

# Leather Technology

## DEGREE STANDARD

## PAPER - I CODE:070

### A. Skin Proteins and Pre-tannages

1 Chemical constituents of hides and skins - Fibrous and Non - fibrous proteins -structure and Chemical Features. Reactive groups of Collagen and cross linking.Histological Characteristics of hides and skins.

2 Preservation techniques - Principles involved - short term preservation - Defects in hides and skins.

3 Chemistry and Principle of different pretanning processes like soaking, liming, deliming, bating and pickling. Different methods of pretanning processes as applied to light, heavy and industrial leathers.

### B. Theory of tannages

1. Types of vegetable tanning materials - Classification, and Chemistry of vegetable tanning. Mechanism of vegetable tanning. Synthetic tannins classification General methods of manufacture and application in leather processing. Chemistry and mechanism of oil and aldehyde tannages.

2. The Chemistry of Chromium salts. Preparation of Chrome tanning salts. Mechanism of Chrome tanning.

3. Chemistry and mechanism of Aluminium, Zirconium, titanium, silicate and Phosphate tannages.

4. Chemistry and mechanism of Combination tannages involving vegetables tanning materials, aldehydes and other mineral tanning agents.

### C. Leather Auxiliaries and Post tanning Operations

1. Chemistry of neutralisation and bleaching processes.

2. Classification of dyes and blending of dyes. Chemistry of dyeing auxiliaries. Theory and mechanism of dyeing.

3. Principles and methods of sulfation, sulfonation and sulfitation of oils. Preparation of synthetic flat liquors. Chemistry and mechanism of fatliquoring and waterproofing.

4. Classification of retanning agents and their application.

5. Chemistry and methods of preparation of aqueous pigment pastes, lacquers and lacquer emulsion, synthetic and protein binders and impregnating agents. Patent leather finishes.

### D. Practice of Leather Manufacture -I

1. Principles and practices involved in the manufacture of following types of leathers: - E.I. tanning of kips, buffcalf, cowcalf and Goat and Sheep skins. - Vegetable tanned sole leather, Chrome sole leather. Sole leather with improved properties. - Picking band leathers and pickers. - Dressing of E.I. Leathers into different finished leathers such as semichrome glazed kid, lining leathers, garment leathers and diaphragm leathers. - Kattai and Bunwar leathers. - Speciality leatehrs for mountaineering shoes, high altitude shoes and pilot gloves.

2. Role of machinery in leather processing.

## PAPER -II

### A. Practice of Leather Manufacture - II

1. Processes and principles involved in manufacture of following types of leather - Processing of Wetblue leathers - Full Chrome Upper leathers - Upholstry leathers Lining leathers - Harness, Belting and Saddlery leathers. - Football, hockey ball, cricket ball and other sports goods leathers - Chamois leather Fashion garment leathers - Utility glove leathers.

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2. Principle methods and mechanism of drying of leathers.

## B. Material Testing & Quality Control

1. Principles of analytical methods employed for water, chemical agents used in soaking, liming, deliming, bating, pickling. Analysis of liquors of beamhouse process, vegetable tanning extracts, spent tan liquors, chrome extracts - zirconium and aluminium tanning salts. Formaldehyde oils and fats - Fatiliquor and other auxiliaries. Estimation of epsom salt and glucose.

2. Instrumental methods of analysis using potentiometry, spectrophotometry chromatography, ion exchange resins, colorimetry.

3. Analysis of vegetable and mineral tanned leathers - Determination of P C P and azo dyes, (Aryl amine based) in leather.

4. Principles and methods employed in physical testing of leathers.

5. Standards and quality control.

## C. Leather Product Technology

1. Footwear:- (a) Anatomy of human feet, foot comfort, foot care and their relationship to footwear. Foot and last measurements Shoe sizing and fitting.

(b) Materials used for footwear - Leather and non-leather materials for upper, sole and components.

(c) Shoe design and pattern making

(d) Grading clicking and closing - skiving - stitching - lasting, sole attachment - bending and edge treatments.

(e) Construction of cemented and welted shoes machines used.

2. Leather goods and garments:-

Classification - selection of materials - modern methods of construction and machinery - Hand tools and grinders, zips, linings and fittings - standardisation, quality control and inventory control.

## D. Organisation and Management of Leather Manufacture

1. Livestock population - availability of hides and skins - marketing of hides/skins.

2. Location, lay-out and selection of machinery for tanneries manufacturing different types of leathers - estimates of investment, costing and feasibility report.

3.

Employment generation - training and training institutes - labour laws for tanneries occupational health and safety.

4. Export performance - marketing strategies and development - Features of overseas sales contract - Role of financial institutions.

5. Role of research, service and development institutions - newer technology and modernisation - process controls in leather processing.

6. Type of tannery effluents - characteristics - Different methods of effluent disposal - primary and secondary systems - standards and specifications for various types of disposal - soil waste disposal.