

Special Topics Course

Business of Healthcare and Biotechnology

MET College CS 582 (listed as CS 593 for Spring 2024) On Campus,
Thursdays 3:30 – 6:15pm Classroom EPC 204 (750 Commonwealth Ave)

John D'Amore, MS

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Office hours: by appointment

Course Description

The course introduces basic business concepts in biomedical, biotech and health information technology entrepreneurship and provides a hands-on experience in creating, proposing and justifying a business model for a healthcare or a biotech startup. Foundational study and research of entrepreneurship, business models, international healthcare systems and innovation compose the first three modules of the course. For the final three modules, students work in teams to propose founder roles, business ideas and analysis leading to a business plan. After providing market needs and competitive analysis of proposals, they visualize and assess overall business models, including strengths, weaknesses, opportunities and threats analysis. Finally, they present their business models including the empathy map and the canvas blocks, defending their business proposal.

Prerequisites: None

Required Books

- Shimasaki, Craig. Biotechnology Entrepreneurship. 2nd Edition, 2020. ISBN: 978-0-12-815585-1. Amazon Link: <https://www.amazon.com/Biotechnology-Entrepreneurship-Commercializing-Innovative-Technologies/dp/012815585X>
- Emanuel, Ezekiel J. Which Country Has the World's Best Health Care? 2020. ISBN: 978-1541797734 Amazon Link: <https://www.amazon.com/Which-Country-Worlds-Best-Health/dp/1541797736>

Optional Books:

- Ness, Roberta B. Innovation Generation: How to Produce Creative and Useful Scientific Ideas. New York: Oxford University Press, 2012. <https://www.amazon.com/Innovation-Generation-Produce-Creative-Scientific/dp/0199892598>

Course Information and Website

Information: <https://www.bu.edu/academics/met/courses/met-cs-593/>

BU Learn: TBD

BU Community COVID-19 Public Health Policies

Boston University requires COVID-19 vaccinations and booster shots for students, faculty, staff, and affiliates. Campus-wide vaccination and boosters are the best defense against severe disease within our community. Facemasks will follow BU policies. At the time of writing, they are recommended but not required. See <https://www.bu.edu/shs/covid-19/face-masks/>

Instructor Information

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John D'Amore has over twenty years' experience in healthcare, health IT and medical informatics. Currently, Mr. D'Amore is the President of More Informatics. Previously, he was Co-Founder, President and CTO of Diameter Health, Inc., a software company focused on data integrity and normalization to improve the clinical, operational and financial performance of health providers. The company drew on his research on medical interoperability standards. The company raised over \$30 million in venture capital and was successfully acquired by Availity, Inc. in 2022. Prior to that, Mr. D'Amore served as Vice President at Allscripts where he was instrumental in the technical and strategic development of Best-in-KLAS software. Previously, Mr. D'Amore was Director of Decision Support with Memorial Hermann Healthcare System and a consultant to the biotechnology and medical device industries.

Mr. D'Amore earned a master's degree in clinical informatics from the University of Texas School of Biomedical Informatics, and a bachelor's degree in biochemistry from Harvard College. Mr. D'Amore research in medical informatics has been published in peer-reviewed journals, such as the *Journal of the American Medical Informatics Association*, *Applied Clinical Informatics*, the *American Journal of Public Health* as well as other journals. Mr. D'Amore has presented at national conferences such as NCQA, HIMSS and Medical Informatics World and regularly serves as consultant and invited speaker on health information technology.

Grading Criteria

The final grade for this course will be based on the following:

- **Quizzes (25%):** In class quizzes based on assigned reading
- **Discussions (25%):** In class attendance, participation and email communications
- **Assignments (10%):** Empathy map (individually submission), business canvas (group submission) and SWOT analysis (group submitted) for planned final project topic
- **Final Project (40%):** 10-15 minute oral presentation and submission of pitch deck and business plan.

Class Meetings, Lectures & Assignments *(Guest Lecture Dates May Change)*

Date	Topic	Readings Due	Assignments Due
January 18	Module 1	Begin reading for Feb 1	n/a
January 25	Module 1	Continue reading for Feb 1	n/a
February 1	Module 1 & 2	Emanuel, Intro + US (Ch 1) Shimasaki, Chapters 1-4,	Quiz 1
February 8	Module 2	Shimasaki Chapters 10-14, 16, 22	Quiz 2
February 15	Module 2 & 3	Emanuel, UK & France (Ch 3 & 5) Shimasaki Chapter 13, 15, 17-19	Quiz 3
February 22	Module 3	VIRTUAL CLASS Innovation Case Studies (professor to send)	n/a
February 29	Guest Lecture (Kleinmann) Module 4	Emanuel, Netherlands, Taiwan and China (Ch 7, 10 & 11)	Quiz 4
March 7	Module 5	Shimasaki Chapter 7-8, 20-21	Quiz 5
March 14	Spring Break No Class	n/a	n/a
March 21	Module 5 & 6	Shimasaki Chapter 23, 30	Quiz 6
March 28	Guest Lecture Module 6	Shimasaki Chapter 22	Group Selection
April 4	Module Review & Business Planning	Pitch Deck and Case Studies (professor to send)	Assignment: Empathy Map
April 11	Module Review & Business Planning	n/a	Assignment: Business Canvas
April 18	Module Review & Business Planning	n/a	Assignment: SWOT Analysis
April 25	Guest Panel Oral Presentations	n/a	Final Project: Presentation & Business Plan

CLASS MODULES

PART 1 – THEORETICAL FOUNDATIONS

MODULE 1: THE HEALTHCARE AND BIOTECHCOMPANY

1. Introduction and current situation of healthcare, biotech and biomedical companies.
2. Types of companies, corporate structure and intellectual property.
3. Fundraising and lifecycle of healthcare and biotechnology companies
4. Leadership, business culture and creating successful human networks.

MODULE 2: CREATION OF HEALTHCARE AND BIOTECH COMPANIES

5. What is entrepreneurship? Entrepreneurial skills
6. Business ideas in healthcare, biotech and biomedical engineering. Overview of regulatory framework for healthcare and biotechnology companies.
7. Methodologies to create a startup: Business Model Canvas and lean startup.
8. Business models & risk management of healthcare, biotech and biomedical companies.

MODULE 3: STRATEGY AND MANAGEMENT OF INNOVATION

9. What is innovation? How does innovation intersect with various health systems internationally?
10. Innovation in product and design thinking
11. Strategy, management and marketing of healthcare innovation.
12. Technology transfer (Patents in US and internationally)
13. Open innovation, ecosystem development and advice for entrepreneurs

PART 2 - PROGRAM OF PRACTICES: GENERATION OF BUSINESS MODELS

MODULE 4: EXERCISE OF DIVERGENCE AND CONVERGENCE AND EMPATHY MAP

DIVERGENCE AND CONVERGENCE

In groups, the students propose different business ideas (divergence) that could be of interest in the biotechnology/ biomedical engineering sector. Between them, they carry out an analysis of the potentialities of the different business ideas generated until they reduce their proposals to a single one (convergence).

EMPATHY MAP

The groups should identify the different segments of potential customers and make a map of empathy with these, which help the business definition and validation of potential customers. This includes exploring the following variables:

- What do the customers see: what is the current environment? What proposals are already offered by the market?
- What do customers say and do? What is their attitude of public and social media, what does it look like?
- What do the customers hear: What do friends, family, medical providers, employers and influential people say?
- What do customers think and feel? What really matters to them and how does your business relate to their concerns, dreams and aspirations.

From these four you get two more:

- What are the efforts they make and what do they fear? Which are the established barriers to block what they want to obtain? What risks will and won't be assumed?
- Results and benefits expected to obtain from new product or business: What are the largest customer needs or desires? How do they measure success and what does it depend on?

MODULE 5: CANVAS. The groups will work with the "canvas" model of Alex Osterwalder for the definition of the business idea. Alex Osterwalder designed the Business Model Canvas; a format that visualizes the business model according to nine fields in only one 'sheet', resulting in a document that directly offers a global vision (the 'helicopter view') of the business idea, clearly showing the interconnections between the different elements.

1. Clients: The groups of people to whom you want to offer the product / service.
2. Value proposal: It deals with the "pain statement" that we solve for the client and how we respond with the products and / or services the initiative. Explain the product / service offered to customers
3. Distribution channels: It focuses on how the value proposal is delivered to customers (to each segment). It is to determine how to communicate, reach and deliver the value proposal to customers.

4. Relations with customers: one of the most critical aspects in the success of the business model and one of the most complex to make tangible. There are different types of relationships that can be established
5. Sources of income: Represent the way in which the company generates revenue for each client. Income can be direct or indirect, in a single payment or recurrent
6. Key resources: The most important resources necessary for the operation of the business are described, as well as type, quantity and intensity
7. Key activities: In order to deliver the value proposal, a series of internal key activities must be developed (production processes, marketing, etc.)
8. Key alliances: The necessary alliances are defined to execute the business model with guarantees that complement the capacities and optimize the value proposition: co-creation is essential in today's business
9. Cost structure: Describes all the costs incurred when operating the business model. It's about knowing and optimizing costs to try to design a sustainable, efficient and scalable business model

MODULE 6: SWOT ANALYSIS

The groups will prepare a “SWOT” analysis of their business model, identifying strengths, weaknesses, opportunities and threats. The exercise serves to perform an analysis of the internal and external factors from which the strategy of differentiation in the market would be designed

FINAL EXAM: ORAL PRESENTATION

The groups will conduct oral presentations of their business models. They should make an exhibition based on a PowerPoint presentation or Prezi of the business model, including how they would pitch the idea to investors. Each group member will adopt a role of a founder in the proposed startup. Presentations should include at a minimum: Company Purpose and Mission, the Problem Statement, Proposed Technology or Product Solutions, Intellectual Property Plan, Target Market (e.g. major points from Empathy Map), Business Model (based on Business Canvas), and Financing Ask.

CLASS POLICIES

1) Attendance & Absences –

Students should plan to attend all classes in-person (see “Class Meetings, Lectures & Assignments”). If an absence is necessary, please plan with course professor in advance.

2) Assignment Completion & Late Work

All quizzes and assignments have to be submitted by the due dates. Each 24 hours of delay will result in 10% penalty unless rescheduling has been permitted by course instructor. Class projects need to be completed and presented by the due date.

3) Academic Conduct Code

For the full text of the academic conduct code, please go to <http://www.bu.edu/met/for-students/met-policies-procedures-resources/academic-conduct-code/>.

A Definition of Plagiarism

“The academic counterpart of the bank embezzler and of the manufacturer who mislabels products is the plagiarist: the student or scholar who leads readers to believe that what they are reading is the original work of the writer when it is not. If it could be assumed that the distinction between plagiarism and honest use of sources is perfectly clear in everyone’s mind, there would be no need for the explanation that follows; merely the warning with which this definition concludes would be enough. But it is apparent that sometimes people of goodwill draw the suspicion of guilt upon themselves (and, indeed, are guilty) simply because they are not aware of the illegitimacy of certain kinds of “borrowing” and of the procedures for correct identification of materials other than those gained through independent research and reflection.”

“The spectrum is a wide one. At one end there is a word-for-word copying of another’s writing without enclosing the copied passage in quotation marks and identifying it in a footnote, both of which are necessary. (This includes, of course, the copying of all or any part of another student’s paper.) It hardly seems possible that anyone of college age or more could do that without clear intent to deceive. At the other end there is the almost casual slipping in of a particularly apt term which one has come across in reading and which so aptly expresses one’s opinion that one is tempted to make it personal property.”

“Between these poles there are degrees and degrees, but they may be roughly placed in two groups. Close to outright and blatant deceit-but more the result, perhaps, of laziness than of bad intent-is the patching together of random jottings made in the course of reading, generally without careful identification of their source, and then woven into the text, so that the result is a mosaic of other people’s ideas and words, the writer’s sole contribution being the cement to hold the pieces together. Indicative of more effort and, for that reason, somewhat closer to honest, though still dishonest, is the paraphrase, and abbreviated (and often skillfully prepared) restatement of someone else’s analysis or conclusion, without acknowledgment that another person’s text has been the basis for the recapitulation.”

The paragraphs above are from H. Martin and R. Ohmann, *The Logic and Rhetoric of Exposition*, Revised Edition. Copyright 1963, Holt, Rinehart and Winston.

Academic Conduct Code

I. Philosophy of Discipline

The objective of Boston University in enforcing academic rules is to promote a community atmosphere in which learning can best take place. Such an atmosphere can be maintained only so long as every student believes that his or her academic competence is being judged fairly and that he or she will not be put at a disadvantage because of someone else's dishonesty. Penalties should be carefully determined so as to be no more and no less than required to maintain the desired atmosphere. In defining violations of this code, the intent is to protect the integrity of the educational process.

II. Academic Misconduct

Academic misconduct is conduct by which a student misrepresents his or her academic accomplishments, or impedes other students' opportunities of being judged fairly for their academic work. Knowingly allowing others to represent your work as their own is as serious an offense as submitting another's work as your own.

III. Violations of this Code

Violations of this code comprise attempts to be dishonest or deceptive in the performance of academic work in or out of the classroom, alterations of academic records, alterations of official data on paper or electronic resumes, or unauthorized collaboration with another student or students. Violations include, but are not limited to:

- A. Cheating on examination. Any attempt by a student to alter his or her performance on an examination in violation of that examination's stated or commonly understood ground rules.
- B. Plagiarism. Representing the work of another as one's own. Plagiarism includes but is not limited to the following: copying the answers of another student on an examination, copying or restating the work or ideas of another person or persons in any oral or written work (printed or electronic) without citing the appropriate source, and collaborating with someone else in an academic endeavor without acknowledging his or her contribution. Plagiarism can consist of acts of commission-appropriating the words or ideas of another-or omission failing to acknowledge/document/credit the source or creator of words or ideas (see below for a detailed definition of plagiarism). It also includes colluding with someone else in an academic endeavor without acknowledging his or her contribution, using audio or video footage that comes from another source (including work done by another student) without permission and acknowledgement of that source.
- C. Misrepresentation or falsification of data presented for surveys, experiments, reports, etc., which includes but is not limited to: citing authors that do not exist; citing interviews that never took place, or field work that was not completed.
- D. Theft of an examination. Stealing or otherwise discovering and/or making known to others the contents of an examination that has not yet been administered.
- E. Unauthorized communication during examinations. Any unauthorized communication may be considered *prima facie* evidence of cheating.

- F. Knowingly allowing another student to represent your work as his or her own. This includes providing a copy of your paper or laboratory report to another student without the explicit permission of the instructor(s).
- G. Forgery, alteration, or knowing misuse of graded examinations, quizzes, grade lists, or official records of documents, including but not limited to transcripts from any institution, letters of recommendation, degree certificates, examinations, quizzes, or other work after submission.
- H. Theft or destruction of examinations or papers after submission.
- I. Submitting the same work in more than one course without the consent of instructors.
- J. Altering or destroying another student's work or records, altering records of any kind, removing materials from libraries or offices without consent, or in any way interfering with the work of others so as to impede their academic performance.
- K. Violation of the rules governing teamwork. Unless the instructor of a course otherwise specifically provides instructions to the contrary, the following rules apply to teamwork: 1. No team member shall intentionally restrict or inhibit another team member's access to team meetings, team work-in-progress, or other team activities without the express authorization of the instructor. 2. All team members shall be held responsible for the content of all teamwork submitted for evaluation as if each team member had individually submitted the entire work product of their team as their own work.
- L. Failure to sit in a specifically assigned seat during examinations.
- M. Conduct in a professional field assignment that violates the policies and regulations of the host school or agency.
- N. Conduct in violation of public law occurring outside the University that directly affects the academic and professional status of the student, after civil authorities have imposed sanctions.
- O. Attempting improperly to influence the award of any credit, grade, or honor.
- P. Intentionally making false statements to the Academic Conduct Committee or intentionally presenting false information to the Committee.
- Q. Failure to comply with the sanctions imposed under the authority of this code.

Disability Services

In accordance with University policy, every effort will be made to accommodate unique and special needs of students with respect to speech, hearing, vision, or other disabilities. Any student who feels he or she may need an accommodation for a documented disability should contact the Office of Disability Services (<http://www.bu.edu/disability>) at (617) 353-3658 or at access@bu.edu for review and approval of accommodation requests.

Etiquette and Netiquette

Before posting to any discussion forum, sending email, or participating in any course or public area, please consider the following:

Ask Yourself...

- How would I say this in a face-to-face classroom or if writing for a newspaper, public blog, or wiki?
- How would I feel if I were the reader?
- How might my comment impact others?
- Am I being respectful?

- Is this the appropriate area or forum to post what I have to say?

When you are speaking or writing, please follow these rules:

- Stay polite and positive in your communications. You can and should disagree and participate in discussions with vigor; however, when able, be constructive with your comments.
- Proofread your comments before you post them. Remember that your comments are permanent.
- Pay attention to your tone. Without the benefit of facial expressions and body language your intended tone or the meaning of the message can be misconstrued.
- Be thoughtful and remember that classmates' experience levels may vary. You may want to include background information that is not obvious to all readers.
- Stay on message. When adding to existing messages, try to maintain the theme of the comments previously posted. If you want to change the topic, simply start another thread rather than disrupt the current conversation.
- When appropriate, cite sources. When referencing the work or opinions of others, make sure to use correct citations.

When you are reading your peers' communication, consider the following:

- Respect people's privacy. Don't assume that information shared with you is public; your peers may not want personal information shared. Please check with them before sharing their information.
- Be forgiving of other students' and instructors mistakes. There are many reasons for typos and misinterpretations. Be gracious and forgive other's mistakes or privately point them out politely.
- If a comment upsets or offends you, reread it and/or take some time before responding.

Important Note

Don't hesitate to let your instructor or student services coordinator know if you feel others are inappropriately commenting in any forum.

All Boston University students are required to follow academic and behavioral conduct codes. Failure to comply with these conduct codes may result in disciplinary action.