UCH 723 PULP AND PAPER TECHNOLOGY

L	T	P	Cr
3	0	0	3.0

Course Objectives:
To provide a comprehensive overview of pulp & paper industry, mill operations, products, process variables, equipment, and terminology and complex environmental challenges.

Introduction: Present status of pulp and paper manufacture, Fibrous raw materials, wood composition, Fibre chemistry, Overview of paper manufacturing.

Paper Properties: Physical (optical, strength, and resistance), Chemical and electrical properties, Paper defects, Variables affecting paper properties.

Raw Material Preparation: Debarking, Chipping, Chip screening, Storage.
Pulping: Chemical, Semi-chemical, Mechanical, Chemi-mechanical, Non-conventional, Secondary fibre pulping, Advances and recent trends in pulping.

Chemical Recovery: Composition and properties of black liquor, Oxidation and desilication, Concentration of black liquor and its incineration, Causticizing and clarification, Sludge washing and burning.

Bleaching: Objectives of bleaching, Bleachability measurement, Bleaching chemicals and their production, single and multi-stage bleaching processes, Bleaching of chemical and mechanical pulp, Colour reversion of bleached pulp, Control procedures in bleaching, Biobleaching, Recent trends in bleaching technology, Water reuse and recycle in bleaching.

Pulp Processing: Deknotting, Defibering, Brown stock washing, Screening, Cleaning, Thickening, Blending, Beating and refining, Specific edge load concept in refining.

Papermaking: Approach flow system, Wire part, Sheet-forming process, Sheet transfer mechanism, Press part, Theory of pressing, Dryer part, Paper drying process, Calendaring, Cylinder mould machine, Finishing, Fibre recovery systems, Recent developments in paper making, Coating and lamination.

Biotech Applications in Pulp and Paper Making: Use of enzymes in debarking, Pulping, Bleaching, Pulp refining, Fibre modification, Improving fibre drainage, Biopulping, Effluent treatment for xenobiotic compounds.

Course Learning Outcomes (CLO):

The students will be able to:

1. understand the pulp & paper making processes
2. get the basic information on chemical & energy recovery
3. have general information on different grades of paper and paper properties
4. know the environmental considerations of pulp & paper industry

Text Books:

1. *J.P. Casey, Pulp and Paper Chemistry and Chemical Technology, Wiley Interscience (1983).*
2. *R.G. MacDonald, Pulp and Paper Manufacture, McGraw Hill (1969).*
3. *G.A. Smook, Handbook for Pulp and Paper Technologists, Atlantic Books (2002).*

***Reference Books**:*

1. *S.A. Rydholm, Pulping Processes, Wiley Interscience (1965).*
2. *C.J. Biermann, Essentials of Pulping and Paper Making, Academic Press (1996).*
3. *J.D.A. Clark, Pulp Technology and Treatment for Paper, Miller Freeman (1985).*
4. *P. Bajpai, P.K. Bajpai and R. Kondo, Biotechnology for Environmental Protection in the Pulp and Paper Industry, Springer-Verlag Berlin Heidelberg (1999).*

Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	50
3	Sessional (May includes assignments/ quiz's etc)	20