Course Specifications

University: Benha University
Faculty: Benha Faculty of engineering

Course specifications

Programme(s) on which the course is given: Electrical Control
Major or minor element of programmes: Major
Department offering the programme: 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: Field Theory in Electrical Machines
Code: E312
Credit Hours: N.A.
Lecture: 2
Tutorial: 2
Practical: 0
Total: 4

B- Professional Information

1 - Overall aims of course

By the end of this course the, the student will gain the following;

- Understand the MMF of Distributing Winding..
- Be able to Induction machines.
- Know Synchronous machines.

2- Intended learning outcomes of course (ILOs)

a. Knowledge and understanding:

- Define Principles of operation.
- Describe of Construction.
- Draw of Equivalent circuits.
- Explain of Test.
- Draw of Phasor diagram.
- Define of Losses and efficiency.
- Describe of Name plat data
- Explain of Effect of motor (Induction- Synchronous) in power factor.
- Describe of Characteristics machine with load.
- Explain Effect of machines in power factor.
- Explain prime- mover governor characteristics
- Rotating MMF Waves in Induction machine.
• Selection between motor (Induction- Synchronous) with respected load

b. Intellectual skill

• Analyze of Rotating MMF Waves in Induction machine.
• Compare between motor (induction- synchronous) with respected to load.
• Analyze Active and Reactive Power sharing between generators operating in parallel

At the conclusion of this course, the student will be able to selection of Electrical Machines, starting, maintains and read name plat.

c- Professional and practical skills

  c.1 Read Name- Plate Data of machines
  c.2 Maintenance of machines(induction- synchronous);
  c.3 Starting of induction motor
  c.4 parallel operation of alternators;

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

<table>
<thead>
<tr>
<th>Topic</th>
<th>No. of Hours</th>
<th>Lecture</th>
<th>Tutorial/Practical</th>
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</thead>
<tbody>
<tr>
<td>The MMF of Distributing Winding; Magnetic field in electrical machines; Rotating MMF waves in ac machines ;Traveling MMF waves in liner machines .torque and e.m.f in electrical machines</td>
<td>10</td>
<td>3</td>
<td>3/0</td>
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<tr>
<td>Induction machines; 3-phase Stator winding and</td>
<td>15</td>
<td>5</td>
<td>5/0</td>
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Course Specification, Physics I

Concept of rotating magnetic fields; Construction; principles of operation; Squirrel Cage Rotor and Wound Rotor Induction motor, Phasor diagram and motor equivalent circuit; torque slip characteristics, Motor Name- Plate Data, power and torque calculations based on equivalent circuit parameters; losses and efficiency calculations

**Synchronous machines;** construction; Equivalent circuits and Phasor diagram; Torque and power equations; Starting of Synchronous motor; effect of field excitation on motor power factor; Synchronous generator(alternator); the concept of infinite bus; load, Power factor and prime mover; parallel operation of alternators; prime-mover governor characteristics; Active and Reactive Power sharing between generators operating in parallel

|               | 15 | 6 | 6/0 |

4– Teaching and learning methods

4.1- Lectures
4.2- Tutorials
4.3- Practice in Laboratories
4.4- Internet collected information and Self-study projects

5- Student assessment methods

5-1 Written exams (Final and Midterm), assignments and quizzes to assess knowledge and understanding, solving problems skills and interpretation capabilities of physical phenomena.

Assessment schedule

Midterm .................. Week No. 8
Final written exam .............. Week No. 15

Weighting of assessments

<table>
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<tr>
<th>Assessment</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Mid-term examination</td>
<td>40%</td>
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<tr>
<td>Final-term examination</td>
<td>60%</td>
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<td>Total</td>
<td>100%</td>
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6- List of references

6.1- Lecture notes
6.3- Recommended books


7- Facilities required for teaching and learning

Lecture rooms – Tutorial section rooms – Experimental Labs - computers – Virtual simulation programs

Course coordinator:

Head of Department: Assoc. Prof. Ghada Amer

Date: 19/6/2009