

5.1 LEATHER MANUFACTURE - IV

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RATIONALE

Before manufacture of footwear and leather goods, various steps are required to be taken for processing of leather. Diploma holders in Leather Technology are suppose to acquire knowledge of various steps involved in processing techniques for heavy and industrial leathers. Students must be conversant with processing technique of different types of leathers used in the industry. This knowledge is very useful for maintaining export quality of leathers in the international market. For this purpose, it is essential that students should be given knowledge and skills for enabling them to perform effectively on the shop-floor of leather processing units. Hence this subject

DETAILED CONTENTS

THEORY

1. Selection (6 hrs)
Selection and identification of raw material and chemicals required.
2. Manufacture of Light Leather (20 hrs)
Manufacture of E.I and vegetable tanned leathers from sheep and goat skins and cow hides. Shoe upper leather, corrected grain leather, glazed kid leather suede upper leather, gloving and grain garment leather, suede garment leather, NU buck leathers, upholstery leather, chamois leather.
Manufacture of fancy leathers like reptiles leathers, leather from splits, patent leather, leathers with hair on and from games skins
3. Manufacture of Heavy Leathers (10 hrs)
Manufacture of sole leather, in-sole leather, suitcase russet leather, harness and saddlery leather
4. Industrial Leathers (16 hrs)
Selection of hides and skins, manufacture of textile leather, roller leathers, pickers and picking band leathers, buffer and check strap leather, combing, cup and pump, hydraulic ram and oil seal leathers, diaphragm leather, gas meter leather with their uses. Industrial glove leather

5. Sports Goods Leathers (12 hrs)

Leather for inflated balls (Football, volley ball, basket ball, hand ball, rugby ball etc), Hockey and cricket ball leather, grip leather, batting and wicket keeping glove leather, belting leather, industrial glove leather, Lace and strap leather for leg-guards

LIST OF PRACTICALS

1. Manufacture of following industrial and sports good leathers
 - Cricket and hockey ball, boxing gloves, wicket keeping gloves, industrial gloves, industrial belting from raw/wet blue/bay tanned hides & skin.
2.
 - Suede Leathers
 - Nu-buck Leathers
 - Corrected Grain Leathers
 - Glazed Kid Leathers
 - Upholstry Leathers
 - Mining Shoe Upper Leathers
3. Manufacture/processing of fancy leathers
4. Manufacture of sole leather/insole leather
5. Visit to sports/industrial leather manufacturing units

INSTRUCTIONAL STRATEGY

This subject is one of the core subject for the diploma holders in leather technology. Teachers should invite experts from the industries to deliver expert lectures to the students. Students may also be taken to various leather manufacturing units to expose them about the various units operations and processes involved in leather manufacturing. During the practical session teacher should demonstrate the complete procedure for leather tanning for different end uses and students may be involved in tanning process.

RECOMMENDED BOOKS

1. CLRI Process Bulletins on Sports Goods Leathers and Industrial Leathers – CLRI Publications
2. Sports Goods Leathers by SP Ghosh, ILTA Publications, Kolkota
3. Lecture Notes on Leathers by PS Venkatachalam, APO

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	10
2	20	30
3	10	12
4	16	24
5	12	24
Total	64	100

5.2 LEATHER TRADE ENGINEERING

L T P Cr
3 - 4 5

RATIONALE

Different types of machinery and machine components are used in leather industry. Diploma holders in Leather Technology are suppose to supervise/perform duties such as selection of site, infrastructure (land/work shed, power, water etc.), installation, operation and maintenance of machinery planning and establishing of tannery, preparation of project feasibility report besides possessing, enterprising qualities (risk taking ability, ability to identify and evaluate available alternatives, arrange and develop resources). For this purpose, it is essential that students should be given adequate knowledge and skills in the areas of product manufacturing, planning, processes, and identify budgetory/materials/inputs to have gainful business and enabling them to perform effectively on the shop-floor. Hence this subject

DETAILED CONTENTS

THEORY

1. Selection of Site (6 hrs)

Location - geographical background, soil and water, power and transport facilities. Facilities of disposal of effluents, facilities for import/export, planning/layout of different sections of tanneries like pots, drums and relevant machinery, building for tannery keeping factors like free air, natural and artificial lighting arrangement, ventilators, windows, doors, roof levels, exhausts etc.

2. Water and Pits (8 hrs)

Water supply, storing and distribution by pipes, valves etc. Arrangements, Sizes, Construction and costing of different pits, sewerage for tannery effluent treatment and proper discharge, estimate for cost of tannery yard with and without machinery

3. Power (6 hrs)

Power supply, steam boiler, types, components and functions of boilers, advantages and disadvantages of machine power and electrical power

4. Transmission of Motion and Power (6 hrs)

Belt drive, slipping of belts, power transmitted by belts, reversing motion by belting fast and lose pullies, rope and chain drive, gear drive, power transmitted by gearing

5. Drums and Paddles (6 hrs)
Types, characteristics, size, weight and cost of drums and paddles, erection and construction of different drums and paddles. Drives for drums and paddles, routine repair and maintenance
6. Tannery Machinery (6 hrs)
General description/characteristics, foundation, installation, erection and commissioning of various tanning machinery like fleshing, unhairing, scudding, setting, shaving, splitting buffing, stacking etc., availability, size, weight, cost, mode of working, fuel and speed, power required, types of drive for each machine, power KWH, safety measures and repair and maintenance for each machine
7. Finishing Machines (6 hrs)
Principles of working of various finishing machines, free hand drawing, weight, cost, capacities - power required, total power for finishing yard, repair and maintenance of of various machines, safty precautions to be observed in each machine
8. Conservation of Energy and Water (4 hrs)

LIST OF PRACTICALS

1. Visit to workshop and tannery to study various working parts of the tanning machines, their make, functions etc
2. Visit to different sections of leather manufacturing industry to study practices followed for checking alignment and rectifying defects therein, Removal of parts for general repair, maintenance and routine service, renewal and reassembly of machines/machine parts
3. Replacement of worn out knives of splitting machine and their renewal
4. Adjustment of grinders and grinding wheels and other attachments of splitting, shaving, and fleshing machine
5. Removal and refixing of glazing glass rollers and seeks in the staking machines, emy shafts in buffing machine and old grinder in shaving machine
6. General check up of all the electrical equipment of motors, starters, switches, fuses etc
7. Replacement of belts, fastening checking slackness of belts their remedies, checking of pullies, tightening/loosening of shafts, bearing and other alignments
8. Visit to tanning industry to study spray guns and drying chambers
9. Demonstration of correct methods of operating machines in industry/workshop and first aid practical training
10. Blue print reading of tannery layouts and installation drawings

11. Exposure to industry
12. Resource financing through institutions - exposure to various institutions
13. Market survey to identify the design and style packaging and forwarding

INSTRUCTIONAL STRATEGY

Since the diploma holders in leather technology have to perform at the shop floor level, a thorough understanding about tool, machinery and equipment used in tannery is essential. The teachers should teach the subject by showing photograph, slide and video films on the machinery and equipment in the modern tanneries. The students may be taken to various leather tanneries so that they are able to appreciate the size, scale and level of operation being undertaken in the tanneries. The specifications and BIS codes related to equipment and processes should also be included in the various units of instructions. Operation, maintenance, minor repair and safety precautions about each of the machine in different sections of leather processing units should be explained and demonstrated to the students.

RECOMMENDED BOOKS

1. Central Leather Research Institute (CLRI) Process Bulletins
2. Modern Practice in Tanning Dyeing and Finishing Leather by PS Briggs, Tropical Products Institute, London
3. Leather Technician's Hand Book by JH Sharpouse, Leather Producer Association, Northamptonh
4. PracticalLeather Technology by TC Thorstemon; Krieger Publishing Co., Malabar, Florida
5. Automatic Spraying Machine for Leather Production – their Operation and Maintenance by DN Price Shoe Trades Publishing Company Cambridge MA

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	12
8	8	16
3	6	12
4	6	12
5	6	12
6	6	12
7	6	12
8	4	
Total	48	100

5.3 TESTING AND QUALITY CONTROL

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3 - 6 6

RATIONALE

Diploma holder in Leather Technology should have competency to analyze water, curing and pre-tanning process. The knowledge of pH measurement, degree of teenage and mineral oxide content is helpful in quality control of tanned leather for quality control. Physical testing help in analyzing quality of leather as per norms. The knowledge about some common instruments, which is necessary in routine working of tannery to create self-confidence in the students

DETAILED CONTENTS

1. Curing and pre-tanning chemicals including spent liquors (6 hrs)
2. Vegetable tanning materials and extracts (4 hrs)
3. Chrome liquors and extracts (4 hrs)
4. Aluminum and zirconium tanning salts, pH measurements, indicators and their use in testing (4 hrs)
5. Vegetable, mineral and combination tanned leathers for characteristics like degree of teenage, mineral oxide, contents etc (4 hrs)
6. Physical testing of various types of leathers for tensile strength, elongation, dynamic water absorption, abrasion resistance, rub fastness, shrinkage etc (4 hrs)
7. Use of instruments such as spectrophotometer, colorimeter, ion exchange resins etc in testing of tanning chemicals (4 hrs)
8. Conservation of chemicals and water in the tannery (2 hrs)
9. Analysis of limed and pickled pelts and chemical testing of vegetable tanned /chrome tanned aluminium tanned/combination tanned leather (4 hrs)
10. Analysis of chrome leather and other mineral, tanned leather for chrome content and other mineral contents, total ash, oils and fats, pH of water soluble, hide substance, moisture (4 hrs)
11. Analysis of vegetable tanned leather, fixed tannis, water soluble and insoluble ash, degree of teenage (4 hrs)
12. Analysis of combination tanned leather for their constituents (2 hrs)

13. Quality control in leather processing, role of testing in process and quality control specification (physical and chemical) from various types of leather (2 hrs)

LIST OF PRACTICALS

1. Analysis of sodium bi-chromate to chrome powder
2. Analysis of chrome leather and other minerals, Tanned leather for chrome content and other mineral contents, Total Ash, Oils and Fats, pH of water solubles, differential numbers. Hide substance, moisture etc.
3. Analysis of spent liquors
4. Analysis of vegetable tanning material extracts and spent liquors
5. Analysis of vegetable tanned leathers, fixed tannins, oil and fats, hide substance, total ash, water soluble and insoluble ash and degree of tannage
6. Analysis of combination of tanned leather for their constituents
7. Students are required to visit:
 - a) Some tanneries having well equipped laboratories for testing chemicals and leather testing
 - b) Regional Extension Centre of CLRI at Jalandhar (Punjab)
8. Testing of limed and pickled pelt and web blue leather
9. Testing of chrome tanned and other mineral tanned leather
10. Testing of vegetable tanned leather

Physical Testing

11. Measurement of thickness, water absorption, apparant density, tensile strength, elongation at break and specified load, stich tear resistance, abrasion, shrinkages, water vapour, permeability, dry and wet rub fastness, shower proofing, flexural endurance, grain crack index.

NOTE: Samples taken for physical and chemical analysis of leathers should be in accordance with official specifications laid by Bureau of Indian Standards of sampling and analysis.

INSTRUCTIONAL STRATEGY

Keeping in view the globalization of economy and the multinational culture in this country, it is imperative that the diploma holders have to match the quality of the products not only with national standards but, with international standards. While teaching this subject teachers should invite experts from the industry for extension lectures and expose the students to various national and international standards, relevant to different topics. Teachers should design tutorial exercises so that the students carry out some independent studies. Students should be taken to the industry to expose them to testing, analysis and quality control measures being taken in the industry. Student should be given independent practical exercises, which should be supervised by the teachers. Wherever possible, print and non-print media should be used to bring clarity, about various concepts and principles involved, in the minds of students.

RECOMMENDED BOOKS

1. Analytical Chemistry of Leather Manufacture by PK Sakar – Indian Leather Technologists Association, Kolkota 1982
2. Official Methods of Analysis; Society of Leather Technologists and Chemists UK, 1981
3. Methods of Chemical Testing of Leathers IS: 18: 582 – 1970, Bureau of Indian Standards, New Delhi 1977
4. Fundamental Principle of Bacteriology by A McGraw Hill Book Company Inc. New York Toronto, London
5. An Introduction to the Principles of Physical Testing of Leather by SS Dutta, Indian Leather Technologists Association, Kolkotta 1991
6. Technological Controls in Leather Manufacture by S Bangaruswamy CLRK Publications, 1984
7. Methods of Physical Testing of Leathers IS 5914 – 1970 BIS, New Delhi
8. Inorganic Quantitative Analysis by Vogel
9. Acceptable Quality Levels in Leathers by United Nation Publications, New York, 1976

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	12
2	4	8
3	4	8
4	4	8
5	4	8
6	4	8
7	4	8
8	2	8
9	4	8
10	4	8
11	4	8
12	2	4
13	2	4
'Total	48	100

5.4 ESTIMATING AND COSTING

L T P Cr
4 - - 4

RATIONALE

Knowledge of raw hides and skins, their availability, marketing, storing, packing and dispatch is necessary for Indian and Foreign trade of raw hides and skins. Terms associated with consumption, distribution, demand and supply, budget and revenue in relation to leather trade are useful to the students. Knowledge of book keeping and accountancy, material management and marketing techniques is an added advantage to the diploma student in the leather technology. Hence this subject.

DETAILED COENTENTS

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1. Principle of Estimating (10 hrs)

Principles of calculating quantities of materials required for the manufacture of different types of footwear and leather goods, classification and distribution costs raw materials, labour, plant, overheads, wastes, packing and forwarding costs. Profit ranges allowances for fluctuation in rates. Calculation of the owning and operating costs of machinery - cost recoverable by disposing waste products - standard costing

2. Cost Estimation (8 hrs)

Estimation of the costs of manufacturing different types of leathers and processes involved in leather manufacture

3. Raw Hides and Skins (12 hrs)

- a) Availability of raw hides and skins in different parts of India, price structure and marketing, foreign trade in raw hides and skins
b) Different types of leathers, stores management, packing and dispatch

4. Elements of Economics (10 hrs)

Explanation of basic terms: consumption, distribution, goods, demand and supply, national income, national products, taxes, budget, revenue, expenditure etc. with reference to Indian economy

Elementary idea of demand analysis and forecasting, cost analysis and pricing

Time value of money-simple problems

Depreciation and its calculation

- Investment appraisal, cost benefit and value analysis, Budgeting
5. Book keeping, maintenance of ledger, profit and loss accounts, balance sheet etc (8 hrs)
 6. Principles of costs and accountancy, prime cost, working cost etc (8 hrs)
 7. Costing of various types of leathers, import, export policies, Incentives, drawbacks (8 hrs)

INSTRUCTIONAL STRATEGY

Since some of the diploma holders in leather technology are going to establish their own enterprise, so the teachers should give sufficient emphasis on developing skills in the students related to estimating and costing. Teacher should design tutorial exercises so that students are able to undergo drills of preparing detailed analysis of quantity, resources, costs, estimates and budgets. Students should also be given exposure to industries for exposing them to the system of packaging, storing and marketing the final products. Some software related to accountancy may also be demonstrated to the students.

RECOMMENDED BOOKS

1. Business Organization and Management by MC Shukla – Sultanchand and Sons
2. Production Engineering and Management – McGraw Hill, 1984
3. Managerial Economics by RL Varshney and KL Maheswari – Sultanchand and Sons
4. Industrial Management by K Chellappan
5. Business Organization and Management by PK Gosh and YK Bhushan, S. Chand and Sons, New Delhi
6. Engineering Economics by R Panneerselvam; Prentice Hall of India Pvt. Ltd. New Delhi
7. Basic Managerial Skills for All by EH McGrath, SJ., Prentice Hall of India, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	16
2	8	12
3	12	18
4	10	16
5	8	12
6	8	12
7	8	14
Total	64	100

5.5 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

L T P Cr
4 - - 4

RATIONALE

Entrepreneurship Development and Management is one of the core competencies of technical human resource. Creating awareness regarding entrepreneurial traits, entrepreneurial support system, opportunity identification, project report preparation and understanding of legal and managerial aspects can be helpful in motivating technical/vocational stream students to start their own small scale business/enterprise. Since diploma technicians are expected to take-up middle level managerial positions, their exposure to basic management principles is very essential. Based on the broad competencies listed above, following detailed contents have been finalized to develop the appropriate competencies.

DETAILED CONTENTS

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|-----|--|----------|
| (1) | Entrepreneurship | (10 hrs) |
| | 1.1 Concept/Meaning and its need | |
| | 1.2 Competencies/qualities of an entrepreneur | |
| | 1.3 Entrepreneurial Support System e.g., District Industry Centres (DICs), Commercial Banks, State Financial Corporations, Small Industries Service Institutes (SISIs), Small Industries Development Bank of India (SIDBI), National Bank for Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State and national level | |
| (2) | Market Survey and Opportunity Identification (Business Planning) | (10 hrs) |
| | 2.1 How to start a small scale industry | |
| | 2.2 Procedures for registration of small scale industry | |
| | 2.3 List of items reserved for exclusive manufacture in small scale industry | |
| | 2.4 Assessment of demand and supply in potential areas of growth | |
| | 2.5 Understanding business opportunity | |
| | 2.6 Considerations in product selection | |
| | 2.7 Data collection for setting up small ventures | |
| (3) | Project Report Preparation | (08 hrs) |
| | 3.1 Preliminary Project Report | |
| | 3.2 Techno-Economic feasibility report | |
| | 3.3 Project Viability Report | |

- (4) Managerial Aspects of Small Business (10 hrs)
- 4.1 Principles of Management, Definitions, functions of management viz planning, organization, coordination and control
 - 4.2 Structure of an industrial organization.
 - 4.3 Basic principles of financial management
 - 4.4 Marketing Techniques
 - 4.5 Personnel Management, staff development and training strategies
 - 4.6 Importance and techniques of communication in business
- (5) Legal Aspects of Small Business (10 hrs)
- 5.1 Elementary knowledge of Income Tax, Sales Tax, Patent Rules, Excise Rules, provident fund
 - 5.2 Elementary knowledge of Factory Act, 1948 and Payment of Wages Act 1936, Workmen Compensation Act, Industrial Dispute act 1947, Employees State Insurance Act 1978
- (6) Environmental Considerations (04 hrs)
- 6.1 Concept of ecology and environment
 - 6.2 Factors contributing to Air, Water, Noise pollution
 - 6.3 Air, water and noise pollution standards and control
 - 6.4 Norms and standards of State pollution Board
 - 6.5 Disaster Management – basic idea
- (7) Miscellaneous (12 hrs)
- 7.1 Human resource development in an organization
 - 7.2 Motivation – Incentives, Rewards, Job Satisfaction
 - 7.3 Leadership- types, qualities, functions and factors of effective leadership
 - 7.4 Labor Welfare schemes including wage payment- types, system of wage payment and incentives
 - 7.5 Workers participation in management, case studies in effective Management.
 - 7.6 Accident and Safety: Classification, precaution and treatment after accident, safety practices promotion, personal protection equipment (PPFs) for safety at work places.
 - 7.7 Introduction to Total quality Management (TQM) and steps to achieve this .
 - 7.8 Intellectual Property Rights (IPR): Concept, definition, infringements and remedies related to patents, copy rights, trademarks, designs. Introduction to registering procedure

INSTRUCTIONAL STRATEGY

The aim of this subject is to develop conceptual understanding by giving inputs and exposure about starting ones own business venture/enterprise. The teacher will discuss success stories and case studies with students, which in turn, will develop managerial qualities in the students. There may be guest lectures by successful diploma holding entrepreneurs and field visits also.

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
3. Environmental Engineering and Management by Suresh K Dhamija, SK Kataria and Sons, New Delhi
4. Environmental and Pollution Awareness by Sharma BR, Satya Prakashan , New Delhi
5. Thakur Kailash, Environmental Protection Law and policy in India: Deep and Deep Publications, New Delhi
6. Handbook of Small Scale Industry by PM Bhandari
7. Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi
8. Industrial management by N. Mohan, and AP Verma, SK Kataria and Sons, Nai Sarak, Delhi-110006
9. Total Quality Management by Dr DD Sharma, Sultan Chand and Sons, New Delhi.
10. Principles of Management by Philip Kotler TEE Publication
11. Intellectual Property Rights and the Law by Dr. GB Reddy.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	10	10
2.	10	20
3.	08	10
4.	10	15
5.	10	15
6.	04	10
7.	12	20
Total	64	100