

## Course Syllabus

### Second Semester - 2013/2014

#### General Information

Course name	Course code	Credits	Contact hours
Biomedical Equipment Design	BMTS475	2 lecture+1 lab	2 lecture+2 lab

#### Instructors/ Coordinators

	Instructor	Coordinator
<b>Name</b>	Mr. Jamel Smida	Mr. Jamel Smida
<b>Email</b>	j.smida@mu.edu.sa	j.smida@mu.edu.sa
<b>Ext</b>	2840	2840

#### Text Book

<b>Title</b>	Medical Instrument Design and Development: From Requirements to Market Placements
<b>Author/Year</b>	Claudio Becchetti , Alessandro Neri / 2013

#### Supplemental materials

Recommended Textbooks and Reference Material	
<b>Title</b>	Multisim 2013 user guide + Ultiboard 2013 user guide
<b>Author/Year</b>	National Instruments / 2013
Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)	
<b>Web sites</b>	<a href="http://www.build-electronic-circuits.com/pcb-design/">http://www.build-electronic-circuits.com/pcb-design/</a> <a href="http://www.seminaronly.com/Engineering-Projects/Biomedical/Biomedical-Projects.php">http://www.seminaronly.com/Engineering-Projects/Biomedical/Biomedical-Projects.php</a>

#### Specific Course Information

<b>a. Brief description of the content of the course (Catalog Description)</b>
This course provides intensive coverage of the theory and practice of electromechanical instrument design with application to biomedical devices. Lectures will present techniques for designing electronic circuits as part of complete sensor systems. Topics covered include printed circuit board (PCB) design including component selection, PCB layout, assembly, and planning and budgeting for large projects. Design of electronic instruments with use of simulation software, emphasis on the use of integrated circuits, both analog and digital. Students practice the design and development in laboratory under supervision of teacher.
<b>b. Prerequisites (P) or Co-requisites (C)</b>
(P) Biomedical Analog Electronics 2 - BMTS362 (P) Biomedical Digital Electronics 2 - BMTS364
<b>c. Course type (Mandatory or Elective)</b>
Mandatory

### Specific Goals

#### a. Specific outcomes of instruction

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

- Use techniques for designing electronic circuits as part of complete sensor systems. (b)
- Interpret electronic sensor system output using simulation software. (c)
- Design electronic circuits using CAD software, emphasis on the use of integrated circuits, both analog and digital. (d)
- Participate as a member or leader of a project team to develop a complete sensor system. (e)
- Write a project dissertation applying specific formatting requirements. (g)
- Perform an oral presentation for the project. (g)
- Apply national standards for medical devices (SDFA) in the designing process. (i)

#### b. Student outcomes addressed by the course

a	b	c	d	e	f	g	h	i	j	k
	✓	✓	✓	✓		✓		✓		

### Brief list of topics to be covered

Topics	No of Weeks	Contact hours
Basics of Biomedical Equipment design	2	8
Sensor systems	2	8
Electronic circuits design process	2	8
Schematics design using Multisim,	2	8
Simulation using Multisim,	2	8
Printed circuit board (PCB) design: <ul style="list-style-type: none"> <li>- component selection</li> <li>- PCB layout, assembly</li> <li>- Planning and budgeting for large projects</li> </ul>	2	8
PCB Design using Ultiboard	1	4
Design project including design ethics and SDFA standards	2	8