ME 537: Product Realization

Instructor Name: Anna Thornton
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Office Hours: Thursday 12 -2

Course Dates: Spring 2019
Course Time 12:20-2:05 MW
Course Credits: 4
Course Location: EPC B05

Course Description.
This course focuses on the essential and challenging process of getting a design from the drawing board into the hands of a customer. Cases are drawn from a range of industries, technologies and development speeds (everything from hardware startups to aircraft). It includes topics such as Design for Manufacturing, validation testing, cash flow modeling, in- vs. outsourcing, setting up a factory, selecting supplier partners, distribution, and ongoing product support. There will be a semester-long project where students will build one prototype, one EVT unit, two DVT units and 10 PVT units. In addition, the students will create all of the design documentation required to launch a product.

Instructional Format, Course Pedagogy, and Approach to Learning
The course will be taught as a mix of lectures, hands-on demos, cases and in class work and presentations. The teams will practice the course material through a semester long projects.

- Teach the framework and processes to bring a product to market. The framework will cover processes for both small startups as well as established large companies
- Help students appreciate the complexity and multi-disciplinary nature of product realization.
- Teach students how to ask the right questions, identify risk and find the resources to launch products
- Enable students to be better prepared for joining an industry product team whether for a startup, small or large organization.
- Provide resources and frameworks for the students to continually learn after the course is over.
- Help students appreciate how early design decisions can have dramatic and unexpected consequences in production and help them incorporate those learnings into the upfront design.

Books and Other Course Materials
- Rob Thompson's Prototyping and Low-Volume Production
- A textbook is being written for the course. The current draft can be found at bit.ly/ProductRealization
- Additional readings from a variety of sources will be posted on blackboard

Courseware
All of the links for the courseware will be provided through Blackboard.

Assignments and Grading
1. The project will be done through seven (7) assignments.
2. Grading
    - 75% assignments
    - 10% class contribution
    - 15% team evaluation

Resources/Support/How to Succeed in This Course:

1. Prof. Thornton will be available for normal office hours and individual meetings can be set up as needed
2. Accommodations for Students with Documented Disabilities: If you are a student with a disability or believe you might have a disability that requires accommodations, please contact the Office for Disability Services (ODS) at (617) 353-3658 to coordinate any reasonable accommodation requests. ODS is located at 19 Deerfield Street on the second floor.

Community of Learning: Class and University Policies

1. **Attendance & Absences.** If you are going to need to miss, a class please let the instructor know ASAP. Please refer as well to the Policy on Religious Observance.

2. **Assignment Completion & Late Work**. Late assignment without permission will not be graded.

3. **Academic Conduct Statement.** All students will be expected to follow BU's academic conduct code (*https://www.bu.edu/academics/policies/academic-conduct-code/).* The project will require work in EPIC and other maker spaces around BU. It is expected that students will operate all equipment safely.

Date	Assignment due	Topics	Topic	Reading*	Demo / Guest lecture / Team time
W: 1/23		1a	Introduction	Chapter 1: Intro & bit.ly/ME517_Mfg	3-D printing
M: 1/28	A1: 3 Ideas		Manufacturing processes	Appendix B: mfg processes & Thompson book	PRESENTATIONS
W: 1/30		1b	Reynolds	None	Casting/ Reynolds
M:2/4		2	Pilot process	Chapter 2 & bit.ly/527_TRL_video	Wood laminate / fiber glass
W: 2/6		3	Project management	Chapter 3: PM	Laser cutting
M: 2/11	A2: Proposal	4	Spec document	Chapter 4: Spec	PRESENTATIONS
W:2/13		5	Product definition	Chapter 5: Product definitions	Thermoforming
T: 2/19		6	Costs	Chapter 6: Costs	High temp casting
W: 2/20		7	DFX	Chapter 7: DFX	DFM demo
M: 2/25		8	Tools and fixture	Chapter 8 tooling	Metal bending
W: 2/27	A3: Concept	9a	Quality plans	Chapter 9: Quality	PRESENTATIONS
M: 3/4		9b	Quality plans		Injection molding
W: 3/6		9c	Tolerance analysis / metrology		Metrology of Candy
M: 3/18		10	Process definition / Supply chain	Chapter 10: Process definition	PERCH
W: 3/20	A4: EVT	11	Presentation	Chapter 11: Supply chain	Presentations
M: 3/25		12	Production planning	Chapter 12: Production planning	Surface finish
W: 3/27		13	Cash flow	Chapter 13: Cash flow	Welding / SPLAT
M: 4/1		14	Packaging	Chapter 14: package design	
W: 4/3	A5: DVT	15	Labeling / certifications	Chapter 15: labeling and certification	Package design
M: 4/8		16	Distribution	Chapter 16: Distribution	Ceramics
W: 4/10		17	Customer support	Chapter 17: Customer support	Review time
W: 4/17			Team time		Prof Blonder
M: 4/22		18	Production systems	Chapter 18: production systems	FORM LABS
W: 4/24	A6: PVT	19	Mass production and basics of electronics	Chapter 19: Mass production	Review time
M: 4/29			Team time		Review time

W: 5/1	A7: MP		Final presentation		**Celebration!**

***Additional readings may be posted on blackboard.**