

# Introduction to Design (ME101)

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# Definition of Design

**Source:** <http://dictionary.reference.com/browse/design?s=t> accessed August 3, 2014

- ❶ to prepare the preliminary sketch or the plans for (a work to be executed), especially to plan the form and structure of: to design a new bridge.
- ❷ to plan and fashion artistically or skillfully.
- ❸ to intend for a definite purpose: a scholarship designed for foreign students.
- ❹ to form or conceive in the mind; contrive; plan: The prisoner designed an intricate escape.
- ❺ to assign in thought or intention; purpose: He designed to be a doctor.

# Definition of Engineer

Source: <http://dictionary.reference.com/browse/engineer?s=t> accessed August 3, 2014

- ① a person trained and skilled in the design, construction, and use of engines or machines, or in any of various branches of engineering: a mechanical engineer; a civil engineer.
- ② a person who operates or is in charge of an engine.
- ③ Also called locomotive engineer. Railroads. a person who operates or is in charge of a locomotive.
- ④ a member of an army, navy, or air force specially trained in engineering work.
- ⑤ a skillful manager: a political engineer.

## 1 **Engineering graphics:**

The principles of projections: projections of points, lines, and planes. Parallel and Oblique projections. Orthographic projections in the first and third angles. Isometric projections. Conversions between orthographic and isometric views. Sectional views in orthographic projection. Perspective views and the concept of the vanishing point. Use of computer graphics software to create 2-dimensional drawings. Exposure to a 3-dimensional solid modelling software is an option left to the instructor.

## 2 **Introduction to Design:**

Need recognition and the conception of an idea to meet this need. Problem definition, and a method of directed development leading to the construction and evaluation of a prototype. Steps will include feasibility study, preliminary design, detailed design, design evaluation and optimization, and physical realizability. A project component of this course will require the student to design and build a prototype to address a stated need.

## Engineering Graphics lectures

- 1 Visual communication
- 2 Free hand sketching (V. V. imp.)
- 3 The computer as a tool
- 4 Scales
- 5 Projections:
  - (a) Concepts & conventions
  - (b) Orthographic (very important)
  - (c) Axonometric & Oblique
  - (d) (Perspective)
- 6 Sectioning
- 7 Dimensioning and Annotation

## Design lectures

- 1 Need Analysis and Problem Definition
- 2 Concept Generation and Solution Synthesis
- 3 Preliminary and detailed design
- 4 Evaluation and decision
- 5 Optimization, revision and implementation
- 6 Embodiment Design (incl. Detail Design / Drawings)
- 7 Result communication

## Computer Graphics Lab:

- 1 Computer Graphics labs: 2-D drafting and some exposure to 3-D modeling using commercial software
- 2 Some time will be allotted in the lab to draw sketches for the project

## Home work assignments:

- 1 Approximately one assignment a week based on class lectures

## Design project:

- 1 Design and fabrication of a prototype (a team project)
- 2 Final report, presentation and physical model submission

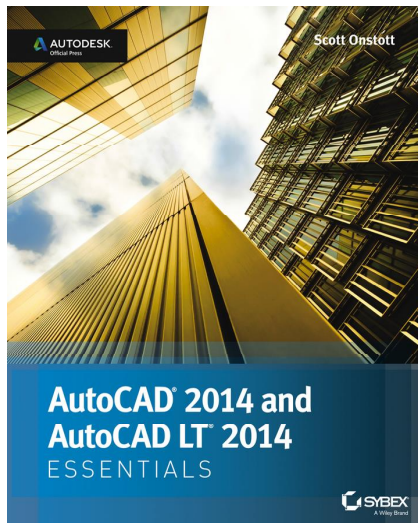
## Text Book:

- ① Engineering Drawing by N. D. Bhatt, Charotar Publishing House Pvt. Ltd., Anand, 2012
- ② Engineering Design by G. E. Dieter and L. C. Schmidt, McGraw Hill 4th ed.

## References:

- (a) Fundamentals of Engineering Drawing by W. J. Luzadder and J. M. Duff, PHI Learning Private Limited, New Delhi, 2012
- (b) Introduction to Design by Morris Asimow, Prentice-Hall, Inc., Englewood Cliffs, NJ, 1962
- (c) Jony Ive: The Genius Behind Apple's Greatest Products by Leander Kahney, Penguin UK, 2013
- (d) Total Design by Stuart Pugh, Prentice Hall, 1990
- (e) Effective Innovation: The Development of Winning Technologies by Don Clausing and Victor Fey, American Society of Mechanical Engineers, 2004

# ME 101: An AutoCAD 2014 text available online





- Home assignments: 10 %
- Laboratory assignments: 15 %
- 1st & 2nd Mid-Semester exams: 15 % + 15 %
- End-semester exam: 25 %
- Design project: 20 %

## Evaluation parameters for the design project:

- (a) Aesthetic appeal (the subjective judgment of the examiners is final): 20 %
- (b) Constraint satisfaction: Violation of any constraint will disqualify the design.
- (c) Teamwork: 20 % (will be judged based on paperwork to be submitted regarding minutes of meeting and timeline planning. The instructor will provide more details in class on the subject matter of documenting teamwork.)
- (d) Group presentation: 20 % (No more than 8 slides on Power Point.)
- (e) Individual report: 20 %
- (f) Workmanship: 20 %

# ME 101: Attendance and Grading

~~75% attendance in class is required as per the rules of the institute (Aug 5, 2014)~~

90% attendance is required as per the Student Handbook 2014

## Lectures

Attendance is optional, but attendance may be helpful. Attendance will be called on some dates selected at random. Your attendance percentage will be calculated on the basis of this small sample.

**Laboratory:** Laboratory attendance is mandatory.

## Grading

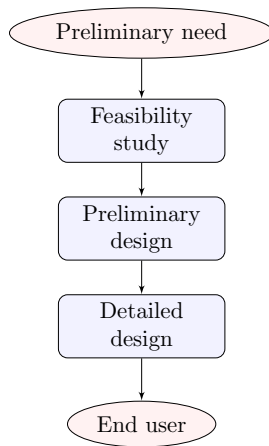
Grading is relative. Your performance is judged in comparison with your peers. The instructor uses her/his judgment to assign a letter grade (A,B,C,D,F) based on your total score on all the evaluations.

Working in groups of six, students will design a proposed MÉC logo. After the design is finalized, each team member will independently build a prototype of the proposed logo. The group will make a final presentation to a committee for evaluation. Each individual team member will submit an independent final report along with her/his prototype.

Details of the project requirements will be circulated separately.

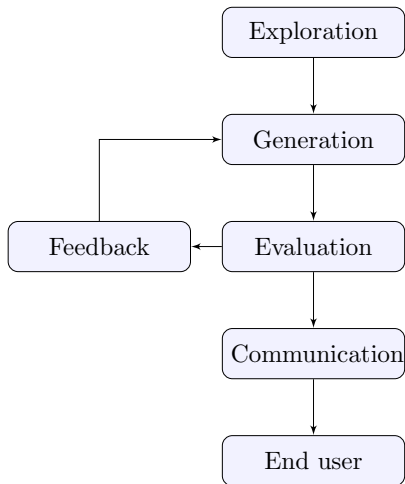
# Asimow's design morphology

Asimow's design morphology (The primary design phase)  
(Ref: Asimow)



# A simple design process (Ref: Cross)

A simple generic  
design process  
(Ref: Cross)



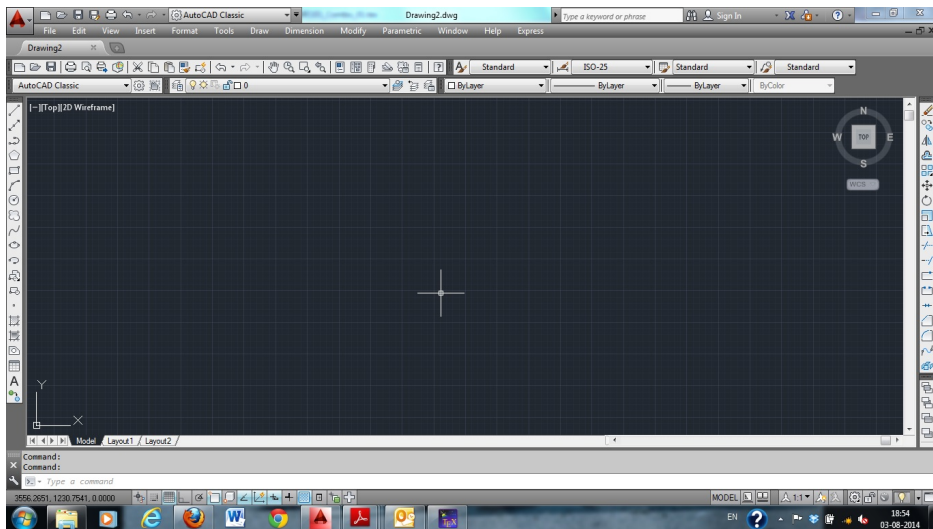
# ME 101: Assignment No. 1

Read Chapter 4 in the Dieter text (Team Behavior and Tools).

Submit a summary of the chapter in not more than 250 words.

Due date: Monday, Aug 18, 2014, at the beginning of the lecture

# The AutoCAD 2014 console (Classic, Model Space)



# Creative Genius: Paul Tetul, Senior (Orange County Choppers)



Downloaded from:

<http://cdn.orangecountychoppers.com/wp-content/uploads/2010/08/Paultimeline41.png>  
accessed June 2, 2014



# Unconventional bikes (a splitback)

This makes a nice wallpaper



Downloaded from:

<http://occ.network.hu/kepek/motoclub-6242/splitbackocc>

accessed June 2, 2014