

BME 180B BME Engineering Design (14170)

CBEMS 189B Senior Design Projects (15110)

Course Descriptions

BME 180B – 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. In-progress grading. Prerequisite: BME180A.

CBEMS 189B – 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.

BME 180B Instructors

Prof. William C. Tang, 3113 Natural Sciences II, wctang@uci.edu

Prof. Christine King, 3410 Engineering Hall, kingce@uci.edu

CBEMS 189B Instructor

Dr. Chris Hoo, 621 Engineering Tower, cmhoo@uci.edu

Teaching Assistants

Joanne Ly, joannl6@uci.edu

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Office Hours

By appointment via E-mail

Lectures

Tuesdays, Thursdays 5:30PM to 6:50PM, 101 Rowland Hall / “The Beach,” Applied Innovation.

Prerequisites

BME 180A/B/C must be taken in the same academic year. Senior standing only.

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

Required Text: None

Reference Texts

Paul Yock, Stefanos Zenios, and Josh Makower, eds., *Biodesign: The Process of Innovating Medical Technologies, 2nd Ed.*, Cambridge University Press, 2015.

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

Grading Policy

Attendance:	10%
Homework:	50% (HW1: 7%, HW2: 8%, HW3: 15%, HW4: 10%, HW5: 10%)
Presentation:	20% (15% overall, 5% individual)
Poster:	10%
Peer evaluation:	5%
Mentor evaluation:	5%
Course Survey Bonus:	1%
Team Lead Bonus:	3%

Course Learning Outcomes

BME 180B – 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. Articulate the impacts of the project in a global, economic, environmental and societal context.
5. Design and conduct experiments to verify team projects requirements.
6. Use knowledge in mathematics, statistics, biological sciences, physical sciences, and engineering to solve the problems at the interface of engineering and biology whenever required.
7. Use the appropriate computer tools to design, model, simulate, and/or operate, the team projects.
8. Demonstrate oral communication skills in presenting team projects.

CBEMS 189B – 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	1/8	1	RH 101	Introduction to the Quarter: Deliverables and Expectations Lecturers: Bill Tang, Christine King, Chris Hoo Lecture 1 Introduction to Winter Quarter.pdf
	1/10	2	The Cove, Applied Innovation	Design and Manufacturing Lecturer: Chris Hoo https://www.youtube.com/watch?v=t8X9E-Vava8
2	1/15	3	The Cove, Applied Innovation	Path from Student to Entrepreneur Lecturer: Vas Bailey, ARTIS Ventures <i>HW 1 Due: SWOT Analysis and Team Science</i>
	1/17	4	RH 101	Commercialization of Clinical Unmet Needs Lecturer: Shiva Sharareh, Finite Medical

				Design for Manufacturing
	1/22	5	The Cove, Applied Innovation	Lecturer: Brad Sargent, Omnica Inc. https://youtu.be/RJIfIyxM3Jc
3				Team Check-Ins 2 - 5pm
	1/24	6	2-5 pm NS2, Room 3212	Lecture at 5:30pm: Understanding how to Market your Idea Lecturer: Fabio Gratton Fabio Gratton Lecture 20190125.pdf
			5:30- 6:50pm, RH 101	
	1/29	7	NS2, Room 3212	Team Check-Ins (no lecture)
4				
	1/31	8	NS2, Room 3212	Team Check-Ins (no lecture)
	2/5	9	RH 101	Pitch Deck, Concept Paper, and Customer Interviews <i>(Optional for Industry Track)</i> Lecturer: David Ochi, School of Business David Ochi Customer Interviews.pdf
5				
	2/7	10	RH 101	The Design History File Lecturer: Christine King King Design History File and Design Controls Lecture.pdf

				FMEA and Quality Control Lecturer: Chris Hoo Chris Hoo FMEA Lecture.pdf FMEA.xlsx
6	2/12	11	RH 101	
				Medical Device Design and Verification (<i>Optional for Entrepreneurial Track</i>) Lecturer: Andrew Piscioneri, Edwards Life Sciences Andrew Piscioneri Edwards Life Sciences Lecture.pdf <i>HW 2: Initial Fabrication Design Review (industry track), Customer Interview (entrepreneurial track)</i>
	2/14	12	RH 101	
7	2/19	13	RH 101	Crash Course on Prototyping Lecturer: Christine King King Lecture Crash Course on Prototyping.pdf

				From Benchtop to Bedside: Clinical Applications of Bioengineering Lecturer: Yama Akbari, School of Medicine Yama Akbari Clinical Applications Lecture.pdf <i>HW 3: Qualification Test Procedure (industry track), New Venture Competition Concept Paper (entrepreneurial track, due 2/24)</i>
	2/21	14	RH 101	
	2/26	15	RH 101	Minimal Viable Product, Pitching to your Boss or Venture Capitalists Lecturer: Ron King
8				CLASS CANCELED
	2/28	16	RH 101	<i>Due 3/1 by 2pm: Winter Design Review Poster Submitted via Dropbox drive on Canvas assignment</i>
	3/5	17	The Cove, Applied Innovation	Project Presentations (8 min presentation per project)
9				
	3/7	18	RH 101	Project Presentations (8 min presentation per project)
	3/12	19	The Cove, Applied Innovation	Project Presentations (8 min presentation per project)
10				Project Presentations (8 min presentation per project)
	3/14	20	RH 101	<i>HW 4: First Generation Prototype (industry track), New Venture Competition Pitch Deck FIRST DRAFT (entrepreneurial track, due 3/16)</i>

	3/15	21	UCI Student Center	Winter Design Review: 8-3pm <i>HW 5: Team Evaluations, Senior Survey and Contact Information</i>
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The Use of Applied Innovation.pdf

Projects List and Expectations

[BME180-CBEMS189 Senior Design Expectations and Projects 2018-6.pdf](#)

Project Team Assignment

[BME180-CBEMS189 Roster & Teams.xlsx](#)

[BME180-CBEMS189 Senior Design Expectations and Projects CHOSEN Projects-1.pdf](#)

Purchase Request Form and instructions:

<http://engineering.uci.edu/faculty-staff/purchasing-reimbursement/purchasing-requests>

Optional Business Competitions:

<http://antrepreneur.uci.edu/competitions/>

2019 Tulane Business Model Competition due Friday, February 1st

Application: <https://lepage.startuptree.co/event/44c57a89-a562-4f45-90ca-aa26458c17cd>

Upcoming Workshops:

The SBDC @ UCI Applied Innovation is excited to announce our upcoming workshops. All start at 12:00pm:

2/22 - Investing in Patents: <https://bit.ly/2RWawfw>

3/5 - How to Pitch BioTech: <https://bit.ly/2CQHjIu>

3/6 - How to Build a Winning Team: <https://bit.ly/2UV5my2>

4/2 - Funding 101: <https://bit.ly/2G8xyZl>

New Venture Competition: [New Venture Competition Workshops.jpg](#)

UCI Applied Innovation Pitch Prep 101 Workshop: [Pitch Prep 101 Workshop.pdf](#)

UCI Applied Innovation Startup Fundamentals Workshop: [Startup Fundamentals Workshop.pdf](#)

Job Opportunities:

Rice 360° Global Health Post-baccalaureate Fellows

A post-baccalaureate fellowship for exceptional early-career engineers with an interest in medical technology for low-resource settings. The fellowship is open to graduating seniors and recent graduates who have received an engineering bachelor's degree from an accredited college or university. Candidates must demonstrate a prior interest in global health technology development.

For more information and the application, visit <https://www.rice360.rice.edu/fellowship>

[Fellows_flyer_2019.pdf](#)

[Fellows_Application_2019.pdf](#)

Rice 360° Chief Electronics Designer

The Rice 360° Chief Electronics Designer is the electrical engineering specialist responsible for the design of electronics components in technologies designed by the Rice 360° Institute for Global Health.

The Chief Electronics Designer will interact extensively with engineers and clinicians, both domestic and in Africa, in support of the initial design and improvement of the electronic aspects of technologies under development at Rice 360°, with a primary focus on technologies within the NEST360° initiative.

For more information and to apply, visit <http://jobs.rice.edu/postings/17728>

Rice 360° Innovation Design Studio Manager, DIT

The Innovation Design Studio Manager, based at the Dar es Salaam Institute of Technology (DIT) in Dar es Salaam, Tanzania, is responsible for the daily operations of an innovative specialized lab, studio or workshop as well as any related specialized machinery and equipment. Provides oversight, technical direction and specialized skills on the use of a wide variety of machinery and equipment. Develops processes and procedures to ensure the safety and creativity of the lab. Advises and serves as the lead support technician to students as it relates to their projects. Instructs students and student workers on safety and the effective use of equipment tools and software, shop techniques, and safety protocol. Participates and assists faculty and students with prototype design, development and research.

For more information, email v12@rice.edu. To apply, visit <https://jobs.rice.edu/>