

## **Homogeneous semiconductor**

Intrinsic and doped semiconductor (donors, acceptors). Determination of concentration of electrons and holes. Fermi Dirac distribution function. Density of states of electrons and holes. Electric neutrality condition. Determination of Fermi level.

Drude kinetic model.

Boltzmann kinetic equation and its solutions. Mechanisms of scattering of charge carriers (acoustic and optical phonons, ionized impurities etc)

Transport effects without magnetic field -electric conductivity, thermal conductivity, seebeck and Peltier effects.

Transport effects in magnetic field - magnetoresistance, Hall effect, Nernst-Ettingshausen, Ettingshausen and Righi-Leduc effects.

Drift – diffusion and continuity equations. Deviation from equilibrium, relaxation time and diffusion length.

Transport including space charge effects (Mott-Guerney law). Transport in vacuum. Ambipolar transport. Shockley-Haynes experiment.

Influence of trapping centers – Shockley Read recombination model.

## **Inhomogeneous semiconductor**

General concept of description of inhomogeneous semiconductor. P-N junction. Contact metal-semiconductor.