DEPARTMENT OF BIOMEDICAL ENGINEERING
INSTRUCTIONAL INCUBATOR
UNIVERSITY OF MICHIGAN

BME Course Summary

Introduction

1. Course Information

Course Name	*Biomedical Engineering Design*
Institution	*UW Madison*
Course Number	**BME 200**
# credits	**1**
Meeting times	**Friday 12:05-2:05**
Is this a required course?	**Yes**
Pre-requisites	**Sophomore standing; Math 222 and EMA 201 (or Physics 201/Physics 207) and Chem 104 (or Chem 109)**
Target audience (e.g. 1st, 2nd year):	**2nd year**
Textbook	**Dym, C. L. 2003. Engineering Design: A Project Based Introduction. New York, John Wiley.**
Course Website (if it exists)	**NA**

2. Course Description

In the space below, "paste" the description of the course. This can be the actual description listed in the syllabus from the course.

Students will work in a team on a client-centered biomedical engineering design project to learn concept generation, product analysis, specifications, evaluation, clinical trials, regulation, liability, and ethics.

3. Course Learning Objectives

In the space below, "paste" the course learning objectives if explicitly stated.

- Apply the design process to solve an open-ended, client-based biomedical problem and produce a physical prototype
- Employ appropriate knowledge of biology, physiology, mathematics and experimental design in the project
- Function as an effective member of a team consisting of both sophomores and juniors in biomedical engineering
- Maintain an engineering notebook
- Make effective oral platform and poster presentations
- Produce a comprehensive written report
- Practice appropriate ethical behavior

4. Fundamental Tools and Skills

In the space below, describe the fundamental tools and skills that are addressed in the class. For example, labvview, arduino's, the design process etc.

The design process is addressed in this class. Since the class is client-focused and project-based, each student will walk away with having a different set of skills based on what project they were assigned. Some fundamental tools and skills that students may walk away with include welding, using 3D design software (CAD), coding (MATLAB, LABVIEW, etc.), and using common imaging modalities.

5. Exercises or Experiential Projects of Interest

Exercise/Project	**Project Overview**	**Learning Activities and Assessments**	**Required Resources for Project Completion**
1	All Projects	**Learning Activities** • Sophomore students work in teams led by junior students to solve a real-world client-based design project achievable in one semester • Students keep design notebooks and submit weekly progress reports to all team advisors and members • One team member will be responsible for keeping the team's website relevant and up to date **Assessment** • Students submit a preliminary design report and give an oral	Funding to complete all projects

Exercise/Project	Project Overview	Learning Activities and Assessments	Required Resources for Project Completion
		presentation midway through the semester to update the class and professor on their progress on their design and prototype • Students design and give a final poster presentation at the end of the semester that should prototype demonstration if applicable • A final report written by the group is handed in at the end of the semester, detailing the design process and final results of the project	
2	"Device to lift a fallen elder back into their chair"	**Project Goal** • Design one iteration of a device that can help elderly people back up after a non-injurious fall	Some sort of modeling software to design the details of the prototype Potentially a welding studio to attach elements of the design together
3	"Osteochondral transplant system"	**Project Goal** • Develop a system that will help improve chondrocyte cell viability in the process of bone grafts. The current design will involve the creation of a bone graft that can be rotated into or out of the bone defect in question	Cadaveric specimens Fresh grafts Sutures Current osteochondral autograft instrument Drill tap Design of a screwdriver-like instrument to rotate the graft into the bone
4	"TherVoyant: Compact guide for minimally invasive surgery in an MRI scanner"	**Project Goal** • Design and create a working prototype for a minimally invasive surgery guide that can be used for performing brain surgeries that use MRI as the imaging modality	Surgical drill, catheters to design and test device Access to MRI scanner Access to surgical planning software Access to image guidance software Access to animal experiments

6. Additional thoughts

If you have any other thoughts about this course, but have not been able to reflect it elsewhere in the document, please feel free to do so here.

I think it's very unique how the groups of sophomores are led by juniors in the BME program. I feel like it's normally difficult in engineering programs to create opportunities that allow students from multiple years to interact with each other. This also gives everyone a chance in the program to be a group leader, although this will not occur for the sophomores in BME 200 specifically.
I love how this class is set up such that each team is working with an actual client, be it a person or group from the university or the surrounding community. I feel like this is an important

experience to have and that it's great that the UW Madison BME program is able to incorporate it so early into their curriculum, as this gives students a taste of what being a real-world engineer is like. This allows them to make an informed decision as to whether or not they want to continue in the program and become an engineer.
I also enjoy the fact that each group member has a specific title and job, such as being the project's webmaster, purchasing, team leader or communicator. Hopefully having an assigned role will encourage students to complete the work, and could perhaps protect the other group members if one member isn't pulling their whole weight.