Product Planning & Development  
(21-423)  
Advanced Manufacturing Laboratory  
Department of Industrial Engineering  
Sharif University of Technology  

Session #13  

Course Description  

- **Instructor**  
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- **Recommended prerequisite**  
  - Manufacturing process I (21-418)  

- **Class time**  
  - Sunday-Tuesday 18:00-19:30  

- **Course evaluation**  
  - Mid-term (25%)  
  - Final exam (40%)  
  - Quiz (5%)  
  - Exercise (Manufacturing Lab.) (30%)
Session reference

- Reference:

Course Description (Continued..)

- Contents:
  - Product development in the changing Global world
  - Stages of Product Development
  - The Structure of the Product Design Process
  - Early design: Requirement definition and conceptual Design
  - Trade-off analyses: Optimization using cost and utility Metrics
  - Detailed design: Analysis and Modeling
  - Design Review: Designing to Ensure Quality
  - Production System: Strategies, planning, and methodologies
  - Production System Development
  - Planning and Preparation for Efficient Development
  - Supply chain: Logistics, packaging, supply chain, and the environment
Detailed design: Analysis and Modeling

- Detailed Design:
  - Concept generation and the search for solutions
Detailed design: Analysis and Modeling

**Detailed Design:**

- Concept generation and the search for solutions
- Ideas may occur to the team members during the information-gathering phase and during the benchmarking phase of the process, where various competing products have been tested, analyzed, and torn down.
- Additional ideas also can sometimes be obtained from:
  - R&D Magazine annually issues their research and development 100 awards, which can be found at [http://www.rdmag.com/awards.html](http://www.rdmag.com/awards.html).
Detailed design: Analysis and Modeling

- Detailed Design:

![Design News](http://www.designnews.com)

Detailed design: Analysis and Modeling

- Detailed Design:
  - U.S. patent office’s database at http://www.uspto.gov/
Detailed design: Analysis and Modeling

- Detailed Design:

Search results
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_CPC Definition - B41K STAMPS- STAMPING OR NUMBERING_...


Hand-operated devices and machines always including a static stamping element carrying a graphical and/or numerical design, e.g. a single letter or nu...  

_Issue Years and Patent Numbers - United States Patent and..._

[www.uspto.gov/web/offices/cfo/oip/tel/issuyear.htm](http://www.uspto.gov/web/offices/cfo/oip/tel/issuyear.htm)

Notes: (*) The current patent numbering system began with a patent issued on July 13, 1836. Prior to that date, an estimated 9,957 patents had been... 

_Class Schedule for Class 101 PRINTING_


_Entries Beginning with " P " Index to the U.S. Patent...

[www.uspto.gov/web/offices/cfo/oip/tel/c_index/indexp.htm](http://www.uspto.gov/web/offices/cfo/oip/tel/c_index/indexp.htm)

_numbering 101 / 338-- -- -- -- -- -- -- roller and plate inked 101 / 359 ... -- -- -- ticket machine 100 / 214-- -- -- -- -- reciprocating....

_P = Index to the U.S. Patent Classification System_

[www.uspto.gov/web/patents/classification/uspcindex/indexp.htm](http://www.uspto.gov/web/patents/classification/uspcindex/indexp.htm)

_Patent Leather -- Permanent Wave Machine for Hair ... D28 A11 Permeability Tuned Transformer -- Personal Identification Number (Pin)...

Detailed design: Analysis and Modeling

- Detailed Design:

**B41K**

_STAMPS; STAMPING OR NUMBERING APPARATUS OR DEVICES (marking meat A22C 17/10; embossing combined with printing B41F 19/10; selective printing mechanisms B41J; embossing decorations or marks B44B 5/00; marking or coding completed packages B65B 61/26; ticket printing and issuing, fare registering, nonprinting aspects of franking apparatus C07B)

**Definition statement**

This subclass covers:

Hand-operated devices and machines always including a static stamping element carrying a graphical and/or numerical design, e.g. a single letter or number in the form of a raised part forming the stamping image. This raised part has usually elastic properties, e.g. it comprises mainly an elastomeric material. After applying ink on the surface of said stamping form, said inked image is applied by contact pressure onto the surface of a substrate of any dimension, which will form a stamped subject-matter, portable devices or machines as a whole as well as all parts, details and objects specifically adapted for use in such devices or machines, e.g.

- handles,
- stands,
- labelling means,
- inking devices,
- stamping surfaces.
Detailed design: Analysis and Modeling

**Detailed Design:**


- **Engineering problems**
  - The methods can be classified into two groups:
    - Prototype testing and
    - Mathematical modeling

- **Detailed design is a group of tasks used to finalize a product design that meets the requirements and design approach defined earlier**
  - This requires decisions, even though some technical information may not be available. The design team must use "best estimates," otherwise known as assumptions, to develop the design.
Detailed design: Analysis and Modeling

- Detailed Design:
  - Design analysis
    - Design and reduce the technical risk in product development.
    - Design analysis is the use of scientific methods, usually mathematical, to examine design parameters and their interaction with the environment.

- Modeling and simulation are tools for evaluating and optimizing designs, services and products.