

ENGG 102 Subject Outline

Week 1-5 → Dr. Umar Asghar (Midterm)

Week 6-10 → Dr. Sana Amir (Finals)

Labs

3 projects

P3 is a competition for building a Truss Bridge

40% weightage

2 projects - 15% each

Truss Bridge - 10%

Tutorials

10% weightage

10 weeks

1 submission per week

Midterm & Finals

20%

25%



Combined should get 40%



Weeks 1-5

6-10

Held in W6

W12

Generally no theoretical questions

Numericals, problem solving

Couple Moment





Couple Moment $\rightarrow M_c = Fd$
 $= 10 \times 5 = 50 \text{ Nm}$

Newton's Laws of Motion

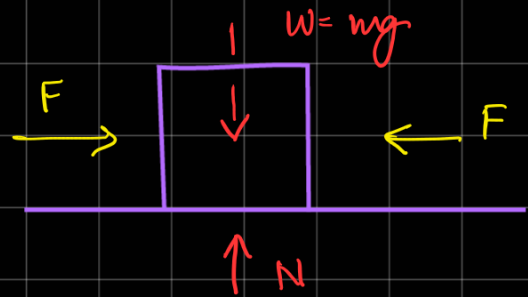
Law 1

$$\Sigma F = 0$$

$$-W + N = 0$$

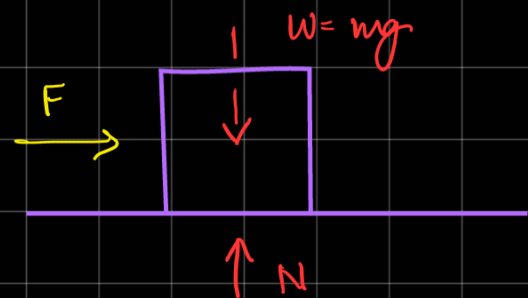
$$\therefore W = N$$

"Push"
 (External
 unbalanced
 force)



Law 2

$$F = ma$$



Law 3

$$F_{12} = -F_{21}$$

Forces

Most common is weight

Mass is a scalar quantity

Weight

Weight is a vector quantity

$$w = mg$$

Spring

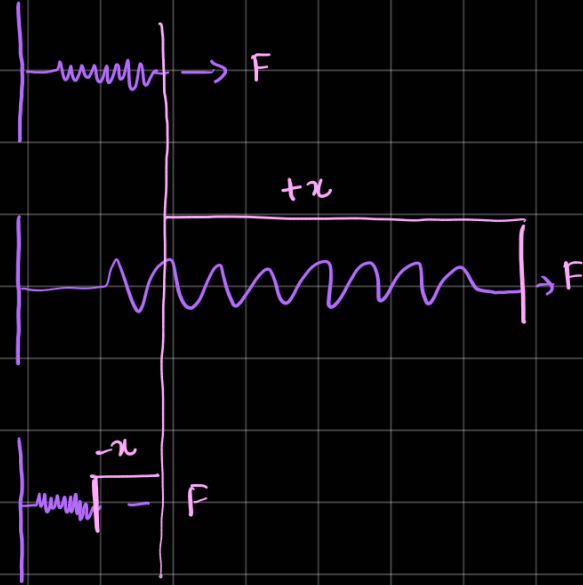
Spring force is a resistive force

F_s is always opposite to x .

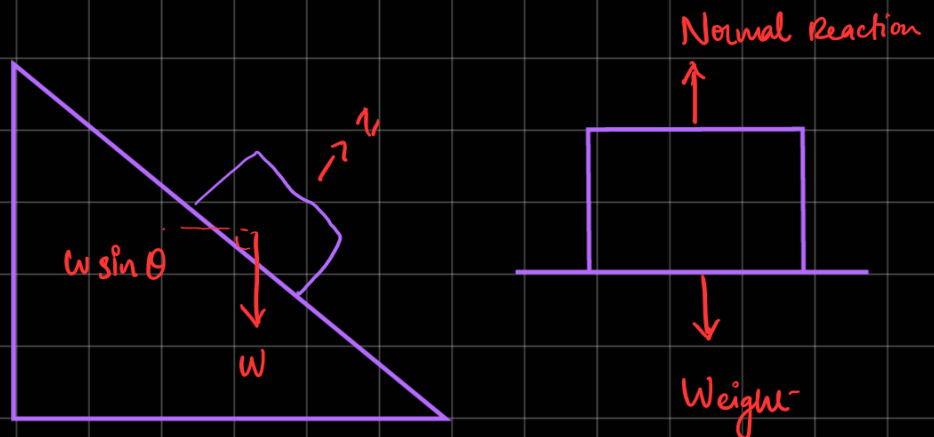
$$F_s = -kx$$

→ magnitude of pull / push

→ stiffness constant
the magnitude of
force required to compress / extend
a spring by one unit of x



Normal Reaction Force



Tension / Compression



Acting away / towards an object

Friction

Force opposite to the movement of the object

Dependent on Normal reaction and constant of friction

μ_s = Static friction

$\mu_k < \mu_s$

usually 75% to 85%

↳ Kinetic

$$\Sigma F = F_R = ma = 0$$

↓

if in
motion

↓

if at
rest

