

ORIGINATOR'S SECTION:

1. College: <input type="checkbox"/> CHABSS <input checked="" type="checkbox"/> CoBA <input type="checkbox"/> CoEHHS <input type="checkbox"/> CSM	Desired Term and Year of Implementation (e.g., Fall 2008): Fall 2017
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2. Course is to be considered for G.E.? (If yes, also fill out appropriate GE form*) Yes No

3. Course will be a variable-topics (generic) course? Yes No
("generic" is a placeholder for topics)

4. Course abbreviation and Number:* BA 670

5. Title: (Titles using jargon, slang, copyrighted names, trade names, or any non-essential punctuation may not be used.)
The Bioentrepreneur: Science to Market

6. Abbreviated Title for PeopleSoft:
(no more than 25 characters, including spaces)
The Bioentrepreneur

7. Number of Units: 2

8. Catalog Description: (Not to exceed 80 words; language should conform to catalog copy. Please consult the catalog for models of style and format; include all necessary information regarding consent for enrollment, pre- and/or corequisites, repeated enrollment, crosslisting, as detailed below. Such information does not count toward the 80-word limit.)

BA 670. The Bioentrepreneur: Science to Market (2). Exposure to the exciting opportunities and unforeseen challenges of developing biotechnology products. Students will learn from successful bioentrepreneurs, the unique aspects of starting, nurturing, growing, and sustaining or exiting a biotech enterprise. Topics will include how to assess a technology product idea, license and protect IP, secure capital, navigate product approval and reimbursement strategies, create biotechnology partnerships, institute biomufacturing, while maintaining high ethical standards. Prerequisite: MBt student or approval of Program Director

9. Why is this course being proposed?

Responding to continuous measurements and feedback, the purpose is to update program needs for students going through the Master of Biotechnology program (Professional Science Master's) as recommended by External Advisory/student feedback/community opinion/local industry demands, as well as the prospective needs for student successes in the life science industry sector. Greater preparation for understanding technology creation and value generation is needed. Longitudinal feedback from graduates suggest that preparation for the workforce from start-ups to participating in novel discoveries in large companies would be beneficial.

10. Mode of Instruction*
For definitions of the Course Classification Numbers:
http://www.csusm.edu/academic_programs/curriculumschedule/catalogcurricula/DOCUMENTS/Curricular_Forms_Table/Instructional%20Mode%20Conventions.pdf

Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)
Lecture	2	C-2
Activity		
Lab		

11. Grading Method:*
 Normal (N) (Allows Letter Grade +/-, and Credit/No Credit)
 Normal Plus Report-in-Progress (NP) (Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress)
 Credit/No Credit Only (C)
 Credit/No Credit or Report-in-Progress Only (CP)

12. If the (NP) or (CP) grading system was selected, please explain the need for this grade option.

13. Course Requires Consent for Enrollment? Yes No

 Faculty Credential Analyst Dean Program/Department - Director/Chair

Tracker —
RP —
PS —

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BY: _____

* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

14. Course Can be Taken for Credit More than Once? Yes No
 If yes, how many times? (including first offering)

15. Is Course Crosslisted: Yes No
 If yes, indicate which course _____ and check "yes" in item #22 below.

16. Prerequisite(s): Yes No

17. Corequisite(s): Yes No

18. Documentation attached:
 Syllabus Detailed Course Outline

19. If this course has been offered as a topic, please enter topic abbreviation, number, and suffix:*

20. How often will this course be offered once established?* Yearly

PROGRAM DIRECTOR/CHAIR - COLLEGE CURRICULUM COMMITTEE SECTION:
(Mandatory information – all items in this section must be completed.)

21. Does this course fulfill a requirement for any major (i.e., core course or elective for a major, majors in other departments, minors in other departments)? Yes No
 If yes, please specify:
 Master of Biotechnology (a Professional Science Masters degree)

22. Does this course impact other discipline(s)? (If there is any uncertainty as to whether a particular discipline is affected, check "yes" and obtain signature.) Yes No
 If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

Biological Sciences
 Discipline _____
 ✓ Signature _____ Date _____ X Support _____ Oppose _____

Discipline _____
 Signature _____ Date _____ Support _____ Oppose _____

SIGNATURES : (COLLEGE LEVEL) :

(UNIVERSITY LEVEL)

1. Originator (please print or type name) _____ Date _____
 2. Program Director/Chair _____ Date _____
 3. College Curriculum Committee _____ Date _____
 4. College Dean (or Designee) _____ Date _____

5. UCC Committee Chair _____ Date _____
 6. Vice President for Academic Affairs (or Designee) _____ Date _____
 7. President (or Designee) _____ Date _____

* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

THE BIOENTREPRENEUR: SCIENCE TO MARKET

BA 670

*Somedays ♦ 5:30~8:15 pm ♦ Some Place
(Except Company Visit or Special Events)*

BA 670. The Bioentrepreneur: Science to Market (2). Exposure to the exciting opportunities and unforeseen challenges of developing biotechnology products. Students will learn from successful bioentrepreneurs, the unique aspects of starting, nurturing, growing, and sustaining or exiting a biotech enterprise. Topics will include how to assess a technology product idea, license and protect IP, secure capital at different stages of development, navigate product approval processes and reimbursement strategies, create biotechnology partnerships (drug, diagnostics, bioagriculture development processes), institute biomanufacturing, while maintaining high ethical standards. Instruction shall be from faculty with life science industry experience. *Prerequisite: MBt student or approval of Program Director.*

Text Books and other Materials:

Shimasaki, C. (2014). *Biotechnology Entrepreneurship: Starting, Managing, and Leading Biotech Companies*: Academic Press. ISBN-13: 978-0124047303, ISBN-10: 0124047300. ca. \$88

Student Learning Objectives:

At the end of the course, students will be able to:

1. Demonstrate their knowledge of the scope of issues and decisions that founders of biotech companies face as they progress from start-up to self-sustaining enterprises
2. Have command of the vocabulary and essential skills required to participate and contribute to the business side of scientific enterprises
3. Devise a road map and write a business plan for a new start-up company
4. Show their knowledge of real entrepreneurial situations (through case studies and guest lectures given by speakers involved in biotechnology startup)

Assignments and Grading:

Class participation (30% of total grade)

As students you are expected to attend all class sessions and actively participate. This means you must be prepared to discuss readings and case studies and have engaging conversations with guest speakers. Class and guest lectures complement, but do not replace textbook information. Together we will create an interactive learning environment where a significant amount of learning will be accrued through the constructive and respectful exchange of thoughts and ideas, and a search for alternative solutions. To improve critical thinking and communication skills you must be actively engaged in class discussions. When there are guest lecturers, time will be provided for an interactive discussion with the speaker.

Weekly Writing Responses (30% of total grade)

Reading or case study assignments will be provided each week related to guest lectures and/or lecture topics. These readings will examine real world problems and offer in-depth analyses of topics covered in class that week. You will be required to write 200-300 word reflections on the article or case study, summarizing the main points and providing critical and careful thought and analysis into how ideas presented impact the life science industry, particularly start-up companies.

Final Project/Business Plan (40% of total grade)

Student teams will develop a viable idea for a life science start-up company that realizes an unmet industry need. After thoroughly developing the idea/product, student teams will: 1) create a slide deck to pitch their

start-up, or 2) write a business plan. Both should be presented to make the idea attractive for a venture capitalist.

Academic Honesty and Integrity

Students are responsible for honest completion and representation of their work. Plagiarism will not be tolerated in the lab reports or lab notebooks. If you have copied or modified someone else's work (e.g. from another group, from your friend who took the course previously) you have plagiarized. The instructor reserves the right to discipline any student for academic dishonesty and plagiarism, in accordance with the general rules and regulations of the university. Disciplinary action may include a failing grade for an assignment or the class.

Disabled Student Services

Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disabled Student Services (DSS). This office is located at Craven Hall 5205, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Students authorized by DSS to receive reasonable accommodations should meet with the Program Director during office hours to ensure confidentiality.

THE BIOENTREPRENEUR: SCIENCE TO MARKET
BA 670
COURSE OUTLINE

Course Outline and General Thrust:

The course will be divided into topics provided by faculty, adjunct and industry speakers:

- Entrepreneurial Overview.
- The Industry and Insight.
- Case Studies from Bioscience Industry.
- Interactive Discussion Topics.

Overlying themes and exposure:

Reviews will include case studies and assigned reading as well as:

- Current events.
- San Diego & Beyond Biotech scene.
- Controversial issues.
- Class Interaction.

Date	Topic Description	Instructor
Week 1	Overview & Expectations of the Course <ul style="list-style-type: none"> • What is Entrepreneurship? • San Diego entrepreneurial life-science industry and beyond. • Companies and Technology and how they got there. • “Must know” terms and issues. • <i>Written Reflection prior to next class.</i> • <i>Current Events reading.</i> 	Instructor of Record
Week 2	Bioscience Business: The Big Picture <ul style="list-style-type: none"> • History of bioscience and how did it get here. • What does it take to get here? • Review Biotech, Biopharma, BioMed, Medical Device industries. • <i>Entrepreneurial reading (TBA)</i> • <i>Current Events reading.</i> 	J. Caulder or Joe Panetta or . . .
Week 3	Entrepreneur: What does it take to start or engage in a novel venture. <ul style="list-style-type: none"> • Key factors and variables • How? Personality type? Tolerance levels? Breadth? • Start-up Models. • Transforming knowledge into products. • Raising money and Boards. • Review of the past and future business models. • <i>Written Reflection</i> 	S. Mento CEO, Conatus Pharmaceuticals . . . or similar
Week 4	Case Study: Large Companies and what they want. <ul style="list-style-type: none"> • Industry operations and development strategies. • Innovation in Today’s world. • What other’s look for. • How Small Tech fits into the Larger Plan. • <i>Homework</i> 	
Week 5	Case Study: Successful Experiences <ul style="list-style-type: none"> • Building, sustaining or exiting a successful novel company • The “outcome” 	

	<ul style="list-style-type: none"> • <i>Written Reflection due</i> 	
Week 6	Case Study: Start Ups and How They Got There <ul style="list-style-type: none"> • Novel Ideas and What's Not. • Science to Technology – and, what's worthwhile. • Idea to a company? • <i>Written Reflection due</i> 	Start-up CEO
Week 7	Business Plans <ul style="list-style-type: none"> • Defining the components. • Business plans for different audiences. • Review of sample plans. • Resources for developing and writing plans. 	Instructor in-charge

Week 8	What you Should Know: Intellectual Property – Patents, Trademarks, Trade Secrets, Confidentiality, Materials Transfer agreements & Processes. <ul style="list-style-type: none"> • What you should know. • Stuff we've missed. • Case examples. • <i>Written Reflection due</i> 	Instructor in-charge and/or Guest
Week 9	A Perspective of Financial Aspects of Companies. <ul style="list-style-type: none"> • Annual Reports & Financial Statements and what they mean. • Venture Capital and Funding. • Marketing: Prices and where they come from • <i>Written Reflection due</i> 	
Week 10	Building the team: hiring, firing, and managing scientists (and other people) <ul style="list-style-type: none"> • Identifying needs & creating a culture. • Sustaining performance. • Compensation considerations. • <i>Assignment.</i> 	
Week 11	Build or Seek your own Opportunity (No class) <ul style="list-style-type: none"> • Initiate your own interest or opportunities. • Talk to opportunists. • Visit an established company, a start-up, or incubator facility. • Gain industry perspectives & what companies want. • Seek insight into corporate/start-up/incubator culture & management. • Experience how science moves from the bench to the marketplace • <i>Written Reflection due</i> • <i>Homework</i> 	Class On your own
Week 12 <i>Date/event is student's discretion & obligation.</i>	Network or Gain Insight from the Industry Leaders. <ul style="list-style-type: none"> • Attend one BIOCUM event, "In the Executive Chair" session offered by the Business School during the semester or alternative. Be ready to share findings next week. • See instructor for alternative options. Approval needed. • <i>Purpose of BIOCUM event is to network and learn about the industry. "In the Executive Chair provides insight from leaders."</i> 	
Week 13	Ethics – Biotech, Business & Innovation Ethics <ul style="list-style-type: none"> • What is an ethical dilemma? • R&D and Corporate Ethical ramifications. • Societal – Scientific advancement or fear of consequences. • Remedy considerations for novel development. 	M. McDuffie and/or Guest
Week 14	Assessing a Biotechnology Company from the Outside, Valuation	Instructor of Record
Week 15	Company Pitches/Business Plans	Instructor of Record & Teams

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Suggested Readings

1. The Entrepreneur's Guide to a Biotech Start-Up
http://www.evelexa.com/resources/EGBS4_Kolchinsky.pdf
2. Carter, N.M., Gartner, W.B. & Reynolds, P.D. Exploring start-up event sequences. *Journal of Business Venturing* **11**, 151–166, 1996.
3. Baron, R. & Shane, S. *Entrepreneurship: A Process Perspective* (South-Western Press, Mason, Ohio, 2004).
4. Formela, J.-F. Business models for the bioentrepreneur *Nat. Biotechnol., Bioentrepreneur Supplement* **16**, 16 (1998).
5. Gansa, J. & Stern, S. The product market and the market for "ideas": commercialization strategies for technology entrepreneurs. *Research Policy* **32**, 333–350 (2003).
6. Foller, A. Leadership management needs in evolving biotech companies. *Nat. Biotechnol., Bioentrepreneur Supplement* **20**, BE64–BE66 (2002).
7. Lehrer, M. & Asakawa, K. Pushing scientists into the marketplace: promoting science entrepreneurship. *California Management Review* **46**, 55–76 (2004).
8. Li, J. & Halal, W. Reinventing the biotech manager. *Nat. Biotechnol., Bioentrepreneur Supplement* **20**, BE61–BE63 (2002). | [Article](#) |
9. Roberts, E. *Entrepreneurs in High-Technology: Lessons from MIT and Beyond* (Oxford University Press, New York, 1991).
10. Reuber, R.A. & Fischer, E.M. Entrepreneurs' experience, expertise and the performance of technology-based firms. *IEEE Transactions on Engineering Management* **41**, 365–374 (1994).
11. Utterback, J., Meyer, M., Roberts, E. & Reitberger, G. Technology and industrial innovation in Sweden: a study of technology-based firms formed between 1965 and 1980. *Research Policy* **17**, 15–26 (1988).
12. Deeds, D., Decarolis, D. & Coombs, J. Dynamic capabilities and new product development in high technology ventures: an empirical analysis of new biotechnology firms. *Journal of Business Venturing* **15**, 211–229, 1999. | [Article](#) |
13. Defrancesco, L. Company founders: voices of experience. *Bioentrepreneur* 22 March 2004, DOI:10.1038/bioent796.

Internet Resources:

Fierce Biotech. www.fiercebiotech.com (free)

BIOCOM Website & BioCommunique Newsletter. www.biocom.org

Crowdfunding is Coming to Biotech, so Get Ready for a Wild Ride (Funding)

<http://www.xconomy.com/national/2013/01/28/crowdfunding-is-coming-to-biotech-so-get-ready-for-a-wild-ride>

Are you a value investor? Take the Apple test. (Finace, Valuation)

<http://aswathdamodaran.blogspot.com/2013/01/are-you-value-investor-apple-test.html>

Why The Series B is the “Sucker Round.” (Funding)
<http://robgo.org/2012/02/05/why-the-series-b-is-the-sucker-round/>

Healthcare's Medical Gluttony (Regulatory, Economics)
<http://www.forbes.com/sites/danmunro/2012/01/31/healthcares-medical-gluttony/>

How Doctors are Trapped (Economics)
http://healthblog.ncpa.org/how-doctors-are-trapped/?utm_source=twitterfeed&utm_medium=twitter

Working For a Biotech Start-Up (Entrepreneurship, Management)
<http://cen.acs.org/articles/88/i15/Working-Biotech-Start.html>

Testing the Waters of Economic Liberty (Regulatory, Economics)
http://www.washingtonpost.com/opinions/testing-the-waters-of-economic-liberty/2011/12/15/gIQAP0NDzO_print.html

Life Sciences 2031: What about 2011? (Biotech Industry, Clinical Development)
<http://www.xconomy.com/new-york/2011/10/20/life-sciences-2031-what-about-2011/>

Far From Any Lab, Paper Bits Find Illness (Entrepreneurship)
http://www.nytimes.com/2011/09/27/health/27paper.html?partner=rss&emc=rss&_r=0

Present Your Business with Six Slides (Communication, Entrepreneurship)
http://www.avc.com/a_vc/2010/06/six-slides.html

When Zinc Fingers Miss the Mark (Drug Development, Innovation)
<http://www.the-scientist.com/?articles.view/articleNo/31007/title/When-Zinc-Fingers-Miss-the-Mark-/>

Business Exits in Biotech (Business Strategy, Development, Biotech, Venture)
http://www.svb.com/pdfs/report-biopharma_July11/

Biotech Executive's Pay Premium vs. Tech: more cash, less equity (Management, Compensation)
<http://lifescivc.com/2011/07/biotech-executives-pay-premium-vs-tech-more-cash-less-equity/>

Biotech Sector Breaks Its Own Record (Funding)
<http://www.signalsmag.com/signalsmag.nsf/0/C706DECAFD78AF6E8825781C006F4BE1>

M&A Activity Remains Important for Building Pipeline and Bottom Line (Mergers & Acquisitions)
<http://www.genengnews.com/analysis-and-insight/m-a-activity-remains-important-for-building-pipeline-and-bottom-line/77899417/>

Genome Sequencing (Entrepreneurship, Biotechnology)
<http://www.genomesunzipped.org/2010/09/basics-second-generation-sequencing.php>

Thoughts on Intrinsic Value (Finance)
<http://aswathdamodaran.blogspot.com/2011/06/thoughts-on-intrinsic-value.html>

The Most Innovative Countries In Biology and Medicine (Development, Entrepreneurship, Biotechnology)
<http://www.forbes.com/sites/matthewherper/2011/05/25/the-most-innovative-countries-in-biology-and-medicine-2/>

Study calls FDA a drag on innovation (Regulatory)
<http://www.startribune.com/business/122497299.html?refer=y>

The Rise of Backyard Biotech (Entrepreneurship)
<http://biot4180.weebly.com/additional-reading.html>

Medallion system shackles cabbies (Economics, Entrepreneurship)
<http://www.bostonglobe.com/opinion/2012/03/11/medallion-system-shackles-cabbies/vFI0baUOzPqYiZagOJ6eaJ/story.html>

Columbia University Trustees Sue Illumina Over Patents (IP, Patents)
<http://www.bloomberg.com/news/2012-03-26/columbia-university-trustees-sue-illumina-over-dna-patents-1-.html>

4 To-Dos for the “Someday” Entrepreneur (Student Recommendation)
<http://www.forbes.com/sites/dailymusc/2012/03/07/4-to-dos-for-the-someday-entrepreneur/>

4 Lessons for Aspiring Entrepreneurs - from the Women Who’ve Been There (Student Recommendation) <https://www.themuse.com/advice/4-lessons-for-aspiring-entrepreneursfrom-the-women-whove-been-there>

Virtues of Differing Biotech Worldviews (Biotechnology, Business Model, Platforms)
<http://lifescivc.com/2012/03/virtues-of-differing-biotech-worldviews>

In Manhattan Pizza War, Price of Slice Keeps Dropping (Economics, Pricing, Business Models)
http://www.nytimes.com/2012/03/31/nyregion/in-manhattan-pizza-war-price-of-slice-keeps-dropping.html?_r=1&pagewanted=all?src=tp

The Evolution of Biotech VC Funding (Funding, VC)
<http://www.lifescienceleader.com/magazine/current-issue-3/item/4076-the-evolution-of-biotech-vc-funding>