

**BME 180C BME Engineering Design (14080)
CBEMS 189C Senior Design Projects (15100)**

Spring 2019 Syllabus

Instructors

BME 180C– Professor William Tang and Professor Christine King,

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- Christine King: 3410 Engineering Hall, kingce@uci.edu, Office Hours: by appointment via e-mail

CBEMS 189C – Professor Chris Hoo

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Teaching Assistants

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Lectures

Tuesdays, Thursdays 5:00PM to 6:20PM, 104 Rowland Hall

Discussion Sessions

Replaced with Team Assessments. See Course Schedule.

Course Descriptions

BME 180C – 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, marketing, and FDA product approval. Materials fee.

CBEMS 189C – Group supervised senior design projects that deal with materials selection in engineering design and that involve ethics, safety, design, failure modes, new products, and patents. Materials fee.

Prerequisites

BME 180C – BME 180B. BME 180A/B/C to be taken in the same academic year.

CBEMS 189C – CBEMS 189B. CBEMS 189A/B/C to 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, 2nd Ed.*, Cambridge University Press, 2010.

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

Grading Policy

Website:	15%
UROP Presentation (Industry track):	20%
Business Competition (Entrepreneurial track):	
Spring Poster:	10%
Final Report:	35%
Peer Evaluation:	10%
Participation:	10%
Bonus Course Survey:	2%
TOTAL:	102%

Links to Competitions:

Venture Well: <http://venturewell.org/student-grants/>

UCI Business Plan Competition: <http://merage.uci.edu/researchandcenters/beall/SYCR.aspx>

Course Learning Outcomes

BME 180A-B-C – 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-B-C – 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
1	4/02	Tue	104 RH	Introduction, expectation, goals, course management Lecturers: Bill Tang, Christine King, Chris Hoo
	4/04	Thu	3414 Calit2	2PM – 6PM Team Assessments #1 (8 teams)
	4/05	Fri	3212 NS2	3PM – 5PM Team Assessments #1 (4 teams)
2	4/09	Tue	104 RH	Global Medical Need – Vietnam Vietnam Expedition Presentations

	4/11	Thu	3201 NS2 104 RH	2PM – 4PM Team Assessments #1 (4 teams, 3201 NS2) Global Medical Need – Gangsu, China Lecturer: Dr. Shouyan Lee, Angel Heart international
	4/12	Fri	3212 NS2	3PM – 5PM Team Assessments #1 (4 teams)
3	4/16	Tue	104 RH	Web Authoring Lecturer: Christine King
	4/18	Thu	3201 NS2 Applied Innovation	2PM – 4PM Team Assessments #1 (4 teams, 3201 NS2) 5PM – 7PM Industry Night
4	4/22	Mon	UROP Website & EEE Canvas	<i>UROP Symposium Abstract due</i>
	4/23	Tue	Various Labs	Project walkthroughs
	4/25	Thu	Various Labs	Project walkthroughs
5	4/30	Tue	3212 NS2	5PM – 6:30PM Team Assessments #2 (3 teams)
	5/02	Thu	3201 NS2	2PM – 6:30PM Team Assessments #2 (9 teams)
6	5/07	Tue	3212 NS2	5PM – 6:30PM Team Assessments #2 (3 teams)
	5/09	Thu	3201 NS2	2PM – 6:30PM Team Assessments #2 (9 teams) <i>Team webpages going live at 5PM</i>
7	5/14	Tue	Various Labs	Project walkthroughs
	5/16	Thu	Various Labs	Project walkthroughs
	5/18	Sat	Student Center	[Industry Track] 8AM – 4PM <i>UROP Symposium Presentation</i>
8	5/21	Tue	3212 NS2	5PM – 6:30PM Team Assessments #3 (3 teams)
	5/22	Wed	Merage Auditorium	[Entrepreneurial Track] 5:30PM – 9PM <i>New Venture Competition Finals & Award Ceremony</i>
	5/23	Thu	3414 Calit2	2PM – 6:30PM Team Assessments #3 (9 teams)
9	5/28	Tue	3212 NS2	5PM – 6:30PM Team Assessments #3 (3 teams)
	5/30	Thu	3201 NS2	2PM – 6:30PM Team Assessments #3 (9 teams)
10	6/03	Mon	EEE Canvas	<i>Final Poster due at 2PM to Course Canvas</i>
	6/04	Tue		No Meeting
	6/06	Thu	Applied Innovation	<i>4:00PM – 7:00PM Final Symposium & Award Ceremony</i>
Final	6/13	Thu	Engineering Upper Plaza	<i>10:00AM – 12:00PM Spring Design Review Poster Display</i>
	6/14	Fri	EEE Canvas	<i>Final Report due at 11:59pm to Course Canvas</i>

Opportunities:

Global BioBusiness Program: [2019 Flyer Global BioBusiness Summer School.pdf](#)

Beall Student Design Competition at The Henry Samueli School of Engineering

Offered to encourage the creation of new technologies, or solutions to current design problems that have the potential for commercialization. Ideas and products are evaluated on their technological merits as well as potential to impact the marketplace. Students are encouraged to submit new product ideas that involve the development of hardware and devices. Products that entail integration are acceptable as long as there is a substantial development effort.

The competition is open to all UCI students. Teams must be composed of at least two (2) students, one (1) of which must be enrolled at the Samueli School of Engineering.

2018 Competitors

Last year's winners of the Beall and Butterworth Competitions were composed of undergraduate and graduate students studying in the areas of Anthropology, Biology, Business Administration and Business Economics, ICS, Informatics, Engineering, Computer Science and Engineering, Electrical Engineering and Medicine. For more information on finalist projects, rules, please visit <http://tech.uci.edu/competitions/>.

For questions, please contact Kristin Huerth, Associate Director, Engineering and ICS at khuerth@ics.uci.edu