AMMR-3 PHYSICAL METALLURGY

UNIT-1 ALLOY

1.1 Theory-terminal solid solutions and intermediate phases,
1.2 Fe-C system, steel and iron microstructures with phase relations,
1.3 Free energy-composition diagrams.
1.4 Ideal and non-ideal behaviour of alloy systems.

UNIT-2 DIFFUSION

2.1 Diffusion laws, Kirkendall effect, activation energy, uphill diffusion etc.
2.2 Transformation in metals and alloys
2.3 Solidification and solid-state transformation.

UNIT-3 NUCLEATION AND GROWTH REACTIONS:

3.1 Homogeneous & Heterogeneous nucleation.
3.2 Dendritic solidification; Divorced eutectic, Super cooling, Interface calculation etc.,
3.3 Kinetics of solid-state transformation, C-curve etc. Segregation precipitation reaction.
3.4 Diffusional phase transformation process: Short range diffusional and long range diffusional process like polymorphic transformation,
3.5 Massive transformation, recrystallisation, precipitation transformation, order disorder, eutectoid and spinoidal transformations.
3.6 Optical microscopy: Construction, image formation and resolution.

Reference Books:

1. The Science and Engineering of Materials, Donald R. Askeland (Chapman & Hall)
2. Materials Science and Engineering, V. Raghvan