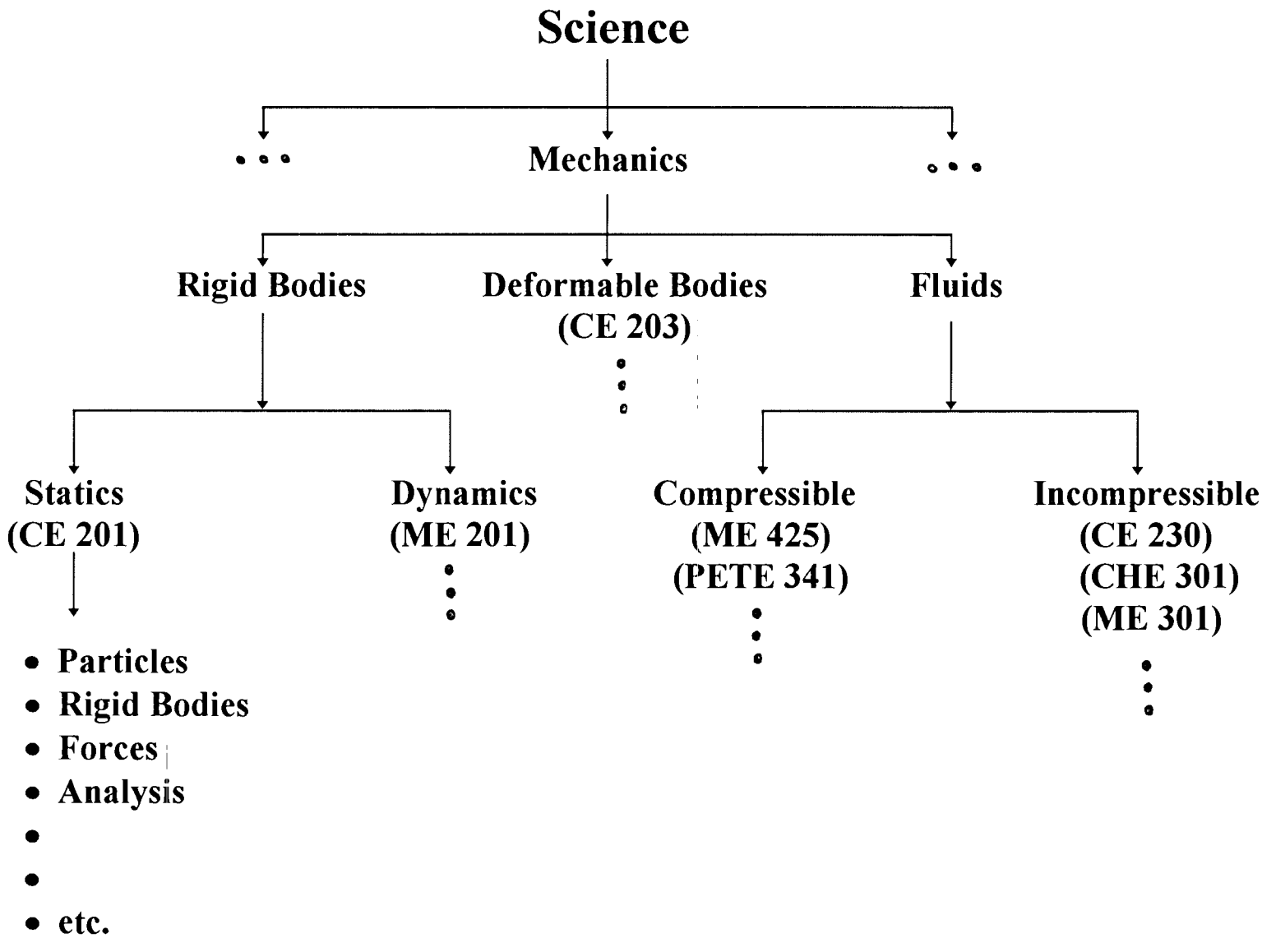
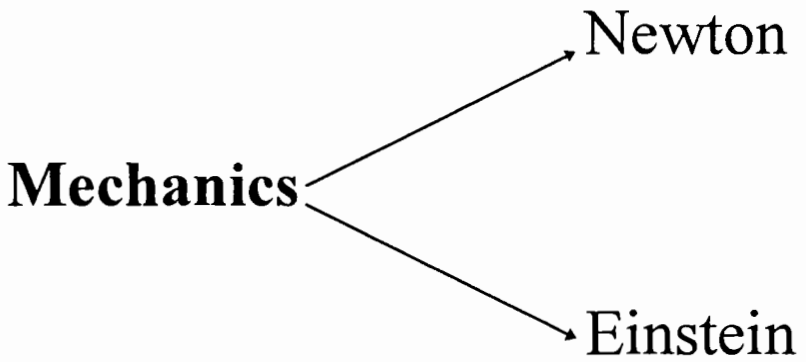

Science
Mechanics
Rigid Bodies
Deformable Bodies
(CE 203)
Fluids
Statics
(CE 201)
Dynamics
(ME 201)
Compressible
(ME 425)
(PETE 341)
Incompressible
(CE 230)
(CHE 301)
(ME 301)
Particles
Rigid Bodies
Forces
Analysis
etc.

Mechanics:

The science which describes and predicts the conditions of rest or motion of bodies under the action of forces.

Mechanics = Applied Science (neither empirical nor abstract [pure] ; it is in-between.)



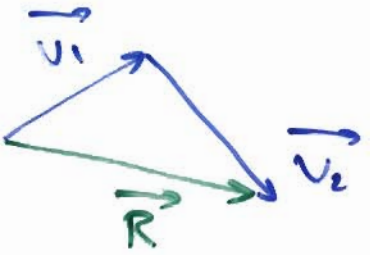
CE 201

Statics

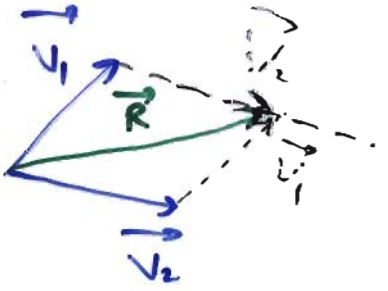
Mechanics = ...
Statics = ...

Scalar = a quantity characterized by positive or negative number

Vector = mathematical expression which has magnitude and direction and adds according to the parallelogram law



triangle



parallelogram

If more than 2 vectors, then the summation can be carried out by repeated application of the triangle law.

Vector operations:

* Vectors are commutative: $\vec{V_1} + \vec{V_2} = \vec{V_2} + \vec{V_1}$
* Vectors are associative: $\vec{V_1} + \vec{V_2} + \vec{V_3} = (\vec{V_1} + \vec{V_2}) + \vec{V_3} = \vec{V_1} + (\vec{V_2} + \vec{V_3})$
* Product of a scalar and a vector:

$$n(\vec{V}) = n\vec{V}$$

$$\vec{V} + \vec{V} + \vec{V} = 3\vec{V}$$

Force = the action of one body on another.

It has ① application point
② magnitude (absolute value)
③ direction (line of action and sense)

The forces are called **coplanar** if they act in the same plane.

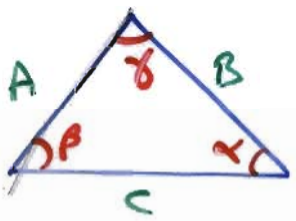
The forces are called **concurrent** if they all pass through the same point.

The effect of the resultant force on the body or particle is exactly identical to the effect of all the forces which were replaced by it (original forces).

* Resolution of forces: opposite of resultant (?!)

* Unknowns: any (2) of the following

$\vec{F_1}, \vec{F_2}, \vec{R}, \theta_1, \theta_2, \theta_R$



sine law:

$$\frac{A}{\sin\alpha} = \frac{B}{\sin\beta} = \frac{C}{\sin\gamma}$$

cosine law:

$$C^2 = A^2 + B^2 - 2AB\cos\gamma$$

$A^2 = \ldots$

$B^2 = \ldots$