

# *CAD/CAM (21-342)*

*Advanced Manufacturing Laboratory  
Department of Industrial Engineering  
Sharif University of Technology*

*Session # 1*



## *Course Description*

### ▪ *Instructor*

- *Omid Fatahi Valilai, Ph.D. Industrial Engineering Department, Sharif University of Technology*
- *Email: [FValilai@sharif.edu](mailto:FValilai@sharif.edu), Tel: 6616-5706*
- *Website: [Sharif.edu/~fvalilai](http://Sharif.edu/~fvalilai)*

### ▪ *Class time*

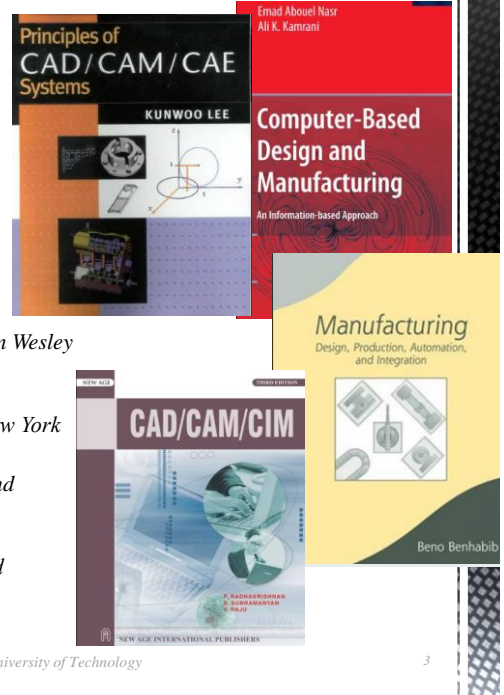
- *Saturday- Monday 10:30-12:00*

### ▪ *Course evaluation*

- *Mid-term (25%)*
- *Final exam (40%)*
- *Quiz (5%)*
- *Exercise (30%)*

## Course Description (Continued ...)

- **Mid-term session:**
  - Monday: 8<sup>th</sup> Ordibehesht 1393, 10:30 ~ 12:30
- **Final Exam:**
  - Saturday: 24<sup>th</sup> Khordad 1393, 15:00 ~ 17:30
- **Reference:**
  - Lee, Kunwoo; "Principles of CAD/CAM/CAE systems", 1999, Addison Wesley
  - Abouel Nasr, Emad; Kamrani, Ali K.; "Computer-Based Design and Manufacturing: An Information-Based Approach", 2007, Springer, New York
  - Benhabib, Beno; "Manufacturing: Design, Production, Automation, and Integration", 2003, Marcel Dekker Inc, New York
  - Radhakrishnan, P.; Subramanian, S.; Raju, V.; "CAD/CAM/CIM", 3rd edition, 2005, New age international (P) limited publishers, New York



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## Course Description (Continued..)

- **Contents:**
  - Introduction to CAD/CAM/CAE systems (5 sessions)
  - Components of CAD/CAM/CAE systems (2 sessions)
  - Geometric modeling systems (3 sessions)
  - Optimization in CAD (5 sessions)
  - Rapid prototyping and manufacturing (3 sessions)
  - Virtual engineering (2 sessions)
  - Product Life Cycle Cost Model (2 sessions)
  - Computer-Based Design and Features/Methodologies of Feature Representations (5 sessions)
  - Feature-Based Process Planning and Techniques (3 sessions)
  - Collaborative Engineering (2 sessions)

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## Course Description (Continued..)

### ▪ Contents:

- *Introduction to CAD/CAM/CAE systems* (5 sessions)
- *Definition of CAD/CAM/CAE*
- *Integrating the Design and manufacturing processes (Case study)*
- *Using CAD/CAM for product development (a practical example)*

## Course Description (Continued..)

### ▪ Contents:

- *Components of CAD/CAM/CAE systems* (2 sessions)
- *Hardware components*
- *Hardware configurations*
- *Software components*
- *CAD/CAM systems*

## Course Description (Continued..)

### ▪ Contents:

- *Geometric modeling systems*

(3 sessions)

- *Wireframe modeling systems*

- *Surface modeling systems*

- *Solid modeling systems*

- *Non-manifold modeling systems*

- *Assembly modeling systems*

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## Course Description (Continued..)

### ▪ Contents:

- *Optimization in CAD*

(5 sessions)

- *Optimization of optimization problems*

- *Treatments of constraints*

- *Search models*

- *Simulated annealing*

- *Genetic algorithms*

- *Structural optimization*

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## *Course Description (Continued..)*

### ▪ *Contents:*

- *Rapid prototyping and manufacturing*
- *RP primitives*
- *Application of RP*

*(3 sessions)*

## *Course Description (Continued..)*

### ▪ *Contents:*

- *Virtual engineering*
- *Definition*
- *Virtual design*
- *Virtual prototyping*

*(2 sessions)*

## Course Description (Continued..)

### ▪ Contents:

- *Product Life Cycle Cost Model* (2 sessions)
- *Cost Breakdown in Manufacturing Systems*
- *Computer-Aided Cost Estimating in Manufacturing*

## Course Description (Continued..)

### ▪ Contents:

- *Computer-Based Design and Features/Methodologies of Feature Representations* (5 sessions)
- *Feature-Based Technologies*
- *The New Methodology Objectives*
- *Variant Process Planning (VPP)*
- *Generative Process Planning (GPP)*
- *Assembly Planning*

## *Course Description (Continued..)*

### ▪ *Contents:*

- *Feature-Based Process Planning and Techniques* (3 sessions)
- *Mapping the Extracted Manufacturing Features to Process Planning*
- *Intelligent Feature Recognition Methodology (IFRM) Implementation*

## *Course Description (Continued..)*

### ▪ *Contents:*

- *Collaborative Engineering* (2 sessions)
- *Product Design and Development Process*
- *Integrated Product Development (IPD)*
- *The Principles of IPD*