Al-Mustaqbal University

College of Engineering

Biomedical Engineering Department

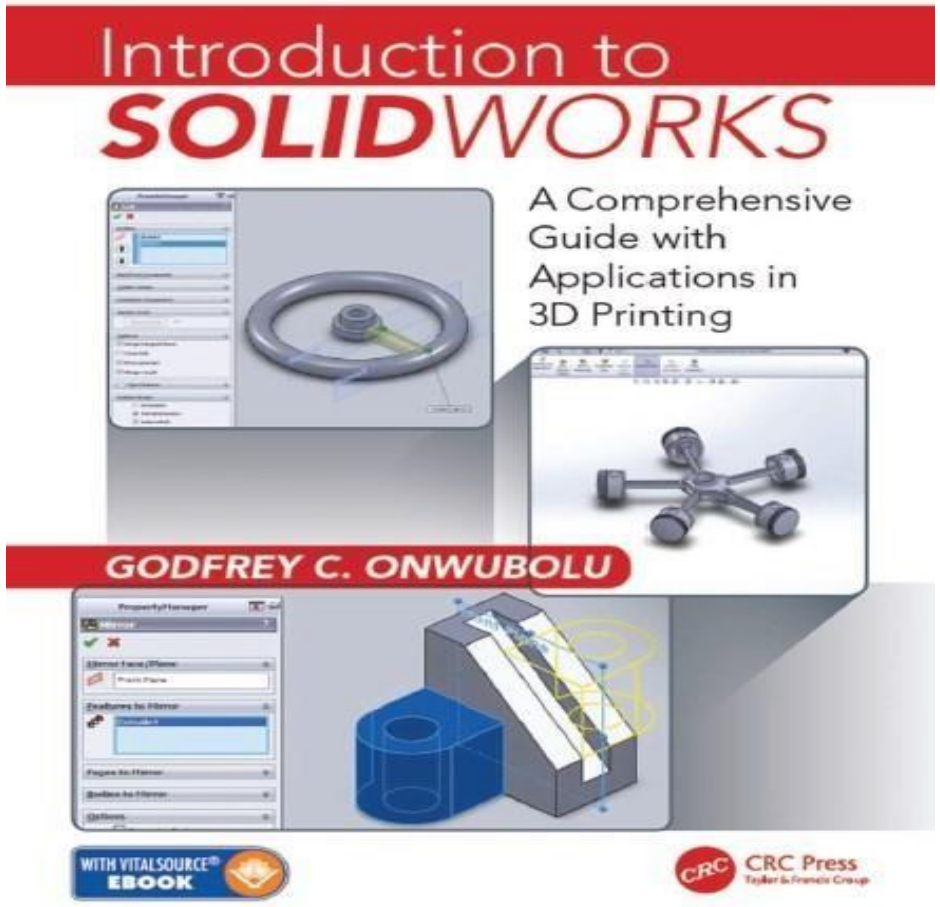
Subject Name: CAD1

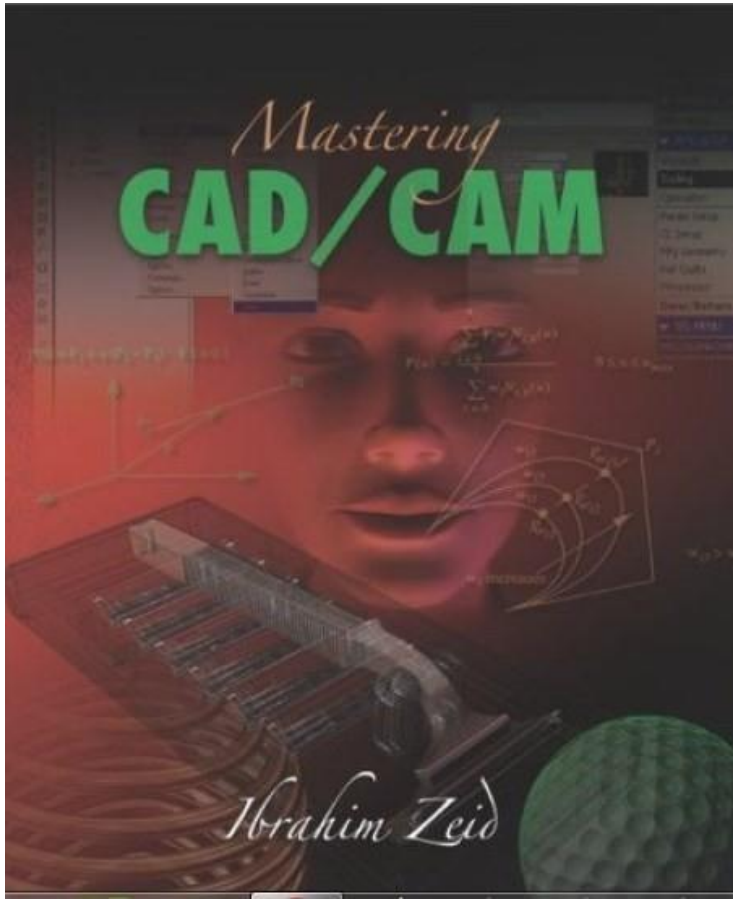
4th Class, First Semester

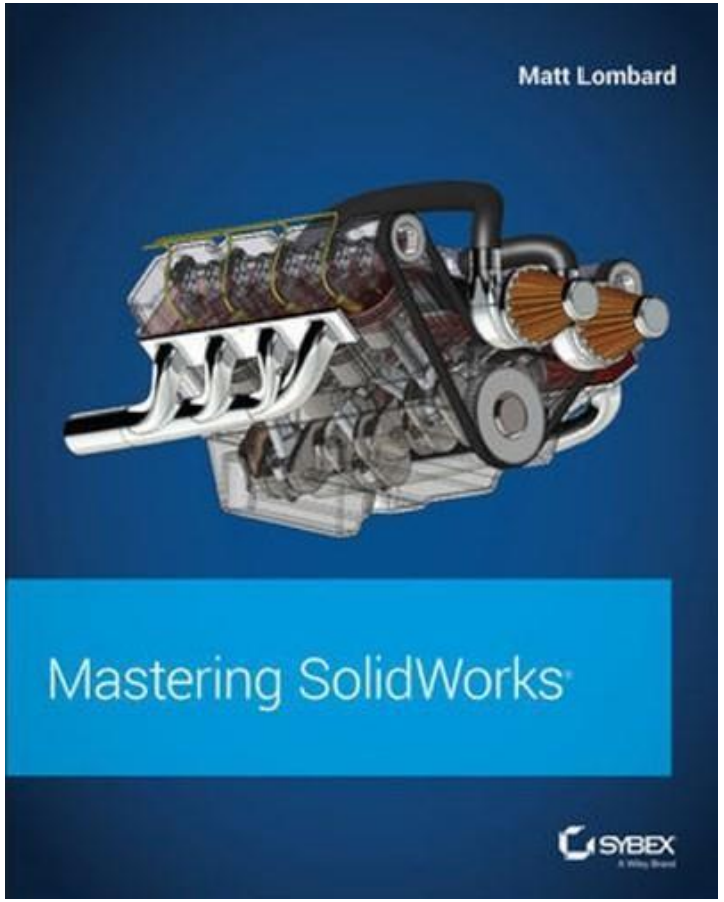
Academic Year: 2025-2026

Lecturer: Assist lect. Eman Y. Hussein

Lecture No.:- 2


Introduction to
SOLIDWORKS
A Comprehensive Guide with Applications in 3D Printing
GODFREY C. ONWUBOLU
WITH VITALSOURCE EBOOK
CRC Press


Mastering
CAD/CAM
Ibrahim Zeid

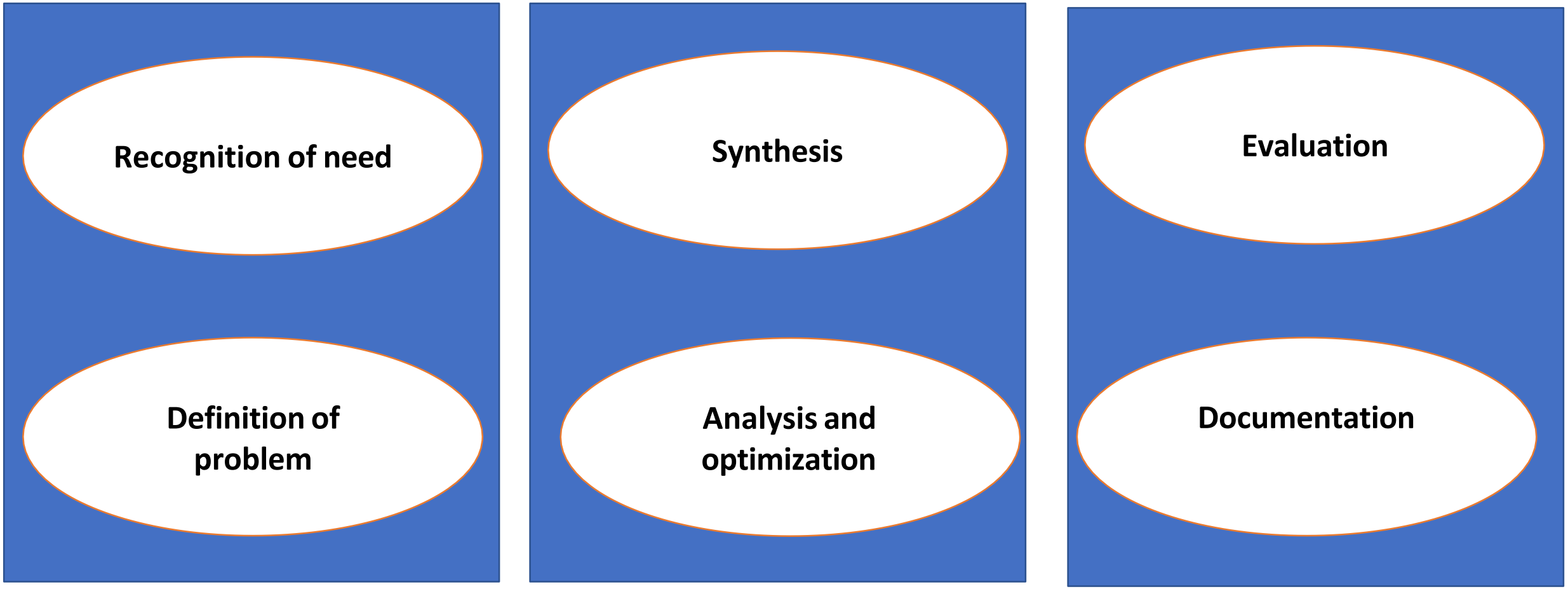

Matt Lombard
Mastering SolidWorks
SYBEX

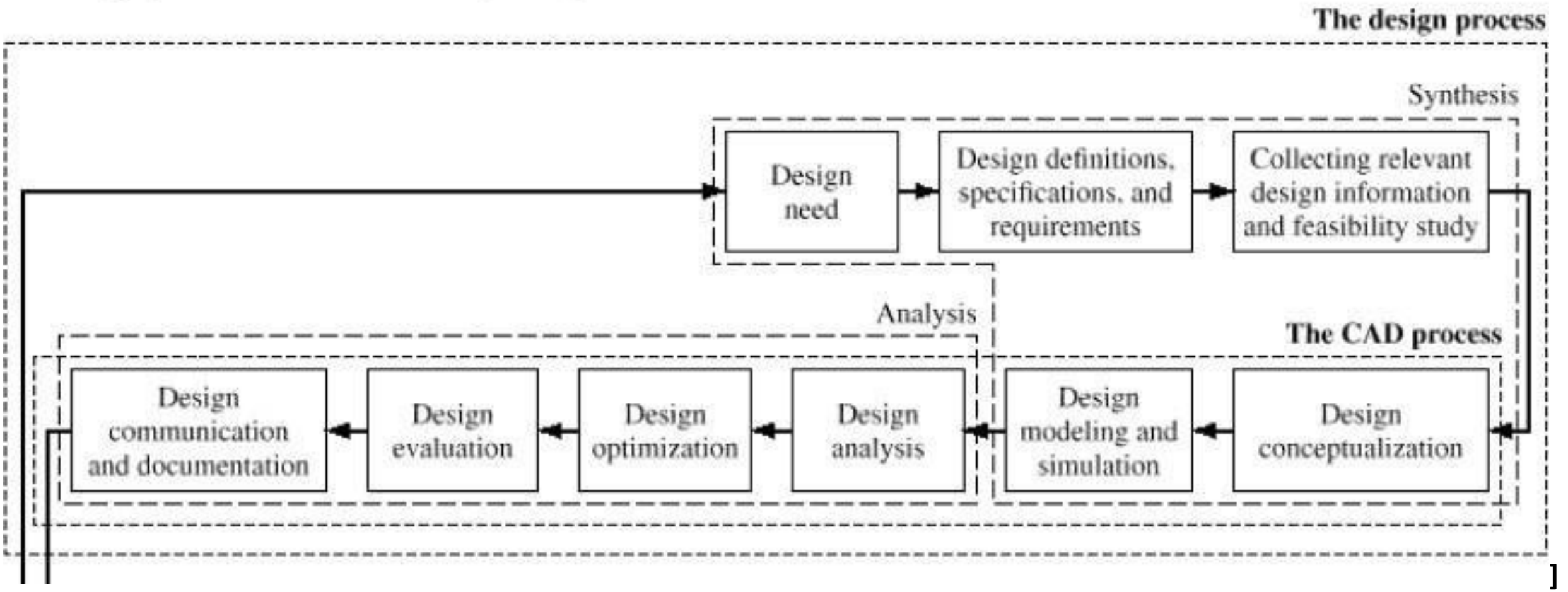
What is CAD?

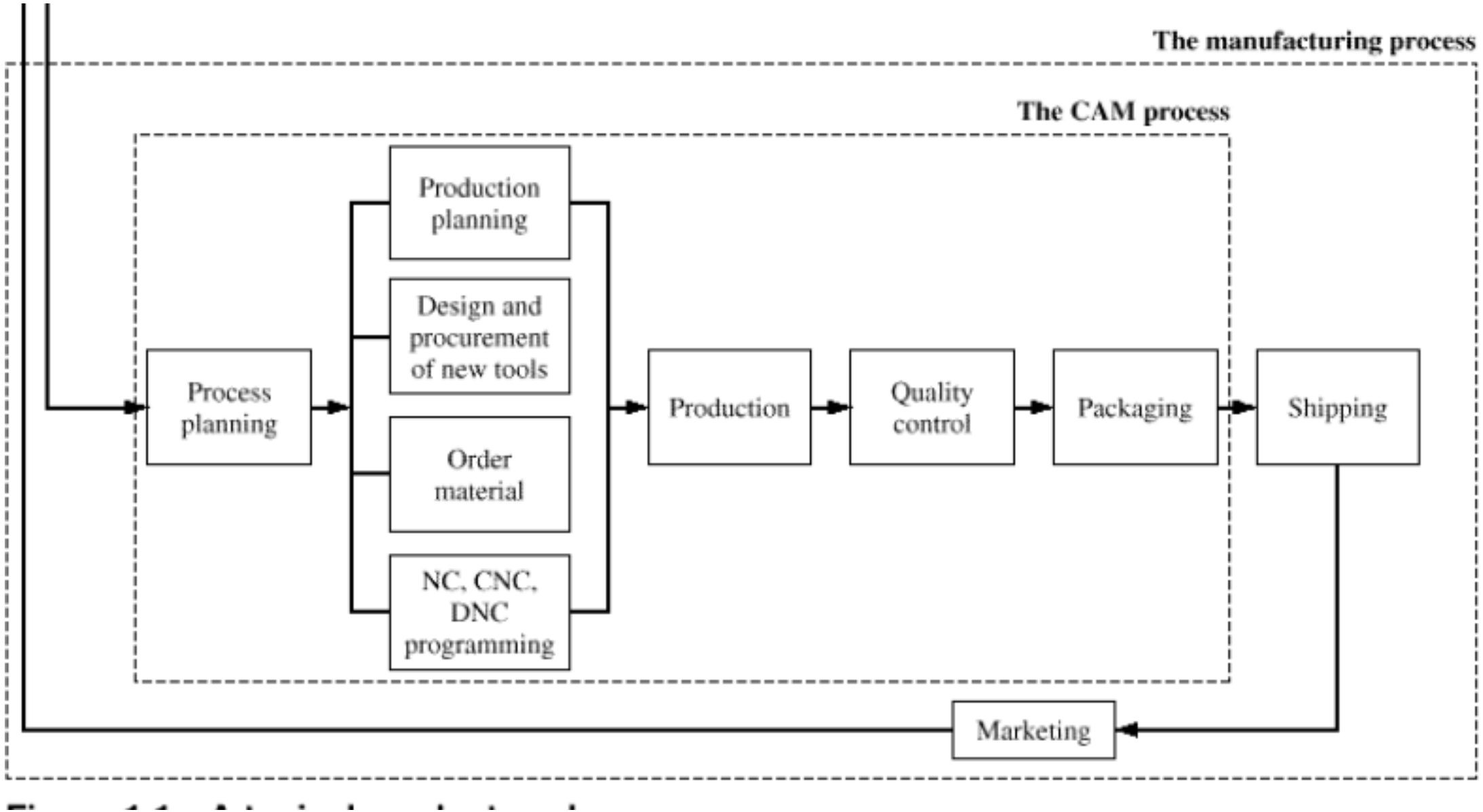
Computer-aided design (CAD) is the use of computers to aid in the creation, modification, analysis, or optimization of the **design process.**

So, what does the design process consist of ?

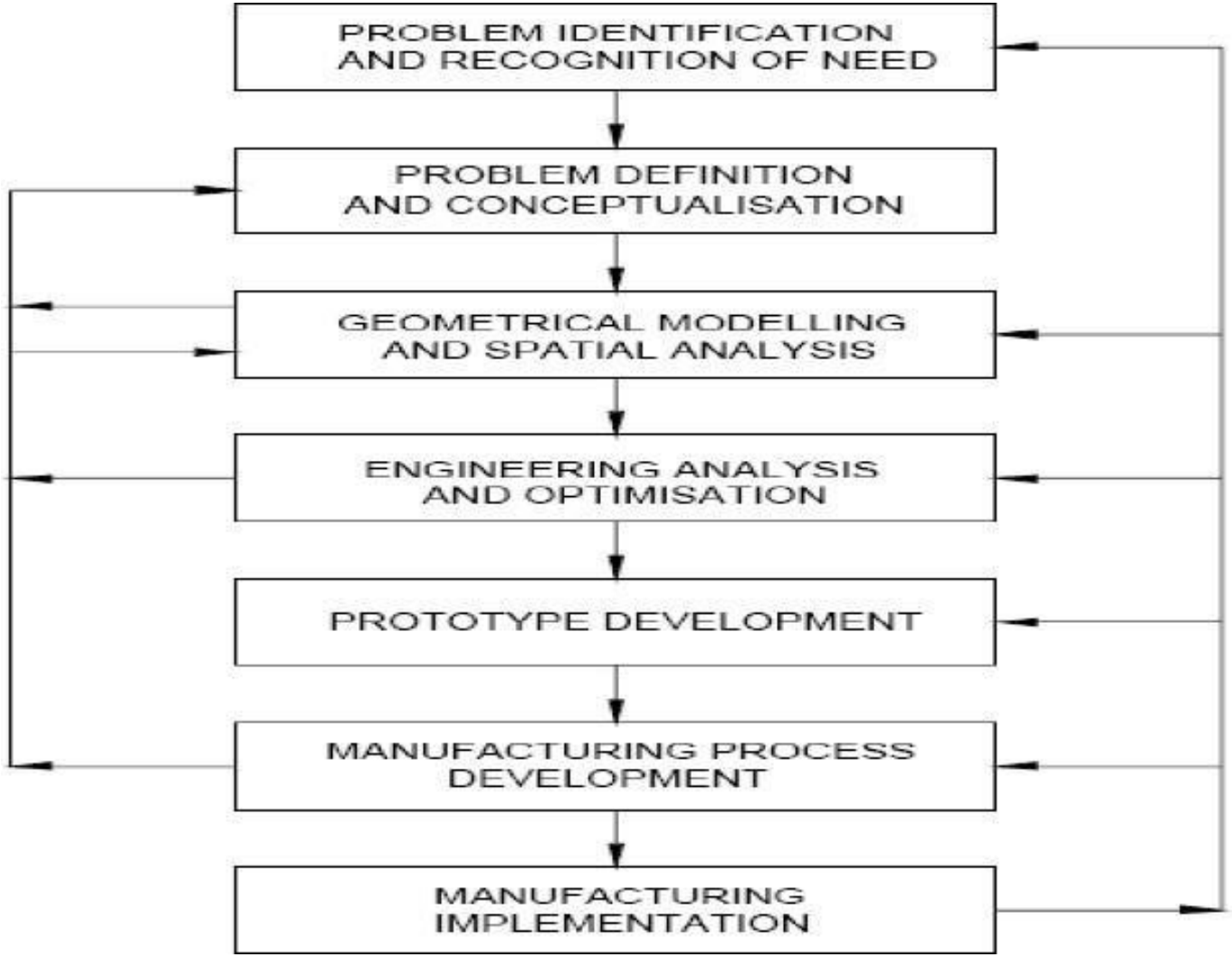
Design Process




The design process
Synthesis
Design need
Design definitions, specifications, and requirements
Collecting relevant design information and feasibility study
Analysis
The CAD process
Design communication and documentation
Design evaluation
Design optimization
Design analysis
Design modeling and simulation
Design conceptualization


The manufacturing process
The CAM process
Process planning
Production planning
Design and procurement of new tools
Order material
NC, CNC, DNC programming
Production
Quality control
Packaging
Shipping
Marketing

Design process as an iterative approach (Shigley)



Some benefits of using CAD systems:

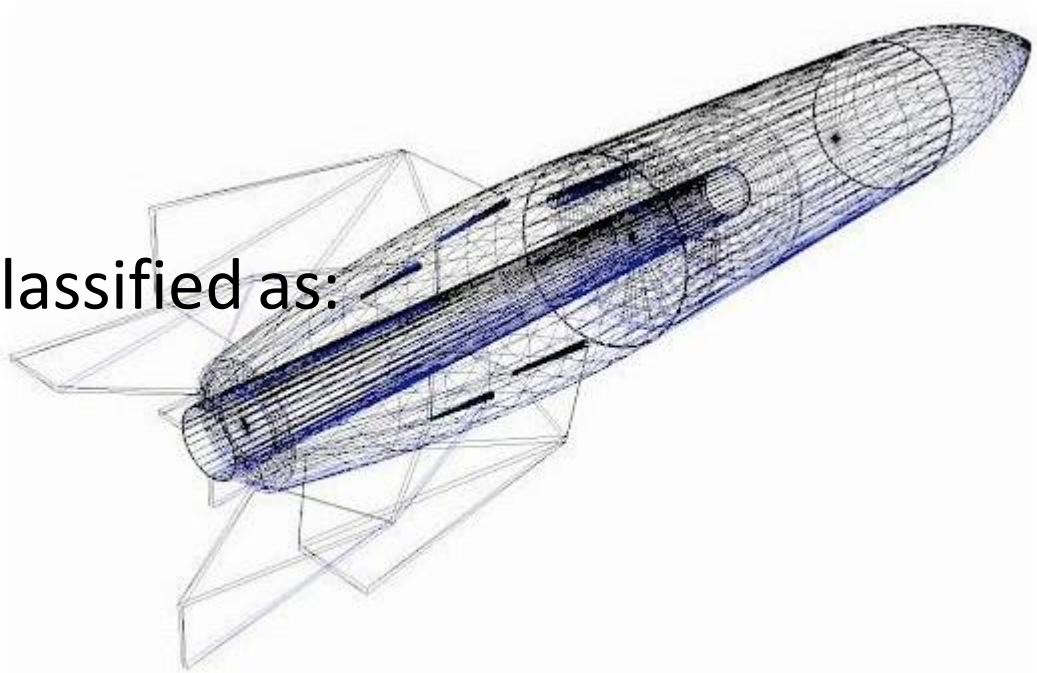
- **To increase the productivity of the designer**.
- **To improve the quality of design**.
- **To improve communications**
- **To create a database for manufacturing**,

Geometric modeling: [Wiki]

is a branch of applied mathematics and computational geometry that studies methods and algorithms for the mathematical description of shapes, and can be divided into:

1. 2D geometrical modeling. (e. g. technical drawing)
2. 3D geometrical modeling is central to computer-aided design and manufacturing (CAD/CAM), and widely used in many applied technical fields such as civil and mechanical engineering, and medical image processing!

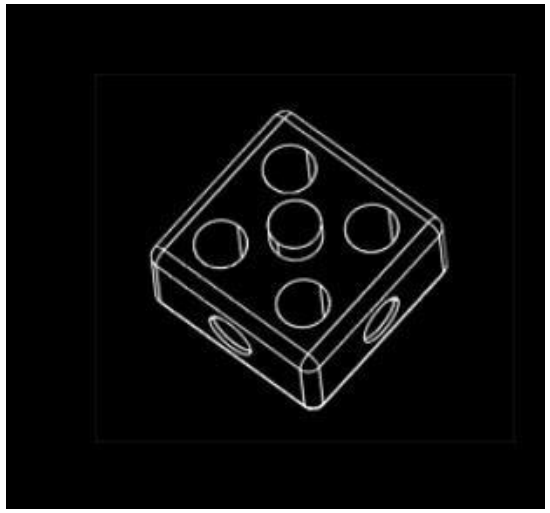
Wireframes: [Wiki –SW site]

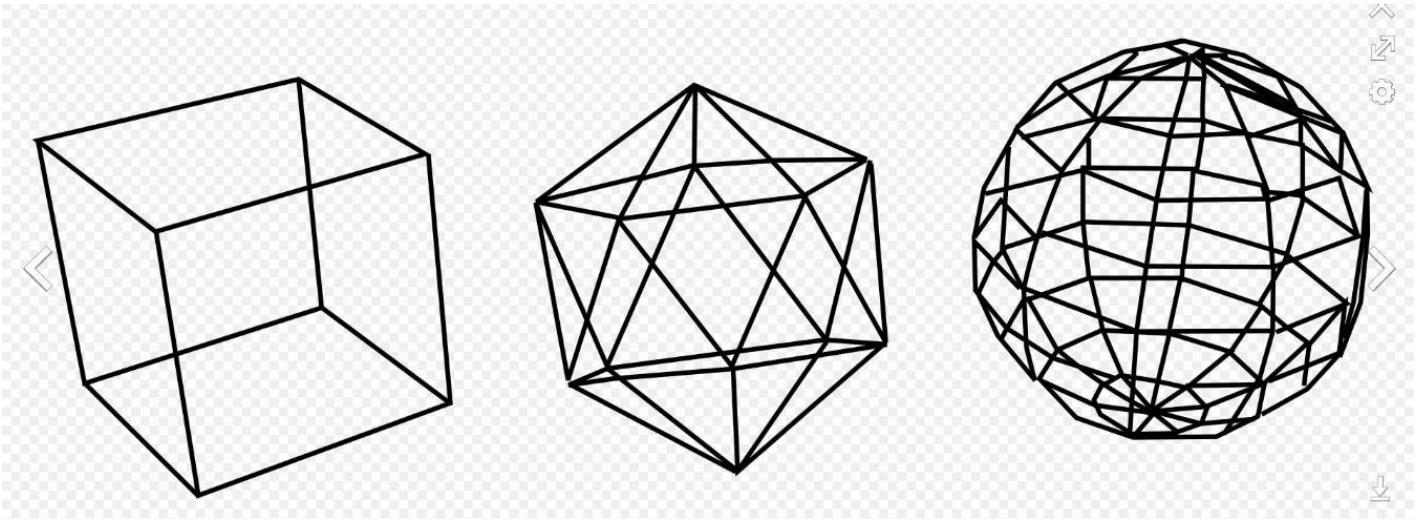


This type of geometrical modeling can be classified as:

- 2D geometrical modeling
- 3D geometrical modeling

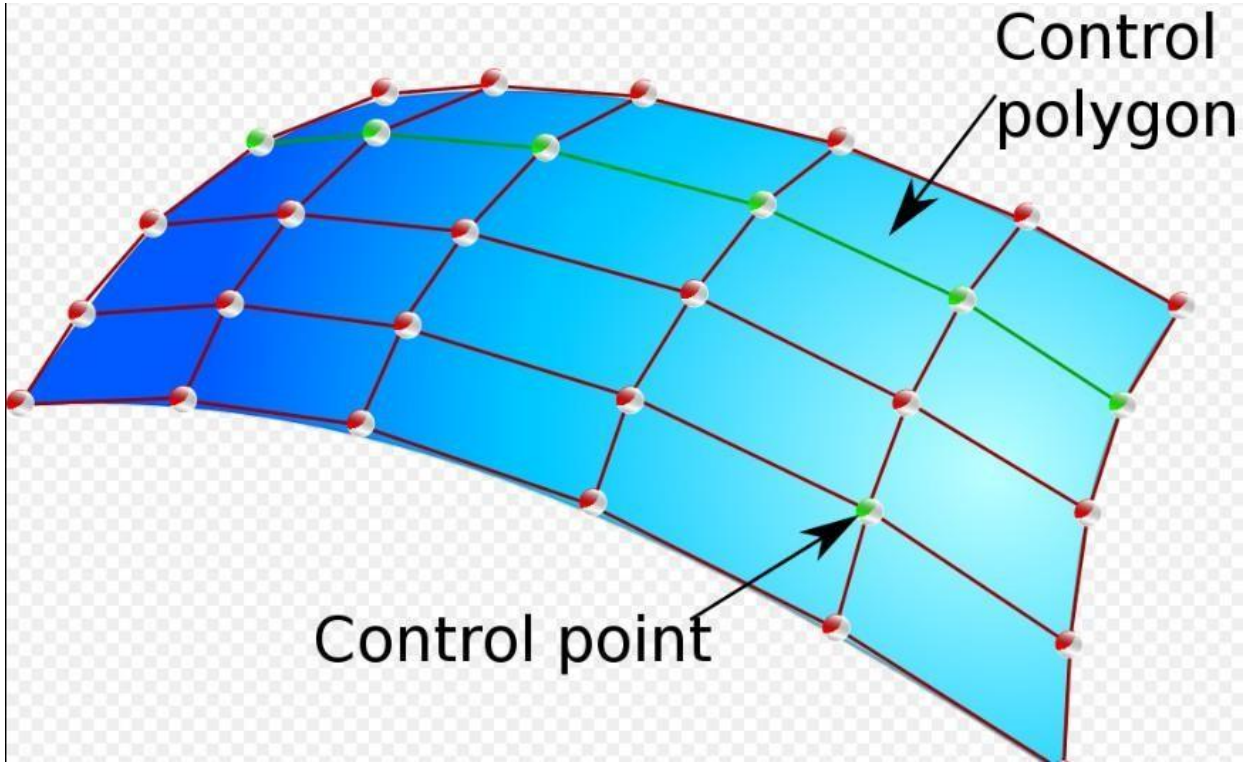
Benefits?





Surface Modeling:

Surface modeling gives you the ability to build out a visual representation of an object's exterior and its contours. In other words, it's a surface! [Wiki]



Solid Modeling:

- A mathematical technique for representing solid objects. Unlike wireframe and surface modeling, solid modeling systems ensure that all surfaces meet properly and that the object is geometrically correct. Solid modeling is the most complicated of the CAD technologies, because it simulates an object internally and externally.
  [PC Mag. Youtube]