

- 1- Why study material science and engineering
- 2- Atomic structure and interatomic bonding/ atomic models
- 3- The periodic tables
- 4- Atomic bonding in solids/ bonding forces and energies
- 5- Primary interatomic bonds.
- 6- Metallic crystal structures/ crystal systems.
- 7- Crystalline and non-crystalline materials.
- 8- Mechanism of crystallization/grain size/grain size measurement.
- 9- Plastic deformation by slip/poly crystalline material
- 10- Effect of cold working on properties.
- 11- Annealing and hot working/ recrystallization temperature.
- 12- Dividing line between hot and cold working.
- 13- Mechanical properties/stress-strain behavior/tensile properties.
- 14- Compressive-shear and torsional.
- 15- Hardness, impact, fatigue and creep test.
- 16- Constitution of alloy/ phases.
- 17- Solubility limit/phase equilibrium properties of solid solution alloys/ equilibrium diagram.
- 18- Iron- carbon carbon equilibrium diagrams.
- 19- Origin of phase transformation stability.
- 20- Diffusion/diffusion mechanisms/ steady –state

And non-steady state.

## المعادن والتحويلات الطورية

- 21- Gibbs phase rule
- 22- Heat treatment
- 23- Seminars.