Curriculum

Postgraduate Diploma in Leather Technology (PGDLT)

and

Advanced Certificate Course on

(i) Compliance and Sustainability for Leather Sector,

(ii) Automation and AI for Design, and

(iii) Lean Manufacturing and Quality assurance

Under Skills for Industry Competitiveness and Innovation Program (SICIP), Ministry of Finance, GoB

Institute of Leather Engineering and Technology

University of Dhaka

Dhaka-1209, Bangladesh

1. Name of the Program Offering Entity: Institute of Leather Engineering and Technology

2. Vision of the Program Offering Entity

To enable a center of excellence by providing advanced educational programs with innovative research, in the field of leather, footwear, leather products, and allied sector to produce competent graduates.

3. Mission of the Program Offering Entity

- Provide a contemporary educational approach that integrates high-tech and modern methods, enhancing their learning experience through research conducted locally and internationally.
- Promote industry-academia collaboration for better understanding and skill development in undergraduate programs in the fields of leather, footwear, and leather products.
- Undertake actions to motivate students for life-long learning, and students' personal development by fostering ethical and moral values.

4. Objectives of the Program Offering Entity

- To produce competent graduates in the field of leather, footwear, and leather products sector;
- To initiate, organize, and undertake research in the fields of leather, footwear, and leather products engineering;
- To provide industry-oriented training programs in various fields of leather, footwear, and leather products engineering;
- To ensure quality control and laboratory facilities for testing raw materials, consumables and finished products;
- To provide facilities for environmental pollution control, chemical management, and occupational health and safety compliances;
- To organize seminars, conferences, workshops, exhibitions, and other events to disseminate knowledge about state-of-the-art technologies for the relevant fields;
- To establish bridge programs and research collaborations with various academic, research, and industrial organizations both at home and abroad.

5. Name of the Program: Post Graduate Diploma in Leather Technology (PGDLT) and Advanced Certificate Course on (i) Compliance and Sustainability for Leather Sector, (ii) Automation and AI for Design, and (iii) Lean Manufacturing and Quality assurance**.**

6. Vision of the Program

To produce technically competent manpower for leather/footwear/leather products industries to enhance business growth in the local and international markets.

7. Mission of the Program

- To produce a smart and competent manager who will lead production and coordinate with other departments.
- To produce competent supervisor and technician for leather sector to improve the productivity and quality of the products for boosting export growth.
- To make the post-graduate diploma personnel with the capacity to foster the leather sector in terms of quality and export so that Bangladesh will be one of the leading countries in the world for leather and leather products export.

8. Objectives of the Program

- To generate skilled managerial manpower according to the demand of the leather, footwear and leather goods sector.
- To fill up the gap between the top and bottom level of manpower for the leather, footwear and leather goods sector in Bangladesh.
- To boost academia-industry collaboration through participation in developing and delivering knowledge, skills, and attitude.

9. Description of the Program

This program will offer a nine-month duration of post-graduate diploma and a three-month long advanced certificate course to graduates and under graduates of multi-disciplinary subjects (science, arts, and business background) including leather, footwear, and leather products engineers. After completing this postgraduate diploma and certificate course, the graduates will be preferred to be recruited in the leather, footwear, and leather goods industries. Through this practical-oriented program, the candidates will learn hand-to-hand updated technical know-how of leather, footwear, and leather products manufacturing. The Total program credits are 36, which will be conducted in three terms with a one-month internship in the relevant industry. The advanced certificate course credits are 9 with a one-week internship in the relevant

industry. Competent and highly experienced academicians and trainers from the University of Dhaka and relevant industries will conduct classes for all courses.

10. Admission Process

The PGDLT program targets two groups: industry professionals and fresh graduates. Industry candidates should ideally have a bachelor's degree and at least three years of relevant work experience, and be under 45 years of age. Academic requirements (CGPA 2.5 or second class) may be relaxed for those with strong industry performance, supported by employer certification. Fresh graduates must hold a bachelor's degree with a CGPA of at least 2.5 and show a clear interest in the leather sector. All candidates (only for PGDLT) must pass an admission test (written and viva) and commit to completing a nine-month course, including coursework and internship requirements. No admission test (except the viva) will be required for Advanced Certificate Courses. All eligible applicants are required to take admission test administered by PIU at ILET. The admission process will entail the followings:

- **Written test:** The written test will assess the applicants' aptitudes in Language and Analytical Ability. To qualify in the written test an applicant must obtain a minimum qualifying score in each of these areas.
- **Final Selection:** Final selection for admission will be on the basis of scores obtained by an applicant in the written, interview tests.

11. Definition of Credit

(i) For theoretical courses, fifteen class-hours of fifty minutes each is defined as one credit.
(ii) For practical or lab courses, thirty lab hours work is defined as one credit.

12. Exam Committee Formation

a) At the beginning of each academic batch, an exam committee shall be formed for that batch by the Traninee Selection Committee (TSC) of this SICIP-ILET program. Chairman of the exam committee will act as a course coordinator for that batch. The role of a course coordinator is to monitor the academic activities and report to the AD (Academic) of the SICIP-ILET program to avoid any unexpected situation.
b) The exam committee will consist of four members proposed by the Traninee Selection Committee (TSC) of the respective program.
c) The committee members are a chairman, two internal members from the institute/SICIP-ILET program and one external member from the outside of the institute/SICIP-ILET program.

d) The exam committee will be responsible for all exam related activities as per the University rules.

13. Evaluation of the Courses

The performance of a student in a course will be evaluated in the following ways:

(a) For a theory course, the evaluation will be made on the basis of attendance & class participation**,** quiz/assignment/viva/case study**,** mid-term exam**, and** final exam (written).

(b) For any course, attendance & class participation**,** quiz/assignment/viva/case study**,** mid-term exam will be evaluated by the course teacher/s and the result must be submitted to the exam committee and the controller of exam before the commencement of the semester final examination.

(c) The percentage of attendance of students for each course (according to the format supplied by the SICIP-ILET Program) along with the attendance sheet must be submitted to the AD (Academic) of the SICIP-ILET Program before the commencement of the term final examination.

(d) The in-course exam scripts must be shown to students before the last class of a term.

(e) If more than one in-course exam is taken, the final marks will be calculated by averaging all of them **(best one will not be allowed)**.

(f) For theory course final exams, generally there will be two examiners: course teacher will be the first examiner and the second examiner will be within the SICIP-ILET Program/institute or from a relevant department of the University of Dhaka. If a suitable examiner is not found from the University of Dhaka, a second examiner may be appointed from other universities with prior permission from the Vice-Chancellor.

(g) The answer scripts of the final exam will be evaluated by one examiner which will be the course teacher. In case of multiple course teacher, the SICIP-ILET Program will appoint one examiner among them.

(h) The assessment of sessional courses will be made by observing overall performance of a student in practical classes (continuous evaluation), attendance, viva-voce, assignments and lab final exams (set by the SICIP-ILET Program).

(i) For and industrial attachment, evaluation will be made on the basis of rule and regulations set by the SICIP-ILET Program.

14. Requirements to Sit for Course/Term Final Exam

(i) Students having 75% or more attendance on average, is eligible to appear in the term final Exam.

(ii) Students having average 60-74% attendance will be allowed to sit for the exam with a fine of Tk. 1000.00 (one thousand) to the University's central account. In addition to usual fees, institute may include additional fine as per the decision of the Traninee Selection Committee (TSC).

(iii) Students having average attendance below 60% will not be allowed to sit for the term final Exam but may seek re-admission in the program.

(iv) The semester final exam will be arranged centrally by the controller of examination of the University of Dhaka.

(v) The duration of theory course final exams will be as follows:

Credit	Duration of Exam
3 credits course	3 hours
2 credits course	2 hours

(vi) Duration of lab exam will be defined by the SICIP-ILET Program.

15. Assessment and Certification Processes

(a) Evaluation During Term 1 and Term 2 for PGDLT and Advanced Certificate Courses

Evaluations in Term 1 and Term 2 for PGDLT and Advanced Certificate Courses will be tailored to each course's specific requirements, ensuring comprehensive assessment of students' engagement, understanding, and practical application of course material. Evaluation methods and mark distribution will be shared at the start of each course.

Evaluation Methods:

1. **Attendance & Class Participation (10%)** Regular attendance and active participation in class discussions and activities will be monitored.

2. **Quiz/Assignment/Viva/Case Study (20%)** Short periodic assessments to test understanding and maintain consistent engagement with the material.

3. **Mid-Term Exam (30%)** An exam covering material up to the midpoint of the term, assessing understanding of key concepts and application.

4. **Final Exam (40%)** A comprehensive written exam at the end of the term, assessing overall understanding. Students must maintain at least 80% attendance to be eligible for the final exam.

Each course will be evaluated out of 100 marks, with the breakdown as follows:

i. For Theory Course

Evaluation Method	Marks
Attendance & Class Participation	10%
Quiz/Assignment/Viva/Case Study	20%
Mid-Term Exam	30%
Final Exam (Written)	40%
Total	**100%**

ii. For Sessional Course

Evaluation Method	Marks
Lab attendance	20%
Continuous evaluation	40%
Final exam	40%
Total Marks	**100%**

iii. Guidelines for Attendance Marks

Attendance (%)	Marks (10)
90 and above	10
85 to 89	8
80 to 84	6
75 to 79	4
60 to 74	2
Less than 60	00

(b) Evaluation During Term 3 (Internship)

In Term 3 (for PGDLT) and Advanced Certificate Courses, students will complete an internship to gain practical experience in their respective industries. Their performance will be evaluated by both the industry and academic supervisors.

Evaluation Methods:

1. **Industry Supervisor Assessment (100 marks)**

Focuses on practical skills such as:

- Time management
- Communication skills
- Teamwork and collaboration
- Creativity and problem-solving
- Adherence to instructions and professional behavior

2. **Academic Supervisor Assessment (100 marks)**

Evaluates the internship report based on:

- Industry description and structure
- Tasks completed and projects undertaken
- Critical analysis of work performed
- Clarity and structure of the report

Total Evaluation for Internship

Assessment Type	Marks
Industry Supervisor Assessment	100
Academic Supervisor Assessment	100
Total	200

Note: The scores from both supervisors will be summed and averaged to derive a final score out of 200 marks for the internship.

(c) Tabulations

a) The exam committee will appoint two tabulators.

b) Tabulators will receive marks of all the courses from the chairman of the Exam committee.

c) The two tabulators will independently prepare the tabulation sheets and compare before submitting it to the office of the Controller of Examination through the Chairman of the Exam committee.

(d) Grading and Certification

At the end of each term, students' numerical scores in courses and internships will be converted into letter grades based on the Dhaka University grading system. These grades will be used to calculate the Cumulative Grade Point Average (CGPA). The grading system is as follows:

Sl. No	Marks	GPA/CGPA in letter	GPA/CGPA in numeric	Comments
1	<80	A+	4.00	Excellent
2	75-<80	A	3.75	
3	70-<75	A-	3.50	Good
4	65-<70	B+	3.25	
5	60-<65	B	3.0	
6	55-<60	B-	2.75	
7	50-<55	C+	2.50	
8	45-<50	C	2.25	
9	40-<45	D	2.00	
10	<40	F	0.0	Fail

Based on the grade points, grade point average (GPA) and Cumulative Grade Point Average CGPA are calculated in the following manner:

$$\text{GPA} = \frac{\Sigma\ (\text{Grade Points x Credits})}{\Sigma Credits}$$

$$\text{CGPA} = \frac{\Sigma(\text{GPA x Credits})\ of\ each\ term}{\Sigma Credits\ of\ each\ term}$$

Students with a CGPA of 2.00 or higher are considered in good standing and eligible to continue in the program. Those with a CGPA below 2.00 may be dismissed. Students who receive a grade of D or below in any course may retake exams to improve their grades, but they will cover the cost of re-examinations. The final CGPA will be calculated by averaging the grades of all completed courses each semester, following the Dhaka University grading system.

Term and Course Structure of PGDLT

Term	Course Title	Credit Hours	
		T*	S**
Term 1 (Generic & Industry Specific Courses)	LT-101: Business Communication Skills	2	1
	LT-102: Pre-tanning & Tanning Processes	2	1
	LT-103: Maintenance & Utility	3	0
	LT-104: Cost and Business Management	3	0
	LT-105: Industrial Engineering & Automation	3	0
Term 2 (Advanced Industry Specific Courses)	LT-201: Post-Tanning & Finishing Processes	2	1
	LT-202: Materials Management & Quality Control	2	1
	LT-203: Merchandising & Supply Chain Management	3	0
	LT-204: Compliances & Environmental Impact Assessment	3	0
	LT-205: Industrial Hazard & Occupational Safety and Health	3	0
Term 3	LT-300: Internship – Case study	0	6
	Total Credits	**36**	

*T= Theory; **S=Sessional

Course Structure of Advanced Certificate Courses

1. *Advanced Certificate Course on Compliance and Sustainability for Leather Sector*

Course Code	Course Title	Credit Hours	
		T*	S**
ACC-CSLS-01	Industrial Compliance	2	
ACC-CSLS-03	Occupational Health and Safety in Leather Sector	2	
ACC-CSLS-05	Environmental Pollutions and Sustainability	2	
ACC-CSLS-02	Occupational Health and Safety in Leather Sector Sessional		1
ACC-CSLS-04	Environmental Pollutions and Sustainability Sessional		1
ACC-CSLS-06	Industrial Attachment		1
	Total Credit	**9.0**	

*T= Theory; **S=Sessional

2. Advanced Certificate Course on Automation and AI for Design

Course Code	Course Title	Credit Hours	
		T*	S**
ACC-ALPD-01	Product Design and Pattern Making	2	
ACC-ALPD-03	Industrial Engineering and Automation	2	
ACC-ALPD-05	Materials allowance and consumption analysis	2	
ACC-ALPD-02	Product Design and Pattern Making Sessional		1
ACC-ALPD-04	Industrial Engineering and Automation Sessional		1
ACC-ALPD-06	Industrial Attachment		1
Total Credit		**9.0**	

*T= Theory; **S=Sessional

3. Advanced Certificate Course on Lean Manufacturing and Quality Assurance

Course Code	Course Title	Credit Hours	
		T*	S**
ACC-LMQA-01	Productivity Improvement and Lean Manufacturing	2	0
ACC-LMQA-03	Total Quality Management (TQM)	2	
ACC-LMQA-05	Testing of Leather and Allied Materials	2	
ACC-LMQA-02	Lean Manufacturing Sessional		1
ACC-LMQA-04	Testing of Leather and Allied Materials Sessional		1
ACC-LMQA-06	Industrial Attachment		1
Total Credit		**9.0**	

*T= Theory; **S=Sessional

10. Course contents

PGDLT

Term I

LT-101: Business Communication Skills

Rationale of the Course: This course is designed to enable students in employability-related communication to enhance their performance in different types of communicative English. Upon successful completion of the course, students are expected to have employability skills that will allow them to do effective presentations, write properly, be career-oriented, and have the ability to work independently skills in addition to personal and interpersonal skills, problem-solving and teambuilding skills that would allow them to present themselves anywhere in the world

Course Objectives: The objectives of this course are as follows:

a) Understand the importance and levels of communication in business and multicultural contexts.
b) Use modern digital tools (email, messaging apps, virtual meetings, professional networking) effectively and professionally.
c) Develop self-management skills to handle stress, manage time, and stay motivated in professional settings.
d) Work individually and collaboratively within diverse teams, applying problem-solving, coaching, and feedback skills.
e) Write clear, structured, and plagiarism-free reports including technical, progress, and executive reports with proper referencing.
f) Design and deliver effective presentations using verbal, non-verbal, and digital communication strategies, overcoming barriers in public speaking.

Course Contents

Business Communications: Significance of communication in corporate and multinational business organizations; level of business communications- intrapersonal, interpersonal, organizational, group, and intercultural, major business-upward communication, downward communication, lateral communication, and external communication.

Digital & Modern Communication Tools: Email etiquette, professional use of messaging platforms (Slack, Teams, WhatsApp for business); Virtual meeting skills (Zoom, Google Meet, MS Teams); social media and professional networking communication (LinkedIn, X/Twitter, etc.).

Self-management skills: Basics of self-management, stress management, ability to work independently, emotional intelligence, role play on avoiding a stressful situation, self reflection, strength and weakness analysis, self-motivation, goal setting, and time management.

Teamwork: Working across different ages irrespective of gender, race, religion or political persuasion, working as an individual and as a member of a team, knowing how to define a role as part of the team, applying teamwork to a range of situations e.g., futures planning, crisis problem solving, identifying the strengths of the team members, coaching and mentoring skills including giving feedback.

Report Writing: Types of report, characteristics, and importance of different types-Purpose-Scope-different styles of writing reports. Preparing informal and formal reports, drafting reports, progress reports, technical reports, abstracts, executive summaries, proposals, academic-style references, citation, plagiarism avoidance, and tips for effective business presentation.

Presentation skill development: Presentation and public speaking, rules for effective speaking, improving skills in non-verbal and verbal communication, the beauty of rhythm and voice modulation, presentation techniques, preparing the contents, tips for preparing attractive and powerful PowerPoint presentation, main challenges or barriers of presentation and public speaking, methods for overcoming the fear and obstacles during presentation, importance of rehearsals, common mistakes in presentation and public speaking, tips for smart speech, discussions on world-famous public speech with the audio-visual record, making interactive presentation slides and presenting the business plan/project proposal and self-assessment.

Lab

- Role plays and simulations on business communication (intra/interpersonal, organizational, intercultural).
- Professional email writing, group chat simulation, and virtual meeting practice.
- LinkedIn profile creation and digital networking.
- Self-reflection, stress management, time management, and emotional intelligence activities.
- Teamwork exercises: crisis problem solving, role rotation, coaching, and feedback.
- Report writing practice: formal/informal reports, progress reports, abstracts, and referencing.
- Presentation skills: voice modulation, slide design, mock presentations, and feedback.

Learning Materials

i. Recommended Readings

a) An Introduction to Employability Skills-Arvind M Nawale, Mahesh M Nivargi, Manisha B Gahelot.
b) The Complete Book of Business Plan- Secrets to Writing Powerful Business PlansJoseph A. Covello and Brian J. Hazelgren.
c) The Complete Presentation Skills Handbook-Suzy Siddons.

ii. Supplementary Readings

a) The Journey-Book on Secrets of Employability Skills-Dr. Hari Prasad. N, Dr. Soundria. S. M
b) Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds-Carmine Gallo.

iii. Others: Handout/lecture material provided by the course teacher.

LT-102: Pre-tanning & Tanning Processes

Rationale of the course: This course introduces the fundamental pre-tanning and tanning processes in leather manufacturing, from raw hide preservation to the production of wet-blue and wet-white leathers. It equips students with both theoretical knowledge and practical skills to analyze, apply, and innovate sustainable tanning techniques for high-quality leather production.

Course Objectives: The objectives of this course are as follows:

a) Identify and differentiate hides and skins based on structure, composition, and grading.
b) Explain the principles and operations of soaking, unhairing, liming, fleshing, deliming, bating, pickling, and tanning.
c) Apply conventional and eco-friendly techniques to manufacture wet-blue and wet-white leathers.
d) Analyze process parameters, defects, and quality outcomes in tanning operations.
e) Evaluate the environmental impacts of pre-tanning and tanning and recommend mitigation strategies.

Course Content

Introduction: Global leather industry overview (supply chain from raw hides to finished leather), Slaughtering and flaying of animals, hides and skins: different parts, identification of hides and skins, chemical composition of hides and skins, economics of hide/skin preservation, saltless or less salt preservation/curing techniques, sorting, and grading, advanced traceability systems (RFID, blockchain for raw material tracking).

Soaking: De-salting, soaking: chemicals used in soaking, eco-friendly soaking, influencing factors in soaking, defects, and their remedies, water management in soaking (recycling, re-use), case studies on defect prevention.

Unhairing and Liming: Objectives, types, advantages and disadvantages, chemicals used in liming and unhairing, immunization of keratin, mechanism of unhairing, hair saving method, enzymatic green unhairing, fleshing, lime splitting and its advantages, hair recovery and its utilization.

Deliming and Bating: Objectives, deliming chemicals, completion test of deliming, bating chemicals, the effect of bating on leather quality, bating completion test.

Pickling and Tanning: Objectives, importance, and controls of pickling and tanning, test of pickling and tanning, saltless pickling and wet-white tanning, variable parameters of chrome-tanning, environmental impact of chrome tanning, waterless and less water chrome tanning, vegetable, and other types of tanning: chrome free tanning, nano material-based tanning etc.

Impact of pre-tanning and tanning operations on environment: Pollutions and their mitigation strategies, impact on climate change and its adaptation.

Lab

1. Hands on practice of grading raw hides and skins.
2. Manufacturing of standard wet-blue leather from cowhide and goatskin.
3. Green tanning of hides and skins to produce wet-white leather.
4. Less water tanning for the manufacturing of wet-blue leather.
5. Hands on practice of grading wet-blue and wet white leather.

Learning Materials

i. Recommended Readings

a) Leather Technician`s Handbook–J. H. Sharphouse, Vernon Lock Ltd., 125 High Holborn, London W-C1

b) Theory and Practice of Leather Manufacture–K. T. Sarkar, Macmillan India Press, Madras

c) Possible Defects in Leather Production-Gerhard John.

ii. Supplementary Readings

a) Tanning Chemistry: The Science of Leather-Anthony D Covington

b) An Introduction to the principles of Leather Manufacture (4th Edition)- Sasanka Shekhar Datta, ILTA, Calcatta-700 001

iii. Others: Handout/lecture material provided by the course teacher

LT-103: Maintenance & Utility

Rationale of the Course: This course provides students with fundamental knowledge and practical insights into the operation and maintenance of tannery machinery and industrial utilities. It emphasizes planned maintenance systems, lubrication practices, energy efficiency, and sustainable utility management, enabling students to support productivity, safety, and sustainability in leather manufacturing.

Course Objectives:

a) Explain the basic concepts, types, and planning methods of maintenance, including Total Productive Maintenance (TPM) and related KPIs.
b) Demonstrate knowledge of the operation and maintenance requirements of key tannery machines.
c) Analyze industrial utilities such as air conditioning, boilers, cooling towers, and generators, focusing on energy and water efficiency.
d) Apply appropriate lubrication systems and evaluate their impact on machine performance and failure prevention.
e) Describe the procedures for machine floor preparation, erection, fixation, and leveling to ensure safe and effective installation.

Course Contents

Introduction: Basic concepts of maintenance, Types, planning and organizing maintenance, preparation of maintenance schedule, Introduction to total productive maintenance (TPM), objectives and benefits of TPM, OEE (Overall Equipment Efficiency), six big losses analysis, difficulties faced in TPM implementation, Case studies of TPM in leather industries, Use of KPIs.

Maintenance of various machineries of tannery: Leather drum, motor for leather drum, fleshing machine, Sammying machine, splitting machine, shaving machine, setting machine, Vacuum machine, Tunnel dryer, toggling machine, stacking machine, Rotto press, plating machine, Buffing and dedusting machine, Auto Spray machine, Role of digitalization: Computerized Maintenance Management Systems (CMMS).

Industrial Utility: Comfort condition, Principle of air conditioning; Energy audit techniques for tanneries; Air conditioning in the leather sector, Humidifier, De-humidifier, Cooling tower, Boiler, Generator, Increase of water and energy efficiency of machinery, Energy audit techniques for tanneries, Water conservation methods, Boiler efficiency improvement techniques, Renewable energy applications.

Lubrication and machine floor erection: Lubricant, types, general properties, functions, lubrication systems of tannery machinery, Failure analysis due to improper lubrication, Floor preparation, foundation, machine erection fixation, leveling, Importance of proper drainage, slope, and chemical-resistant flooring in tanneries.

Learning Materials

i. **Recommended Readings**
   a) Pivecka J. - Practical Handbook on Shoe Production
   b) Joel Levitt - Handbook of Maintenance Management (Volume 1) Second Edition
   c) Sharphouse - Leather Technicians Hand books.

ii. **Supplementary Readings**
   a) Boothroyd G.- Assembly Automation and Product Design

iii. **Others:** Handout/lecture material provided by the course teacher

LT-104: Cost & Business Management

Rationale of the Course: Cost and business management accounting is an indispensable course for the leather products industry that assists in formulating business policies. This course provides knowledge of cost behavior and terminology, cost elements, accounting systems, and costing techniques. This course also emphasizes decision-making and strengthens business strategy to develop problem-solving aptness in the areas of cost ascertainment, cost control & cost management, human resources, and product branding in the complicated manufacturing environment of the leather industries.

Course Objectives: The learning objectives of this course are:

a. To know about cost accounting, cost behavior, terminology, and cost elements.
b. To know about management processes, leadership, and product management.
c. To know problem-solving aptness in the areas of cost and business management in a complicated manufacturing environment of the leather industries.

Course Content

Cost and Costing Techniques: Terminologies, financial accounting vs cost accounting, cost designing factors, limitations, cost accounting system, cost elements, cost behavior, standard costing, costing of by-products and joint products, direct costing, costing of leather products, material, labor, power, overhead expenses, budgeting, and control in leather industries, cost management ratio, manufacturing vs non-manufacturing cost.

Basic Management: Management concepts, evolution of management thoughts, managerial functions, approaches to management, manager's complex environment, organizing and staffing, planning, and decision making.

Management Process and Leadership: Significance and elements of the management process, coordination, and control, concept, traits, styles of leadership, gender equality in leadership, understanding individual behavior, attitudes, and job performance, personality and perception, motivation, Maslow's hierarchy of needs, communication, management information systems, business process re-engineering, human resource development, and management 4.0.

Product and Brand Management: Product concepts: product mix concepts, product classification, product planning: marketing plan, portfolio analysis, market potential and forecasting, product market strategies, new product development, product life cycle stages and corresponding strategies, product evaluation, product modification, line extension and brand extension.

Learning Materials

1. **Recommended Readings**
   a) Managerial accounting (Textbook) Garrison, R. H., & Noreen, E. W. (7th / Latest edition) Boston: Irwin/McGraw-Hill.
   b) Cost Accounting: A Managerial Emphasis, Horngren CT, 15th / Latest edition publisher Pearson.
2. **Supplementary Readings**
   a) Management Accounting, J. Batty, Latest edition, Latest, Macdonald & Evans Ltd
   b) Cost Accounting: Planning & Control, Usry & Hammer, Latest edition, Thomson South-Western
   c) Cost Accounting (Textbook), S.P Iyengar, Latest Edition, 2017-2018, Sultan Chand & Sons
   d) Theory & Practice of Costing (Reference Book), Basu& Das, Latest, 2018-19
3. **Others:** Handout/lecture material provided by the course teacher.

LT-105: Industrial Engineering & Automation

Rationale of the Course: This course will assist students in developing basic knowledge about industrial and production engineering as well as automation skills related to the leather sector.

Course Objectives

- **a.** Introduce basic knowledge about industrial engineering and management.
- **b.** Introduce fundamental knowledge on forecasting and plant layout
- **c.** Provide students with knowledge on production planning and control strategy.
- **d.** Familiarize students with basic automation tools and techniques.

Course Contents

Introduction: Basic concepts of industrial engineering, industrial floor management, production line balancing, work and time study, industrial management

Forecasting and plant layout: Forecasting types, methods, applications, Basics of plant layout and facility location, climate change and forecasting, special considerations for leather plant layout, waste disposal facility

Production planning and control: Aggregate planning, master production schedule, material requirement planning, control strategy and tools, manufacturing resource planning, business function planning.

Automation Technologies in Footwear and Leather Goods Manufacturing: Fundamentals of automation technologies, Types of automated machinery and equipment used in footwear and leather goods sector, Benefits and challenges of implementing automation, Automated cutting machines (laser, die-less cutting, etc.), Nesting optimization, Automated sewing machines and lasting machine, Automated Material Handling Systems, and Automated conveyors in footwear and leather products factories.

Automation: Basics of automation, types, components, level of automation, latest automation technologies, robotics, Artificial Intelligence, automated guided vehicles (AGVs), Human-Machine Interaction (HMI), Smart factories and real-time AI monitoring applications for footwear and leather goods manufacturing, Overview of ERP and SAP software, Industry 4.0 & 5.0.

Learning Materials

- **i. Recommended Readings**
  - a) Introduction to Industrial Engineering by Avraham Shtub, Yuval Cohen
  - b) Introduction to Industrial Automation 1st Edition- by Stamatios and Manesis George Nikolakopoulos
- **ii. Supplementary Readings**
  - Industrial Automation: Hands-On, 1st Edition by Frank Lamb
- **iii. Others:** Handout/lecture material provided by the course teacher

Term II

LT-201: Post-Tanning & Finishing Processes

Rationale of the Course: This course provides an in-depth exploration of key post-tanning operations essential for enhancing the properties of leather, with a focus on sustainable practices and a gender-inclusive approach. Participants of all genders will gain comprehensive knowledge and practical skills in re-chroming, neutralization, re-tanning, dyeing, fat-liquoring, and finishing processes, considering the environmental and social impact of leather production.

Course Objectives:

- **a.** To make the students understand concepts of post-tanning processes.
- **b.** To develop skills in mechanical operations related to leather finishing.
- **c.** To develop problem-solving skills in leather production challenges.
- **d.** To foster practical skills to produce environment-friendly high-quality leathers.

Course Contents

Re-chroming, Neutralization, and Re-tanning: Preparation for post-tanning operations, role of pH, process of re-chroming, neutralization, and re-tanning, types of materials used in re-tanning and semi-chroming, advantages and disadvantages, quality control, and cleaner alternatives.

Dyeing and Fat-liquoring: Preparation of leather for dyeing, factors, dyeing auxiliaries, and fixation, natural and synthetic fat-liquors, factors affecting fat-liquoring, modern trends in dyeing and fat-liquoring, Common defects and remedies.

Mechanical and manual operations of re-tanned leather: Water content in leather, Objectives of setting out, vacuum drying, tunnel/overhead drying, vibrating staking, toggle drying, trimming, dry vacuum, methods of drying, defects, and remedies of drying, renewable energy utilization, defects in drying and corrective actions.

Finishing: Basic products for finishing, Application of finishes-padding, spraying, roller coating, printing, and laminating, plating, glazing, and polishing, green finishing techniques, airless spray finishing, cleaner finishing of splits for garment suede.

Lab

1. Manufacturing of shoe upper crust leather from cow/goat wet blue.
2. Manufacturing of finished shoe upper leather from cow/goat wet blue.
3. Manufacturing of printed bag leather from cow/goat crust leather.

4. Manufacturing of eco-friendly finished leather.
5. Hands-on Practice: Operation and Maintenance of Tannery Machinery

Recommended books

a) Mishra. B, Sharma. S (2011) Communication Skills for Engineers and Scientists. PHI Learning Pvt. Ltd. ISBN: 8120337190.
b) Chaturvedi P. D, Chaturvedi M. (2011) Business Communication: Concepts, Cases and Applications. Pearson Education India. ISBN: 8131718727.
c) Greenbaum. Sidney. College Grammar of English. Longman Publishers. ISBN: 9780582285972.

Others: Handout/lecture material provided by the course teacher

LT-202: Materials Management & Quality Control

Rationale of the Course: Materials Management and Quality Control is a comprehensive course providing knowledge on materials management, purchase management, procurement cycle, lead time analysis, purchase policy, and procedure, bill of materials, surplus materials, and materials handling. This course emphasizes different tests to assess the quality of upper, lining leather, and other allied materials. This course also covers the basic concepts of TQM, TQM framework, tools and techniques, and Quality management system. The students will be capable in the field of quality control and materials management of the leather industry which the learner is expected to possess upon completion of the course.

Course Objectives: Objectives of this course are:

a.To familiarize students with various theoretical aspects of materials management.
b. To describe operating steps involved in the physical testing of leather, leather products, and other allied materials.
c. To implement different TQM tools and techniques to control the quality.
d. To make the students experienced in Quality Management System.

Course Content

Concept of Materials Management: Meaning, definition, scope, and functions of materials management, interfaces of materials management: internal and external interfaces, purchase management, procurement cycle, lead time analysis, purchase policy, and procedure, bill of materials, Demand forecasting methods, ABC classification, HML, VED, FSN classification/analysis, surplus materials, materials handling, Relationship between materials management, production, and supply chain.

Inventory and Supplier Management: Inventory types and control systems, Economic order quantity (EOQ) and safety stock concepts, Material handling, coding, and documentation, Modern warehouse practices (FIFO, LIFO, barcode/RFID applications), Vendor selection and evaluation criteria, Negotiation and purchasing systems, Global sourcing and local sourcing issues in the leather sector, Supplier relationship management & strategic partnerships

Quality Assessment of Materials: Introduction, thumb tests, sampling and sampling positions, different strength tests of leather; tensile, stitch teat, tongue tear, Baumann tear, grain crack resistance, and other physical tests to assess the comfortable properties of upper and lining leather; flexing endurance, water vapor permeability, scuff resistance, heat fastness, color rub fastness, waterproofness, etc. tests for finish film, tests for insole and sole (leather and synthetic) and tests for complete products.

Quality Control and Total Quality Management (TQM): Quality and its measurement, quality characteristics: quality of design conformance and performance, Deming's principles on quality, Statistical quality control (SQC) basics, Pareto analysis, cause-and-effect diagram, histogram, Control charts: X-bar, R-chart, p-chart, np-chart, Sampling inspection methods, basic concepts of TQM, TQM framework, TQM Tools and Techniques, Six Sigma: concepts, methodology, applications in Leather/Footwear/Leather Products industries, benchmarking, benchmarking processes, and Quality Management Systems.

Lab

1. Determination of tensile strength, tear strength/Stitch tear strength/Tongue tear strength/ Split tear strength/ Grain crack strength of upper leather.
2. Determination of flexing endurance (Vamp flexing/ Bally flexing).
3. Determination of water vapour permeability of upper and lining leather and resistance to water penetration.
4. Determination of scuff resistance of leather.
5. Determination of colour fastness to circular rubbing.
6. Determination of heat resistance of finish film.
7. Determination of adhesion of finish using deadweight method.
8. Determination of perspiration resistance for upper and lining materials used in products.
9. Determination of pilling and abrasion of synthetic / fabrics materials.
10. Tests for accessories.

Learning materials

i. **Recommended readings**
   a) Dale H. Besterfiled, et al., "Total Quality Management", Pearson Education Asia, Third Edition, Indian Reprint, 2006.
   b) Dutta S.S, "An Introduction to the Principles of Physical testing of Leather".
   c) Steve Chapman, Tony Arnold, Ann Gatewood- Introduction to Materials Management 8th Edition

ii. **Supplementary Readings**
   a) SATRA Owner's manual
   b) Testing and Quality Assessment of Footwear and Footwear Materials- B. Venkatappiah, CLRI 1999

iii. **Others:** Handout/lecture material provided by the course teacher

LT-203: Merchandising & Supply Chain Management

Rationale of the Course: Merchandising and supply chain management is a global, regional, and national concern. This course is to disseminate knowledge about merchandise planning, prototype preparation, costing and negotiation with buyers, business planning, coordination and product management, the industry's supply chain, supply chain performance drivers, designing an agile supply chain network, demand forecasting, outsourcing decisions, and lead time management.

Course Objectives: The objectives of this course are as follows:

a. To disseminate knowledge about the basics of merchandising and supply chain management.

b. To equip students with knowledge and theories of merchandise plan, prototype preparation, costing, and negotiation.

c. To demonstrate various analytical methods and tools of the supply chain so that students can be able to measure and evaluate various facets of supply chain performance.

Course Contents

Introduction to Merchandising: Definition of merchandising and merchandiser, functions, and roles of merchandiser in business, merchandising tools, merchandising process, merchandising plan, costing and negotiation with buyer, preparation and evaluation of Bill of Materials (BOM), logistics, CNF.

Production, Planning, Quality, Shipment Follow-Up: Merchandiser roles in the production department, planning department, quality department, shipment date, follow-up to meet buyer requirements, coordination, and management of shipment, NAP, NDC, CCGAP, MCPP.

Understanding the Supply Chain: Definition of Supply chain, types, strategic, tactical, and operational decisions in supply chains, supply chain performance, and drivers, distribution network design in the supply chain, green supply chain and its implication in leather sector.

Demand Forecasting and Sourcing Decisions in Supply Chain: The role of forecasting in a supply chain, characteristics of forecasts, components of forecasts and forecasting methods, the role of sourcing in a supply chain, supplier scoring and assessment, and selection, procurement process, sourcing planning, analysis, and making sourcing decisions, advanced planning, and scheduling in supply chain management.

Learning Materials

i. Recommended Reading

a) Grace I kunz, Merchandising: Theory, Practice, and Principles.
b) K. Shridhra Bhat, "Logistics and Supply Chain Management".
c) S. Chopra and Mendil, "Supply chain management, strategy, planning and operation",
d) Pearson Education, Asia, 2/2004.
e) John Donnellan, Merchandise Buying and Management.
f) G. Raguram and N. Rangarajan, "Logistics and Supply Chain Management-Cases and concept," Macmillan.

ii. Supplementary Readings

a) B.S. Sahay, "Supply Chain Management, for Global Competitiveness", Macmillan Bangladesh Limited, 1999.
b) A J Chuter, Introduction to clothing production management.
c) M Krishan Kumar-Apparel Merchandising

iii. Others: Hand notes/Lecture materials will be provided by the course teacher.

LT-204: Compliances & Environmental Impact Assessment

Rationale of the Course: This course will provide vast knowledge on environmental management and compliance. It involves air and water pollution, solid wastes, and their management. It will also provide environment management, compliance, and LWG certification. The course is intended to describe different methods of existing and advanced tannery wastewater treatment facilities and solid waste management for meeting discharge standards. Climate change and adaptation and its impact are also addressed in this course.

Course Objectives: The objectives of this course are as follows:

a. To introduce the basic concepts of air, water, and solid waste pollution as well as climate change and their management system.

b. To identify the impacts of different natural and anthropogenic activities on the environment and their remediation.

c. To impart knowledge on industry-specific solid waste management practices and energy recovery approaches.

Course Contents

Air and water Pollution in the **Leather Industry:** Air pollution, air pollution in the leather sector, particulate matter, SOx, NOx, VOCs, H_2S, NH_3, greenhouse gas emission, CO_2 emissions, and air pollution control in tanneries, and environmental footprint. Tannery effluents, chromium discharge in effluent, environmental impacts of BOD, COD, TDS, Cr^{6+}, $Cr^{3+,}$ and Cl^- of tannery wastewater, effluent treatments, MBBR, reverse osmosis.

Wastewater treatment and Solid Waste Management: Effluent treatment techniques, Different sources of solid waste generation, their impact on air, water, and soil, waste minimization, waste valorization (such as energy, fertilizer, protein hydrolysate, feed, and so on), circular economy, the concept of 6R.

Environmental Impact Assessment (EIA): Concept, purposes and characteristics of EIA, global evolution of EIA, participants in EIA process, types of EIA, environmental inventory, EIS, Concept and certification process of EMS, and Environment Conservation Act and rules, air pollution rules, solid waste management rules of Bangladesh, sustainability report for tanneries based on SDGs.

Compliances and LWG certification: LWG certification, Social audit- SA 8000, WRAP, SADEX, BSCI, SLF, Operating permits, Production data, Traceability, EMS, RSL, Energy and water usage, Air and noise emission, Waste Management and effluent treatment, Emergency plan, Chemical and operation management.

Climate change: Global warming, Causes, impact to ecosystems, water resources, agriculture and food security, biodiversity, environment, human health and natural calamity. Mitigation and adaptation efforts to achieve SDGs of 2030, NAP2021, MCCAP 2023, NDC 2022.

Learning Materials

i. Recommended Readings

a) Fifield & Haines. - Environmental Analytical Chemistry.

b) Thierry Chambolle - Environment and Tannery.

c) Roy M. Harrison - Pollution causes, Effects, and Control.

ii. **Supplementary Readings**

DE A.K. - Environmental Chemistry

iii. **Others:** Handout/lecture material provided by the course teacher.

LT-205: Industrial Hazards & Occupational Safety & Health

Rationale of the Course: This course will help the students to attain knowledge about safe chemical management systems and risk identification and assessment in tannery. Students will also be introduced to different personal protective equipment and occupational health and safety rules and practices that they can follow in their workplace.

Course Objectives: The objectives of this course are as follows:

a. To provide detailed knowledge about different safe chemical management systems.

b. To introduce the students to different risk assessment tools and practices.

c. To enrich the occupational safety know-how of the students.

d. To prepare the students for any industrial hazards and risks related to the leather industry.

Course Contents

Chemical Management: Hazardous chemicals, MSDS, REACH (EU), SVRC, safe chemicals handling, dilution of chemicals, transferring and transportation of chemicals, structure, and layout of chemical store, rules of storage of chemicals, use of new chemicals, information of chemicals, labeling of chemicals, signage of chemicals storage and free-way, safe disposal of chemical waste, adverse impact of chemicals on humans.

Personal Protective Equipment (PPE): Benefits of PPE, safety rules, proper uses of PPE, and PPE for low, medium, and high-risk activities in tanneries.

Occupational Health and Safety: Definition, rules of an individual in OSH practice, benefits of OSH practice, OSH culture and safety committee, working at heights, confined space (H_2S, ammonia, VOCs), ergonomics and workers well-being, First Aid, emergency preparedness (fire explosion, medical, natural disaster), Harassment and Violence in the workplace.

Risk Assessment in Tannery: Hazard Identifications and Risk Assessment **(**HIRA), types, and sources of industrial hazards, monitor, measure, analyze, and evaluate action to address risk and SWOT analysis, identification of source of potential risks.

Learning Materials

i. **Recommended Readings**

a) Occupational Safety and Health Aspects of Leather Manufacture, UNIDO, 2003

b) Occupational Safety and Health Aspects of Leather Manufacturing, UNIDO, 2021, 2nd Edition.

ii. Supplementary Readings

a) Formal Safety Management Systems ISO 45001 (https://www.iso.org/iso-45001-occupational-health-and-safety.html).

iii. Others: Handout/lecture material provided by the course teacher.

LT-300: Internship-Case Study

Course Duration: 1 Months (6.0 credits)

Course Content

1. Orientation and Raw Material Handling

- Observe factory layout, structural setup, machinery, and certifications.
- Study the organogram and interact with staff to understand workflow.
- Introduction to tannery operations, safety practices, and OSH policies.
- Identification, grading, and preservation of hides/skins; exposure to basic machinery and process flow.

2. Beamhouse and Pre-tanning Operations

- Observe and participate in soaking, liming, deliming, and bating processes.
- Study re-chroming, neutralization, and re-tanning practices, with focus on process parameters and quality control.
- Examine material handling, sorting, and intermediate packaging steps.

3. Post-tanning, Finishing and Exports

- Hands-on practice in dyeing, fat-liquoring, drying, staking, and finishing (spraying, roller coating, embossing).
- Analyze product range, export contributions, and forecast potential performance in global markets.

4. Utilities, Compliance & Reporting

- Familiarization with industrial utilities: boiler, air conditioning, humidifiers, water treatment, and energy efficiency systems.
- Basics of machinery operation, preventive maintenance, and sustainable practices.
- Study OSH practices, CSR initiatives, and benchmark compliance against local labor laws.
- Identify gaps in compliance, safety, and productivity; propose feasible improvements.
- Compile a structured internship case study report and present findings.

Advanced Certificate Course on Compliance and Sustainability for Leather Sector

ACC-CSLS-01: Industrial Compliance

Course Duration: 3 Months (2.0 credits)

Course Content

Introduction to Industrial Compliance

Definition and scope, Importance of compliance in global and local contexts, Regulatory authorities and bodies, National industrial laws and policies, Legal vs Voluntary Compliance, Corporate Social Responsibility (CSR), Codes of conduct and supplier compliance.

Labor Laws and Workplace Standards

Labor rights and working conditions, minimum wage, working hours, overtime, record-keeping, social insurance, leave policies, child labor, forced labor, discrimination, grievance mechanisms, and worker representation

Workplace Safety and Environment

Health & safety compliance-PPE, first aid, accident logs, ergonomics, occupational hazards; Fire safety and emergency procedures-evacuation routes, drills, fire equipment, environmental laws and regulations, waste and chemical management, and sustainability and green compliance practices.

Compliance Systems and Audits

Internal compliance systems, roles of compliance officer, compliance KPIs and monitoring tools, audit types and preparation-social, technical, environmental, and buyer audits, industry-specific compliance (leather), pre-audit preparation and staff training; Corrective Action Plans (CAPs): non-compliance identification, root cause analysis and CAP follow-up, global standards and certifications.

ACC-CSLS-03: Occupational Health and Safety in Leather Sector

Course Duration: 3 Months (2.0 credits)

Course Content

Introduction to Occupational Health and Safety in the Leather Industry: Definition and Importance of OSH, Basic Principles, Legal Frameworks and International Standards (ILO, REACH, SVRC).

Chemical Management: Hazardous chemicals, REACH (EU), SVRC, safe chemicals storage and handling, dilution of chemicals, transferring and transportation of chemicals, structure, and

layout of chemical store, labeling of chemicals, safe disposal of chemical waste, adverse impact of hazardous chemicals on humans.

Hazards and Risk Management: Hazards, Types and Sources of Hazards (Physical, Chemical, Biological, Mechanical, Ergonomic), Hazard Identification and Risk Assessment (HIRA).

Machinery and Equipment Safety: Common Tannery Machinery (e.g., fleshing, sammying), Safe Operating Procedures, Maintenance, and Inspection Practices.

Ergonomics and Workplace Design: Ergonomic Risk Factors, Manual Handling and Repetitive Work Injuries, Lifting Techniques, Workstation Optimization.

Fire and Electrical Safety: Fire Hazards and Prevention Systems, Safe Electrical Installations, Emergency Evacuation Planning.

Personal Protective Equipment (PPE): Importance and Types of PPE, Risk-Based Selection (Low/Medium/High), Proper Usage, Maintenance, Replacement.

Emergency Preparedness and First Aid: Common Tannery Accidents, First Aid for Burns, Cuts, Gas Exposure (H_2S, Ammonia), Volatile Organic Compound (VOC), Emergency Response Planning.

Safety Management and Culture Development: Components of OSH Management Systems, Safety Committees, Incident Reporting and Analysis, Continuous Improvement through Audits and PDCA Cycle.

ACC-CSLS-05: Environmental Pollutions and Sustainability

Course Duration: 3 Months (2.0 credits)

Course Content

Introduction to Bangladesh's Leather Industry and Pollution Challenges: Economic contribution, employment, and major export markets (EU, USA, China), Historical environmental crisis: Hazaribagh tannery pollution and relocation to Savar Leather Industrial Estate.

Environmental Policies and Legislation: Bangladesh Environmental Conservation Act (1995, amended 2010), Department of Environment (DoE) effluent standards for tanneries (BOD, COD, TDS, sulfide, chromium limits), Hazardous Waste and E-Waste Management Rules, Biomedical waste management rules, responsibilities of generators, roles and responsibilities of pollution control boards.

Major Pollution Sources in Leather Processing: Water Pollution: Effluents from soaking, liming, tanning, and dyeing; impact on Buriganga River. Air Pollution: Ammonia and hydrogen

sulfide emissions and their health effects. Solid & Hazardous Waste: Chrome-tanned waste management; byproduct use like protein recovery from fleshings.

Sustainable Leather Production Techniques: Chrome recovery and recycling systems, Alternative tanning methods: Vegetable tanning, chrome-free tanning agents, Water conservation technologies: Waterless dyeing, low-water processing, Waste valorization: Biogas production from fleshings, Composting of tannery sludge, Recycling of trimming scraps into leather boards.

Environmental Compliances: Environmental laws, regulations, standards, Persistent Organic Pollutants (POPs) Environmental Compliance; Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) Environmental Compliance, Toxic Substances Control Act (TSCA) by Environmental Protection Agency (EPA).

ACC-CSLS-02: Occupational Health and Safety in Leather Sector Sessional

Course Duration: 3 Months (1.0 credits)

Course Content

1. Orientation & Safety Rules – tannery layout, safety signage, restricted areas.
2. PPE Practice – selection, usage, maintenance of gloves, masks, boots, goggles, etc.
3. Chemical Safety – safe storage, dilution, transfer, labeling, spill response.
4. Hazard Identification (HIRA) – walk-through, checklist, discussion of risks.
5. Machinery Safety – safe operation, guards, emergency stop, inspection.
6. Ergonomics – lifting techniques, posture, safe manual handling.
7. Fire & Electrical Safety – extinguisher use, fire drill, evacuation, electrical hazards.
8. First Aid & Emergency Response – cuts, burns, chemical splashes, CPR, eyewash.
9. Reporting & Safety Culture – mock incident report, group role-play on safe behavior.

ACC-CSLS-04: Environmental Pollutions and Sustainability Sessional

Course Duration: 3 Months (1.0 credits)

Course Content

1. Water Pollution Analysis – effluent sample collection, physicochemical property analysis (e.g. pH, TDS, COD/BOD).
2. Air Quality & Odor Monitoring – dust/particulate measurement, VOC observation.
3. Solid Waste & Sludge Handling – segregation, drying/weight analysis.
4. Resource Efficiency & Sustainability – 3R demo, small water/chemical saving experiment.
5. Reporting & Presentation – lab report preparation, group discussion on solutions.

ACC-CSLS-06: Industrial Attachment

Course Duration: 1 Week (1.0 credits)

Course Content

Orientation

- Observe plant layout, production flow, and safety provisions.
- Study organizational structure, roles, and communication practices.
- Review machinery types, functions, and operational efficiency.

Industrial Compliance

- Observe compliance records, wage documentation, and worker files.
- Participate in buyer audits (social, technical, environmental).
- Review Corrective Action Plans (CAPs), CSR, and supplier codes of conduct.

Occupational Health & Safety (OHS)

- Monitor PPE use, ergonomics, and machinery safety.
- Review accident reporting, emergency drills, and HIRA exercises.

Environmental Sustainability

- Visit ETPs and review effluent and sludge management.
- Observe wastewater testing and chrome recovery systems.
- Study waste valorization and water-saving initiatives.

Seminars & Reflection

- Prepare and present a report summarizing observations and recommendations.

Advanced Certificate Course on Automation and AI for Design

ACC-ALPD-01: Product Design and Pattern Making

Course Duration: 3 Months (2.0 credits)

Course Content

Product Development and Commercialization: Design, fashion, style and their current trend, fashion forecasting, the procedure of product development, motif analysis, value addition, research and inspiration, cultural value in design, collection, range building, DFE, DFM, development of sample and prototype.

Pattern Making of Goods: Concept of patterns, types, construction of wallet, purse, and ladies' bag, details working patterns for wallet, purse, and ladies' bag, CAD and pattern engineering, specification, and costing.

Pattern Making of Footwear: Concept of footwear patterns, last features, shoe sizes, design and generate patterns for fashionable sandals, standard and detail sectional pattern making for court shoes, casual shoes, moccasin shoes, sports shoes, and boots.

CAD/CAM: Introduction to CAD/CAM system, software, 2D and 3D scanners, plotter, concept on grading, types of grading, grading of standard, piece grading, pattern engineering, specification, consumption, and costing.

ACC-ALPD: Industrial Engineering and Automation

Course Duration: 3 Months (2.0 credits)

Course Content

Introduction to Industrial Engineering in Leather Sector: Overview of Industrial Engineering principles, Footwear & leather goods manufacturing processes overview, Organizational structures and production systems, Relevance and applications in footwear and leather products manufacturing, Role of industrial engineering in enhancing efficiency and productivity, Workflow Analysis and Optimization, Process mapping and workflow analysis, Methods of time and motion study specific to footwear and leather goods production, Productivity improvement techniques, and Ergonomics in cutting, stitching, lasting, and finishing operations.

Automation Technologies in Footwear and Leather Goods Manufacturing: Fundamentals of automation technologies, Types of automated machinery and equipment used in footwear and leather goods sector, Benefits and challenges of implementing automation, Automated

cutting machines (laser, die-less cutting, etc.), Nesting optimization, Automated sewing machines and lasting machine, Automated Material Handling Systems, and Automated conveyors in footwear and leather products factories.

AI, Internet of Things (IoT) and Industry 4.0 Applications: Basic concepts of AI, IoT and Industry 4.0., IoT solutions in inventory management, equipment maintenance, and quality assurance, Smart factories and real-time AI monitoring applications for footwear and leather goods manufacturing.

ACC- ALPD -05: Materials allowance and consumption analysis

Course Duration: 3 Months (2.0 credits)

Course Content

Introduction to Material Management in Leather Sector: History of industrial material management, Objectives and function of material management, Scope of material management, Integrated material management concept, Types of material, Inventory, ABC classification for materials; HML classification for materials; VED classification for materials; ABE-VED matrix analysis for materials; SED classification/analysis for materials; FSN classification/analysis for materials; Material codification, Methods of pricing of issues of materials.

Material Consumption Analysis: Basic concepts of consumption, Marking up method, Graphical method, Russ and Small method, Scale area calculation, Types of waste, Adjustment of size and fittings, Scientific leather measurement (SLM) system, and SATRA Summ method.

Material Waste Reduction Strategies: Design phase strategies, cutting direction, Area measurement, Leather grading and sorting, cutting value, Quality consideration for different parts of footwear and leather products, clicking techniques, Cutting allowance, and nesting of full grain, corrected grain, suede and nubuck leather, and synthetic and textile materials.

ACC-ALPD-02: Product Design and Pattern Making Sessional

Course Duration: 3 Months (1.0 credits)

Course Content

Practical session 1.

Design and produce patterns for leather goods by manual system.

Design and produce patterns for footwear by manual system.

Practical session 2.

Design and produce patterns for leather goods by CAD/CAM system.

Design and produce patterns for footwear by CAD/CAM system.

Practical session 3.

Practical project: Developing a prototype footwear or leather good based on candidate's own design.

ACC-ALPD-04: Industrial Engineering and Automation Sessional

Course Duration: 1 Week (1.0 credits)

Course Content

Orientation

- Observe plant layout, production flow, and safety provisions.
- Study organizational structure, roles, and communication practices.
- Review machinery types, functions, and operational efficiency.

Product Design and Development

- Exposure to product design and development processes.
- Study of manual vs. CAD/CAM pattern making practices in footwear and leather goods industry.
- Interaction with designers on costing, specification sheets, and commercialization.

Industrial Engineering and Automation

- Observation of workflow analysis, time & motion studies, and ergonomics in operations.
- Exposure to automated cutting (laser/die-less), nesting optimization, and automated sewing/lasting machines.
- Study of automated conveyors, material handling systems, and factory layouts.
- Participation in discussions on efficiency improvement and bottleneck analysis.
- Observation of AI-based defect detection tools and inventory management (if available).

Material Consumption and Waste Management

- Observation of leather and synthetic material grading, sorting, and measurement.
- Study of cutting allowance, nesting techniques, and waste minimization.
- Practical demonstration of waste reduction strategies in design and production.

Seminars & Reflection

- Prepare and present a report summarizing observations and recommendations.

ACC-ALPD-06: Industrial Attachment

Course Duration: 1 Week (1.0 credits)

Course Content

Orientation

- Observe plant layout, production flow, and safety provisions.
- Study organizational structure, roles, and communication practices.
- Review machinery types, functions, and operational efficiency.

Product Design & Pattern Making

- Observe manual and CAD/CAM-based pattern making for leather goods and footwear.
- Participate in prototype development and workflow analysis.

Industrial Engineering & Automation

- Monitor automated cutting, sewing, lasting machines, and material handling.
- Participate in workflow optimization and troubleshooting exercises.
- Assist in data collection and analysis for inventory and quality monitoring.

Material Management

- Study material handling, consumption analysis, and waste reduction techniques.
- Evaluate leather and synthetic material usage and nesting optimization.

Seminars & Reflection

- Prepare and present a report summarizing observations and recommendations.

Advanced Certificate Course on Lean Manufacturing and Quality assurance

ACC-LMQA-01: Productivity Improvement and Lean Manufacturing

Course Duration: 3 Months (2.0 credits)

Course Content

Productivity:

Introduction to Productivity: Concept and Importance of productivity, Difference between Production and Productivity, Tools of productivity improvement (5S, TQM, LEAN Operations, KPIs), Reasons for low productivity, Productivity improvements and its benefits, causes of low productivity and techniques of their elimination, Factors affecting productivity, technical methods to improve productivity, Main contributors to productivity improvement, Benefits of increased productivity.

Method Study: Definition, Concept, Objectives and Procedure of method study, Process chart symbols, recording techniques like Flow process charts, Operation, Flow and Two-handed Process charts, Flow diagram, String diagram, Multiple Activity chart, Operation Analysis, Analysis of motion, Motion economy, Design of work place layout.

Work Measurement: Definition, Concept and Objectives of work measurement, Stop watch procedure for collecting time study data, Time estimating techniques like analytical estimating, Predetermine Motion Time System-PMTS, Elemental Motion Time System, Basic Motion Time System, Method Time Measurement, Work factor.

Lean Manufacturing:

Introduction to Lean Manufacturing: Introduction to lean, History of Lean & Toyoda Production System, 7 Wastes & Techniques to eliminate wastes.

Lead Time Management: Time based competition, time-based process mapping, logistics pipeline management. Lean thinking, Lean operations, Push-pull production concepts, KANBAN, Kaizen, Toyota approach, seven elements of JIT system for planning and control.

Workplace Improvement: Keys to Workplace Improvement, Improvement of Material Flow by Right Plant Layouts, Material Flow and Design of Cellular Layouts.

ACC-LMQA-03: Total Quality Management (TQM)

Course Duration: 3 Months (2.0 credits)

Course Content

Introduction to TQM: Principles and philosophy of TQM, Product & process quality planning, Quality information, feedback, and service quality, quality manuals and system management, techniques of quality engineering, quality objectives and quality planning, deviation of quality requirements, analysis of products reliability and life-cycle, analysis of safety.

Statistical Quality Control: Control and measurement of quality; Elementary SPC tools: Control charts, process capability analysis, design of experiments; acceptance sampling plans: OC curves, single and double sampling plane, rectifying inspection, AOQ.

TQM Tools and Techniques: Deming's principles on quality, TQM Tools and Techniques: The seven traditional tools of quality, new management tools, Six-sigma: Concepts, methodology, applications in Leather industries; benchmarking, benchmarking processes, FMEA, etc.

Quality Management Systems: Need for ISO 9000:2015 (Quality Management System), elements, documentation, quality auditing concepts, requirements and benefits, quality council, leadership, employee involvement, motivation, empowerment, team and teamwork, recognition and reward.

ACC-LMQA-05: Testing of Leather and Allied Materials

Course Duration: 3 Months (2.0 credits)

Course Content

Introduction: Introduction, prevalent thumb tests, determination of sample size, selection of a sampling location, sampling positions for full hide and skins, bends or butts.

Physical Tests of leather: Tensile strength and percentage of elongation at break, stitch tearing strength, influencing factors of strength property, tongue tearing strength, simple tearing strength, Baumann tearing strength, buckle tear strength, split tear strength, distension and strength of grain by the ball burst test, relationship between different strength, Flexing endurance test, vamp flexing, water-vapor permeability test, dynamic water proof ness test, scuffing and abrasive resistance, absorption of water, water penetration, perspiration resistance of leather, leather softness, fogging tendency of leather.

Tests for finish film: Introduction, bond strength between the leather surface and the finish film, heat resistance of finish film, cold crack resistance, light fastness of finish film, wet and dry colour rub fastness, etc.

Tests for insole & sole leather: Flexing test-SATRA BATA belt flexing test, Ross flex, Bennewart flex, adhesion test, adhesion test, abrasion resistance, absorption of water, resistance to cracking of grain crack index, flexing index of insole.

Quality Assessment of Special Leather: Safety hand gloves leather, garments leather, upholstery leather, shoe upper leather, lining leather, luggage leather, belt leather.

ACC-LMQA-02: Lean Manufacturing Sessional

Course Duration: 3 Months (1.0 credits)

Course Content

Practical Session 1: Productivity Improvement

1. Apply knowledge on production and productivity
2. Identify productivity improvement techniques
3. Perform work/time study and use productivity improvement tools.

Practical Session 2: Kaizen and Continuous improvement

1. Mini-KAIZEN Event Simulation- Simulate a small process improvement activity and measure its impact
2. Root Cause Analysis- Use 5 Whys and Fishbone Diagram to identify the root cause of a problem.

Practical Session 3: Kanban system and Poka-yoke

1. Design of a KANBAN Board- Create a physical or digital board to visualize work-in-progress.
2. KANBAN Card Simulation and KANBAN Loop calculation- Use cards to manage flow in a simulated pull production system and calculate the optimal number of KANBAN cards based on system parameters

Practical Session 4: Poka-yoke

1. Hands-on sessions with poka-yoke systems and Poka-yoke validation test.

Practical project: Combine KAIZEN, KANBAN, and Poka-Yoke tools in a comprehensive simulation or real-world improvement scenario in a simulated leather product manufacturing environment.

ACC-LMQA-04: Testing of Leather and Allied Materials Sessional

Course Duration: 3 Months (1.0 credits)

Course Content

1. Determination of various strength properties of leather
2. Determination of comfort properties of leather.
3. Test for sole and insole leather.

ACC-LMQA-06: Industrial Attachment

Course Duration: 1 Week (1.0 credits)

Course Content

Orientation

- Observe plant layout, production flow, and safety provisions.
- Study organizational structure, roles, and communication practices.
- Review machinery types, functions, and operational efficiency.

Productivity and Lean Practices

- Observation of production vs productivity indicators (KPIs).
- Participation in 5S workplace observation (sorting, organizing, cleaning, standardizing, sustaining).
- Explore the method study and work measurement (if available).
- Identification of bottlenecks and waste.

Total Quality Management (TQM) Applications

- Visit to Quality Control Department: inspection, quality records, and feedback systems.
- Study of SPC tools in practice– control charts, sampling, and acceptance criteria (if available).
- Review of ISO 9001:2015 (QMS) documents and quality auditing practices (if available).

Leather and Materials Testing

- Visit to Quality Testing Laboratory (if available).
- Observe physical tests of leather: tensile strength, tear strength, flexing endurance, water absorption, scuff resistance, etc.
- Testing of insole/sole leather: flexing, adhesion, abrasion resistance, etc.

Seminars & Reflection

- Prepare and present a report summarizing observations and recommendations.