Course Specifications

University: Benha University  Faculty: Benha Faculty of engineering

Course specifications
Programme(s) on which the course is given:  Control and measurements 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 (second semester)
Date of specification approval:  2008

A- Basic Information
Title:  Microelectronics  Code:  E302
Credit Hours: N.A.  Lecture:  2
Tutorial:  2  Practical:  2  Total:  6

B- Professional Information

1 - Overall aims of course
Upon successful completion of this course, the student should be gain the following:
Knowledge of the IC process: the bipolar process, C-MOS process. The elements of
integrated circuits: R, C, L, BJT and MOST. The basic integrated circuit building blocks,
active loads, current sources and sinks, current mirrors, voltage and current references.
Amplifiers: operational amplifiers, difference amplifiers, comparators, op-amp
applications. Linear and non-linear op-amp circuits, analog signal processing. D/A and
A/D converters, switched capacitor filters, analog signal processing circuits.

2- Intended learning outcomes of course (ILOs)
a. Knowledge and understanding:
   a. Mention basics of electronic circuits and their engineering applications.
   b. Describe fundamentals of analog and digital circuits design

b. Intellectual skills
   a. Develop analytical models for electronic circuits.
b. Analyze electronic circuit’s problems and search for optimized solutions.
c. Design of electronic circuits for engineering systems applications.

c- Professional and practical skills
   a. Implement an electronic circuit
   b. Test the implemented circuit.
   c. Write technical report containing the design principles and the practical observations.

d- General and transferable skills
   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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<tbody>
<tr>
<td>The IC process</td>
<td>18</td>
<td>6</td>
<td>6/6</td>
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<tr>
<td>The elements of integrated circuits</td>
<td>12</td>
<td>4</td>
<td>4/4</td>
</tr>
<tr>
<td>The basic integrated circuit building blocks</td>
<td>12</td>
<td>4</td>
<td>4/4</td>
</tr>
<tr>
<td>Amplifiers</td>
<td>18</td>
<td>6</td>
<td>6/6</td>
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<tr>
<td>Linear and non-linear op-amp circuits</td>
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<td>2</td>
<td>2/2</td>
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<tr>
<td>Analog signal processing circuits</td>
<td>6</td>
<td>2</td>
<td>2/2</td>
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<tr>
<td>D/A and A/D converters</td>
<td>12</td>
<td>4</td>
<td>4/4</td>
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<td>Total</td>
<td>84</td>
<td>28</td>
<td>28/28</td>
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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.
5-2 Oral exams to assess the abilities of discussing physical concepts
5-3 Practical exam to assess measuring and professional skills

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

<table>
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<tr>
<th>Assessment</th>
<th>Percentage</th>
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<tr>
<td>Mid-term examination</td>
<td>12%</td>
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<tr>
<td>Final-term examination</td>
<td>60%</td>
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<tr>
<td>Oral and Practical examination</td>
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<tr>
<td>Semester work</td>
<td>8%</td>
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<tr>
<td>Total</td>
<td>100%</td>
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</table>

6- List of references

6.1- Lecture notes
- Taken by the student inside classroom

6.2- Essential books (text books)

6.3- Recommended books
- Microelectronics Circuits, A.Sedra & K.Smith, Latest edition

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: