BME 180A BME Engineering Design (14080)
CBEMS 189A Senior Design Projects (15090)

Fall 2016

Syllabus

Instructors

BME 180A – Prof. William C. Tang, 3408 Engineering Hall, wctang@uci.edu
Office Hours: by appointment via E-mail

CBEMS 189A – Dr. Chris Hoo, 621 Engineering Tower, cmhoo@uci.edu
Office Hours: by appointment via E-mail

Teaching Assistants

Lancy Lin, lancyl@uci.edu
Office Hours: by appointment via E-mail

Joshua Kim, joshuk7@uci.edu
Office Hours: by appointment via E-mail

Lectures

Tuesdays, Thursdays 5:30PM to 6:50PM, 101 Rowland Hall / "The Cove," Applied Innovation.

Discussion Sessions

A1 – (14081) Tuesdays 2:00PM to 4:50PM, 224 MSTB
A2 – (14082) Thursdays 8:00AM to 10:50AM, 224 MSTB
A3 – (14083) Thursdays 2:00PM to 4:50PM, 224 MSTB
A4 – (14084) Tuesdays 8:00AM to 10:50AM, 224 MSTB

Course Descriptions

BME 180A – Design strategies, techniques, tools, and protocols commonly encountered in biomedical engineering; clinical experience at the UCI Medical Center and Beckman Laser Institute; industrial design experience in group projects with local biomedical companies; ethics, economic analysis, and FDA product approval. Materials fee.

CBEMS 189A – Group supervised senior design projects that deal with materials selection in engineering design and that involve case studies in ethics, safety, design, failure modes, new products, and patents. Activities conclude with a presentation of the projects. Materials fee.

Prerequisites

BME 180A – BME 110C, BME 111, BME 120, BME 121, BME 140. BME 180A/B/C must be taken in the same academic year.

CBEMS 189A – CBEMS 189A/B/C must be taken in the same academic year.

Required Text

None

Reference Texts

Stefanos Zenios, Josh Makower, and Paul Yock, *Biodesign: The Process of Innovating Medical Technologies*, Cambridge University Press, 2010.

Clive L Dym, Patrick Little, and Elizabeth Orwin, *Engineering Design: A Project-Based Introduction, 4th Ed.,* Wiley, 2014.

Grading Policy

Attendance:	10%
UROP proposal:	15%
Fall quarter final report:	40% (35% overall, 5% individual)
Fall quarter presentation:	15% (10% overall, 5% individual)
Fall poster exhibition	10%
Peer evaluation:	5%
Mentor evaluation:	5%
Course Survey Bonus:	3%

Course Learning Outcomes

BME 180A – Upon completing the course, students will be able to:

1. Demonstrate leadership and teamwork skills in a project team environment.
2. List and define the various steps in bringing a biomedical product from concept to market.
3. Identify the realistic constraints of the team project.
4. Identify and assess challenges in each of the steps.
5. Articulate the impacts of the project in a global, economic, environmental and societal context.
6. Design and conduct experiments to verify team projects requirements.
7. Use knowledge in mathematics, statistics, biological sciences, physical sciences, and engineering to solve the problems at the interface of engineering and biology whenever required.
8. Use the appropriate computer tools to design, model, simulate, and/or operate, the team projects.
9. Apply engineering principles and practices to meet the challenges.
10. Demonstrate oral communication skills in presenting team projects.
11. Establish initial contacts with major local BME companies.
12. Demonstrate knowledge of contemporary issues related to biomedical engineering.

CBEMS 189A – Upon completing the course, students will be able to:

1. Apply knowledge of mathematics, science, and engineering.
2. Design and conduct experiments as well as to analyze and interpret data.
3. Process and select a material to meet desired needs.
4. Function on multi-disciplinary teams.
5. Identify, formulate, and solve engineering problems using techniques, and modern engineering tools essential for engineering practice.
6. Understand professional and ethical responsibility.
7. Communicate effectively both orally and in writing.
8. Understand the impact of engineering solutions in a global and societal context.
9. Recognize the need for life-long learning.
10. An ability to understand contemporary issues influencing the society and the materials profession.
11. Apply and integrate knowledge from each of the four primary elements of Materials Science and Engineering (structure, properties, processing and performance) to solve problems related to materials selection and design.

Course Schedule

Wk #	Date	Day	Location	Lecture
0	9/22	Thu	101 RH	Introduction, expectation, goals, course management **Lecturers:** Bill Tang, Chris Hoo
1	9/27	Tue	Applied Innovation	Introduction, *BioAccel (i6)* and *Applied Innovation* **Lecturer:** Ron King
	9/29	Thu	101 RH	Design Process I **Lecturer:** Bill Tang
	10/1	Sat		***Submit Team Preference & Project Rank Order by 5PM***
2	10/04	Tue	101 RH	Design Process II **Lecturer:** Bill Tang
	10/06	Thu	Applied Innovation	Lean Launchpad **Lecturer:** Ron King
3	10/11	Tue	Applied Innovation	Pitching ideas to investors **Lecturer:** David Ochi
	10/13	Thu	101 RH	IP 101 **Lecturer:** Alvin Viray
4	10/18	Tue	Applied Innovation	EvoNexus and incubation **Lecturer:** Rory, Admiral Davis
	10/20	Thu	Applied Innovation	How to start up a startup company **Lecturer**: Ron King
5	10/25	Tue	101 RH	Design for manufacturing **Lecturer:** Brad Sargent
	10/27	Thu	101 RH	The team: assessing strengths & weaknesses **Lecturer:** Sheri Smith
6	11/01	Tue	101 RH	Materials selection, biocompatibility, & manufacturing 1 **Lecturer:** Chris Hoo
	11/03	Thu	101 RH	Materials selection, biocompatibility, & manufacturing 2 **Lecturer:** Chris Hoo
	11/03	Thu		***UROP Proposal due at 5pm to Course Dropbox***
7	11/07	Mon		***Submit UROP Proposal to UROP Website***
	11/08	Tue	Applied Innovation	Dealing with team conflicts **Lecturer:** Sheri Smith
	11/10	Thu	101 RH	Team Work **Lecturer:** Ali Curtis & Vivian Khalil
8	11/15	Tue	101 RH	Leadership **Lecturer:** Ali Curtis & Vivian Khalil
	11/16	Wed		***Poster (Draft) due at 5PM to Course Dropbox***
	11/17	Thu	101 RH	Industry Perspective **Lecturer:** Randal Schulhauser
	11/18	Fri		***Poster (Final) due at 5PM to Course Dropbox***
9	11/22	Tue	Applied Innovation	Regulatory affairs **Lecturer:** Eve Ross
	11/24	Thu		***THANKSGIVING HOLIDAY***
10	11/29	Tue	101 RH	***Preliminary Design Review (8-min presentation each team)***
	12/01	Thu	101 RH	***Preliminary Design Review (8-min presentation each team)***
	12/02	Fri	EG Lower Plaza	***2PM – 4PM Engineering Fall Design Review – Poster Exhibition***
Final	12/09	Fri		***Final Report due at 5pm to Course Dropbox***