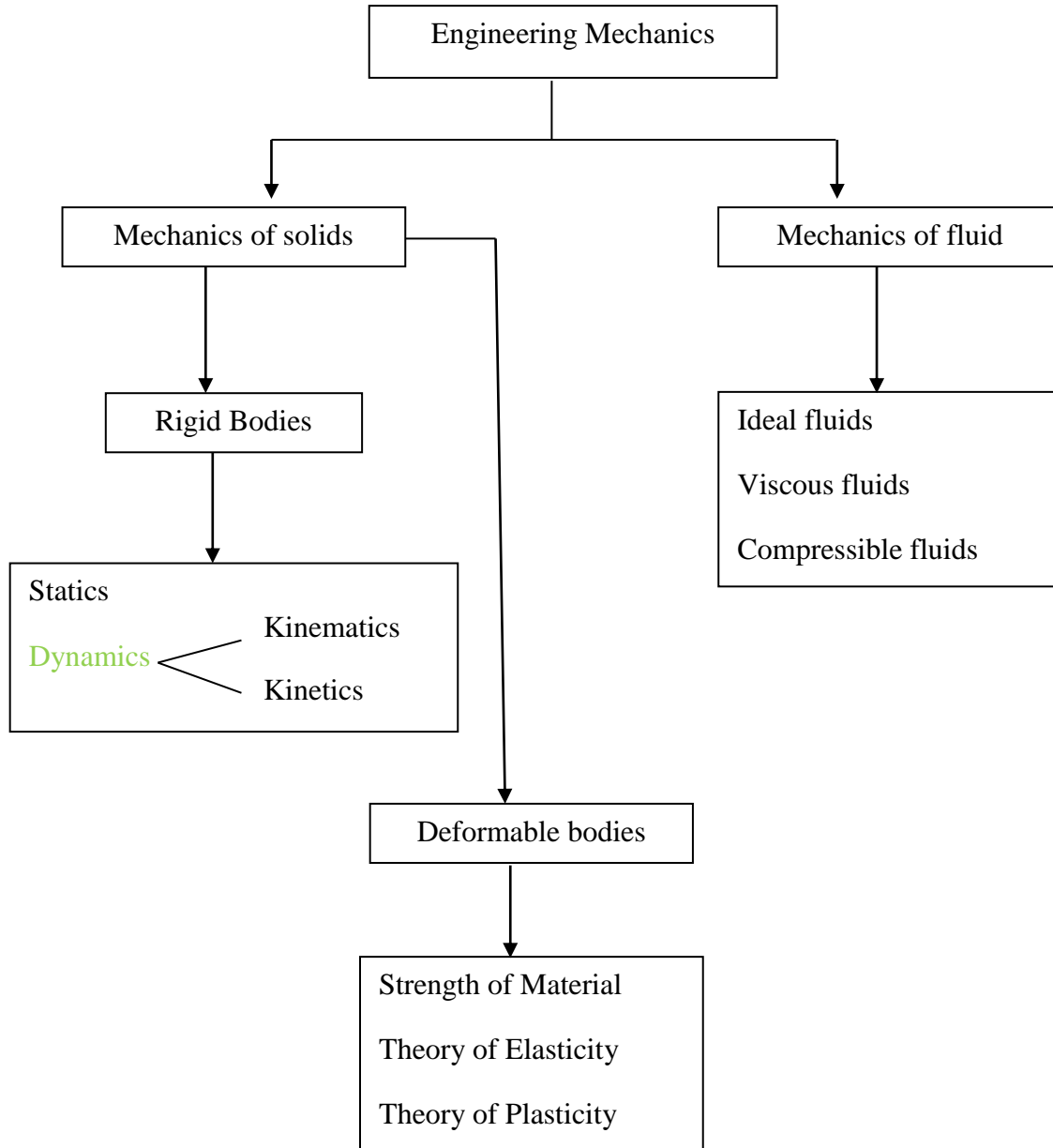


Introduction to Mechanics

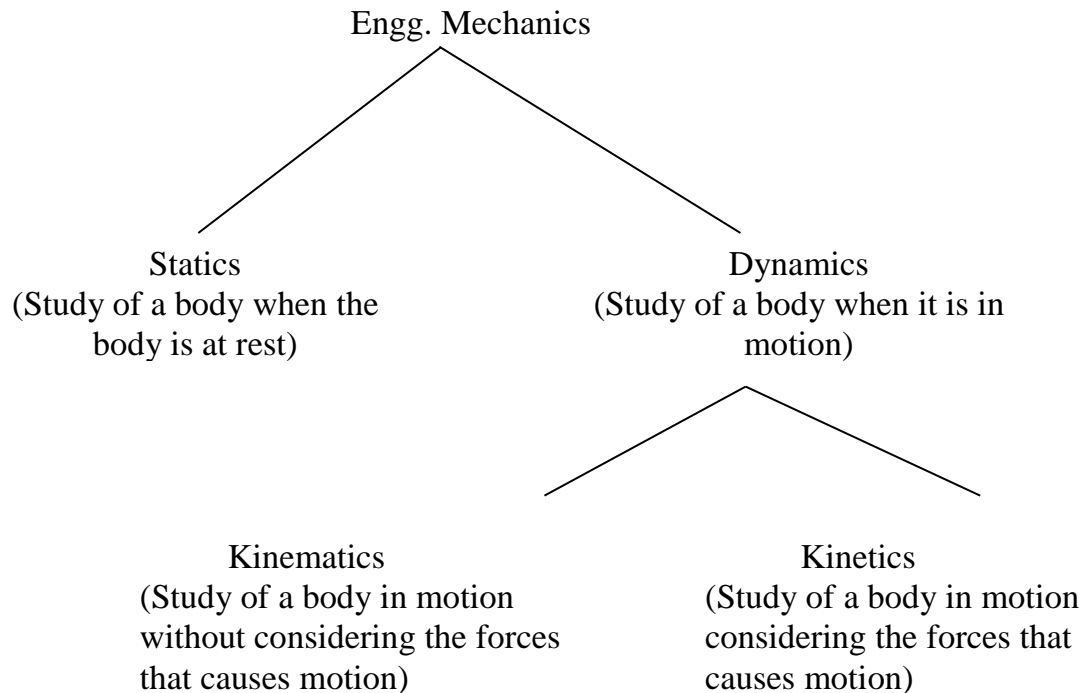


Units of Quantities (SI Unit)

Quantity	Unit	Symbol	Formula
Acceleration	Metre / (Second) ²	-	m/s ²
Angle	Radian	rad	Rad
Angular Acceleration	radian / (Second) ²	-	Rad/s ²
Angular Velocity	Radian/second	-	Rad/s
Area	Square meter	-	m ²
Density	Kilogram / (meter) ³	-	Kg/m ³
Energy	Joule	J	Nm
Force	Newton	N	Kg m/s ²
Frequency	Hertz	Hz	(1/s)
Length	Meter	M	M
Mass	Kilogram	Kg	Kg
Moment of force	Newton-metre	-	Nm
Power	Watt	W	J/s
Pressure	Pascal	Pa	N/m ²
Stress	Pascal	Pa	N/m ²
Time	Second	S	S
Velocity	Metre/second	-	m/s

Introduction

Engg. Mechanics is a branch of science which deals with the behavior of a body when the body is at rest or motion.



Terms used in Engineering Mechanics

Vector quantity: A quantity which is completely specified by magnitude and direction is known as vector quantity. (Eg.) Velocity, Acceleration, Force & **Momentum**.

Scalar quantity: A quantity which is completely specified only by magnitude is known as scalar quantity. (Eg) **Mass**, Time , Length etc.

Particle: A particle is a body of negligible dimensions and the mass of the particle is considered to be concentrated at a point.

Rigid body: A body which does not deform under the action of applied force.

Mass: The quantity of matter contained in a body is called as mass.

Weight: The force with which a body is **attracted** towards the centre of the earth.

$$W = mg$$

Unit of measurement: A physical quantity can be measured by comparing the sample with a known standard amount. The known amount used as a reference in the measurement of physical quantities called unit.

Types of units

1. Basic units
2. Derived units

Basic unit: Used in the measurement of basic (or) fundamental quantities (ie) mass, length, time.

Derived unit: Used in the measurement of the physical quantities other than fundamental quantities. (E.g) Area, Volume, Energy.

System of Units

1. FPS (Foot Pound System)
2. CGS (cm, gram, sec)
3. MKS (m, kg, sec)
4. SI (International System of units)

Laws of Mechanics

Newton's first law of motion: A body remains in its state of rest or motion unless **a a** external force acting on it.

Newton's second law of motion: The acceleration of a particle is proportional to the resultant **force** acting on it and is in the direction of the force applied.

$$F = ma$$

Newton's Third law of motion: To every action there exists an equal and opposite reaction.