A. Basic Information

Course Title: Power and electrical Machines **Code**: EP381
Lecture: 3 **Tutorial**: 1 **Practical**: - **Total:** 4
Program on which the course is given: B.Sc. Electrical Engineering (Communications)
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 / **Second** 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:

1- Understand the basic principles of Power Engineering.
2-Understand the basic principles of Electromagnetism.
3- Analyze the behaviour of D.C. Machines and Electrical Transformers.

2. Intended Learning outcomes of Course (ILOs)

a. Knowledge and Understanding:

a.1) Concepts and theories of mathematics and sciences, appropriate to the discipline.
a.14) Basics of design and analyzing electronic engineering systems, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation.

b. Intellectual Skills

b.2) Select appropriate solutions for engineering problems based on analytical thinking.
b.5) Assess and evaluate the characteristics and performance of components, systems and processes.
b.13) Develop innovative solutions for the practical industrial problems.

c. Professional and Practical Skills

c.1) Apply knowledge of mathematics, science, information technology, design, business context and engineering practice to solve engineering problems.
c.2) Professionally merge the engineering knowledge, understanding, and feedback to improve design, product and/or services.
c.5) Use computational facilities and techniques, measuring instruments, workshops and laboratories equipment to design experiments, collect, analyze, and interpret results.
c.13) Use appropriate mathematical methods or IT tools.
c.17) Identify appropriate specifications for required devices.

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d. General and Transferable Skills

d.2) Work in stressful environment and within constraints.
d.7) Search for information and engage in life-long self learning discipline.

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3. Contents

No	Topic	No. of hours	ILOs	Teaching / learning methods and strategies	Assessment method
1	Electrical D.C. Machines, Classifications, Magnetic Circuit, Electro Motive Force, Armature Reaction, Commutation.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Mid-term exam Final exam

2	Electrical D.C. Machines, Classifications, Magnetic Circuit, Electro Motive Force, Armature Reaction, Commutation.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Mid-term exam Final exam
3	Electrical D.C. Machines, Classifications, Magnetic Circuit, Electro Motive Force, Armature Reaction, Commutation.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Mid-term exam Final exam
4	Electric D.C. Motor, Excitation Methods, Magnetic Curve, Torque, Speed, Starting of Motion, Characteristics, Speed Control.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Mid-term exam Final exam
5	Electric D.C. Motor, Excitation Methods, Magnetic Curve, Torque, Speed, Starting of Motion, Characteristics, Speed Control.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Mid-term exam Final exam
6	3- Electric D.C. Generator, Parallel Operation, Losses and Efficiency.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments /	Assignments Quizzes Mid-term exam

				homework	Final exam
7	3- Electric D.C. Generator, Parallel Operation, Losses and Efficiency.		a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Mid-term exam Final exam
8	Mid-Term Exam				
9	Electromagnetism, Theory of Magnetism, Magnetic Circuits, Fringing and Leakage, Analogy between magnetic and electric circuits, Magnetic Core Losses (Hysteresis and Eddy current).	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Mid-term exam Final exam
10	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.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Final exam
11	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.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Final exam
12	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.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Final exam
13	Elect. Energy Generation, Power stations, Load Curves.	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5, c.13, c.17, d.2, d.17	Lectures Class activity Case study Assignments / homework	Assignments Quizzes Final exam
14	Corona, Insulators, Elecrical and Mechanical	4	a.1, a.14, b.2, b.5, b.13, c.1, c.2, c.5,	Lectures Class activity	Assignments

	Design, D.C. and A. C. Distibutions.		c.13, c.17, d.2, d.17	Case study Assignments / homework	Quizzes Final exam
15	Final Exam				
16					

4. Teaching and Learning Methods

Lectures
Class activity
Case study
Assignments / homework

5. Student Assessment Methods

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

6. Assessment schedule

Assessment 1 on weeks 3, 5, 7, 10, 12, 13
Assessment 2 Quizzes on weeks 2, 4, 6 , 9, 11, 14
Assessment 3 Mid-term exam on week 8
Assessment 4 Final exam on week 15

7. Weighting of Assessments

05% Home assignments
05% Quizzes
20% Mid-term examination

70% Final-term examination

100% Total

8. List of References

8.1 Course Notes

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

8.2 Essential books

- M. G. Say, The Performance and Design of Alternating CurrentMachines, Pitman Paperbacks.
- M. G. Say, Direct Current Machines, Pitman Book Limited, London,128 Long Acre, 1982.
- C.L. Wadhwa, Electrical Power Systems, Wiley Eastern Limited.

8.3 Recommended books

- " Electrical Machines " , A draper, Kyodo â€“ Shing Loong Printing Industries, 1978 , Singapore.
- “Fundamentals of Electric Circuits”, David Bell, Prentice / Hall International Editions, 1981.
- William D. Stevenson, “Elements of Power System Analysis”, McGraw-Hill, International Student Edition.
- A.T. Starr, “Generation, Transmission and Utilization of Electrical Power”, Pitman Publishing
- S. L. Uppal, “Electrical Power”, Khanna Publishers, Delhi.
- G. R. Nagpal, “ Power Plant Engineering”, Khanna Publishers, Delhi, 6.

9. Facilities required for teaching and learning

Lecture room equipped with overhead projector

Presentation board, computer and data show Laboratory

Course coordinator: Dr. Prof. Dr. Mohamed Moenes M. Salama , Dr. Samia Mansour

Course instructor: Dr. Prof. Dr. Mohamed Moenes M. Salama

- **Head of Department:** Prof. Dr. Mousa A. Abd-Allah **Date:** March 19, 2012