Course Specifications – Electrical Machines E361

University: Benha University
Faculty: Benha Faculty of engineering

Course specifications
Program(s) on which the course is given: Electrical Engineering Technology Dep. (Electrical Power & Machines Branch)
Major or minor element of programs: Major
Department offering the program: Electrical Engineering technology Dep.
Department offering the course: Electrical Engineering technology Dep.
Academic year / Level: Third year
Date of specification approval: 2008

A- Basic Information
Title: Electrical Machines
Code: E361
Credit Hours: N.A.
Lecture: 2
Tutorial: 1
Practical: 1
Total: 4

B- Professional Information
1 - Overall aims of course
Upon successful completion of this course, the student should be able to demonstrate any type of the Transformers and Electrical Machines such as: Basics of electromagnetic circuits, single phase transformers, three-phase transformers, and DC-machines. Different Practical Systems for Transformers, and DC-Machines and their Overall Control Systems were declared.

2- Intended Learning Outcomes of course (ILOs)
a. Knowledge and understanding:
Review the following items:
  a.1 The different main circuits of the transformers and DC machines
  a.2 The general control systems used for any type of transformers and electrical machines including testing for parameters and different control methods.
  a.3 The MatLab and Pspice software packages or any up-to-date suitable package.

b. Intellectual skills
By the end of this course, the student should be able to:
b.1 Study of real Electrical Machines Systems and their control.

b.2 Review of the electromagnetic circuits and transformers.

c- Professional and practical skills

By the end of this course, the student should be able to:

c.1 Use basic instruments that measure and control industrial quantities.

c.2 Perform simple Lab experiments on the transformers and DC Machines.

c.3 Extract information from collected data in the lab.

d- General and transferable skills

By the end of this course, the student should be able to:

d.1 Work cooperatively and effectively in a group,

d.2 Find information independently.

3- Contents

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<tr>
<th>Topic</th>
<th>Lecture</th>
<th>Hours</th>
<th>Tutorial</th>
<th>Hours</th>
<th>Practical</th>
<th>Hours</th>
<th>Total Hours</th>
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<tr>
<td>Review of the electromagnetic circuits</td>
<td>2</td>
<td>4</td>
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<tr>
<td>Single Phase Transformers operation, construction, phasor diagrams</td>
<td>2</td>
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<td>and equivalent circuits.</td>
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<td>Transformer Losses, efficiency, and Tests</td>
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<td>Inrush current, Auto transformers, and parallel operation</td>
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<td>Three phase transformers, harmonic suppressions in 3-phase connections; CT and VT.</td>
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<td>DC machines operation, construction, diagrams and equivalent circuits.</td>
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Motor performance using equivalent circuits; expressions of power and torque; losses and efficiency calculations

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Classification of DC-Machines characteristics; and its applications

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Total numbers 15 30 15 15 15 15 60

4- Teaching and learning methods
Lectures,
Tutorials,
Practice in Laboratories,
Internet collected information and Self-study projects.

5- Student assessment methods
Written exams (Final and Midterm), assignments and quizzes to assess knowledge and understanding, solving problems skills and interpretation capabilities of physical phenomena.
Oral exams to assess the abilities of discussing physical concepts.
Practical exam to assess measuring and professional skills.

Assessment schedule
Quiz 1 .......................... Week No. 5
Midterm .......................... Week No. 10
Quiz 2 .......................... Week No. 12
Oral and Practical exam......... Week No. 14
Final written exam ............. Week No. (According to Exam-Plan)

Weighting of assessments
Mid-term examination 10%
Oral and Practical examination 20%
Semester work 10%
Final-term examination 60%
Total 100%

6- List of references
6. a Lecture notes
6. b Lab notes
6. c Recommended books
1- Electrical Machines, Theory, Operations, Adjustment, and Control.
2- Electric Machinery and Power System Fundamentals.
3- Any other Suitable Books on the Electrical Machines.

7- Facilities required for teaching and learning
   a- Lecture rooms
   b- Tutorial section rooms
   c- Experimental Labs
   d- Computer Labs
   e- Virtual simulation programs

Course coordinator: Dr. Abdel-Nasser Nafeh.

Head of Department: Ass. Prof. Ghada Amer.

Date: 5/2/2009