

# GUJARAT TECHNOLOGICAL UNIVERSITY

## M.E. Mechanical (Production Engg.)

Semester: II

Subject Name: **Mechanics of Metal Forming**

Subject Code: **1722801**

Sr. No.	Course Content
1	Basics of metal forming - Mohr's circle - isotropic elasticity - yield theories - plastic stress- strain relationship - plastic work - the principle of normality - incremental plastic strain.
2	Constitutive relationships - mechanical properties - work hardening - compression test, bulge test, plane strain compression test - plastic instability in tension tests.
3	Strain rate - super plasticity - slab analysis for sheet drawing - Extrusion and forging - upper bound solution for Extrusion - Indentation and plane strain forging, lower bound solution
4	Slip line field theory and its solution - Formability and its testing.
5	Sheet Metal forming - Bending theory, Cold Rolling theory - Hill's anisotropic plasticity theory - Hill's general yield theory, CAD/CAM applications in Extrusion, Forging and sheet metal Forming - Localized necking in biaxial stretching.

### Reference Books:

1. Hosford W.F and Caddell, R.M., "Metal Forming Mechanics and Metallurgy", Prentice Hall, 1983.
2. Narayanasamy R., "Theory of Plasticity", Ahuja Publications, 2000.
3. Scrope Kalpakjian,, "Manufacturing processes for Engineering Materials", Addison Wesley, 1997.
4. Metal forming: Processes and Analysis – B. Avitzler-Tata-MGH
5. Mechanical Metallurgy – Dieter-MGH