

# School of Mechanical Engineering

Course Code : BTME3025

Course Name: Machine Design



## UNIT-1

Topic: Introduction to Machine Design

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# Learning Objectives

- Introduction to Machine design.
- Outcome of a machine design process.
- Steps involved in design of a machine element.
- Basic requirements of a machine element.

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# ***Machine design***

***Machine design is defined as the use of scientific principles, technical information & imagination in the description of a machine or a mechanical system to perform specific functions with maximum economy & efficiency.***

***-Machine Design is defined as the creation of new design or improving the exist one.***

***-Design is an innovative and highly iterative process.***

# Basic Procedure of Machine Design

Market Survey

Define Specification of Product

Study alternative Mechanism for Product  
Select Proper Mechanism

Prepare General Layout of Configuration  
and Select joining method of individual Product

Design Individual Component

Prepare Assembly and Detail Drawings and Modify Drawing  
after Testing Prototype model

# Market survey



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Ref: <https://www.carwale.com/rollsroyce-cars/>



Ref: <http://www.lamborghini.com/>



Ref: [https://www.cardekho.com/Tata/Tata\\_Nano](https://www.cardekho.com/Tata/Tata_Nano)

# Product Specification



Selection of Mechanism



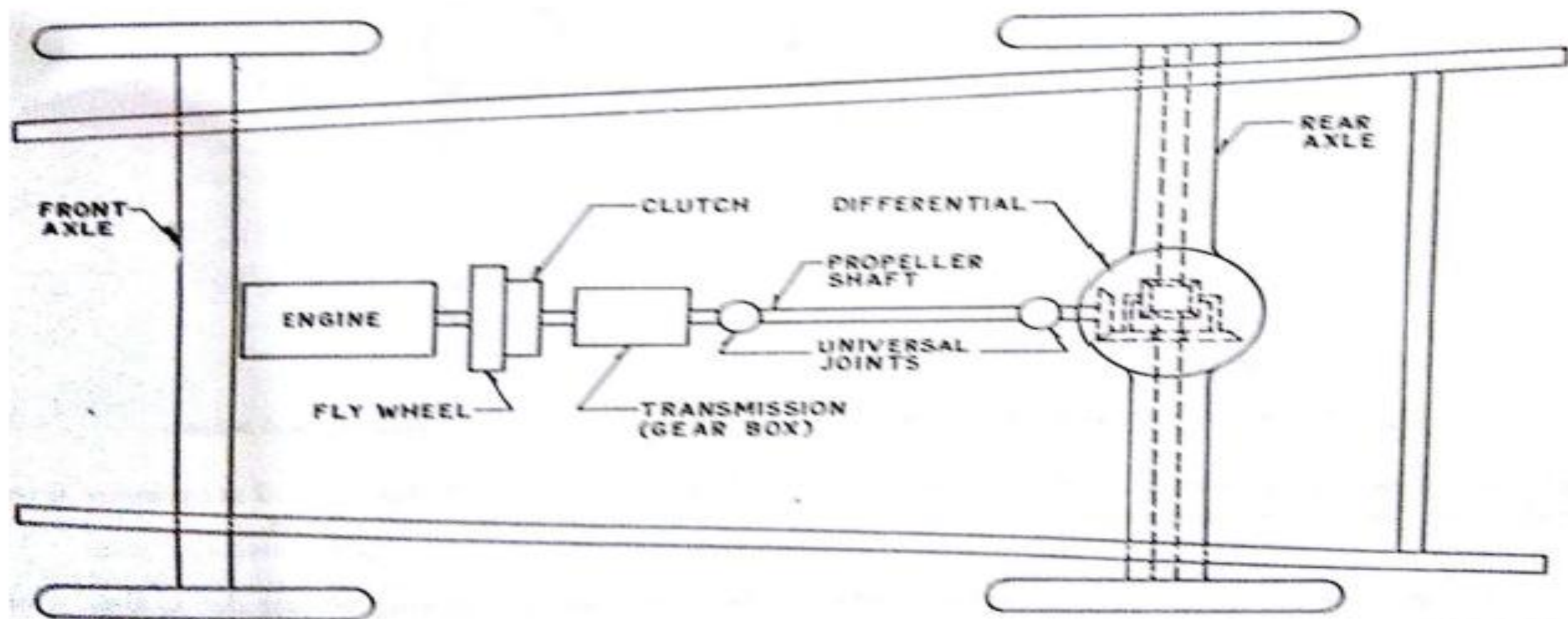
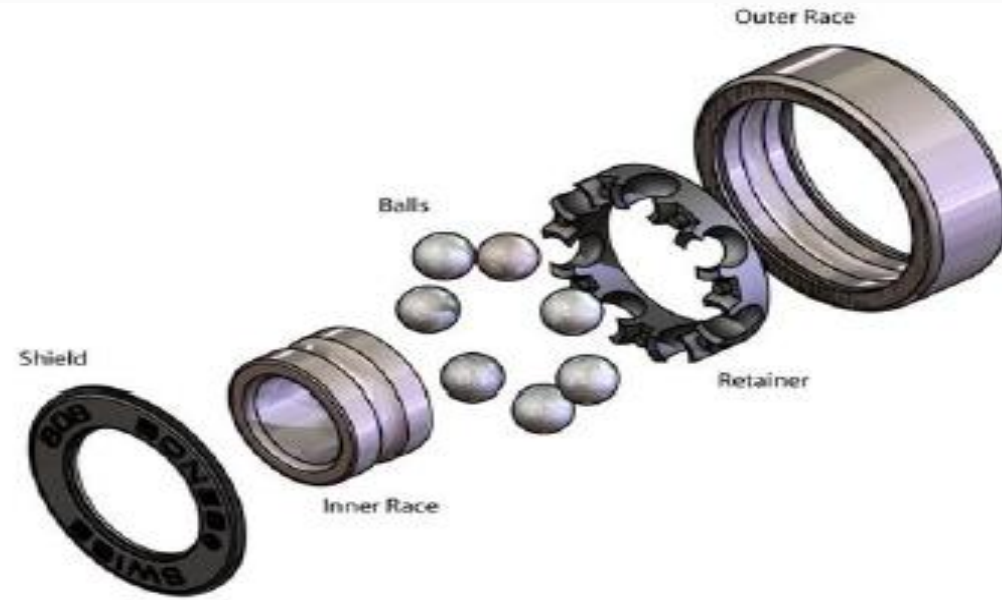


Fig. 1.4. Layout of complete transmission system of an automobile.

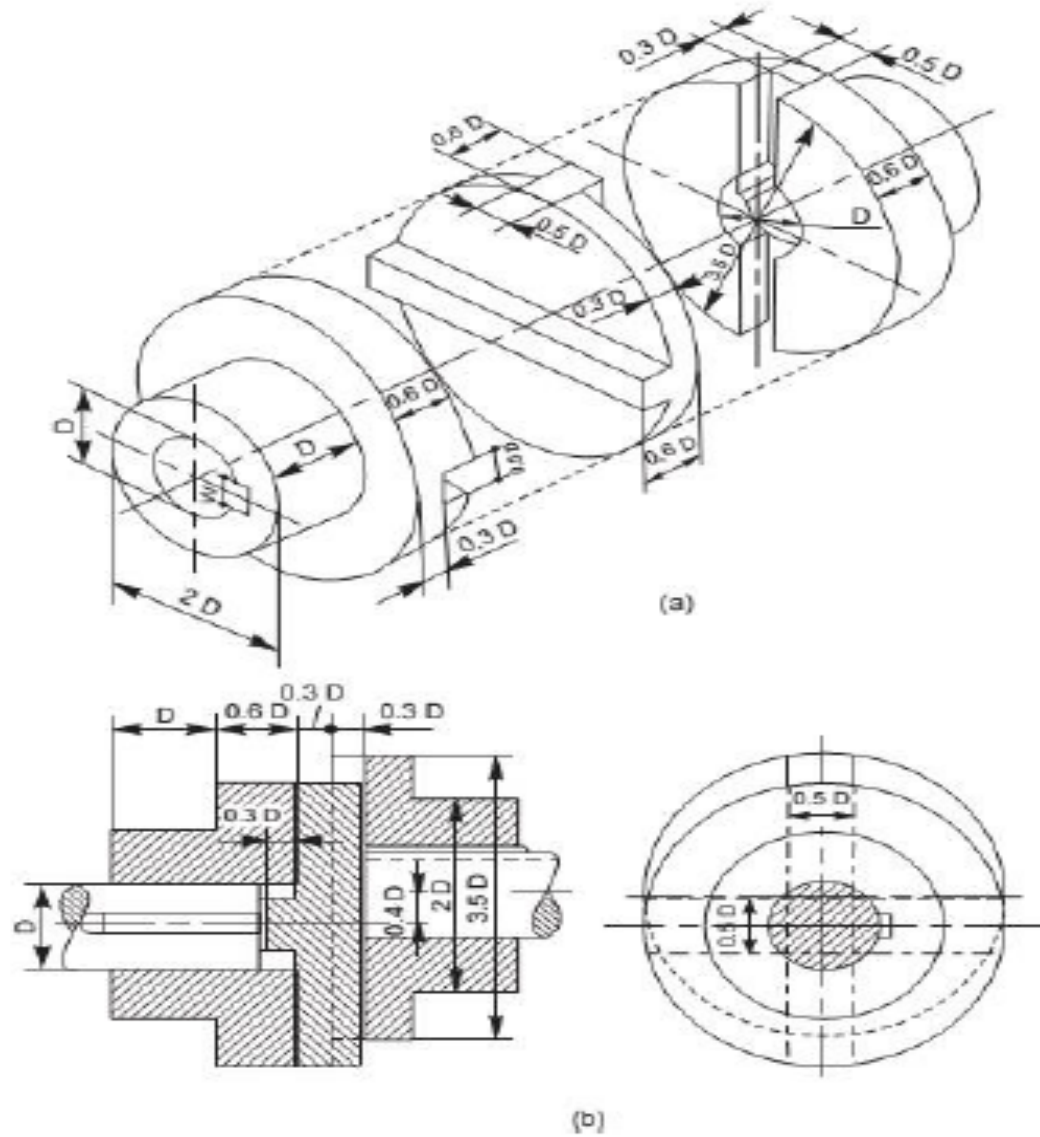
## Layout of configuration and selection of joining methods

Ref. Automobile Engineering, Vol-1, Dr. Kirpal Singh





Design of  
Individual  
Components



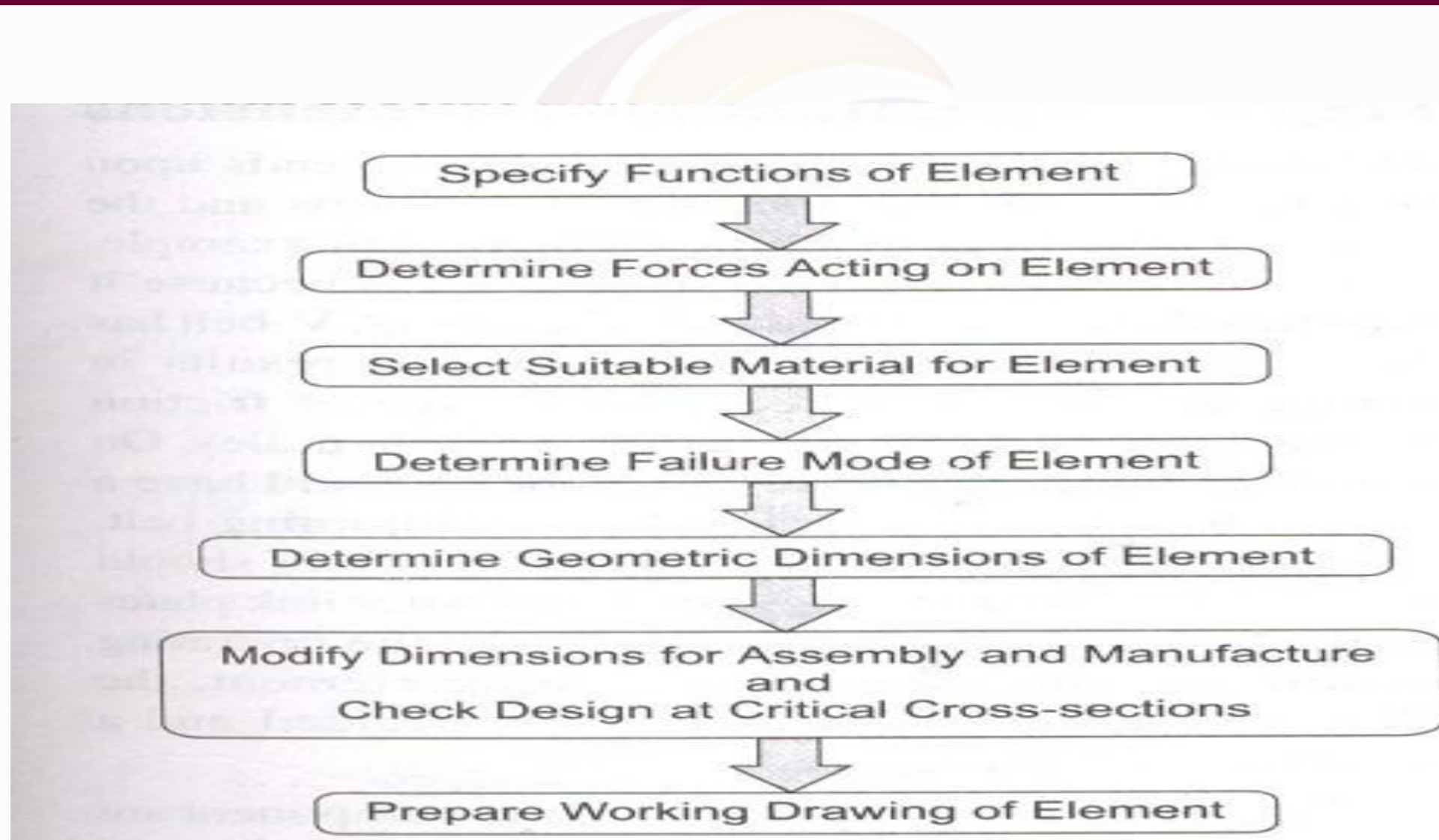
- Prepare Assembly and detail drawing
- Modify drawings after testing prototype

Ref:  
<https://blogpuneet.wordpress.com/2013/10/08/oldhams-coupling/>

# Basic Requirement of Machine Element

- Strength
- Rigidity
- Wear resistance
- Minimum Dimensions and Weight
- Manufacturability
- Safety
- Conformance to Standards
- Reliability
- Maintainability
- Minimum Life Cycle Cost

# Basic Procedure of Design of Machine Elements



# Questions

- Define machine design.
- What is the final outcome of a machine design process.
- What are the steps involved in design of a machine element?
- What are the basic requirements of a machine element?
- Name the various requirements of a product giving suitable example.

# MCQs

**1-Following is the correct order for design of machine elements.**

- (A) Specify functions of element – Determine forces acting on element – select suitable material for element – determine failure mode of element.
- (B) Specify functions of element – select suitable material for element – Determine forces acting on element – determine failure mode of element
- (C) Specify functions of element – Determine forces acting on element– determine failure mode of element – select suitable material for element
- (D) Specify functions of element – determine failure mode of element – Determine forces acting on element – select suitable material for element

**In design process, which process is followed after selecting the material?**

- a. Selecting factor of safety
- b. Synthesis
- c. Analysis of forces
- d. Determining mode of failure

**In which part of engineering design process would you follow your plan to make something ?**

**Select one:**

- a. ask
- b. create
- c. imagine
- d. plan

The logo of Galgotias University is a stylized 'G' composed of three overlapping, curved bands in shades of yellow, blue, and pink, set against a light pink circular background.

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# References

1. V.B. Bhandari (2010), Design of Machine elements, 3rd Edition, Tata McGraw Hill. ISBN: 978-0-070-68179-8.
2. Richard G. Budynas, J. Keith Nisbet(2011) Shigley's Mechanical Engineering Design ,Ninth Edition, McGRAW-HILL, ISBN: 978-0-07-352928-8



The logo of Galgotias University is a circular emblem with a stylized, multi-colored swirl in shades of yellow, orange, and blue. The text "Thank you" is centered over the logo in a large, bold, black sans-serif font.

**Thank you**

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