 2- know basics of design and analyzing electronic engineering systems, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation. (a17)
- a-3-Demonstrate topics related to Electromagnetism.(a11)
- a-4- Illustrate professional ethics and impacts of Electromagnetism on society and environment.(a13)

#### b- Intellectual Skills

At the end of this course, the students will be able to:

- b- 1 -Select appropriate solutions for power engineering problems based on analytical thinking. (b3)
- b- 2 - Assess and evaluate the characteristics and performance of D.C machines and electrical transformers.(b6)
- b- 3 - Develop innovative solutions for the practical D.C machines.(b14)

#### c- Professional Skills

On completing this course, the students are expected to be able to:

- c- 1 –Use knowledge of mathematics, science, information technology, design, business context and engineering practice to solve power engineering problems. (c1)
- c- 2 - Merge the power engineering knowledge and related feedback to improve design, product and/or services. (c2)
- c- 3 - Apply computational facilities and techniques, measuring instruments, workshops and laboratories equipment to design Electromagnetism experiments, collect, analyze, and interpret results. (c5)
- c- 4 - Use appropriate mathematical methods of Electromagnetism. (c13)
- c- 5 - Identify appropriate specifications for electrical power devices and machines. (c18)

#### d- General Skills

At the end of this course, the students will be able to:

**d- 1 -** To work in stressful environment and within constraints. (d2)

#### 4- Course Contents

No.	Topics	No of hour
1	Electrical D.C. Machines, Classifications, Magnetic Circuit, Electro Motive Force, Armature Reaction, Commutation.	12
2	Electric D.C. Motor, Excitation Methods, Magnetic Curve, Torque, Speed, Starting of Motion, Characteristics, Speed Control.	8
3	3- Electric D.C. Generator, Parallel Operation, Losses and Efficiency.	8
4	4 - Electromagnetism, Theory of Magnetism, Magnetic Circuits, Fringing and Leakage, Analogy between magnetic and electric circuits, Magnetic Core Losses (Hysteresis and Eddy current).	4
5	5- Transformer, E.M.F. Equation, No-Load and On Load, Phasor Diagrams, Equivalent Circuit, Referred Impedance, Voltage Regulation, Efficiency, Open- and Short-Circuit Tests, Auto- and Current-Transformer, Three-phase Transformer Connections.	8
6	Elect. Energy Generation, Power stations, Load Curves.	8
7	Corona, Insulators, Electrical and Mechanical Design, D.C. and A. C. Distributions.	4

#### 5- Teaching and Learning Methods

- 5.1- modified Lectures
- 5.2- Class activity
- 5.3- Case study
- 5.4- Assignments / homework

#### 6- Teaching and Learning Methods of Disables

- 6.1 – power point & data show

#### 7- Student Assessment

##### a- Student Assessment Methods

1	• Assignments to assess To assess knowledge and intellectual skills.
2	Quiz to assess • To assess knowledge, intellectual .
3	• Mid-term exam to assess •To assess knowledge, intellectual and general skills.
4	• Final exam to assess •To assess knowledge, intellectual.

##### b- Assessment Schedule

No.	Assessment	Week
1	• Assignments	3, 5, 10, 12, 13
2	Assessment 2 Quizzes	4, 6, 9, 11,
3	Assessment 3 Mid-term exam	7

##### c- Weighting of Assessments

Assessment	Weight
Mid_Term Examination	20 %
Final_Term Examination	70 %
Oral Examination	0 %
Practical Examination	0 %
Semester work	5 %
Other types of assessment	5 %
Total	100 %

#### 8- List of References

##### a- Course Notes

Course notes prepared by instructor. By Prof. Dr. Mohamed Moenes M. Salama , Dr. Samia Mansour

##### b- Recommended Books

1- M. G. Say, The Performance and Design of Alternating Current Machines, Pitman Paperbacks..

- 2 -M. G. Say, Direct Current Machines, Pitman Book Limited, London,128 Long Acre, 1982
- 3- C.L. Wadhwa, Electrical Power Systems, Wiley Eastern Limited.
- 4- " Electrical Machines " , A draper, Kyodo Shing Loong Printing Industries, 1978 , Singapore.
- 5- "Fundamentals of Electric Circuits", David Bell, Prentice / Hall International Editions, 1981
- 6- William D. Stevenson, "Elements of Power System Analysis", McGraw-Hill, International Student Edition
- 7- A.T. Starr, "Generation, Transmission and Utilization of Electrical Power", Pitman Publishing
- 8- S. L. Uppal, "Electrical Power", Khanna Publishers, Delhi

#### **c- Web Sites**

- 1- - [en.wikipedia.org/wiki](http://en.wikipedia.org/wiki)
- 2- - [www.allaboutcircuits.com/vol\\_1/](http://www.allaboutcircuits.com/vol_1/)
- 3- - [www.answers.com/topic](http://www.answers.com/topic)
- 4- - [www.wisc-online.com/objects](http://www.wisc-online.com/objects)
- 5- - [www.absoluteastronomy.com/topics](http://www.absoluteastronomy.com/topics)

**- Course Coordinator : Mohamed Moenes Mohamed Salama**

**Dr. Ahmed Mohamed Hassan**

#### **Course Instructor**

**- Head of Department : Prof. Dr. SayedAboo-Elsood Ward**



Faculty of  
Engineering at  
Shoubra

## Model No.11A

### Course Specifications : Electrical power and Machines

**University :** Benha university

**Faculty :** Faculty of Engineering at Shoubra

**Department :** Electrical Engineering Department

#### Matrix of Knowledge and Skills of the course

N o.	Topics	week	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
1	Electrical D.C. Machines, Classifications, Magnetic Circuit, Electro Motive Force, Armature Reaction, Commutation.	1,2,3	a.1, a.2,a3	b.3	c.1, c.2, c.35	
2	Electric D.C. Motor, Excitation Methods, Magnetic Curve, Torque, Speed, Starting of Motion, Characteristics, Speed Control.	4,5	a.1, a.2	b.3.	c.1, c.2, c.3	
3	3- Electric D.C. Generator, Parallel Operation, Losses and Efficiency.	6,7	a.1, a.2	b.3.	c.1, c.2, c.3	
4	4 - Electromagnetism, Theory of Magnetism, Magnetic Circuits, Fringing and Leakage, Analogy between magnetic and electric circuits, Magnetic Core Losses (Hysteresis and Eddy current).	9	a.1, a.2,a.3	b.1, b.2, b.3	c.1, c.2	
5	Midterm exam	8	a.1, a.2,a.4	b.1, b.2, b.3		d.1
6	5- Transformer, E.M.F. Equation, No-Load and On Load, Phasor Diagrams, Equivalent Circuit, Referred Impedance, Voltage Regulation, Efficiency, Open- and Short-Circuit Tests, Auto- and Current-Transformer, Three-phase Transformer Connections.	10,11	a.2	b.3	c.1, c.2, c.3, c.4, c.5	
7	Elect. Energy Generation, Power stations, Load Curves.	12,13	a.2	b.3	c.1, c.2, c.3, c.4, c.5	
8	Corona, Insulators, Electrical and Mechanical Design, D.C. and A. C. Distributions.	14	a.2,a.4	b.3	c.1, c.2, c.3, c.4, c.5	
9	Final exam	15	a.1, a.2	b.1, b.2, b.3		d.1

**- Course Coordinator :** Dr. Mohamed Moenes Mohamed Salama

**Course Instructor**

**Dr. Ahmed Mohamed Hassan**

**- Head of Department :** Prof. Dr. SayedAboo-Elsood Ward

## Matrix of course content and ILO's

**Course Title:** Electrical power and Machines

**Code:** EPE 381

**Lecture:** 3

**Tutorial:** 1

**Practical:** -

**Total:**4

**Program on which the course is given:** third year Electrical Engineering

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

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

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

**Academic year / level:** **third** Year 2014-2015

**Date of specifications approval:** 20/6/2010

Course content	a1	a2	a3	a4	b1	b2	b3	c1	c2	c3	C4	C5	d1
Electrical D.C. Machines, Classifications, Magnetic Circuit, Electro Motive Force, Armature Reaction, Commutation.	✓	✓	✓	✓			✓	✓	✓	✓			
Electric D.C. Motor, Excitation Methods, Magnetic Curve, Torque, Speed, Starting of Motion, Characteristics, Speed Control.	✓	✓					✓	✓	✓	✓			
3- Electric D.C. Generator, Parallel Operation, Losses and Efficiency.	✓	✓		✓			✓	✓	✓	✓			
4 - Electromagnetism, Theory of Magnetism, Magnetic Circuits, Fringing and Leakage, Analogy between magnetic and electric circuits, Magnetic Core Losses (Hysteresis and Eddy current).	✓	✓	✓		✓	✓	✓	✓	✓				
5- Transformer, E.M.F. Equation, No-Load and On Load, Phasor Diagrams, Equivalent Circuit, Referred Impedance, Voltage Regulation, Efficiency, Open- and Short-Circuit Tests, Auto- and Current-Transformer, Three-phase Transformer Connections.		✓					✓	✓	✓	✓	✓	✓	
Elect. Energy Generation, Power stations, Load Curves.		✓		✓			✓	✓	✓	✓	✓	✓	
Corona, Insulators, Electrical and Mechanical Design, D.C. and A. C. Distributions.		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓

## Matrix of course aims and ILO's

Course Code : EPE381

Course Title : Electrical power and  
Machines

Study Year : Third Year

Specialization :

Teaching Hours:

Lecture : 4

Tutorial : 2

Practical :

Date of specifications approval: 20/6/2010

Course Aims	ILO a's				ILO b's			ILO c's					ILO d's
	1	2	3	4	1	2	3	1	2	3	4	5	1
Understand the basic principles of Power Engineering	✓	✓	✓				✓	✓	✓	✓			
Understand the basic principles of Electromagnetism.	✓	✓		✓	✓	✓	✓	✓	✓				
Analyze the behaviour of D.C. Machines and Electrical Transformers		✓		✓			✓	✓	✓	✓	✓	✓	✓

**Course Coordinator : Dr. Mohamed Moenes Mohamed Salama**

**Dr. Ahmed Mohamed Hassan**

**Head of department: Prof. Dr. Sayed A. Ward**