

MCH2011 STATICS & STRENGTH OF MATERIALS

Dr.Savaş Dilibal

Tentative Schedule

No	Weeks	Lecture Topics	Remarks
1	17, 19, 24 Sep.	Introduction & Preliminaries	Ch.1
2	26 Sep., 01 Oct.	Force Systems –I	Ch.2
3	03, 08 Oct.	Force Systems –II	Ch.3
4	17, 22 Oct.	Equilibrium	Ch.4
5	24, 29 Oct.	Structures & Review of Statics	Ch.5
6	31 Oct.	Midterm Exam -I	
7	05, 07, 12 Nov.	Strength of Materials	Ch.7
8	14, 19 Nov.	Stress & Strain	Ch.7
9	21, 26 Nov.	Mechanical Properties of Materials	Ch.8
10	28 Nov., 03 Dec	Axial Load & Midterm Exam - II	Ch.9
11	05, 10 Dec.	Torsion	Ch.10
12	12, 17 Dec.	Bending	Ch.11
13	19, 24 Dec.	Transverse Shear	Ch.12
14	26 Dec.	Review & Summary	

Course Materials

- R. C. Hibbeler (2011). Statics & Mechanics of Materials, Pearson (course textbook)
- MCH2011 lecture presentations
- Textbook companion website
<http://www.pearsoned-asia.com/hibberler>

Statics &
Mechanics
of Materials
FOURTH EDITION

R. C. HIBBELER

What is statics?

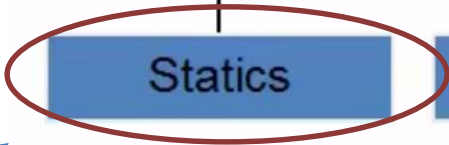
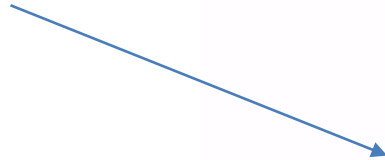
Classical Mechanics - Quantum Mechanics

Mechanics is a branch of **physics**, since it deals with **physical phenomena**.

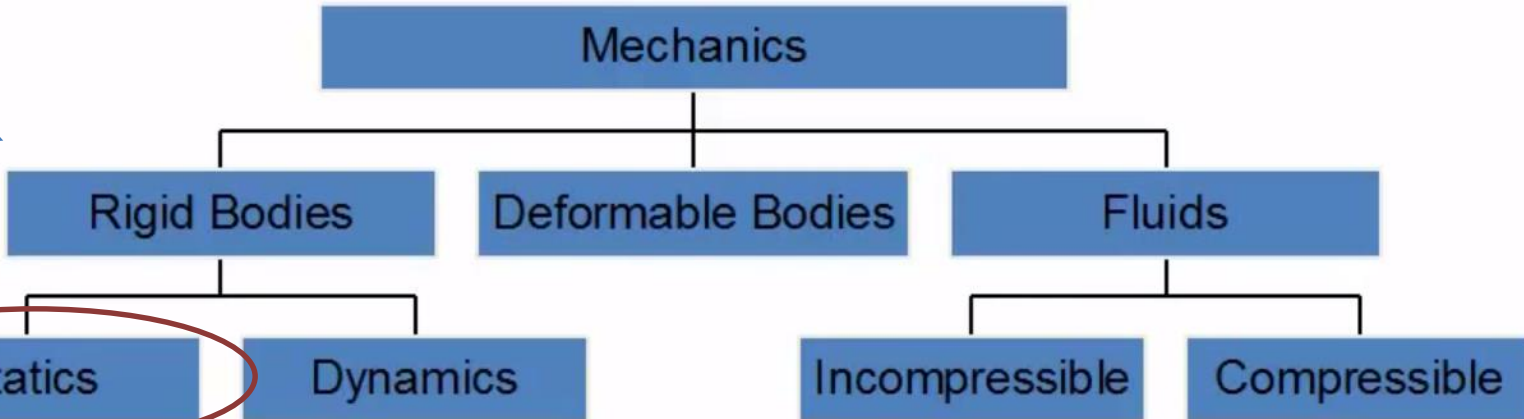
Mechanics describes and predicts the state of **rest** or **motion** of bodies under the action of **force**.

Branches of Mechanics

undeformable



Time independent
Velocity is zero



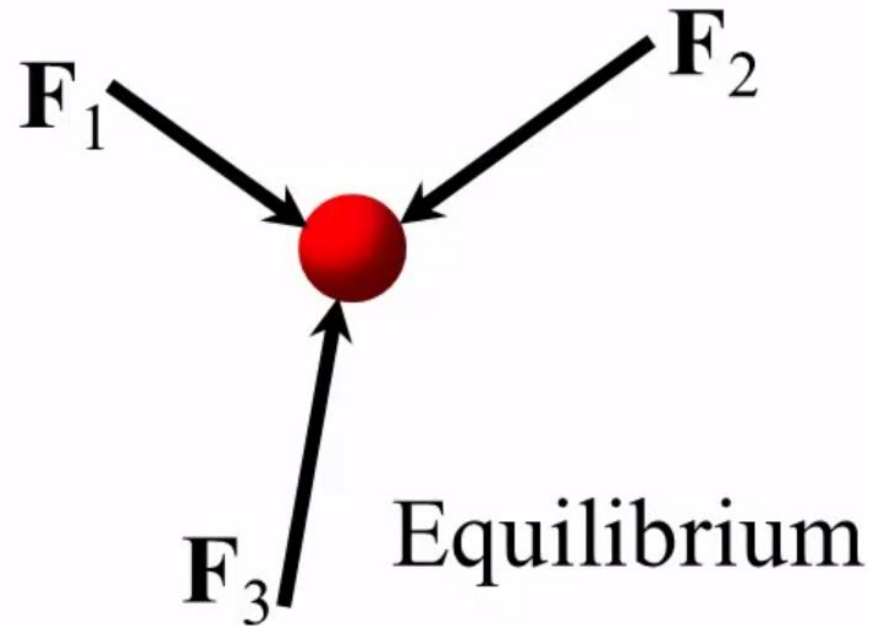
Newton`s second law



Accelerated motion

The acceleration of the movement of an object is ***proportional to the resultant force***, and is also in the ***same direction*** of the resultant force.

Newton's first law

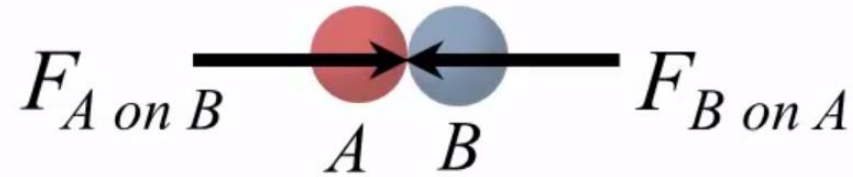


$$\mathbf{F}_R = \mathbf{0}$$

$$\mathbf{a} = \frac{\mathbf{F}_R}{m} = \mathbf{0}$$

An object will remain its original state of motion (**rest** or moving at **constant velocity** in a straight line) if there is no unbalanced force acting on it.

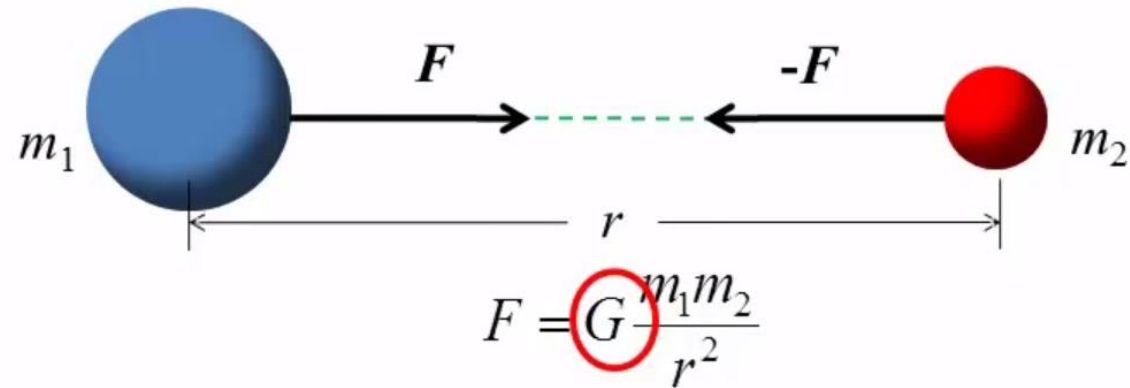
Newton's third law



Action and reaction

The forces of action and reaction between two objects are of the **equal**, **collinear** and **opposite**.

Newton's law of gravitation



G : universal constant of gravitation,
 $66.73 \times 10^{-12} \text{ m}^3/(\text{kg} \cdot \text{s}^2)$

The gravitational attraction forces between any two objects are equal and opposite.