UCH 713 NON-NEWTONIAN FLUID MECHANICS

L	T	P	Cr
3	1	0	3.5

Introduction: Flow phenomena, Vectors operations, Tensor operations, Integral theorems, Curvilinear coordinates, Review of Newtonian fluids.

Material functions for polymeric liquids: Stress tensor, Shear and shear free flows, Material functions

Rheometry overview & generalized Newtonian fluids: Shear and extensional rheometers, Empiricisms for viscosity; Solution to flow problems

Linear visco-elasticity: Linear visco-elastic models, Predictions of models, Flow problems

Differential constitutive equations: Convected derivatives, Quasi-linear models, Non-linear models, Flow problems.

Single-Integral constitutive equations: Finite strain tensors, Quasi-linear models, Non-linear models, Flow problems

Text Books:

1. R. P. Chhabra, R. P. and Richardson, J.F., Non-Newtonian flow in the process industries: fundamentals and engineering applications, Butterworth-Heinemann (1999).
2. Bird, R. B., Armstrong R.C., Hassager, O., Dynamics of Polymeric liquids, Fluid Mechanics: Volume1, John Wiley & Sons (1987).

Reference Book:

1. Bohme G., Non-Newtonian Fluid Mechanics, Volume 31, North-Holland series in applied mathematics and mechanics (1987).