BASIC ENGINEERING DESIGN

GEN- N1003

Fall 2016

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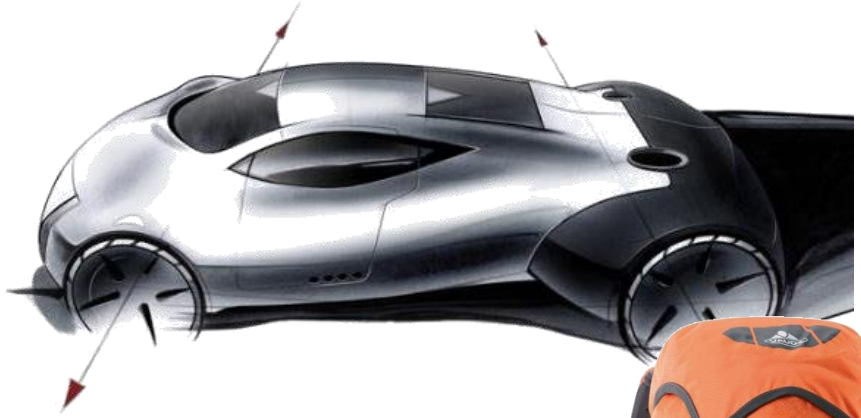
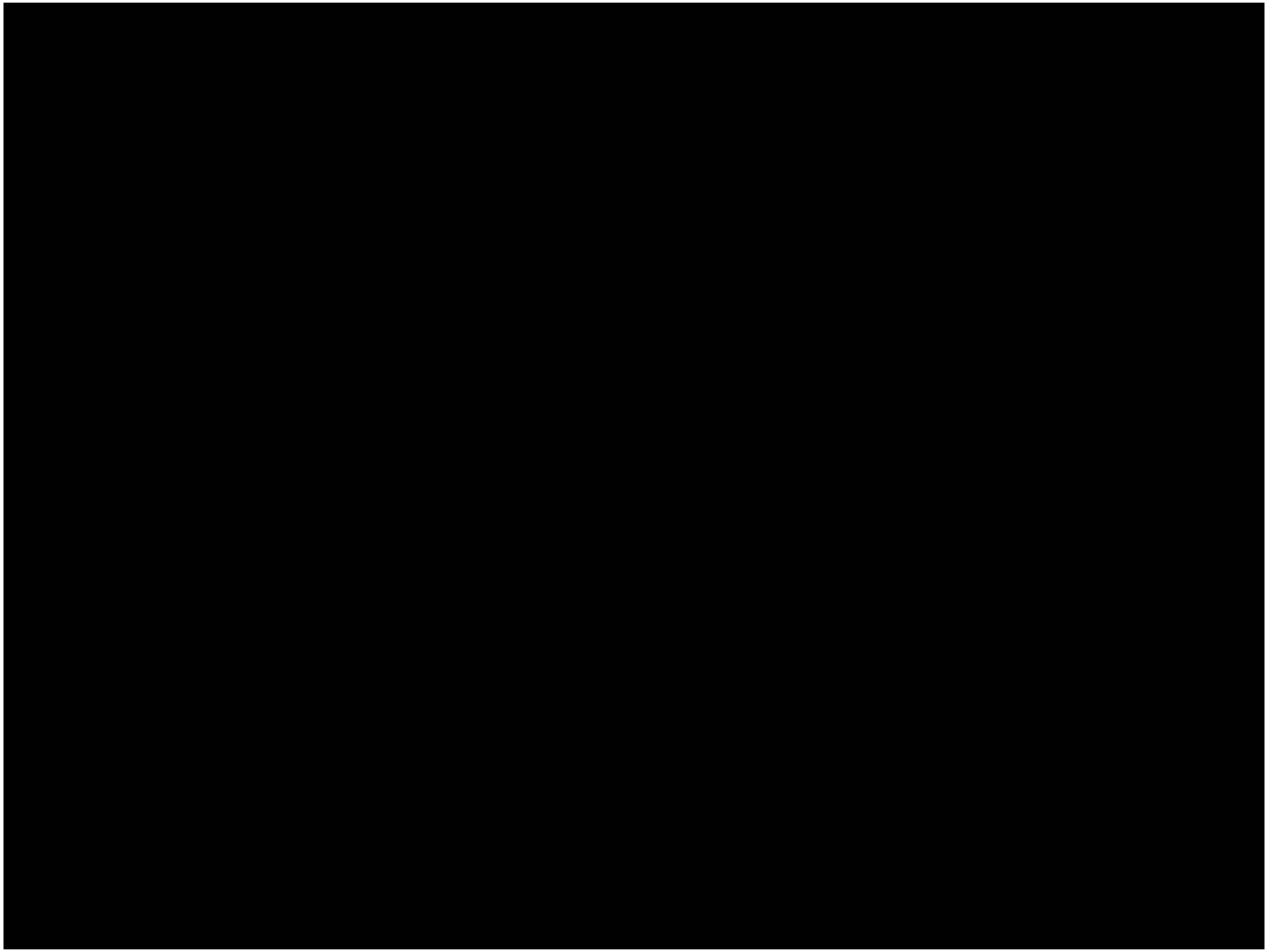
Video



Video



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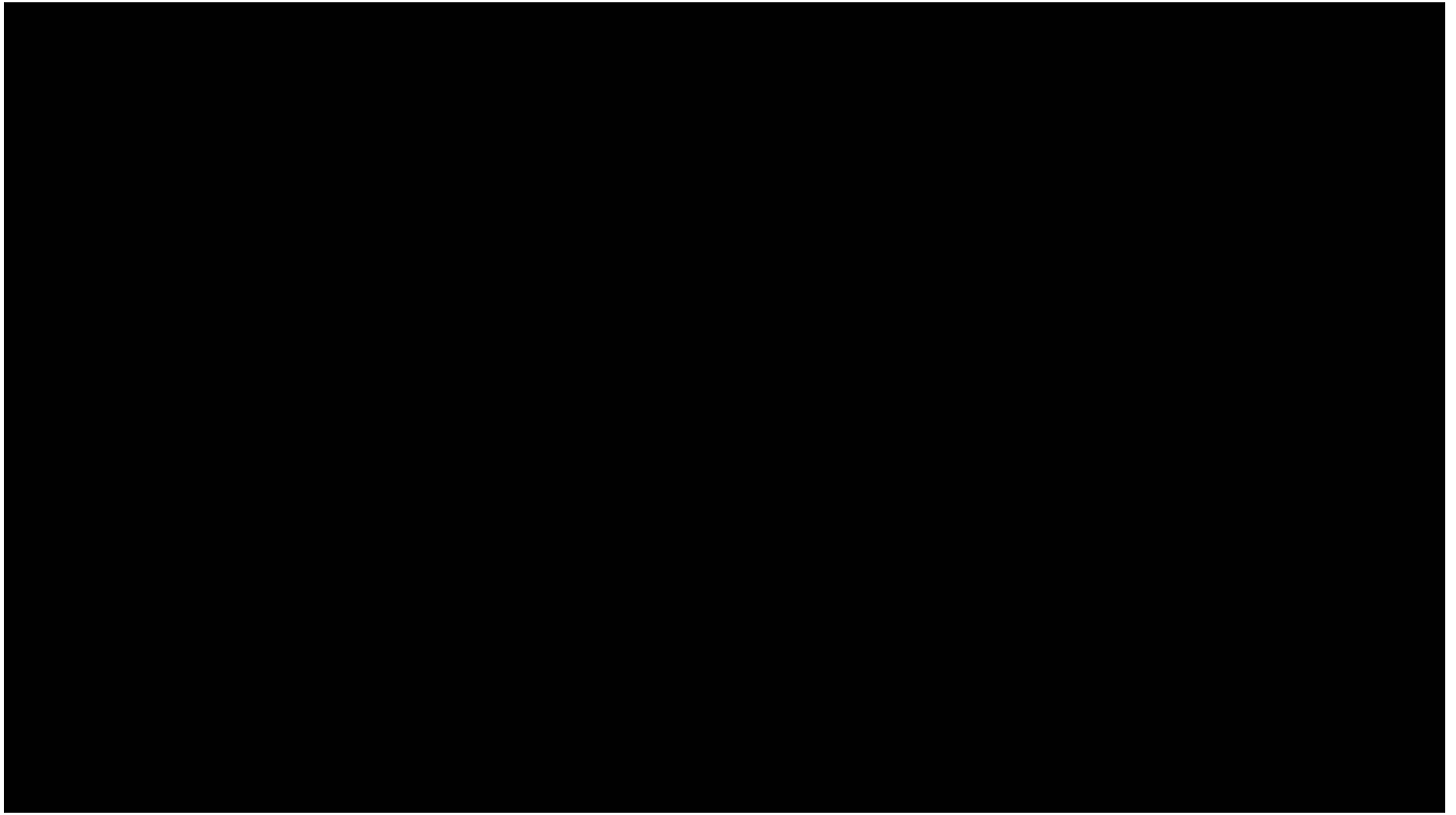
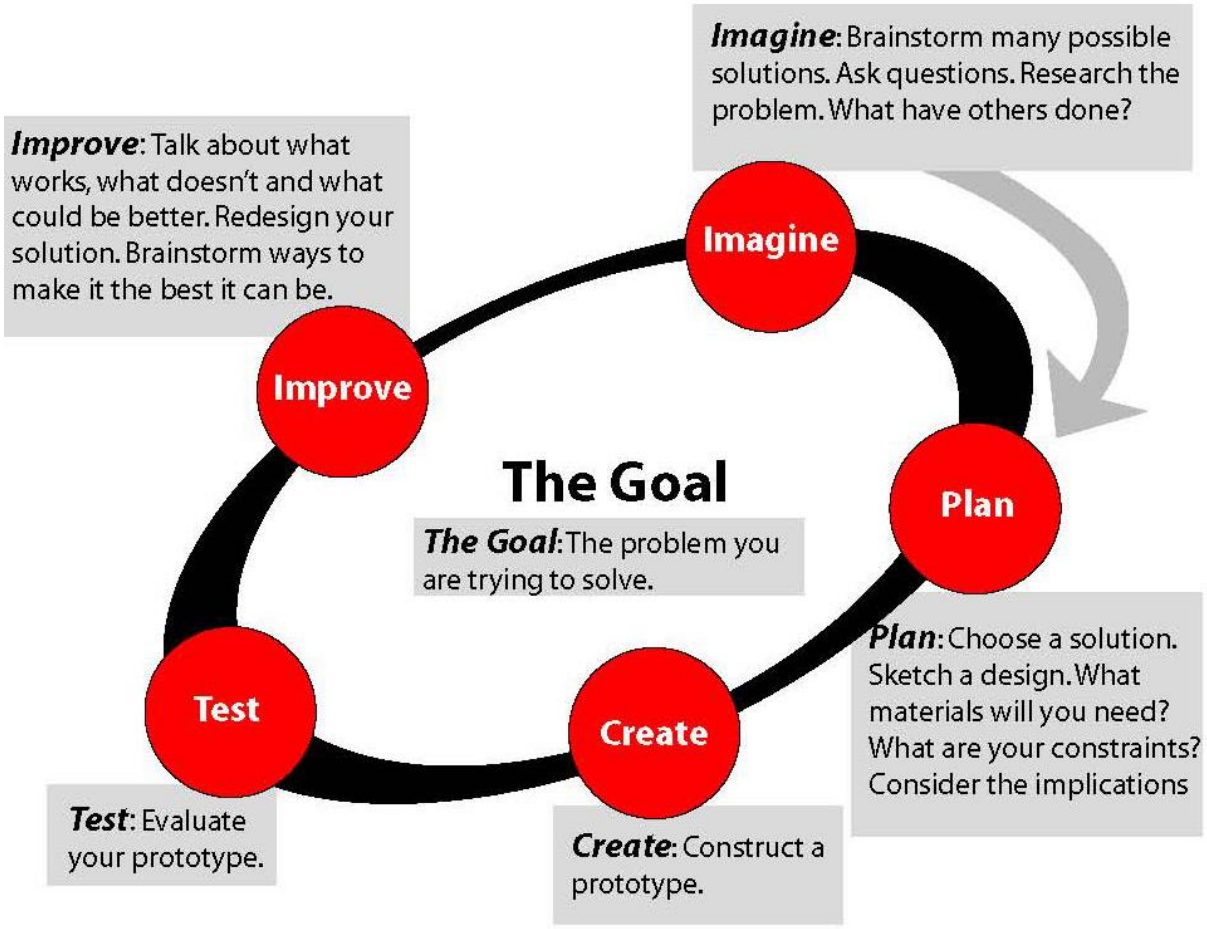


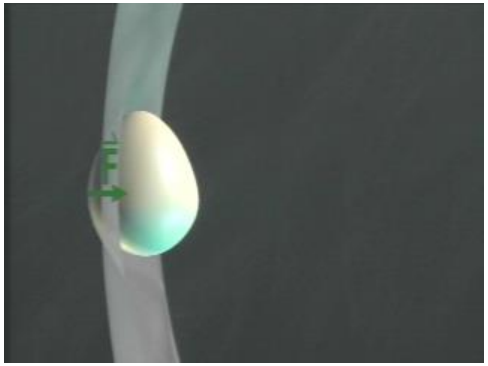
Engineering Disciplines

- Aeronautical and Aerospace Engineering
- Architectural Engineering
- Biomedical Engineering and Systems
- Chemical Engineering
- Computer Engineering
- Electrical Power and Machines
- Electronics and Communications
- Engineering Mathematics and Physics
- Irrigation and Hydraulics
- Mechanical Design and Production
- Mechanical Power Engineering
- Mining, Petroleum and Metallurgical
- Structural Engineering

Please go to http://eng.cu.edu.eg/en/departments/ for more details

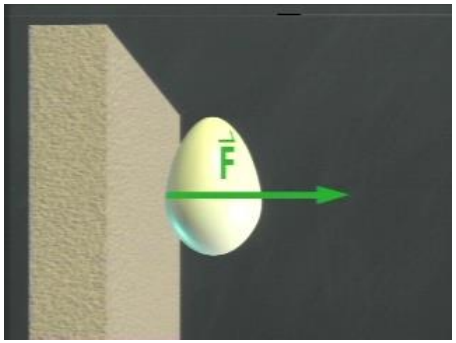


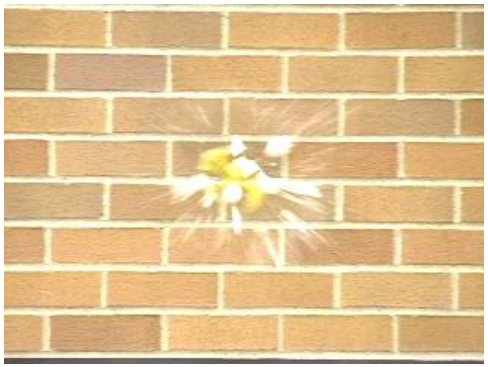
This is one of many possible diagrams of the engineering design cycle.

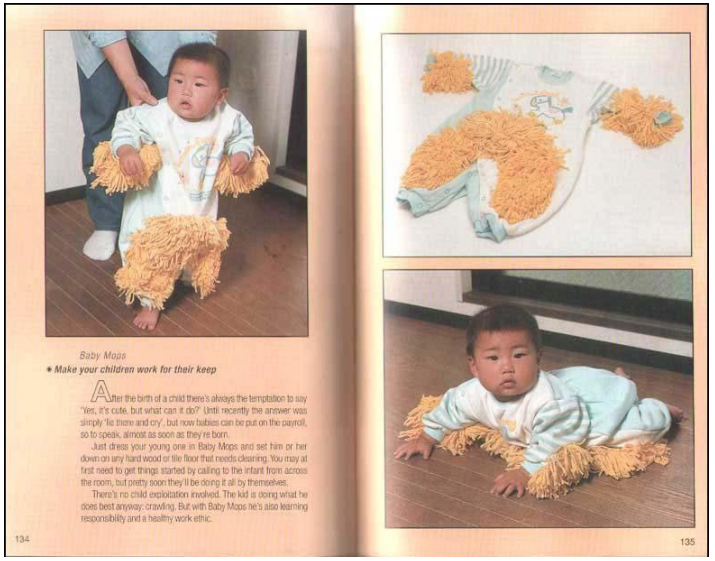


OBJECTIVES:

Basic Engineering Design requires the students to constantly exercise their practical problem solving skills and creativity. Wonder about the best way to protect an egg that's thrown into a wall? You might be required to design a device that will preserve it. Have a bag of random mechanical bits and pieces? You might be given a time limit in which to create a robotic device.







Baby Mops

*** Make your children work for their keep**

After the birth of a child there's always the temptation to say 'Yes, it's cute, but what can it do?' Until recently the answer was simply 'lie there and cry', but now babies can be put on the payroll, so to speak, almost as soon as they're born.

Just dress your young one in Baby Mops and set him or her down on any hard wood or tile floor that needs cleaning. You may at first need to get things started by calling to the infant from across the room, but pretty soon they'll be doing it all by themselves.

There's no child exploitation involved. The kid is doing what he does best anyway: crawling. But with Baby Mops he's also learning responsibility and a healthy work ethic.

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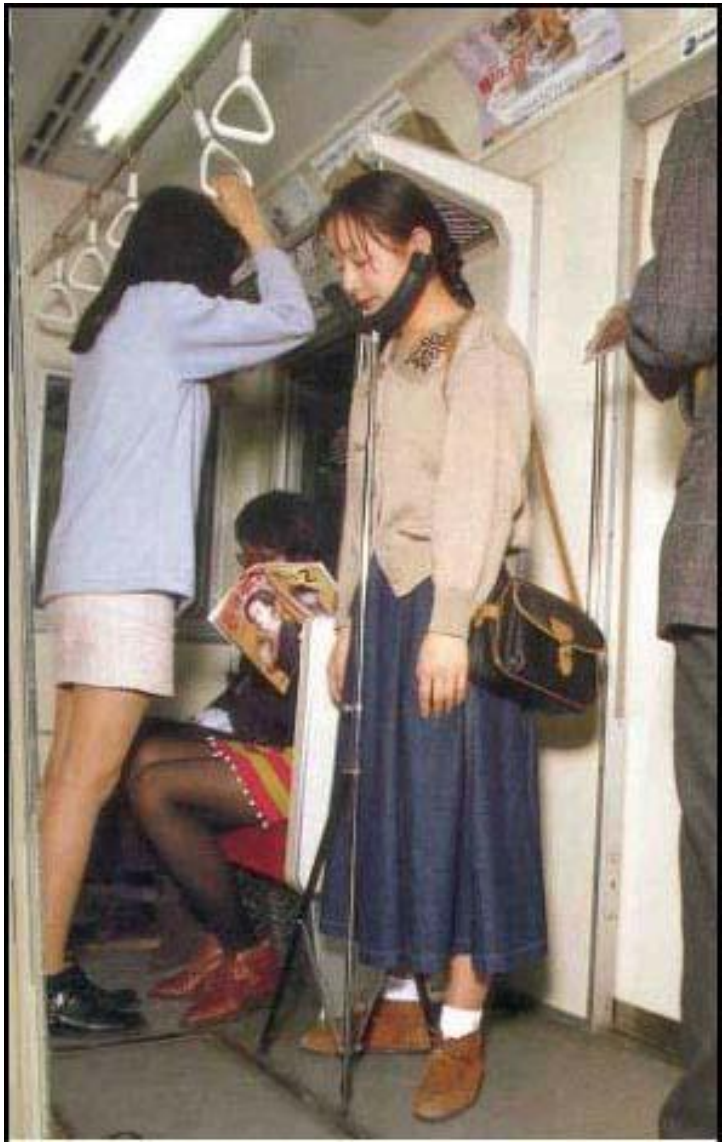


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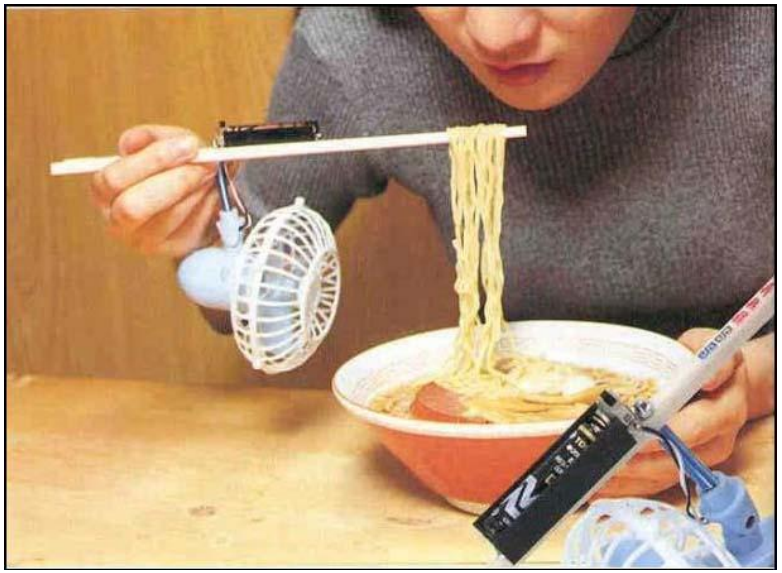


Video

Knowledge

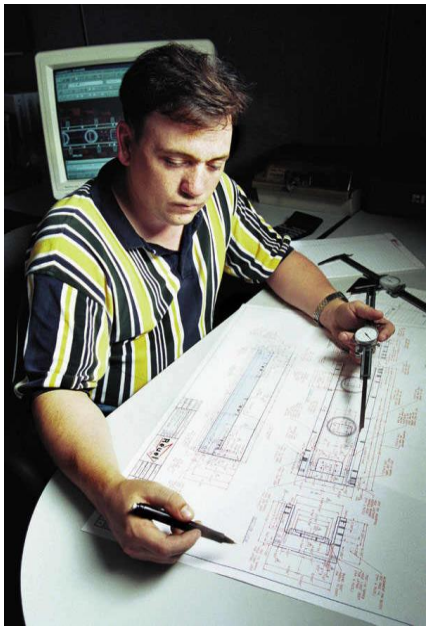
After completing this Course students will be able to:

1. Introduce the basic ideas of **systematic engineering design**.
2. Be involved in all aspects of **engineering development**, including Design.
3. Form the **ideas and laying out its specifications to fabricating** it to testing the **finished device**.
4. Develop methods of **creative thinking a**nd progressive outlook
5. Emphasize the importance of **designing products** that meet their **performance requirements** safely, reliably, economically, and sustainably.

Skills

After completing this course, students will be able to:

- ❑ Prepare a problem statement for a simple engineering product
- ❑ Elaborate a requirements list (design specification).
- ❑ Generate and select suitable combinations to produce concepts.
- ❑ Develop problem-solving and decision-making skills in real-life situations
- ❑ Get hands-on experience with the actual nuts and bolts of Engineering.



Engineering Life

Introduction to Design
Introduction to design, Problem description

Project Management
Project Management Application , Start information gathering: Literature, Patents, Standards

Problem Solving Techniques
Problem Definition, Design Constraints

Creative Thinking and Problem Solving I
Introduction to critical and creative thinking, The nature of design problems

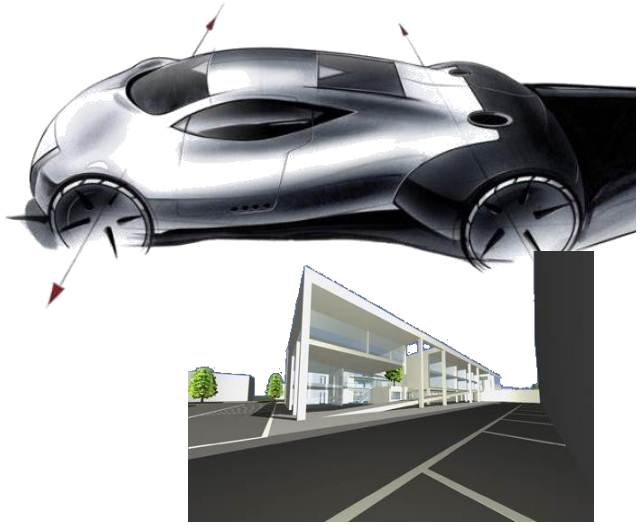
Creative Thinking and Problem Solving II
Brainstorming seminar, list of possible and impossible solutions and generating Ideas

Creative Thinking and Decision making III

Product life cycles , Preliminary evaluation of ideas, and Preliminary decision matrix, Selection of idea (s), Final decision matrix, Justify decision

The Design Matrix I, II, III

The context, purpose and requirements of engineering design, Analyze selected solution / preliminary design - Automated Design and the Positive Attitudes for Creativity, Systematic generation and evaluation of ideas. Case studies.



EVALUATION, ASSESSMENT & EXPECTED PRODUCTS/ ASSIGNMENTS:

- Total number of 8 weekly assignments and Course Project and a model experiments as applications of the different topics discussed before.

Text Book:

- **Effective Inquiry for Innovative Engineering Design: From Basic Principles to Applications**, *Ozgur Eris*, Kluwar academic Publisher, 2004.

REFERENCES & READING MATERIAL:

- Basic Engineering Design, Starkey, C.V., 1992
- Engineering Design Decisions. Hodder And Stoughton, 1991
- The Engineering Design Process, Barry Hawkes & Ray Abinett, Longman Scientific & Technical, 1984
- Engineering Design, George E. Dieter, Mcgraw - Hill International Editions, 1991