Course Description

- Instructor
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  - Website: Sharif.edu/~fvalilai

- 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%)
Course Description (Continued ...)

- **Mid-term session:**
  - Wednesday: 9th Ordibehesht 1394, 16:30 ~ 18:30
- **Final Exam:**
  - Monday: 1st Tir 1394, 09:00 ~ 11:30
- **Reference:**

The Design Needs and Specifications

- **Early Design:**
  - **Customer Needs Analysis**
  
  Defining the customer’s needs can be an extremely complex process resulting in many different and conflicting types of information.

  There are several approaches for knowledge acquisition of customer needs.

  The design team should use several of these methods to insure that the final requirements are representative of the customer.
The Design Needs and Specifications

- Early Design:
  - Customer Needs Analysis
  - Methods for capturing and documenting customer needs:
    - Interviews of customers including techniques such as surveys
    - Design partnerships or alliances
    - Computer databases and data mining
    - Consultants or experts
    - Brainstorming sessions
    - Personal and company experience
    - Published information such as magazines, patents, etc.
    - Technology capability forecasting
    - Market and competitor benchmark analysis
    - Prototyping and virtual reality
    - House of quality or Quality Function Deployment

QFD
- QFD constitutes “A system for translating customer requirements into appropriate company requirements at every stage, from research through production design and development, to manufacture, distribution, installation and marketing, sales and services”
The Design Needs and Specifications

- Early Design:
  - Customer Needs Analysis
  - Methods for capturing and documenting customer needs:
    - QFD
      - The QFD process begins when we endeavor to pinpoint customer requirements (or needs), which are usually expressed in terms of qualitative characteristics.

      During the process of product development, customer requirements are successively converted into internal company requisites, called design specifications.
The Design Needs and Specifications

- **Early Design:**
  - Customer Needs Analysis
  - Methods for capturing and documenting customer needs:
    - QFD
      - To effectively obtain the required quality characteristics, the identified manufacturing process specifications are translated into quality control specifications.

- Such specifications include like:
  - Inspection plans for acquired materials,
  - Information needed to determine which activities will need monitoring with statistical process control (SPC),
  - Planned preventive maintenance on machinery
  - Instructing and training operative personnel.
The Design Needs and Specifications

- **Early Design:**
  - Customer Needs Analysis
  - Methods for capturing and documenting customer needs:
    - **QFD**
      - The first matrix to be used in QFD is known as the house of quality (HoQ).
      - This matrix serves to describe the basic process underlying QFD: the transition (based on a strategy of input–output) from a list of customer requirements, the “what,” through to a list of considerations as to “how” the requirements will be met (product characteristics).
The Design Needs and Specifications

- Early Design:
  - Customer Needs Analysis
  - Methods for capturing and a customer needs:
    - QFD

![QFD chart](image)

The Design

- Early Design:
  - Customer
  - Methods for capturing and a customer needs:
    - QFD

![QFD chart](image)
The Design Needs are:

- Early Design:
  - Customer Needs Analysis
  - Methods for capturing and documenting customer needs:
    - QFD

The Design Needs and Sp:

- Early Design:
  - Customer Needs Analysis
  - Methods for capturing and customer needs:
    - QFD
### Customer Requirements

**Legend 1**

<table>
<thead>
<tr>
<th>Degree of importance</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong relationship = 9 Points</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Medium relationship = 3 Points</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Weak relationship = 1 Point</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Preference versus**

- MAX
- MIN
- TARGET

**D = O/B**

**F = A*D**

### Customer requirements

1. **Easy to hold**
   - 2
   - 17%
   - 4
   - 4
   - 4
   - 1
   - 3.0
   - 2.0
   - 51%

2. **Does not sensor**
   - 3
   - 25%
   - 4
   - 5
   - 5
   - 1.0
   - 2.0
   - 3.0
   - 30%

3. **Point lasts**
   - 3
   - 25%
   - 4
   - 5
   - 5
   - 1.2
   - 1.3
   - 8.4
   - 33%

4. **Does not roll**
   - 2
   - 17%
   - 4
   - 4
   - 4
   - 1.0
   - 3.0
   - 2.0
   - 15%

**Total**

- 12
- 100%

### Technical Importance

- ### Relative Importance
  - Absolute Weight: 120, 120, 120, 120, 120, 120
  - Relative Weight: 10, 10, 10, 10, 10, 10

### Measurement Unit

- 1 mm
- 1 mm
- 1 mm
- 1 mm
- 1 mm
- 1 mm

### Targets for the new model

<table>
<thead>
<tr>
<th>Company</th>
<th>Company 7</th>
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<tbody>
<tr>
<td>10 cm</td>
<td>5 cm</td>
</tr>
<tr>
<td>5 cm</td>
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