

Hands-on Rapid Prototyping - FTMBA 290T

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Haas Innovation Lab, Memorial Stadium
Haas Business School, U.C. Berkeley

Th 8:10-11a (8/29, 9/5, 9/12, 9/19, 9/26)

Office Hours: by appointment only

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| <p>A. DISCLAIMER</p> <p>This class is hard. It's a 1.0 unit class, but it should be treated like a 3.0 unit workload for just 5 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.</p> <p>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.</p> | |
| <p>B. SUMMARY</p> <p>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.</p> | |
| <p>C. COURSE OBJECTIVES</p> <ol style="list-style-type: none">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." | |

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| <ol style="list-style-type: none"> 2. By the end of the course, students should have a robust product development toolkit and 3. A strong understanding of how to measure the market potential of a vast array of business opportunities. | |
| <p>D. HANDS-ON ACTIVITIES</p> <p>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.</p> <p>You need to arrive <u>on time</u> 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, etc.).</p> <p>Contribute with an open mind, a concentrated effort and a positive attitude and you'll do fine in these activities.</p> | |
| <p>E. ASSIGNMENTS, DUE DATES / TIMES AND MAKE UP ASSIGNMENTS</p> <p>No makeup assignments. No late submissions. All assignment due dates and times are found on Bcourses. Use bCourses as your single source of truth.</p> | |
| <p>F. COURSE COMMUNICATIONS</p> <ul style="list-style-type: none"> ● For general course questions, commentary on prototyping: <ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ A GSI (if available) ○ The instructor (both email and phone are at the top of the syllabus). | |
| <p>G. EVALUATION</p> <p>There are:</p> | |

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| <p>A. Five (5) total “Prototype Now” submissions during the course, each worth 25 points, for a grand total of 125 points. You can access the details and submit these assignments here: http://bit.ly/prototype-now</p> <p>B. Six (6) 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 30 points. You will be scored just before the start of the next class.</p> <p>C. Therefore, a total of 155 points are possible in this course, however 100% completion = 125 points. This implies that (1) “Prototype Now” assignment and one (1) In-class participation score will be dropped. Therefore, only 125 points are required to earn 100% of the points possible. The highest possible score in the class is 155 / 125 or 124%, giving you the flexibility to miss a class or a submission.</p> <p>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.</p> | |
| <p>H. DETAILS ON EVALUATION: 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 plan; the final grading structure, format and learner evaluations can change at anytime in an effort to create fair and optimal learning outcomes that map to real-world entrepreneurial experiences.</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> | |

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| <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 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 *may* be prompts to help you kickstart your day of prototyping, there *may* 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 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 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> <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.</p> | |

N. TENTATIVE SCHEDULE

| Classes | Learning Objective(s) | 1st half (70 min) | 2nd Half (60 min) | ALL Assignments Due at 8:10am same day of class unless otherwise noted* |
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| #1 | <p>Topics</p> <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. | <p>20 min Hands-on Activity and Introductions</p> <p>20 min Overview, expectations and motivation for class</p> <p>20 min Review of the design-thinking process and iteration</p> <p>10 min Q&A</p> | <p>30 min Introduction to the Rapid Innovation Cycle (RIC): opportunity recognition, solution selection, market experiment, and experimental results</p> <p>20 min Teams present prototypes to class in 1 min presentations</p> <p>10 min Wrap-up/open discussion</p> | <p>1. In-class Participation - Week 1</p> |
| #2 | <p>Topics</p> <ul style="list-style-type: none"> • Hardware Prototyping • Digital Fabrication • Emphasis 3D Printing • Intro to basic 3D modeling (CAD) • Intro to basic 3D printing | <p>10 min Hands-on Activity</p> <p>10 min Why build hardware prototypes and how to get started.</p> <p>30 min Examples of Digital Fabrication and Prototypes</p> <p>20 min Rapid Learning of CAD + 3D Printing to enable hardware market testing. TinkerCAD, Cura and Repetier</p> | <p>50 min Activity: Generate a physical part using Haas Innovation Lab 3D Printers</p> <p>10 min Wrap-up/open discussion</p> | <p>2. Prototype Now Week 1 submission</p> <p>3. In-class Participation - Week 2</p> <p>4. Pre-course Survey</p> <p>5. Signed Syllabus</p> |
| #3 | <p>Topics</p> <ul style="list-style-type: none"> • Software Prototyping • Web applications • Mobile applications • Collecting data from your prototypes | <p>10 min Hands-on Activity</p> <p>20 min Overview of Software Prototyping Tools</p> <p>20 min Gaging interest</p> | <p>20 min Review prior Hands-on Rapid Prototyping prototyping successes / failures</p> <p>20 min Activity: Market feedback on a software prototype</p> | <p>6. Prototype Now Week 2 submission</p> <p>7. In-class Participation - Week 3</p> |

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| | | Software prototyping examples 20 min Activity: quick paper prototype of mobile or webapp | 20 min Wrap-up/open discussion Class Representative Audit / Survey | |
| #4 | 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 | 8. Prototype Now Week 3 submission 9. In-class Participation - Week 4 |
| #5 | Topics <ul style="list-style-type: none"> • Innovating in a Corporate Environment • PROTOTYPATHON FALL 2019 | 20 min Hands-on Activity 50 min PROTOTYPATHON | 50 min PROTOTYPATHON Cont'd 10 min PROTOTYPATHON Wrap | 10. Prototype Now Week 4 submission 11. Prototype Now Week 5 submission - PROTOTYPATHON: DUE AT 11AM IN CLASS 12. In-class Participation - Week 5 + 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 |
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| 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 |

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| 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

Printed Name

Date Signed

Date Signed
