

Hands-on Rapid Prototyping - UGBA 290T

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<p>Haas Innovation Lab, Memorial Stadium Haas Business School, U.C. Berkeley</p>	<p>Office Hours: by appointment only</p>
<p>Mon 4:10-6p</p>	<p>GSIs:</p>

A. DISCLAIMER

This class is hard. It's a 1.0 unit class, but it should be treated like a 2.0 unit workload for just 8 weeks. If you're serious about entrepreneurship / intrapreneurship, this class is for you. The activities and learnings are pulled from real-world entrepreneurial experiences and map to the joy, pain and hard-work experienced by successful startup founders. If you immerse yourself in the class, the content and most importantly your weekly prototyping submissions, you will leave with a high-value experience that will either change your career trajectory OR simply give you a meaningful story about how you built something...giving ample discussion-worthy content in your job interviews, networking events, etc.

The only prerequisite to this class is your relentless motivation to uncover the truth about your market opportunities via the scientific method and prototyping in a business context.

B. SUMMARY

Many people have great ideas but seldom act on them. This Hands-on Rapid Prototyping course aims to equip students with the tools and insights to quickly test their ideas with prototypes and capturing feedback. To realize these objectives, students will take part in hands-on activities, become familiar with the latest prototyping tools and leverage the Rapid Innovation Cycle (RIC), an iterative process that innovates on new or pre-existing, product or service concepts.

C. COURSE OBJECTIVES

1. Empower students to rapidly transcend from "I have a great idea" to "I have a great and growing product that has real customer data."
2. Upon completion, students should have robust product development and prototyping toolkits
3. A strong understanding of how to measure the market potential of a vast array of business opportunities.

D. HANDS-ON ACTIVITIES

Every course will start with a hands-on activity that is meant to challenge you and your teams into new ways of thinking and approaching problems. They're designed to get you out of your comfort zone. Their duration is typically 5-7 minutes with a short debrief to discuss the learning objectives.

You need to arrive on time in order to participate in these activities. They last for approximately 15 minutes only and you will be evaluated on your successful participation in the activity, not necessarily the outcome. These exercises are to stress various skills and mindsets found commonly in entrepreneurs (problem solving, constraints, pressure, discomfort, failure, etc.).

Contribute with an open mind, a concentrated effort and a positive attitude and you'll do fine in these activities.

E. ASSIGNMENTS, DUE DATES / TIMES AND MAKE UP ASSIGNMENTS

No makeup assignments. No late submissions. All assignment due dates and times are found on Bcourses. Use bCourses as your single source of truth.

F. COURSE COMMUNICATIONS

- For general course questions, commentary on prototyping:
 - Rapid Innovation Cycle (RIC) Slack Channel linked-to on the prototyping resources page: <https://prototype.berkeley.edu/resources/>. Here, the teaching team can answer questions at scale to the rest of the class and you can start discussions amongst your peers. This is THE FASTEST way to communicate with the teaching team.
 - Bcourses forums or any other student learning management system provided by U.C. Berkeley or Haas.
- For student-specific, course-instance specific concerns:
 - A GSI (if available)
 - The instructor (both email and phone are at the top of the syllabus).

G. EVALUATION

There are:

- A. **Eight (8) total "Prototype Now" submissions** during the course, each worth 25 points, for a grand total of 200 points. You can access the details and submit these assignments here: <http://bit.ly/prototype-now>
- B. **Eight (8) In-class participation assignments** in Bcourses, each worth a total of 5 points (of which you get 3 points just for showing up). For a grand total of 40 points. You will be scored just before the start of the next class.
- C. **Therefore, a total of 240 points are possible in this course, however 100% completion = 210 points.** This implies that (1) "Prototype Now" assignment and one (1) In-class participation score will be dropped. Therefore, only 210 points are required to earn 100% of the points possible. The highest possible score in the class is 240 / 210 or 114%, giving you the flexibility to miss a class or a submission.
- D. **The course is however always graded on a curve** and you'll be competing with your classmates. Life and business works this way too.

H. DETAILS ON EVALUATION:

<p>The final grading breakdown, assignment rubrics and all other scoring is at the sole discretion of the teaching team and can be changed at anytime with or without notice.</p> <p>Although the teaching team will strive to follow this syllabus and Bcourses workplan; the final grading structure, format and learner evaluations can change at anytime in an effort to create fair and optimal learning outcomes that both map to real-world entrepreneurial experiences and adjust for any unexpected circumstances that are encountered during the course.</p>	
<p>I. IN-CLASS PARTICIPATION - is what it sounds like. You need to be present to participate. Asking good questions and offering opinions are part of what makes a healthy classroom dynamic. If you can positively answer, “yes” to the following question:</p> <p>“will my comment or question add value to the course or the learning experience of others?”</p> <p>...then these are the types of comments / questions we’re looking for. It is your job to ensure the teaching team has fully captured the value of your in-class / out-of-class commentary and insights.</p>	
<p>J. ABSENCES - You will be penalized for unexcused absences and late arrivals (via your Class Participation scores). We have such little time together, there is no doubt that our learning goals for you will be impacted if you miss any class or portion thereof.</p> <p>If you are in doubt about any absence or late arrival, email a written letter, signed by an authority and saved as PDF to formally document the absence so the teaching team can fairly process amongst your peers who attend all the sessions.</p>	
<p>K. PROTOTYPATHON - LAST DAY OF CLASS - IN CLASS SUBMISSION</p> <p>The last day of class will be informally known as the “PROTOTYPATHON”. You will execute a prototype of your choosing during class time in order to demonstrate your mastery of the prototyping tools and philosophies articulated in this course. There <i>*may*</i> be prompts to help you kickstart your day of prototyping, there <i>*may*</i> be mystery / prototyping tools / materials that you’ll be required to use in your PROTOTYPATHON submission. The evaluation criteria will be exactly the same as all prior “Prototype Now” submissions. If you’ve done well on the weekly Prototype Now submissions and have done the work to improve your iterative prototyping skills, you’ll do just fine during the PROTOTYPATHON.</p>	
<p>L. CLASS STRUCTURE</p> <p>Use of technology is permitted so long as it is focused and / or related to the course / topics / lecturers / content / etc. We understand tablet PCs, smartphones and other gadgets can be enabling. We’ll permit the use of these devices until we reach a point where we believe the use is distracting to the teaching team or the surrounding students. IT IS ALSO YOUR RESPONSIBILITY TO INFORM THE TEACHING TEAM IF ONE OR MORE STUDENTS TECHNOLOGY USE BECOMES DISTRACTING.</p>	
<p>M. ACADEMIC HONESTY</p> <p>All students should be familiar with the Code of Student Conduct and know that the general rules and student rights stated in that document apply to this class (know and understand the policies found here: https://sa.berkeley.edu/conduct/integrity).</p>	

Cheating on homework, projects or the final exam may result in a failing grade for the entire course. In all cases of alleged cheating, your actions will also be reported to the Office of Student Conduct for administrative review.

N. TENTATIVE SCHEDULE

Class	Date	Learning Objective(s)	1st half (50 min)	2nd Half (60 min)	ALL Assignments Due at 4:10pm same day of class unless otherwise noted*
#1		Topics <ul style="list-style-type: none"> Overview of course and expectations for class Review the design-thinking processes / PFPS Introduce the iterative, Rapid Innovation Cycle (RIC) process Define “prototyping” in the context of business. 	20 min Hands-on Activity and Introductions 20 min Overview, expectations and motivation for class 20 min Review of the design-thinking process and iteration 10 min Q&A	40 min Introduction to the Rapid Innovation Cycle (RIC): opportunity recognition, solution selection 20 min Wrap-up/open discussion	1. In-class Participation - Week 1
#2		<ul style="list-style-type: none"> Continue the iterative, Rapid Innovation Cycle (RIC) process Define “prototyping” in the context of business. 		30 min Rapid Innovation Cycle (RIC) continued: market experiment, and experimental results 20 min Teams present prototypes to class in 1 min presentations	2. Prototype Now Week 1 submission 3. In-class Participation - Week 2 4. Pre-course Survey 5. Signed Syllabus
#3		Topics <ul style="list-style-type: none"> Hardware Prototyping Digital Fabrication Emphasis 3D Printing Intro to basic 3D modeling (CAD) Intro to basic 3D printing 	10 min Hands-on Activity 10 min Why build hardware prototypes and how to get started. 30 min Examples of Digital Fabrication and Prototypes 20 min Rapid Learning of CAD + 3D Printing to enable hardware market testing.	50 min Activity: Generate a physical part using Haas Innovation Lab 3D Printers 10 min Wrap-up/open discussion	6. Prototype Now Week 2 submission 7. In-class Participation - Week 3

			TinkerCAD, Cura and Repetier		
#4		Topics <ul style="list-style-type: none"> • Software Prototyping • Web applications • Mobile applications • Collecting data from your prototypes 	10 min Hands-on Activity 20 min Overview of Software Prototyping Tools 20 min Gaging interest Software prototyping examples 20 min Activity: quick paper prototype of mobile or webapp	20 min Review prior Hands-on Rapid Prototyping prototyping successes / failures 20 min Activity: Market feedback on a software prototype 20 min Wrap-up/open discussion Class Representative Audit / Survey	8. Prototype Now Week 3 submission 9. In-class Participation - Week 4
#5		Topics <ul style="list-style-type: none"> • Introduction to Outsourcing, Crowdsourcing and Crowdfunding • Fabricate a prototype for testing • The 4D Prototype • A/B Testing 	10 min Hands-on Activity 20 min Outsourcing, Crowdsourcing and Crowdfunding 20 min Kickstarter Example: RaverRings 20 min Outsource some aspect of this course	25 min Storyboard a viral video 35 min Wrap-up / open discussion / work on weekly prototype submissions	10. Prototype Now Week 4 submission 11. In-class Participation - Week 5
#6		Topics <ul style="list-style-type: none"> • Conciernging • Service prototyping 	20 min Hands-on Activity 20 min Conciernging and Service prototyping Overview 20 min Outsource some aspect of this course	30 min Conciernging and Service prototyping 30 min Wrap-up / open discussion / work on weekly prototype submissions	12. Prototype Now Week 5 submission 13. In-class Participation - Week 6
#7		Topics <ul style="list-style-type: none"> • PROTOTYPATHON Logistics • Innovating in a Corporate Environment 	10 min Hands-on Activity 10 min PROTOTYPATHON Logistics + Q&A 40 min	20 min Team reports 30 min Work in teams + coaching sessions 10 min	14. Prototype Now Week 6 submission 15. In-class Participation - Week 7

			Innovating in a Corporate Environment	Wrap-up/open discussion	
#8		Topics <ul style="list-style-type: none"> ● PROTOTYPATHON SPRING 2020 	60 min PROTOTYPATHON	50 min PROTOTYPATHON Cont'd 10 min PROTOTYPATHON Wrap	16. Prototype Now Week 7 submission 17. Prototype Now Week 8 submission - PROTOTYPATHON : DUE AT 6PM IN CLASS 18. In-class Participation - Week 8 + MANDATORY TIES SURVEY DUE TODAY

O. OPTIONAL READINGS AND MEDIA:

<https://prototype.berkeley.edu/resources/readings/>

The most up-to-date links and other media will be found at the website above.

While not required, these references are important readings if you want to increase your success in entrepreneurship or intrapreneurship:

#	Title	Authors	Date	Format	Topic	Reference Comment
1	The Rapid Innovation Cycle - An innovation and market testing process for new products and services development	McCoy, C.D., Chagpar, Z., Tasic, I	2012	Article	Entrepreneurship	Market experimentation process which is the foundation for Hands-on Rapid Prototyping
2	The 4-hour Work Week	Tim Ferriss	2007	Book	Entrepreneurship	Rethink what it means to be "Rich". The "New Rich" value time and experiences...not money.
3	Innovation as a Learning Process: Embedding Design Thinking, 2007	Sara L. Beckman and Michael Barry	2007	Article	Innovation	Pioneer of Innovation as a Learning Process. Most of all the frameworks discussing innovation involve some aspect of the frameworks presented in this article.

4	The Lean Startup	Eric Ries	2011	Book	Entrepreneurship	Build, test, learn. It's that simple; which is what makes it so powerful.
5	Design a Better Business	Patrick van der Pijl, Justin Lokitz, and Lisa Kay Solomon Designed by Erik van der Pluijm & Maarten van Lieshout	2016	Book	Innovation	These people know how to innovate around business models and kickstart new products / services.
6	The Startup Owner's Manual	Steve Blank and Bob Dorf	2012	Book	Entrepreneurship	A reference manual for how to build your startup
7	How to Start a Startup	Altman, Sam	2014	Video	Entrepreneurship	Words of wisdom from those who have been in the startup trenches. Video Series by Sam Altman + Guest Speakers
8	Shoe Dog: A Memoir by the Creator of Nike	Phil Knight	2016	Book	Entrepreneurship	The amazing story of Phil Knight and how he built the Nike empire.
9	Measure What Matters	John Doerr	2017	Book	Management	Powerful story on Objectives and Key Results aka, OKRs. The tool Google used and continues to use to manage extraordinary business progress
10	The E-Myth Revisited: Why Most Small Businesses Don't work and What to Do About It	Michael Gerber	1986	Book	Entrepreneurship	Dated examples, but process and structural framework of a "franchise prototype" is helpful to get some entrepreneurs "unstuck" from being the "eternal technician".

For more recommended reading and other tools, check out this link:

<http://bit.ly/rapid-prototyping-tools>

P. Professor Bio: Chris D. McCoy, Ph.D.

Chris is the founder and CEO of You3Dit Inc., a global design engineering and rapid prototyping company with a mission to help anyone transform a sketch into parts and prototypes. Chris earned his Ph.D. in mechanical engineering at the University of California, Berkeley in 2013. While researching small-scale fuel-flexible

engines, he also completed the Management of Technology Program (MOT) at the Haas School of Business and received his Masters Degree in Mechanical Engineering Design; both from U.C. Berkeley. On top of growing his business, Chris teaches graduate students about precision manufacturing & sustainable manufacturing in UC Berkeley's mechanical engineering department, MBA students about rapid prototyping principles & innovation at the Haas School of Business & I.E. Business School and 1000s of learners online through MIT's program on Additive Manufacturing for Innovative Design and Production.

Q. SYLLABUS REVIEW

Instructor Signature

Student Signature

Printed Name

CHRIS D. MCCOY

Printed Name

Date Signed

Date Signed
