Material properties (Week2)

- **Ductility:**
  Ability of a structure to go through in-elastic deformation without rupture.
- **Redundancy:**
  it is the ability to redistribute the load. Simple beam is determinate. Fixed beam is indeterminate by 2 degrees so it has two redundant actions. fixed supported beam is more better as indeterminate structure can redistribute the load. When load increases support becomes plastic and it turns into a simply supported beam. But simply supported does not go through the stage of plastic hinge rather they fail directly.
- **Hardness:**
  It is the ability to resist abrasion.
- **Steel Strength:**
  Maximum load which an object can resist. OR it is the maximum load that the steel can resist before failure. Steel is said to be failed when it has yielded. It is thus called yield strength
- **Toughness:**
  Ability of a structure or structural component to absorb energy.
- **Fatigue:**
  It is a progressive, localized permanent damage under fluctuating stress.

Design process (Week 3)

- Preliminary member sizing of beams
- Structural analysis - modeling, analysis
- Design review - member modifications
- Cost of estimation
- Preparation of structural drawings and specifications
- Loads for structural analysis and design
  - Dead load
  - Live load
  - Live loads for various occupancies
  - Reduction in basic design live load
  - Impact Load
  - Wind load

Factor of safety (Week4)

- The development of design specifications to provide suitable values of the margin of safety, reliability and probability of failure must take into consideration the following factors.
- Variability of the material with respect to strength and other physical properties
- Uncertainty in the expected loads
- Precision with which internal forces are calculated
- Possibility of corrosion
- Extent of damage, loss of life
- Operational importance
- Quality of workmanship