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ICT Innovation – Spring 2016

MSc in Computer Science and MEng Telecom. Engineering
EIT Masters ITA, S&P,SDE

Lecture 00 – Administrative Details
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https://securitylab.disi.unitn.it/doku.php?id=ict_innovation

Course Objective

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- **Myth:**
  - Product design and development is essentialy creative so it cannot be structured
  - It requires a talented individual (e.g. Steve Jobs)
  - The first inventor of a good-enough technology conquers the market
- **Reality (concise version)**
  - "Genius is 1% inspiration and 99% perspiration". T.A. Edison (Quoted in the Harper's Magazine)
- **Reality (extended version)**
  - Product development includes many steps that can be documented and analyzed. They can therefore be learned and, possibly, improved.
  - Product development requires a wide range of skills ranging from software engineers to marketers, from industrial designers to manufacturing engineers
  - The first-comer has an advantage ONLY if it keeps innovating its original product
- **Course Objectives**
  - Illustrate (some) steps of product design and developement and guide students, forming multi-disciplinary teams, into the development of a "product" as opposed to just a "project".
- **Which steps we don't do**
  - Market analysis, financial analysis etc. etc. → Business Development Lab Course

Course Structures

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- **Learning: Lectures on Product Design and Development (PD&D)**
  - Introduction
  - Product Specifications
  - Concept (Mostly selection and testing)
  - Product Architecture
  - Prototyping and robust design
  - Patents and Intellectual Property
- **Thinking: Research Canvas (up to 10/30 grade points)**
  - Each team will produce a research canvas to clarify the ideas on how to make it a product
- **Designing: Product design and architecture (up to 10/30 grade points)**
  - Each team will produce a poster explaining how their product will work
- **Producing: Product prototype (up to 15/30 grade points)**
  - Each team will have a small budget for hardware/software and will have to actually present a working product
- **Feedback: Bonus 4 points if you addressed the feedback given to your team in intermediate presentations**

Overarching Learning Objectives

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- **The course should develop and evaluate your abilities in**
  - Creativity
    - How to solve problems when not all steps are completely specified (this what you should try to do with your design/architectural result)
  - Intellectual Transformation
    - How to transform an idea into a product (the first "brainstorming" step is your research canvas, the last one is the final product)
  - Leadership
    - Organize yourselves into a team and arrive to make a final product (you should try to leverage on each other's competences)
  - Making value judgement
    - Decide which parts are important and which are not (this should be an important part of the process that produce a lean design, as you have no time to make a sophisticated one with parts that you don't need)

The "Research Idea"

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- **We have already the invention: "SkyJack"**
  - SkyJack is a drone engineered to autonomously seek out, hack, and wirelessly take over other drones within wifi distance, creating an army of zombie drones under your control.
  - The key research ideas are described here
    - http://samy.pl/skyjack/
- **Objections:**
  - This looks illegal, how can it be a product?
    - Well, not if you are a law enforcement officer, authorized penetration tester, etc. etc. This is a big market.
    - For example it could be a DogDrone fending off drones from your own land or finding and reconnecting out drones that lost control for whatever reason (eg stolen drones…)
  - The idea is already described what else to do?
    - It is NOT a product. You can't "search on Google to find the specs" of Parrot MACs. You need a proper Web Server addressing the market that you have. Equally you need a reliable way to hack cannot just "try the various alternatives".
  - It is a lot of work to make it a product, how can we do it?
    - You are a team of 4+ people. You need to divide the work. If somebody really doesn't work you come to see me and we discuss the issue F2F

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Tentative Timing of Classes

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- **Lectures on Thursday-Friday**
- **Your Presentation**
  - *Fri. 26/Feb* → *Case study presentation*
  - *Fri. 11/Mar* → *Feedback Sessions*
  - **Fri. 18/Mar** → **Concept Canvas Show at CLC**
  - *Fri. 22,29/Apr* → *Feedback Sessions*
  - **Fri. 6/May** → **Design Poster Show at CLC**
  - *Fri 13,20,27/May* → *Feedback Sessions*
  - **Fri. 17/Jun** → **Product ShowRoom at CLC**

(Grades are "won" at the ShowRoom)

Show Room dates to be confirmed

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What's a ShowRoom at CLC?

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- **You have all seen the CLC main lobby**
- **Each group will have a stand and we will pass around giving you a vote for your set up**
  - Concept Canvas → basically a poster with some key ideas
  - Design Poster → more details, clear architecture, how to solve steps etc.
  - Product → you'll have the product and should be able to do some demonstrations eg with a laptop, the keyboard etc,

It's a product…

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- **You must have a complete walkthrough for the "customer experience".**
  - You buy one, you set up the network, how do you register the drone/how do you set-up the web service (eg is it "a install on your machine", or it is "use a remote service")
  - It cannot be "it works but only on our laptop".
- **You have a budget for the actual hardware, or if you need Amazon WS etc.**

Teams (1 S&P, 1 SDE + 1 ITA + mixed background)

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- **See the excel file on Google Drive**

Textbook

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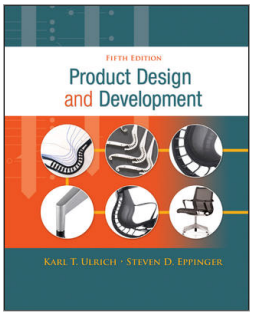
Product Design and Development
Karl T. Ulrich and Steven D. Eppinger
5th edition, Irwin McGraw-Hill, 2012.

1. Introduction
2. Development Processes and Organizations
3. Opportunity Identification
4. Product Planning
5. Identifying Customer Needs
6. Product Specifications
7. Concept Generation
8. Concept Selection
9. Concept Testing
10. Product Architecture
11. Industrial Design
12. Design for Environment
13. Design for Manufacturing
14. Prototyping
15. Robust Design
16. Patents and Intellectual Property
17. Product Development Economics
18. Managing Projects



Also as eBook with most chapters and far cheaper