Course Specifications

University: Benha University
Faculty: Benha Faculty of engineering

Course specifications
Programme(s) on which the course is given: Electrical Engineering technology Dep.
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 First Term
Date of specification approval: 2009

A- Basic Information
Title: Control Engineering
Code: E352
Credit Hours: N.A.
Lecture: 2
Tutorial: 0
Practical: 2
Total: 4

B- Professional Information

1 - Overall aims of course
By the end of the course the students will be able to:
   Understand the concepts of feedback _ control system.
   Analyze control system performance using frequency response techniques, and to check system stability and transient response.
   Design PID controllers.

   The student shall attain the above mentioned objectives efficiently under controlled guidance and supervision

2- Intended learning outcomes of course (ILOs)

a-Knowledge and understanding
   a1 - Definitions and terminologies used in classical linear automatic control systems.
   a2 - Modeling techniques for electrical and/or mechanical systems.
   a3 - Specifications of time and frequency responses of systems.
   a4 - Methods of stability analysis of systems.
   a5 - Relative stability indices.
   a6 - Design of controllers and/or compensators for systems especially power systems.
b - Intellectual skills
   b1 - Assess the steady-state and transient performance of linear systems.
   b2 - Assess the adequacy of systems based on their performance and stability.
   b3 - Suggest solutions to improve the performance and stability of electromechanical systems.

c - Professional and practical skills
   c1 - Identify model structures and data of realistic systems.
   c2 - Analyze realistic power and drive systems and evaluate their performance.
   c3 - Suggest solutions to improve the performance and stability of systems.
   c4 - Practical implementation of solutions.

d - General and transferable skills
   d1 - Use of commercial software programs such as MATLAB.
   d2 - Writing technical reports and conducting presentations about present and future status of systems under study.
   d3 - Participation in team work to achieve the professional and practical skills listed above.

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>Time domain Analysis</td>
<td>10</td>
<td>6</td>
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<tr>
<td>Stability Analysis</td>
<td>12</td>
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<td>Root Locus Analysis</td>
<td>10</td>
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<tr>
<td>Design of Control Systems using root locus</td>
<td>14</td>
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<tr>
<td>Frequency domain analysis</td>
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<tr>
<td>Frequency domain design</td>
<td>14</td>
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<td>4</td>
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</table>
4– Teaching and learning methods
4.1 - Computer lab
4.2 - Internet search
4.3 - Class Lectures
4.4 - Tutorials/MATLAB software application

5- Student assessment methods
Assignment 1 Week 2
Assignment 2 Week 5
Mid term exam Week 8
Assignment 3 Week 9
Quiz Week 10
Report Week 11
Assignment 4 Week 12
Assignment 5 Week 13
Final exam Week 15

Assessment schedule
Quiz 1 ..........................Week No. 4
Midterm ........................Week No. 8
Quiz 2 ..........................Week No. 12
Oral and Practical exam.........Week No. 14
Final written exam ...............Week No. 15

Weighting of assessments
Mid-Term Examination 15 %
Final-term Examination 60 %
Assignments 10 %
Quiz 5 %
Report 10 %
total 100 %

6- List of references
6. 1 Course notes
6. 2 Essential books (text books)
- R. Dorf and R. Bishop, Modern control systems, 8th Ed., Addison Wesley

6. 3 Recommended books

6. 4 Periodicals, Web sites, … etc
-www.Engin.umich.edu
-www.ece.gatech.edu

7- Facilities required for teaching and learning
   - Appropriate teaching class accommodations including presentation board and data show
   - Computer Lab and MATLAB software.

**Course coordinator:** Prof DR Awad and Dr Tamer ElKhodragy

**Head of Department:** Prof Ghada Amer

**Date:** 14/2/2009