Theory of Plastic Deformation

True stress-strain curve, Bauschinger effect, theory of plasticity, empirical equations to strain, strain curves, three dimensional stress and strain, invariants of stress and strain Yield criteria of metals, Treasca and Von Misces theory, Pandtl Reuss and Levy-Mises stress-strain relations work handling. Plastic instability application to rods in tension, thin walled pipes spherical shells subjected to internal pressure circular natural diaphragm. Equilibrium approach, concepts of friction in metal forming column friction and constants shear friction factor. Application of stress equilibrium approach to extrusion, drawing, rolling and forging, Discipline field theory, application to frictionless flat punch and wedge indentation, simple solution for frictionless extrusion and drawing. Upper and lower bound theorems, application plane-strain problems, simple indentation and extrusion using hodographs.

Text Books:

1. Plasticity for mechanical Engineering - Johnson, Von Nostrand. (Chap.1, 2, 2, 4, 5, 10,12,13)

Reference Books:

1. An introduction to the principles of Metal working - Rowe, Edward Arnold, 1968
2. Metal Forming Processes and Analysis -Avitzur, TMH, 1977