made in China

中国制造

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Course Title:	**Made in China**		
Meeting Times (Subject to Change)**:**	Tuesdays & Thursdays 9:45AM - 11:30PM NYU Shanghai Room 950		
Instructors:	Christian Grewell Rodolfo Cossovich	**Office Hours:** (by appointment) **Email:**	M/W/F 4:00PM - 6:00PM christian@nyu.edu cossovich@nyu.edu

Website: http://ima.nyu.sh/made-in-china/

Course Discussion (Slack) Site: madeinchina-2018.slack.com

Trello Board: https://trello.com/madeinchina12

Slack Join Link:
https://join.slack.com/t/madeinchina-2018/shared_invite/enQtMzAwNjQxMjU0MTAwLWM5ZGNkNDUzYTgwMThiOTRjZDBiNjIzY2RiMjg3ZTUxOGE1ZTM0ODM0MjE3NWI3OTFjM2I5OGJlNjEzMTFkYml

Course Description

Grab nearly any consumer product in the world today and take a closer look. What sentence might you find embossed on the surface?

Made in China has become synonymous with the development of the largest economy in the world, and China has rapidly been moving up the value chain not only as a destination for manufacturing and final goods assembly, but more importantly as a hub for new product design and rapid prototyping.

This course also takes a hands-on critical look at the history and factors shaping China's reputation as the 'workshop of the world' and also it's emergence through economies of scale and scope as a hub for innovation through rapid prototyping and manufacturing. They will become experts on not just the techniques involved in conceptualizing and delivering innovation to a market, but also in the ways that China's unique online, offline and decentralized marketplaces for skills, talent and innovation enable a small team to accomplish what a large one cannot.

Students will make the full use of China's rapid design and production infrastructure to conceptualize, prototype, design for manufacture and market a consumer electronics product. This is an intensive course that takes place across two of China's innovation hubs, Shanghai and Shenzhen, with conceptualization, design and rapid prototyping, and rapid manufacturing followed by a final presentation, user testing and documentation.

Course Structure

The course is divided into three units in parallel. The first unit provides a conceptual foundation into design and the development cycle of a consumer product. The second unit presents the means and resources to actually work directly in a dynamic environment and to go straight from idea to product within few days. The third and final unit helps to get an understanding about what it is needed to actually launch a product, collecting feedback from users, refining a design for manufacturing and generating marketing materials.

Modest adjustments in the syllabus will be introduced to accommodate specialized interests by students and address important topical issues as they arise.

Course Teaching Objectives: The teaching objectives of the course are:

- ❏ To establish an understanding of the processes involved in designing, prototyping and marketing a novel product.
- ❏ To familiarize students with the tools commonly used in factories to rapidly introduce a new product.
- ❏ To develop an understanding of the role of design and innovation as a collaborative, multi-disciplinary group activity.
- ❏ To improve skills of presentation and product design.
- ❏ Expose students to a hybrid set of methods to understand the wide array of approaches to do research in the field of technology and innovation in China.

Course Learning Outcomes: The following learning outcomes are anticipated upon completion of this course. Students will be able to:

- ❏ Competence with a set of tools and methods for product design and development.
- ❏ Confidence in your own abilities to create a new product.

- ❏ Awareness of the role of multiple functions in creating a new product (e.g. marketing, finance, industrial design, engineering, production).
- ❏ Become fluent on the vocabulary required to technically and conceptually communicate their ideas across the different areas involved in a product development (assessed by the fieldwork and their participation)
- ❏ Reinforcement of specific knowledge from other courses through practice and reflection in an action-oriented setting.
- ❏ Work effectively as team members and demonstrate leadership skills (assessed by fieldwork and final project)
- ❏ Communicate effectively (assessed by fieldwork and final project)

Class Participation

Class participation is essential. Students will be required to demonstrate knowledge of the readings and be able to offer a critical assessment of the contents. Students will be asked to lead class discussions and others will be expected to contribute to discussion based on the topic, readings and other relevant sources of information. Laptops are permitted in class to take notes and to follow along during demonstrations. All other devices are not to be used, and checking social media during class is prohibited.

Attendance

Attendance in all classes is mandatory. Unexcused absences and tardiness will affect your grade. If you know you are going to be absent or late, please let me know in advance so we can figure out how you can make up what you missed in class. 2 unexcused absences will lead to a failing grade.

Academic Integrity

It is a condition of passing this course that students read and adhere to the NYU Shanghai policy on academic integrity as described in the current NYU Shanghai Academic Bulletin.

Moses Center Statement of Disability

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd.

Grading

- ❏ **Class Participation (10%):** will be evaluated on the basis of: (a) familiarity with the readings; (b) quality of contributions; (c) critical and creative approaches to the issue; and (c) respect for the views of others.

- ❏ **Journal (20%):** Students will be evaluated on the content, quality and completeness of an online journal documenting their progress. **1 Post Due Weekly**

- ❏ **Assignments (20%):** There will be weekly assignments designed to ensure students are acquiring the basic knowledge needed to prototype hardware/software products.

- **Projects (50%):** Students will produce and present a large array of prototypes up-to-and-including a final prototype for production throughout the course. These will be graded on their novel applications of course concepts as well as the thought and work required to realize them.

Grading Criteria

A: Excellent performance showing a thorough knowledge and understanding of the topics of the course; all work includes clear, logical explanations, insight, and original thought and reasoning.

B: Good performance with general knowledge and understanding of the topics; all work includes general analysis and coherent explanations showing some independent reasoning, reading and research.

C: Satisfactory performance with some broad explanation and reasoning; the work will typically demonstrate an understanding of the course on a basic level.

D: Passable performance showing a general and superficial understanding of the course's topics; work lacks satisfactory insight, analysis or reasoned explanations.

F: Unsatisfactory performance in all assessed criteria.

Equipment

This course may necessitate the use of equipment from the IMA Equipment Room. Policies and procedures for checking out, caring for, and returning equipment will be discussed during IMA Orientation (DATE X or X, mandatory) as well as in class. Be aware that keeping IMA equipment past return dates or failing to adhere to the policies of the IMA Lab WILL affect your participation grade for this course.

Resources

I've created a number of digital resources for the course (email, message board and resources list). The website will have the most up-to-date course information (check the course schedule for upcoming course readings, videos, and other info)

- Class Slack Team: https://madeinchina-2018.slack.com
- Class Website: http://ima.nyu.sh/made-in-china/

Networking

Information on career and networking opportunities will be provided as needed. NYU Shanghai's Career Services Center maintains links with numerous organizations and alumni around the world. Additional contacts are provided through Interactive Media Arts, the NYU Shanghai Program on Creativity + Innovation and its partners throughout the NYU Global Network and beyond.

In addition, the course offers opportunities for establishing contacts with a wide network of entrepreneurs, professionals and institutions innovating across a diverse set of industries in China and abroad. The focus of the network is to enable course participants to explore opportunities for future academic and professional engagement.

Course participants will also have the opportunity to recommend guest speakers or professional contacts of relevance to the syllabus.

Schedule

Session	Date	Topic	ASSIGNMENT
Class 1	Jan 23	Introduction - Strangest Idea Activity	
Class 2	Jan 25	Crash & Burn - Electronics Hackathon	Journal Post 1 Electronics Quiz
Class 3	Jan 30	Product Design Introduction	
Class 4	Feb 1	Crash + Burn Finale	Journal Post 2 Project Proposal
Class 5	Feb 6	Hardware Hacking	
Class 6	Feb 8	Knowing your BOM	Journal Post 3 Project Presentation
Class 7	Feb 13	Innovation	
Break	Feb 15-21	Spring Festival	
Class 8	Feb 22	Reverse Engineering Project (group based)	Journal Post 4 Concept Design
Note	Feb 23	**Project 1 Due:** Reverse Engineering	Project 1: reverse engineering
Class 9	Feb 27	Prototyping Introduction	
Class 10	Mar 1	Rapid Prototyping #1 (Function)	Journal Post 5 PCB Shipment
Class 11	Mar 6	Factory Tour #1	
Class 12	Mar 8	Rapid Prototyping #2 (Form)	
Class 13	Mar 13	CAD Workshop	Journal Post 6 Final Concept Model
Class 14	Mar 15	Work on Prototypes	
Class 15	Mar 20	Work on Prototypes	Journal Post 7 Alpha Documentation
Class 16	Mar 22	**Prototype Presentations**	
Note	Mar 23	**Project 2 Due:** Alpha Prototype	**Project 2:** α Prototype
Class 17	Mar 27	Design for Manufacturing	
Class 18	Mar 29	Sustainable Manufacturing	Journal Post 8 Re-Engineering Exercise
Class 19	Apr 3	Supply Chains	
Break	Apr 4 - 6	Spring Recess (Qingming)	
Class 20	Apr 10	The Beer Game	Journal Post 9 Updated BOM
Class 21	Apr 12	Talking to Humans - Customer Discovery	
Class 22	Apr 17	Prototype Show + Tell	Journal Post 10 Talking to Humans
Class 23	Apr 19	New Product Financing in China	

Note	Apr 20 - 22	[Optional] Trip to Shenzhen	
Class 24	Apr 24	Financial Models	Journal Post 11 Financial Model
Class 25	Apr 26	**Project 3 Due:** Beta Prototype	**Project 3:** β prototype
Break	May 1	China Labor Day	
Class 26	May 3	Branding and Retail Design	
Class 27	May 8	Visual Design and Packaging Workshop	
Class 28	May 10	**Final Project Presentations**	**Final Journal Post**
Note	May 11	Final Show Setup - Pop Up Store	

Course Details

Week 1: Introduction

Week one includes an introduction to the course and overview of the schedule for the semester. In addition, we would like to begin to impart on students the value in the strategy of thinking strangely and combining basic skills, knowledge, new technologies with curiosity.

Agenda:

- ❏ **Discussion:** Course Introduction + Student Interests
- ❏ **Activity:** The Strangest Idea
- ❏ **Activity:** Crash and Burn Electronics Workshop Part 1

Prepare:

- ❏ Heath Robinson Deserves a Museum
- ❏ How Do People Get New Ideas?
- ❏ How to Get Startup Ideas
- ❏ Your Ideas Have No Value
- ❏ Why good design comes from bad design
- ❏ Getting started in electronics (pages 6-17 & 22-31)
- ❏ Electricity: the basics
- ❏ Watch: Ice Cream Glove

Assignment:

- ❏ **[Assignment]** Engineering Basics Quiz
- ❏ **[Journal]** Why did you sign up for this class?

Week 2: Product Design

Week two is designed to help introduce the overall 'workflow' associated with making products - designing, making and delivering new and existing products or services to their customers. We will continue our rapid electronics prototyping track by teaming up to continue to build our electronics products.

Agenda:

- ❏ **Discussion + Activity:** Product Design
- ❏ **Activity:** Crash and Burn Electronics Workshop - Part 2

Prepare:

- ❏ Watch: The Cell Phone: Marty Cooper's Big Idea
- ❏ Watch: IDEO, an Innovative Design Company
- ❏ Getting started in electronics (pages 32-38 & 42-49)
- ❏ Talking to Humans, Pages 11 - 27

Assignment:

- ❏ **[Journal]** Bad Human Factors: Identify one product in the Academic Building that is hard to use because it does not follow human factors principles.

- ❏ **[Assignment]** Project Proposals: Propose your final project!

Week 3: Hardware Hacking + China Speed

This week will focus heavily on the concept of hardware manufacturing at a small scale, with a special emphasis on hardware startups and the digital and physical innovation ecosystems that support them. In addition, we will cover must-know concepts related to rapid manufacturing and the Shenzhen manufacturing ecosystem.

Agenda:

- ❏ **Lecture + Discussion:** Introduction to Shenzhen and Rapid Manufacturing Culture
- ❏ **Activity:** Reverse Engineering Basics

Prepare:

- ❏ China is Building a Robot Army of Model Workers
- ❏ China's Rapid Rise
- ❏ What materials to include in your bill of materials
- ❏ How to reverse engineer a PCB
- ❏ Reverse engineering gone wrong: A case study

Assignment:

- ❏ **[Assignment]** Project Presentation: Each student will prepare a 50 second presentation
- ❏ **[Journal]** Post your presentation and reflect.

Week 4: Innovation + Intellectual Property

This week will begin with a discussion of the important role innovation plays in economies, markets and the ecosystem Shenzhen and China. Special attention will be paid towards the role of open-source technologies both in terms of how they enable rapid prototyping, but also in the ways that they discourage rent-seeking behaviors by entrenched incumbents.

Agenda:

- ❏ **Lecture + Discussion:** Open Innovation and Intellectual Property
- ❏ **Activity:** Copy Your Competition (Reverse Engineering)

Prepare:

- ❏ The Discipline of Innovation
- ❏ Open Innovation and Intellectual Property Rights: the two edged sword
- ❏ The 5 myths of Innovation
- ❏ The Era of Open Innovation
- ❏ How patents kill innovation and hold tech companies back
- ❏ The Xiaomi business model: built to last?
- ❏ How Arduino is Open-Sourcing Imagination

Assignment:

- ❏ **[Assignment]** Reverse Engineering Documentation #1
- ❏ **[Journal]** Concept Design + Patent Review

Week 5: Rapid Prototyping - Design

Our rapid prototyping module begins in Week 5. This week focuses on further refinement of our concept sketches using a variety of inexpensive and rapid prototyping techniques and materials. The goal for the week is to develop a simple design and low-rez prototype.

Agenda:

- ❏ **Lecture + Discussion:** Rapid (and Sustainable!) Prototyping
- ❏ **Activity:** Low Rez Prototype Generation

Prepare:

- ❏ Chapter 12 - Prototyping - Product Design and Development
- ❏ Product Design and Development, Ulrich & Eppinger (Concept selection, pages 146 - 155)

Assignment:

- ❏ [Assignment] Low-Rez Prototype
- ❏ [Journal] Concept Selection + Schedule

Week 6: Rapid Prototyping - Function

This week will focus further on integrating simple functionality into our low-rez prototype while continuing to keep on a path towards producing products rapidly and efficiently. Specifically, we will design and test a prototype circuit board using digital tools and utilize the rapid fabrication resources in China to produce a finished circuit.

Agenda:

- ❏ **Lecture:** Electronic Circuit Design and Manufacturing in China
- ❏ **Activity:** Functional Schematic and PCB Layout Workshop

Prepare:

- ❏ Product Design + Development - Prototyping - 1 (on #readings channel on Slack)
- ❏ Watch: New Autodesk EAGLE - PCB Design Tools for Everyone
- ❏ Download https://www.autodesk.com/products/eagle/overview
- ❏ There are no Electrons: Electronics for Earthlings
- ❏ Eagle: schematics
- ❏ Eagle: board layout
- ❏ PCB outsourcing cost calculator (JDB in Shenzhen, content in Chinese)

Assignment:

- ❏ [Journal] How much of a 'maker' are you?
- ❏ [Assignment] Ship a completed PCB file to our vendor

Week 7: Rapid Prototyping - Form

This week will be spent continuing to work through the design of our alpha prototyping. In this week, we'll focus on the physical structure and function of our design. Specifically we'll look at a variety of workflows to prototype common qualities and features.

Agenda:

- ❏ **Lecture:** Introduction to Digital Fabrication
- ❏ **Activity:** CAD Workshop

Prepare:

- ❏ The difference between CNC milling and 3D printing
- ❏ How to Make Almost Anything: The Digital Fabrication Revolution by Neil Gershenfeld.
- ❏ Today's Maker Movement is the New Industrial Revolution
- ❏ Prototyping and modelmaking for product design, Bjarki Hallgrims (pages 6-17)
- ❏ Prototyping and modelmaking for product design, Bjarki Hallgrims (pages 20-57)

Assignment:

- ❏ [Journal] Mission Statement
- ❏ [Assignment] Final Concept and Model

Week 8: Rapid Prototyping - Build

Week 8 will be spent with your faculty mentors rapidly producing your alpha prototype. By this point, we should have our PCBs back, and be ready to build and test.

Assignment:

- ❏ **[Project 2]** Alpha Prototype Presentation
- ❏ **[Journal]** Document your alpha prototype

Week 9: Design for Sustainability

Week 9 will focus on designing for sustainability and efficiency. We will specifically look at simple methods that can be employed to reduce the costs of manufacturing - both directly in terms of your BOM, but also in terms of impact on the environment and fellow people.

Agenda:

- ❏ **Lecture:** Manufacturing Processes of the Past, Present and Future
- ❏ **Activity:** Reduce, Reuse, Recycle

Prepare:

- ❏ 100K is Not Enough
- ❏ Product Design and Development, Ulrich & Eppinger (Design For Manufacturing, pages 257 - 293)
- ❏ Product Design and Development, Ulrich & Eppinge, (Design for Sustainability Chapter)

Assignment:

- ❏ **[Assignment]** Re-Engineering and Sustainability Exercise
- ❏ **[Journal]** Reflection: Sustainability versus Cost

Week 10: Supply Chains

Week ten is designed to help students understand how the smallest and largest firms in the world manage the process of 'innovating' - designing, making and delivering new and existing products or services to their customers.

Agenda:

- ❏ **Lecture:** Modern Supply Chains
- ❏ **Activity:** The Beer Game

Prepare:

- ❏ From Bean to Cup
- ❏ Case Study: Dell Distribution and Supply Chain
- ❏ How Smartwatch Pioneer Pebble Lost Everything
- ❏ CES 2018 lack of innovation

Assignment:

- ❏ **[Assignment]** Updated BOM Exercise
- ❏ **[Journal]** Production and Partnerships

Week 11: Customer Needs

It's Week 11 and we are now formally talking about customer needs. This week we will focus on the value of customer problem and opportunity discovery as both a means towards ideation, learning about and validating your target market and preparing us to position our product in a market and build a brand.

Agenda:

- ❏ **Lecture:** Talking to Humans
- ❏ **Activity:** Show Off Your Prototypes

Prepare:

- ❏ How to gather feedback, measure, and iterate. (https://www.americanpressinstitute.org/publications/reports/strategy-studies/gather-feedback-measure-iterate/)
- ❏ How Netflix measures product success. (http://techblog.netflix.com/2011/01/how-we-determine-product-success.html)
- ❏ A/B Testing Best Practices Guide, Facebook (https://www.facebook.com/business/help/290009911394576)

Assignment:

- ❏ **[Journal]** Finish Line Progress Update
- ❏ **[Assignment]** Talking to Humans

Week 12: Financials

This course session is an introduction to the design and function of a business model within the context of an individual product or service. The goal for the week is to be able to understand our product's potential financial trajectories and respond to rapidly to opportunities.

Agenda:

- ❏ **Lecture:** New Product Financing in China
- ❏ **Activity:** Financial Model Workshop

Prepare:

- ❏ Business Model Design, an Activity System Perspective
- ❏ How Chinese Companies Disrupt Through Business Model Innovation
- ❏ Watch: Silicon Valley Season 1: Episode #2 Clip 1
- ❏ Business Model Design: An Activity System Perspective

Assignment:

- ❏ **[Journal]** Describe your team's process, including a brief status report on your prototyping and testing progress.
- ❏ **[Assignment]** Financial Model

Week 13: Final Prototype

This week is set aside for work on your final (beta) prototype. The goal for the week is to have a piece of prototype hardware

Assignments:

- ❏ **[Project 3]** Project 3 Due: Final Beta

Week 14: Pop-Up

The final week is set aside to prepare each prototype for presentation at the IMA Show.

Agenda:

- ❏ **Activity:** Landing Page
- ❏ **Activity:** Packaging Your Product

Assignment:

- ❏ **[Journal]** Final Documentation
- ❏ **[Assignment]** Made in China Pop-Up Store