

SCHEME OF STUDIES
DIPLOMA IN LEATHER & FASHION TECHNOLOGY
(C-20)

V SEMESTER

V Semester Scheme of Studies - Diploma in Leather and Fashion Technology [C-20]

Pathway	Course Category / Teaching Department	Course Code	Pathway Title	Hours per Semester			Total contact hrs /Semester	Credits	CIE Marks		SEE-1 Marks (Theory)		SEE-2 Mark (Practical)		Total Marks	Min Marks for Passing (including CIE marks)	Assigned Grade	Grade Point	SGPA and CGPA
				L	T	P			Max	Min	Max	Min	Max	Min					
Programme Specialization Pathway																			
1	ES/ LT Specialization pathways in emerging areas Student may select any one of the specializations	20LT51I	Leather Manufacturing & Technology	104	52	312	468	24	240	96	60	24	100	40	400	160			
		20LT52I	Advanced Footwear Technology	104	52	312	468	24	240	96	60	24	100	40	400	160			
		20LT53I	Leather & Non-leather Apparel & Accessories Technology	104	52	312	468	24	240	96	60	24	100	40	400	160			
		20LT54I	Testing of Leather & Non Leather Materials	104	52	312	468	24	240	96	60	24	100	40	400	160			
Science and Research Pathway				L	T	P	Total	Credit	CIE Marks		SEE Marks								
									Max	Min	Max	Min							
2	BS/SC/LT Specialization pathway in Science and Research (Student need to take all four papers in this pathway)	20SC51T	Paper 1-Applied Mathematics	52	26	0	78	6	50	20	50	20	100	40					
		20SC52T	Paper 2 - Applied Science	52	0	52	104	6	50	20	50	20	100	40					
		20RM53T	Paper 3 - Research Methodology	52	0	52	104	6	50	20	50	20	100	40					
		20TW54P	Paper 4 - Technical Writing	39	13	52	104	6	60	24	40	16	100	40					
			Total	195	39	156	390	24	210	84	190	76	400	160					
Entrepreneurship Pathway																			
3	ES/LT	20ET51I	Entrepreneurship and Start up	104	52	312	468	24	240	96	160	64	400	160					

Both SGPA & CGPA

L:- Lecture T:- Tutorial P:- Practical BS- Basic Science:: ES-Engineering Science:: SC: Science , I: Integrated

**Note : In 5th Semester student need to select any one of the pathways consisting of 24 credits
Students can continue their higher education irrespective of the pathways selected**

CURRICULUM STRUCTURE

VI Semester Scheme of Studies - Diploma in Leather and Fashion Technology [C-20]

Pathway	Course Category / Teaching Department	Course Code	Pathway	Course		Total contact	Credits	CIE Marks		SEE Marks		Total Marks	Min Marks for Passing	Assigned Grade	Grade	SGPA and CGPA
								Max	Min	Max	Min					
Internship	ES/LT	20LT61S	Specialisation pathway	Internship/ project	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			
		20LT61R	Science and Research Pathway	Research project	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			
		20LT61E	Entrepreneurship and Start up pathway	Minimum Viable Product - MVP/ Incubation/ Startup proposal	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			

Note: Student shall undergo Internship/Project/research project/MVP/Incubation/Startup proposal in the same area as opted in 5th semester pathway



Government of Karnataka
DEPARTMENT OF COLLEGIATE and TECHNICAL EDUCATION

Program	Leather & Fashion Technology	Semester	V
Course Code	20LT51I	Type of Course	L:T:P (104: 52: 312)
Specialization	Leather Manufacturing & Technology	Credits	24
CIE Marks	240	SEE Marks	160

Introduction:

Welcome to the curriculum for the Specialisation Pathway - Leather Manufacturing & Technology. This specialisation course is taught in Bootcamp mode. Bootcamps are 12 weeks, intense learning sessions designed to prepare you for the practical world – ready for either industry or becoming an entrepreneur. You will be assisted through the course, with development-based assessments to enable progressive learning. In this course, you'll learn how to develop new leather article and exploit chemical industries in a range of manufacturing and industrial applications that are needed for today's job market.

Leading to the successful completion of this bootcamp, you shall be equipped to either do an internship in leather processing tanneries & leather chemical industries or do a new research project in the related field. After the completion of your Diploma, you shall be ready to take up roles like a Supervisor, sample developer, quality controller and can rise up to the level of Manager, also can become Entrepreneur in the related field and more.

Pre-requisite

Before the start of this specialisation course, you will have prerequisite knowledge gained in the first two years on the following subjects:

1st year -Engineering Mathematics, Communication Skills, Computer Aided Engineering Graphics, Statistics & Analytics, IT Skills, Fundamentals of Electrical and Electronics Engineering, Project Management Skills, Leather Chemistry and Basics of Leather.

2nd year- Tanning & Post Tanning Operations, Footwear Science & Technology – I, Elements of Fashion Illustration, Leather Goods & Garment Technology, Leather Finishing & Surface Upgradation Techniques, Footwear Science & Technology – II, Pattern Designing and Leather Biotechnology & Microbiology.

Instruction to course coordinator

1. Each Pathway is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. Single faculty shall be the Cohort Owner.
3. This course shall be delivered in boot camp mode
4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.

5. The cohort owner shall identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for industrial visits.
7. Cohort owner shall maintain and document the industrial assignments and weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom can augment or use for supplementally teaching on line courses available although reliable and good quality online platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademic, SWAYAM, etc.
10. Cohort owner shall guide the cohort for the execution of mini project

Course Outcomes: At the end of the Course, the student will be able to:

CO-01	Process the hides & skins with pre-tanning, tanning, post-tanning, finishing and mechanical operations successfully during the development of leather
CO-02	Develop the various kinds of leather by selecting suitable chemicals as per the properties required in the leather with knowledge of check points
CO-03	Apply the environmental concern associated with the leather processing and manage successfully the solid & liquid waste coming out of the tanneries
CO-04	Apply the eco-friendly leather processing methodologies
CO-05	Maintain the work area, tools and machines in hygiene condition with proper safety measures

Detailed course plan

Week	C O	P O	Days	1 st session (9am to 1 pm)	L	T	P	2 ND session (1.30pm to 4.30pm)	L	T	P
1	1	1	1	Present an overview on Leather industry & its significance starting from procurement of raw materials to finished product and delivery to the leather product industries			4	Present an overview on the opportunities of leather industries in India			3
	1		2	Present an Overview on various operations followed in the leather industries & its categorisation			4	Present an Overview on the support given to leather industry by central government under Make in India program			3
	1		3	Virtual tour on modern leather industries			4	Virtual tour on modern leather industries			3
	1		4	Overview on the possibilities to improve the leather industries efficiency from current situation			4	Overview on the limitations of the leather industries which we can't improve from current situation			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
2	1	1,3,4	1	PEER Discussion on Industry Assignment		4		Draw the anatomical structure & grain patterns of hides and skins with the importance of protein for the development of leather	1		2
	1		2	Demonstrate the meaning of preservation, Putrefaction of hides/ skins, effects of			4	Demonstrate the pre-tanning operations & their specific objectives			3

				bacteria and mould growth on raw hides and skins, curing followed in leather industry.						
	1		3	Explanation of conventional : Cr & Vegetable & non-conventional tanning methods & properties obtained by : Zirconium, Aluminium, Aldehyde & oil tanning	4			Demonstrate the sequential operations followed in chrome and vegetable tanning leather production.		3
	1		4	Explanation of Post-tanning operation: Neutralization as property development operation	4			Analysis of Neutralization operation by observing various kinds of leather		3
			5	Developmental Assessment				Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5					
3	1	1,3,4	1	PEER Discussion on Industry Assignment		4		Post tanning mechanical operations: Splitting & Shaving operations with their hands on working practices		3
	1		2	Explanation & demonstration of Post-tanning operations: Dyeing, Dyes & its properties	1		3	Demonstration of Post tanning mechanical operations: Sammying, Setting operations with their hands on working practices		3
	1		3	Explanation & demonstration of the effects of Retanning & Syntans on leather properties	1		3	Demonstration of Post tanning mechanical operations: Drying, Staking, Milling operations with their hands on working practices		3
	1		4	Explanation & demonstration of the effects of Fat-liquoring & Currying operation on leather properties	1		3	Demonstration of Post tanning mechanical operations: Toggling, Glazing operations with their hands on working practices		3
			5	CIE 1- Written and practice test				Assessment Review and corrective action		3

			6	Industry Class +Industry assessments	5					
4	1	1,3,4	1	PEER Discussion on Industry Assignment		4		Demonstration of leather finishing with its effect on the leather properties		3
	1		2	Explanation & the Finishing Components: Binder, Pigment, Plasticizer with demonstration of their properties development	1		3	Explanation & demonstration of Finishing Components: Lacquer Wax, finishing auxiliaries: Feel modifiers, slip, and matt agents, Preservatives.	1	2
	1		3	Explanation of Upgradation of leather & Patent finish with their demonstration	1		3	Demonstration of Post tanning mechanical operations: Embossing & Plating machine operations with their hands on working practices		3
	1		4	Demonstration of the application of Lamination technique, Transfer foil technique, Crush and Antique effect, Easy care and rub off finishes on the			4	Demonstration of Post tanning mechanical operations: Buffing machine operation with their hands on working practices		3
			5	Developmental Assessment				Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5					
5	2	1,3,4	1	PEER Discussion on Industry Assignment		4		Demonstration of the recipe of Manufacturing process of veg tan leather, Chrome tan leather		3
	2		2	Demonstration of Heavy Leather products, selection of suitable raw materials & required general properties			4	Demonstration of the recipe of Manufacturing process of Semi chrome tan leather, Chrome retan leather, Full chrome tan leather with their check points		3
	2		3	Demonstrate the Manufacturing process of Sole leathers with their check points			4	Demonstrate the manufacturing process of Luggage & Welting leather with their check points		3

	2		4	Explain the recipe of manufacturing process of Harness and Saddlary leather and demonstrate with their check points	1		3	Demonstrate manufacturing process Oil Seal Leathers with their check points			3
			5	CIE 2- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class	5						
6	2	1,3,4	1	PEER Discussion on Industry Assignment		4		Demonstrate the manufacturing process of Insoles with their check points			3
	2		2	Demonstrate the Manufacturing process of Belting leathers with their check points			4	Demonstrate the Manufacturing process of Sports Glove leathers with their check points			3
	2		3	Demonstrate manufacturing process of Cricket ball Leather with their check points			4	Demonstrate the manufacturing of process of Wicket Keeper Pads with their check points			3
	2		4	Demonstrate manufacturing process of Football Leather with their check points			4	Demonstrate manufacturing process of Hockey Ball Leather with their check points			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
7	2	1,3,4	1	PEER Discussion on Industry Assignment		4		Explanation of Light Leather, raw materials & required general properties	3		
	2		2	Explain the recipe of the Manufacturing process of softy leathers and demonstrate it with their check points	1		3	Demonstrate the Manufacturing process of softy leathers with their check points			3
	2		3	Demonstrate the Manufacturing process of milled leathers with their check points			4	Demonstrate the Manufacturing process of Shoe Nappa leathers			3

	2		4	Demonstrate the Manufacturing process of Garment Nappa leathers with their check points		4	Demonstrate the Manufacturing process of Upholstery leathers with their check points		3
			5	CIE 3- Written and practice test			Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5				
8	2	1,3,4	1	PEER Discussion on Industry Assignment		4	Demonstrate the Manufacturing process of Suede leather		3
	2		2	Demonstrate the Manufacturing process of Industrial Glove leather with their check points		4	Demonstrate the Manufacturing process of Fashionable Glove leather with their check points		3
	2		3	Demonstrate the Manufacturing process of Glazed kid with their check points		4	Demonstrate the Manufacturing process of Nubuck leather with their check points		3
	2		4	Demonstrate the manufacturing process of Burnishable leathers with their check points		4	Manufacturing process of Water proof leathers with their check points		3
			5	Developmental Assessment			Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5				
9	2	1,3,4	1	PEER Discussion on Industry Assignment		4	Demonstrate the Manufacturing process of Zug Grain leathers with their check points		3
	2	.	2	Demonstrate the Manufacturing process of Snake leathers with their check points		4	Demonstrate the Manufacturing process of Oil pull up leathers		3
	2		3	Explain the recipe of the Manufacturing process of crocodile leathers and demonstrate it with their check points	1	3	Demonstrate the Manufacturing process of fish leather with their check points		3

	2		4	Demonstrate the Fur technology and dressing of fur skins (rabbit) with their check points		4	Demonstrate the manufacturing process of hair on tanning with their check points			3
			5	CIE 4- Written and practice test			Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5					
10	3	1,3,5	1	PEER Discussion on Industry Assignment		4	Explanation of Environment, Ecosystem, Biodiversity of Ecosystem, Water Characteristics: DO, BOD, COD, etc. Pollution, Types of pollution	3		
	3		2	Explain the implications of Leather Industries on Environment, Sources of generation of Liquid & Solid wastes in Tanneries with demonstration	1	3	Explain the need of B.I.S. specification for discharge of treated effluent & its Parameters, Recovery & Reuse of water in tannery - Waste water drainage & Collection Systems in Tanneries with demonstration	1		2
	3		3	Explanation of Waste water Management System : ETP/CETP, Treatment of Waste water methodologies : Pretreatment, Primary Treatment, Secondary Treatment with demonstration	1	3	Explanation of Bio-energy Production from Solid Waste - Sludge Disposal with demonstration Explain the Importance of minimization of Chemical & Water Consumption in Leather Processing - Chrome Recovery & Reuse Technique with their demonstration			3
	3		4	Explain the need to convert into By-products from tannery solid wastes - Types, End-Products & Uses with demonstration	1	3	Explain the Leather Board - Pet Treats/ Dog Chews - Glue/Gelatin as By-product obtained from tannery solid waste with demonstration	1		2
			5	Developmental Assessment			Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5					

11	4	1,3,4, 5,7	1	PEER Discussion on Industry Assignment		4	Explain the Cleaner Technology: Less Salt & Salt-less Curing Techniques – Sulphide free Unhairing systems with demonstration	1	2
	4		2	Explain the Ammonia free Deliming systems – Salt free pickling system - Solvent free Ecofriendly Degreasing system and Demonstrate them	2	2	Explain Eco-friendly Tanning Systems: High Exhaustion Cr-tanning - Less Cr/ Cr-free Tanning - Organic Tannages, Alternative Mineral Tanning Systems wnd demonstrate them	1	2
	4		3	Explain the need of Pollution free Dyeing, Safer dye materials uses with its demonstration	2	2	Demonstration of Cleaner Finishing Techniques: Process Control & Optimization of use of Chemicals / Auxiliaries for pollution reduction, Safer Pigments -Reduction of Formaldehyde		3
	4		4	Demonstration of Eco-friendly Finishing practices, Autospray	1	3	Demonstration of the side effects of preservatives & Limitations of use of preservatives		3
			5	CIE 5- Written and practice test			Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5				
12	5	1,5,7	1	PEER Discussion on Industry Assignment		4	Explain the Safety philosophy, hazard identification and its demonstration	1	2
	5		2	Explain the role of industrial hygiene, Hazard classification (hazard categories and groups) with demonstration	1	3	Explain the Safety hazards of machinery, machine tools and electrical installations: Hazard prevention and safeguarding of machinery (guards, machine controls, ergonomics) with demonstration	1	2
	5		3	Explain the chemical and biological hazards in the work place with its Health effects in the leather industry (material safety data sheets, labelling), hazard prevention and control measures (storage, handling and	1	3	Explain the role of preventive maintenance; Safe workstation design and layout, Manual handling of material;	1	2

			disposal) in the leather industry with demonstration				Lighting (standards, use of natural and artificial illumination) with demonstration			
	5		4	Explain the Noise management (standards, prevention and protection); Safety of factory premises and installations (railings, flooring, safe structures) with demonstration	1		3	Explanation of Welfare measures; Personal protection and hygiene with demonstration	1	2
	5		5	Developmental Assessment Explain the planning of emergencies; Control of fire and explosion; Dealing with medical emergencies with demonstration	1		3	Review of developmental assessment Promoting safety and health practices at the workplace (training, safety and warning signs); Roles and responsibilities as an individual in the tanneries with demonstration		3
			6	Industry Class + Industry assessments	5					
13	1,5	1,6	1	PEER Discussion on Industry Assignment		4		Mini Project Design a recipe, process the hides/skins & develop a leather sample with a specific set of properties		3
			2	Mini Project Design a recipe, process the hides/skins & develop a leather sample with a specific set of properties			4	Mini Project Design a recipe, process the hides/skins & develop a leather sample with a specific set of properties		3
			3	Mini Project Design a recipe, process the hides/skins & develop a leather sample with a specific set of properties			4	Mini Project Design a recipe, process the hides/skins & develop a leather sample with a specific set of properties		3
			4	Mini Project			4	Mini Project		3

			Design a recipe, process the hides/skins & develop a leather sample with a specific set of properties				Design a recipe, process the hides/skins & develop a leather sample with a specific set of properties			
		5	Presentation & Discussion on the Mini Project performed during the week		4		Presentation & Discussion on the Mini Project performed during the week			
		6	Presentation & Discussion on the Mini Project performed during the week							

CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

* The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE

Note: Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam – 4 hours

Programme	Leather & Fashion Technology	Semester	V		
Course	Leather Manufacturing & Technology	Max Marks	30		
Course Code	20LT51I	Duration	4 hours		
Name of the course coordinator					
Note: Answer one full question from each section.					
Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) - 10 marks					
1.a)	Draw the anatomical structure & grain patterns of hides and skins with the demonstration of importance of protein for the development of leather.	L3	1	1,3,4	5
b)	Explain the liming operation and analyse the effect caused due to liming operation for the development of leather	L4	1	1,3,4	5
2.a)	Draw the grain pattern of various hides/skins and demonstrate the properties obtained after converted into leather.	L3	1	1,3,4	5
b)	Explain the uses of syntans and analyse the effects caused to leather due to syntans uses.	L4	1	1,3,4	5
Section-2 (Practical) - 20 marks					
3)	Demonstrate the functioning of Shaving machine operation with their hands on working practice.	L3	1	1,3,4	20
4)	Demonstrate the functioning of Sammying cum Setting machine operation with their hands on working practice.	L3	1	1,3,4	20

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme :	Leather & Fashion Technology	Semester :	V	
Course :	Leather Manufacturing & Technology	Max Marks :	100	
Course Code :	20LT51I	Duration :	3 Hrs	
Instruction to the Candidate: Answer one full question from each section.				
Q.No	Question	CL	CO	Marks
Section-1				
1.a)	Draw the anatomical structure & grain patterns of hides and skins with the demonstration of importance of protein for the development of leather.	L3	1	10
b)	Explain the liming operation and analyse the effect caused due to liming operation for the development of leather,	L4		10
2.a)	Draw the grain pattern of various hides/skins and demonstrate the properties obtained after converted into leather.	L3		10
b)	Explain the uses of syntans and analyse the effects caused to leather due to syntans uses.	L4		10
Section-2				
3.	Demonstrate the manufacturing process of Luggage & Welting leather with their check points	L3	2	20
4.	Demonstrate the Manufacturing process of Nubuck leather with their check points.	L3		20
Section- 3				
5.	Analyze the need of B.I.S. specification for discharge of treated effluent and tabulate the Parameters required for discharge of waste water after treatment.	L4	3	20
6.	Analyze the various sections of an ETP with their waste water treatment of methodologies like Pretreatment, Primary Treatment and Secondary Treatment.	L4		20
Section-4				
7.a)	Demonstrate the Salt-less Curing Techniques followed in leather processing.	L3	4	10
b)	Analyze the effect of Sulphide free Unhairing systems.	L4		10
8.a)	Demonstrate the High Exhaustion Cr-tanning - Less Cr/ Cr-free Tanning methodologies followed in leather industries.	L3		10
b)	Analyze the side effects of preservatives used in leather industries.	L4		10
Section-5				
9.a)	Demonstrate the measures taken for the personal protection in the leather industries.	L3	5	10
b)	Analyze the safe workstation design and layout planning of leather industries	L4		10

10.a)	Demonstrate the noise management techniques followed in the leather industries.	L3	10
b)	Analyze the role of industrial hygiene and its effect in productivity of leather industries.	L4	10

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Case submission	20
2	Case presentation	20
3	Case innovation	20
4	Result	20
5	Viva voce	20
Total		100

Case Submission / Content Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Identification of the main issues / problem	Identifies and understands all the main issues in the problem statement	Identifies and understands most of the main issues in the problem statement	Identifies and understands some of the issues in the problem statement	Identifies and understands a few of the issues in the problem statement	Identifies limited issues in the problem statement	5
Analysis of the issues	Insightful and thorough analysis of all the issues	Thorough analysis of most of the issues	Superficial analysis of some of the issues in the problem statement	Incomplete analysis of the issues	No analysis of the issue	4
Comments on effective solutions / strategies (The solution may be in the problem statement already or proposed by you)	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues in the problem statement	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues in the problem statement	Superficial and / or inappropriate solutions to some of the issues in the problem statement	Little and/or inappropriate solutions to all of the issues in the problem statement	No action to all issues in the problem statement	2
Links to course learning and additional research	Excellent research into the issues with clearly documented links to course learnings beyond.	Good research and documented links to the materials read during the course	Limited research and documented links to any readings	Incomplete research and links to any reading.	No research or links to any reading	3
Total						14/20

Case Presentation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Delivery & Enthusiasm	Very clear and concise flow of ideas Demonstrates passionate interest in the topic and engagement with class / examiner	Clear flow of ideas Demonstrates interest in the topic and engagement with class / examiner	Most ideas flow but is lost at times Limited evidence of interest in and engagement with the topic	Hard to follow the flow of ideas Lack of enthusiasm and interest	No flow in the presentation Poor presentation skills	4
Visuals	Visuals augmented and extended comprehension of the issues in unique ways	Use of visuals related to the topic	Limited use of visuals loosely related to the topic	No use of visuals	Poor visuals used and some visuals are not easy to understand its relevance.	2
Staging	Uses stage effects such as props, sound effects, and speech modulation in a unique and dramatic manner that enhances the understanding of the issues in the problem statement.	Uses stage effects such as props, sound effects, and speech modulation in an effective manner to extend the understanding of the issues in the problem statement.	Limited use of stage effects and/or used in a manner that did not enhance the understanding of the issues in the problem statement.	No use of stage effects	Poor stage effects usage	5

Involvement of the class / Examiners <ul style="list-style-type: none"> • Questions • Discussions • Activities 	Excellent and salient discussion points that elucidated material to develop a deep understanding Appropriate and imaginative activities used to extend understanding in a creative manner	Questions and discussions addressed important information that developed understanding Appropriate activities used to clarify understanding	Questions and discussions addressed important superficial issues of the problem Limited use of activities to clarify understanding	Little or no attempt to engage the class / examiner in demonstrating their learning	Did not engage the class / examiner and poor listening skills	1
Total						12/20

Case Results Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Problem outcome	The topic was well researched and all information and data included are accurate and from reliable sources of information like high impact journals standards, etc. The proof was enough backed up with accurate data, analysis and reasoning beyond the class learning. Outcome achieved beyond the problem brief	The topic was researched and most information and data were from reliable sources of information. The proof was backed up with good data and reasoning as taught in the class. Outcome achieved as per the problem brief	The topic was researched but information and data were only partly from reliable sources of information. The proof was not fully backed up with good data or reasoning as taught in the class. Partial outcome achieved as per the problem brief	The topic was researched and data were not from reliable sources. The proof was not backed up with data, analysis or reasoning as taught in the class. Some outcome obtained as per the problem brief	Desired results not obtained, but some relevant research was done. Outcome not obtained as per the problem brief	4
Application of class learning in problem solving	Made effective use of class principles, models and theories. Also used creativity to find effective results appropriate to industry beyond class learning.	Made good use of class principles, models and theories Some creative ideas were explored to find desired outcome but within the framework of class learning	Made some use of class principles, models and theories No creative ideas or models explored	Made limited use of class principles, models and theories	Poorly applied class principals, models and theories	3
Response to Class /	Queries Excellent response to	Good response to questions and	Satisfactory response to questions and	Limited response to questions and	Poor or no response to	2

Examiners Queries	comments and discussion with appropriate content supported by theory/research	discussions with some connection made to theory/research	discussions with limited reference to theory/research	discussions with no reference to theory/research	questions and did not participate in the discussions.	
Conclusions	Provides detailed and appropriate conclusion for the problem statement	Provides appropriate conclusion for the problem statement	Provides adequate and mostly appropriate conclusions for the problem statement	Provides limited and somewhat appropriate conclusions for the problem statement	Has not provided appropriate conclusions for the problem statement.	4
Total						13/20

Case Innovation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Finding new processes / models / approaches	The newly discovered processes / models / approaches are of good quality and relevant	The newly discovered processes / models / approaches are of appropriate quality but limited relevance	The newly discovered processes / models / approaches have limited application but relevant to the problem	The newly discovered processes / models / approaches has restricted application	No new processes / models / approaches were identified	5
Proposing ideas and innovative solutions in terms of processes / models / approaches and how they can be applied to solve the problem on hand	Various ideas and innovative solutions have been proposed and their application have been clearly outlined	Various ideas and innovative solutions have been proposed as well as the outline of the process to apply them	Some ideas or innovative solutions have been proposed but the process of applying them hasn't been specified	Few ideas have been proposed	No ideas or innovative solutions have been proposed	3
Using creativity techniques to provide and reason good ideas which are original and unconventional	Wherever necessary creativity techniques are utilized to analyse and solve the problem	Creativity techniques are frequently utilized in more than 50% of the occasions	Creativity techniques are utilized at times in less than 50% of the occasions	Creativity techniques are used a few times only	Creativity technique are not utilized to analyse and solve the problem	2
Finding constraints and weak points in existing processes / models / approaches or methods	Constraints and weak points are understood	Constraints and weak are identified	A critical analysis is undertaken	Only a description of the working process and methods are provided	No constraints or weak points have been identified.	3
Total						13/20

Reference:

- 1) Theory and practice of Leather manufacture –K.T. Sarkar.
- 2) S.S. Dutta, (1980), Introduction to the Principle of leather Manufacture”, Kolkata. - Indian Leather Technologist Association
- 3) Leather Technicians Hand Book - J.H.Sharphouse
- 4) The manufacture of Upper Leathers, Tropical Product Institute, London-D.H.Tuck
- 5) A Practical guide to heavy leather processing - Fuel & Leather research Institute (1980) – ChoichiOgiwara.
- 6) Practical aspects of the manufacture of Upper leather – Indian Leathers Technologists Association (ILTA, 1980) – JyotirmayDey.
- 7) TSK Mahadevan, (2001), “A manual on practical leather processing”, Chennai, Indian Leather Publication.
- 8) Gloving, Clothing & Special Leathers- Tropical Products Institute, London(1981)-P.S.Briggs
- 9) Richard Daniels, (2003), “Back to Basics Leather Manufacture”, Northampton – World Leather.
- 10)The Chemistry & Technology of Leather – Vol.-III – O. Flaherty, William Roddy, T. Robert, M. Lollar. – E.Robert Krieger Publishing Company, Newyork.
- 11) Pigment Hand Book – Vol. -III – ed. W.J.Newyork, 1973
- 12) Pigments- An Introduction to Theory of Physical Chemistry – P. Patterson – Elsevier Publishing Company Ltd. Amseterdam. 1967.
- 13) The manufacture of Upper Leathers, Tropical Product Institute, London- D.H. Tuck
- 14) Process & Utilization of Animal By-products ---- I. Mann.
- 15) Hand book of Glue & Gelatin ----Dr. S. Divakaran.
- 16) Animal By-products -Their processing & utilization –Scaria K.J, Mahindra Kumar &Divakar,
- 17) Animal Wastes ----Taiganides E.P.
- 18) Handbook of rural technology for processing of animal by-products -- Mahindra Kumar.
- 19) Thomas C. Thortensen --- Fundamentals of Pollution control for leather industry.
- 20) Kothari’s desk Book Series ---Dr. S. Sadulla. Kothari Group Publication, Chennai.
- 21) Waste Water Engg. ---Metcalf & Eddy.
- 22) Chemistry of Environmental Engineering – Sawyer C.M., Maccarty.P.L, 3rd edition McGraw hill publications
- 23) Tanneries and the environment – A technical guide1991 – UNIDO & UNDP
- 24)Proceedings of workshop on Cleaner Production Technology – UNIDO- Chennai 1998
- 25)Proceedings of workshop on Cleaner Production Technology- CLRI - Chennai 1998
- 26)Environmental Engineering (English, Paperback, MP Poonia, S.C. Sharma)

Required Facilities

Laboratory facilities

1. Leather Processing Workshop
2. Post-tanning Mechanical Operations Workshop
3. Leather Finishing workshop

Research institute & Industrial facilities

1. CSIR-Central Leather Research Institute(CLRI), Adyar, Chennai - 600 020
2. Bhartiya international, 27/2, Bannerghatta Main Rd, Himagiri Meadows, Gottigere, Bengaluru, Karnataka 560083.
3. Stanley Lifestyles, Sy No. 16/2 and 16/3 Veerasandra, Opposite Electronic City Toll Plaza, Bengaluru, Karnataka 560068
4. Footwear Design & development Institute (FDDI) International Testing Centre (ITC), Chennai
5. Paragon Polymers Products, No.489, Ground Floor, 14th Cross, 4th Phase, Peenya Industrial Area, Bangalore - 560058
6. Sara Suole Private Limited, Sy No.192/1/2/3 CKPalya Sakalwara Post CKPalya Sakalwara, Post, Bengaluru, Karnataka 560083
7. VBL Innovations Private Limited, 5th Main Rd, Phase 3, Peenya, Bengaluru, Karnataka 560058
8. SGS India Private Limited, Ambattur Industrial Estate, Chennai, Tamil Nadu 600058
9. Tata International Limited, 58 and 59, Pudhuper Village Nandambakkam Post, Kundrathur, Chennai, Tamil Nadu 600069
10. Aquarrelle India Pvt. Limited, Address. 6. 93/25/1 & 24/2, Kempanayakanahalli, Bannerghatta Dhakle, Jigani Hobli
11. Bata India Limited, No.117/1, Peenya 2nd Stage, Bangalore - 560058, Near Bus Stop Circle
12. Deccapel Fashions Pvt. Ltd., 306-B, 5th Main Rd, Ganapathy Nagar, Peenya Industrial Area Phase IV, Peenya, Bengaluru, Karnataka 560058
13. Sona Leathers, N S Palya, No-6, 5th Cross, Bannerghatta Main Rd, Industrial Area, Stage 2, BTM Layout, Bengaluru, Karnataka 560076
14. Namaste Exports Limited, 21/2, Vittalnagar, Chamrajapet, Bengaluru, Karnataka 560018
15. Farida Prime Tannery (FPT), FPT Complex, Ambur 635 811,Vellore District, Tamil Nadu , India

List of software/Learning Websites:

1. <http://www.unido.org/fileadmin/import/userfiles/timminsk/leatherpanel14ctcwastes.pdf>
2. [http://nopr.niscair.res.in/bitstream/123456789/4856/1/JSIR%2065\(7\)%20541-548.pdf](http://nopr.niscair.res.in/bitstream/123456789/4856/1/JSIR%2065(7)%20541-548.pdf)
3. <http://italiaindia.com/images/uploads/pdf/leather-industry-in-india-2010.pdf>
4. <https://www.youtube.com/watch?v=dKllwyxPpWI>
5. <https://www.youtube.com/watch?v=1dYczsDQ300>
1. https://en.wikipedia.org/wiki/Wastewater_treatment
2. <http://www.waterworld.com/waste-ater/treatment.html>
3. <http://www.conserve-energy-future.com/process-of-wastewater-treatment.php>
4. <http://www.slideshare.net/anniesj/treatment-of-tannery-wastewater-susan>
5. http://www.authorstream.com/Presentation/anup4949-1383441-study-of-waste-water-5_discharged-from-tannery-3/
6. <https://leatherpanel.org/content/tannery-effluent-treatment-plants-india>
7. [https://leatherpanel.org/sites/default/files/publicationsattachments/introduction to treatment of tannery effluents.pdf](https://leatherpanel.org/sites/default/files/publicationsattachments/introduction_to_treatment_of_tannery_effluents.pdf)
10. <http://scialert.net/fulltext/?doi=jest.2011.1.17>
11. <http://www.scirp.org/journal/PaperInformation.aspx?paperID=69056>
12. <https://www.pdfdrive.com/ecology-and-environment-books.html>



Government of Karnataka

DEPARTMENT OF COLLEGIATE and TECHNICAL EDUCATION

Program	Leather & Fashion Technology	Semester	V
Course Code	20LT52I	Type of Course	L:T:P (104: 52: 312)
Specialization	Advanced Footwear Technology	Credits	24
CIE Marks	240	SEE Marks	160

Introduction:

Welcome to the curriculum for the Specialisation Pathway - Advanced Footwear Technology. This specialisation course is taught in Bootcamp mode. Bootcamps are 12 weeks, intense learning sessions designed to prepare you for the practical world – ready for either industry or becoming an entrepreneur. You will be assisted through the course, with development-based assessments to enable progressive learning. In this course, you'll learn how to design and develop various footwear and exploit footwear industries in a range of manufacturing and industrial applications that are needed for today's job market.

Leading to the successful completion of this bootcamp, you shall be equipped to either do an internship in footwear industries or do a new research project in the related field. After the completion of your Diploma, you shall be ready to take up roles like a Designer, Merchandiser, Supervisor, Sample Developer, Quality Inspector and can rise up to the level of Manager, also can become Entrepreneur in the related field and more.

Pre-requisite

Before the start of this specialisation course, you will have prerequisite knowledge gained in the first two years on the following subjects:

1st year -Engineering Mathematics, Communication Skills, Computer Aided Engineering Graphics, Statistics & Analytics, IT Skills, Fundamentals of Electrical and Electronics Engineering, Project Management Skills, Leather Chemistry and Basics of Leather.

2nd year- Tanning & Post Tanning Operations, Footwear Science & Technology – I, Elements of Fashion Illustration, Leather Goods & Garment Technology, Leather Finishing & Surface Upgradation Techniques, Footwear Science & Technology – II, Pattern Designing and Leather Biotechnology & Microbiology.

Instruction to course coordinator

1. Each Pathway is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. Single faculty shall be the Cohort Owner.
3. This course shall be delivered in boot camp mode
4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.

5. The cohort owner shall identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for industrial visits.
7. Cohort owner shall maintain and document the industrial assignments and weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom can augment or use for supplementally teaching on line courses available although reliable and good quality online platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademic, SWAYAM, etc.
10. Cohort owner shall guide the cohort for the execution of mini project

Course Outcomes: At the end of the Course, the student will be able to:

CO-01	Analyze the importance of anthropometric foot surveys & biomechanics of human foot in footwear manufacturing
CO-02	Design & develop footwear manually by identifying suitable materials & accessories.
CO-03	Design a footwear through CAD designing software
CO-04	Demonstrate the purpose, working principles & maintenance of various advanced footwear machineries
CO- 05	Design and fabricate customized footwear as per the requirement of the wearer

Detailed course plan

Week	C O	P O	Day s	1 st session (9am to 1 pm)	L	T	P	2 ND session (1.30pm to 4.30pm)	L	T	P
1	CO1	PO1, 3, 4	1	Present an overview on the manufacturing process of Leather & non-leather footwear industries			4	Present an overview on the market & clusters of Leather & non-leather footwear manufacturers			3
			2	Present an overview about the opportunities available in footwear industries.			4	Present an Overview of the current footwear industries and their needs			3
			3	Virtual tour on modern footwear industries			4	Virtual tour on modern footwear industries			3
			4	Introduction to foot anthropometry- Design of anthropometric foot surveys- data collection and statistical analysis of foot data, establishment of sizing system.	4			Explanation on various current footwear sizing system. Practice on conversion between the shoe sizing system.	2		1
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
2	CO2	PO1, 3,4	1	PEER Discussion on Industry Assignment		4		Explain about the design & development of footwear based on a theme/season/fashion.	3		
			2	Sketch any five style footwear. Mention the theme or inspiration for each design & sketch.			4	Sketch any five style footwear. Mention the theme or inspiration for each design & sketch.			3

			3	Practice on designing & pattern making of any one advanced style footwear.			4	Practice on designing & pattern making of any one advanced style footwear.			3
			4	Practice on designing & pattern making of any one advanced style footwear.			4	Practice on designing & pattern making of any one advanced style footwear.			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
3	CO2	PO1, 3,4	1	PEER Discussion on Industry Assignment		4		Prepare a specification sheet for the fabrication of developed advanced footwear design based on their patterns	1		2
			2	Exercise on calculation of material consumption/reduction of wastage using graph paper for developed advanced footwear design.	2		2	Practice on costing for the fabrication of developed advanced footwear design based on their patterns	1		2
			3	Practice on fabrication of developed footwear design.			4	Practice on fabrication of developed footwear design.			3
			4	Practice on fabrication of developed footwear design.			4	Practice on fabrication of developed footwear design.			3
			5	CIE 1- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
4	CO4	PO1, 4	1	PEER Discussion on Industry Assignment		4		Demonstrate and practice on working of various footwear machineries			3
			2	Demonstrate and practice on working of various footwear machineries			4	Demonstrate and practice on working of various footwear machineries			3
			3	Demonstrate and practice on working of various footwear machineries			4	Demonstrate and practice on working of various footwear machineries			3

			4	Demonstrate and practice on working of various footwear machineries		4	Demonstrate and practice on working of various footwear machineries			3
			5	Developmental Assessment			Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5					
5	CO3	PO1, 2,34	1	PEER Discussion on Industry Assignment		4	Shoe Last – Definition, Classification, Parts its Terminology Introduction to modelling of e-last through CAD software	1 2		
			2	Demonstrate the modelling of various e-last through CAD software.		4	Demonstrate the modelling of various e-last through CAD software.			3
			3	Demonstrate the modelling of various e-last through CAD software.		4	Demonstrate the modelling of various e-last through CAD software.			3
			4	Demonstrate the modelling of various e-last through CAD software.		4	Demonstrate the modelling of various e-last through CAD software.			3
			5	CIE 2- Written and practice test			Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5					
6	CO3	PO1, 2,34	1	PEER Discussion on Industry Assignment		4	Explanation about the various shoe CAD software available in market Explanation about the various hardware of shoe CAD system available in market	1 2		

			2	Practice on digitizing of various footwear standard through digitizer			4	Practice on digitizing of various footwear standard through digitizer			3
			3	Practice on digitizing of various footwear standard through digitizer			4	Practice on digitizing of various footwear standard through digitizer			3
			4	Practice on digitizing of various footwear standard through digitizer			4	Practice on digitizing of various footwear standard through digitizer			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
7	CO3	PO1, 2,34	1	PEER Discussion on Industry Assignment			4	Introduction to 2D shoe pattern designing through shoe CAD software	3		
			2	Explain about the various basic engineering techniques in Shoe CAD software	2			Practice on style line modification in shoe CAD software			3
				Explain the various menus of shoe CAD software	2						
			3	Practice on style line modification in shoe CAD software			4	Practice on style line modification in shoe CAD software			3
			4	Practice on pattern creation in shoe CAD software			4	Practice on pattern creation in shoe CAD software			3
			5	CIE 3- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						

8	C03	P01, 3,4	1	PEER Discussion on Industry Assignment		4	Practice on pattern engineering in shoe CAD software			3
			2	Practice on pattern engineering in shoe CAD software		4	Practice on pattern engineering in shoe CAD software			3
			3	Practice on pattern engineering in shoe CAD software		4	Practice on pattern engineering in shoe CAD software			3
			4	Practice on pattern engineering in shoe CAD software		4	Practice on pattern engineering in shoe CAD software			3
			5	Developmental Assessment			Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5					
9	C03	P01, 2,3,4	1	PEER Discussion on Industry Assignment		4	Explain about the grading of patterns - its principle	3		
			2	Introduction to grading of footwear patterns through shoe CAD software Practice on grading of various footwear patterns through shoe CAD software	2	2	Practice on grading of various footwear patterns through shoe CAD software			3
			3	Practice on grading of various footwear patterns through shoe CAD software		4	Practice on grading of various footwear patterns through shoe CAD software			3
			4	Explain about the nesting and its importance in leather footwear manufacturing	1		Demonstrate the cutting of footwear patterns after pattern designing through cutting machine/plotter			3

				Practice on nesting (laying of patterns with best interlocking system) of various footwear patterns through shoe CAD software			3			
			5	CIE 4 - Written and practice test				Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5					
10	CO3	PO1, 2,3,4	1	PEER Discussion on Industry Assignment		4		Practice on pattern designing of any one style footwear through shoe CAD software		3
			2	Practice on pattern designing of any one style footwear through shoe CAD software		4	Practice on pattern designing of any one style footwear through shoe CAD software		3	
			3	Introduction to 3D shoe designing through shoe CAD software Demonstrate the 3D designing tools of shoe CAD software system.	2		2	Demonstrate & practice on 3D shoe designing for any one footwear style		3
			4	Demonstrate & practice on 3D shoe designing for any one footwear style			4	Demonstrate & practice on 3D shoe designing for any one footwear style		3
			5	Developmental Assessment				Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5					
11	CO1, CO5	PO2, 5	1	PEER Discussion on Industry Assignment		4		Explain the Biomechanics of Human Foot - Biomechanics of walking &	3	

							running – Gait Analysis – Normal gait patterns, pressure distribution			
			2	Explain few Common foot abnormalities or disorder along with its causes and treatments.			4	Identify any one foot deformity. Design and develop an orthopaedic footwear for the same.		3
			3	Identify any one foot deformity. Design and develop an orthopaedic footwear for the same.			4	Identify any one foot deformity. Design and develop an orthopaedic footwear for the same.		3
			4	Identify any one foot deformity. Design and develop an orthopaedic footwear for the same.			4	Identify any one foot deformity. Design and develop an orthopaedic footwear for the same.		3
			5	CIE 5- Written and practice test				Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5					
12	C02	PO 3,4	1	PEER Discussion on Industry Assignment		4		Explain the General shoe engineering techniques for different types of sports	3	
			2	Demonstrate the manufacturing process of sports shoes.			4	Demonstrate the manufacturing process of sports shoes.		3
			3	Explain the General characteristic features of industrial or safety shoe	4			Demonstrate the manufacturing technology involved in the production of safety shoe.		3
			4	Demonstrate the manufacturing technology involved in the production of safety shoe.			4	Demonstrate the manufacturing technology involved in the production of safety shoe.		3
			5	Developmental Assessment				Assessment Review and corrective action		3

			6	Industry Class +Industry assessments	5						
13	C05	PO 3,4, 7	1	PEER Discussion on Industry Assignment		4		Mini Project : Identify any one foot abnormality. Design & develop your own orthopaedic footwear for that particular foot abnormality (OR) Design any one style footwear with the help of Shoe CAD software. Develop and submit the designed footwear.			3
			2	Mini Project : Identify any one foot abnormality. Design & develop your own orthopaedic footwear for that particular foot abnormality (OR) Design any one style footwear with the help of Shoe CAD software. Develop and submit the designed footwear.			4	Mini Project : Identify any one foot abnormality. Design & develop your own orthopaedic footwear for that particular foot abnormality (OR) Design any one style footwear with the help of Shoe CAD software. Develop and submit the designed footwear.			3
			3	Mini Project : Identify any one foot abnormality. Design & develop your own orthopaedic footwear for that particular foot abnormality (OR) Design any one style footwear with the help of Shoe CAD software. Develop and submit the designed footwear.			4	Mini Project : Identify any one foot abnormality. Design & develop your own orthopaedic footwear for that particular foot abnormality (OR) Design any one style footwear with the help of Shoe CAD software. Develop and submit the designed footwear.			3

			4	Mini Project : Identify any one foot abnormality. Design & develop your own orthopaedic footwear for that particular foot abnormality (OR) Design any one style footwear with the help of Shoe CAD software. Develop and submit the designed footwear.			4	Mini Project : Identify anyone foot abnormality. Design & develop your own orthopaedic footwear for that particular foot abnormality (OR) Design any one style footwear with the help of Shoe CAD software. Develop and submit the designed footwear.			3
			5	Presentation & Discussion on the Mini Project performed during the week		4	Presentation & Discussion on the Mini Project performed during the week				
			6	Presentation & Discussion on the Mini Project performed during the week			4				

CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

* The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE

Note: Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam – 4 hours

Programme	Leather & Fashion Technology	Semester	V		
Course	Advanced Footwear Technology	Max Marks	30		
Course Code	20LT52I	Duration	4 hours		
Name of the course coordinator					
Note: Answer one full question from each section.					
Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) - 10 marks					
1.a)	Demonstrate the gait analysis of human foot.	L3	1	2,5	5
b)	Calculate 42 French point in English Size	L4	2	3,4	5
2.a)	Write a note on grading of footwear patterns.	L3	3	1,3,4	5
b)	Analyse the working procedure of toe lasting machine with a neat sketch.	L4	4	1,4	5
Section-2 (Practical) - 20 marks					
3)	Demonstrate the pattern engineering for given footwear standard	L3	3	1,3,4	20
4)	Design and develop upper and lining pattern for ladies court shoe with the help of mean form	L4	5	1,3,4,5	20

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme : Leather & Fashion Technology			Semester : V	
Course : Advanced Footwear Technology			Max Marks : 100	
Course Code : 20LT52I			Duration : 3 Hrs	
Instruction to the Candidate: Answer one full question from each section.				
Q.No	Question	CL	CO	Marks
Section-1				
1.a)	Interpret the design of anthropometric foot surveys and establishment of foot sizing system	L3	1	10
b)	Calculate the following: i) 5 US/American size to French point ii) 42 French point to English Size	L4		10
2.a)	Illustrate the biomechanics of human foot in walking & running with diagrams	L3		10
b)	Analyse the common foot abnormalities & its remedial treatments	L4		10
Section-2				
3.a)	Demonstrate the manufacturing process of sports shoe & mention its general characteristic features with suitable diagram	L3	2	10
b)	Analyse the purpose of various components of footwear with a clean & neat sketch.	L4		10
4.a)	Write the general characteristics of safety shoe & its manufacturing process with suitable diagram	L3		10
b)	Prepare a list of tools used in footwear fabrication. Describe its purposes with neat sketches.	L4		10
Section-3				
5.a)	i) Interpret the common commands used in footwear CAD ii) Write a note on common shoe CAD software in the market.	L3	3	4 6
b)	Distinguish between digitizer and foot scanner with the help of neat sketches	L4		10
6.a)	Demonstrate the step by step procedure for 3D designing of footwear in CAD	L3		10
b)	Categorise the input and output hardware used in shoe CAD. Explain in brief with sketches.	L4		10
Section-4				
7.a)	Illustrate the purpose and working principle of back part moulding with neat and clean diagram.	L3	4	10
b)	Differentiate between roughing and pounding operations & its needs in footwear manufacturing.	L4		10
8.a)	Write the need and working procedure of side and seat lasting machine with suitable diagram,	L3		10
b)	Compare the various methods of conditioning of upper in detail.	L4		10
Section-5				

9.a)	Interpret the step by step procedure for preparing upper standard for monk style derby shoe.	L3	5	10
b)	Analyse the pressure distribution of human foot during walking with suitable diagram.	L4		10
10.a)	Write the step by step procedure for extraction of upper and lining components of ladies court shoe.	L3		10
b)	Appraise the general shoe engineering techniques for different types of sports in detail	L4		10

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Project submission	20
2	Project presentation	20
3	Project innovation	20
4	Result	20
5	Viva voce	20
Total		100

Project Submission / Content Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Identification of the main issues / problem	Identifies and understands all the main issues in the problem statement	Identifies and understands most of the main issues in the problem statement	Identifies and understands some of the issues in the problem statement	Identifies and understands a few of the issues in the problem statement	Identifies limited issues in the problem statement	5
Analysis of the issues	Insightful and thorough analysis of all the issues	Thorough analysis of most of the issues	Superficial analysis of some of the issues in the problem statement	Incomplete analysis of the issues	No analysis of the issue	4
Comments on effective solutions / strategies (The solution may be in the problem statement already or proposed by you)	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues in the problem statement	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues in the problem statement	Superficial and / or inappropriate solutions to some of the issues in the problem statement	Little and/or inappropriate solutions to all of the issues in the problem statement	No action to all issues in the problem statement	2
Links to course learning and additional research	Excellent research into the issues with clearly documented links to course learnings and beyond.	Good research and documented links to the materials read during the course	Limited research and documented links to any readings	Incomplete research and links to any reading.	No research or links to any reading	3

Total	14/20
--------------	--------------

Project Presentation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Delivery & Enthusiasm	Very clear and concise flow of ideas Demonstrates passionate interest in the topic and engagement with class / examiner	Clear flow of ideas Demonstrates interest in the topic and engagement with class / examiner	Most ideas flow but is lost at times Limited evidence of interest in and engagement with the topic	Hard to follow the flow of ideas Lack of enthusiasm and interest	No flow in the presentation Poor presentation skills	4
Visuals	Visuals augmented and extended comprehension of the issues in unique ways	Use of visuals related to the topic	Limited use of visuals loosely related to the topic	No use of visuals	Poor visuals used and some visuals are not easy to understand its relevance.	2
Staging	Uses stage effects such as props, sound effects, and speech modulation in a unique and dramatic manner that enhances the understanding of the issues in the problem statement.	Uses stage effects such as props, sound effects, and speech modulation in an effective manner to extend the understanding of the issues in the problem statement.	Limited use of stage effects and/or used in a manner that did not enhance the understanding of the issues in the problem statement.	No use of stage effects	Poor stage effects usage	5
Involvement of the class / Examiners • Questions • Discussions	Excellent and salient discussion points that elucidated material to develop a deep understanding Appropriate and	Questions and discussions addressed important information that developed	Questions and discussions addressed important superficial issues of the problem	Little or no attempt to engage the class / examiner in	Did not engage the class / examiner and poor listening skills	1

• Activities	imaginative activities used to extend understanding in a creative manner	understanding Appropriate activities used to clarify understanding	statement Limited use of activities to clarify understanding	demonstrating their learning		
Total						12/20

Project Results Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Problem outcome	The topic was well researched and all information and data included are accurate and from reliable sources of information like high impact journals standards, etc. The proof was enough backed up with accurate data, analysis and reasoning beyond the class learning. Outcome achieved beyond the problem brief	The topic was researched and most information and data were from reliable sources of information. The proof was backed up with good data and reasoning as taught in the class. Outcome achieved as per the problem brief	The topic was researched but information and data were only partly from reliable sources of information. The proof was not fully backed up with good data or reasoning as taught in the class. Partial outcome achieved as per the problem brief	The topic was researched and data were not from reliable sources. The proof was not backed up with data, analysis or reasoning as taught in the class. Some outcome obtained as per the problem brief	Desired results not obtained, but some relevant research was done. Outcome not obtained as per the problem brief	4
Application of class learning in problem solving	Made effective use of class principles, models and theories. Also used creativity to find effective results appropriate to industry beyond class learning.	Made good use of class principles, models and theories. Some creative ideas were explored to find desired outcome but within the framework of class learning	Made some use of class principles, models and theories. No creative ideas or models explored	Made limited use of class principles, models and theories	Poorly applied class principals, models and theories	3
Response to Class /	Queries Excellent response to comments	Good response to questions and	Satisfactory response to questions and	Limited response to questions and	Poor or no response to	2

Examiners Queries	and discussion with appropriate content supported by theory/research	discussions with some connection made to theory/research	discussions with limited reference to theory/research	discussions with no reference to theory/research	questions and did not participate in the discussions.	
Conclusions	Provides detailed and appropriate conclusion for the problem statement	Provides appropriate conclusion for the problem statement	Provides adequate and mostly appropriate conclusions for the problem statement	Provides limited and somewhat appropriate conclusions for the problem statement	Has not provided appropriate conclusions for the problem statement.	4
Total						13/20

Project Innovation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Finding new processes / models / approaches	The newly discovered processes / models / approaches are of good quality and relevant	The newly discovered processes / models / approaches are of appropriate quality but limited relevance	The newly discovered processes / models / approaches have limited application but relevant to the problem	The newly discovered processes / models / approaches has restricted application	No new processes / models / approaches were identified	5
Proposing ideas and innovative solutions in terms of processes / models / approaches and how they can be applied to solve the problem on hand	Various ideas and innovative solutions have been proposed and their application have been clearly outlined	Various ideas and innovative solutions have been proposed as well as the outline of the process to apply them	Some ideas or innovative solutions have been proposed but the process of applying them hasn't been specified	Few ideas have been proposed	No ideas or innovative solutions have been proposed	3
Using creativity techniques to provide and reason good ideas which are original and unconventional	Wherever necessary creativity techniques are utilized to analyse and solve the problem	Creativity techniques are frequently utilized in more than 50% of the occasions	Creativity techniques are utilized at times in less than 50% of the occasions	Creativity techniques are used a few times only	Creativity technique are not utilized to analyse and solve the problem	2
Finding constraints and weak points in existing processes / models / approaches or methods	Constraints and weak points are understood	Constraints and weak are identified	A critical analysis is undertaken	Only a description of the working process and methods are provided	No constraints or weak points have been identified.	3
Total						13/20

Reference:

1. Comprehensive Footwear Technology- Somenath Ganguly
2. Introduction to modern Footwear Technology-B.Venkatappiah
3. Textbook of Footwear Manufacture – J. H. Thornton
4. Footwear Material and Process Technology- A. J. Harvey
5. Shoe material design guide - Wade Motawi
6. The Science of footwear technology - Ravindra S Goonetilleke
7. Footwear pattern making and last design - Wade Motawi
8. Footwear Design (Portfolio Skills) – Aki Choklat
9. Hand book of Footwear design and Manufacture - A. Luximon
10. Manual for 2D CAD pattern engineering – CLRI
11. Groover, M.P. and Zinimers, M.P., “CAD/CAM, Computer Aided Design and Manufacturing”, Prentice Hall of India, 1984.
12. “Step by Step guide to CAD for footwear”: CAD Centre, SDDC, CLRI.
13. Creative solutions for footwear design and patterns engineering: 2D and 3D perspective – CLRI
14. Gait analysis – An Introduction by Michael W. Whittle
15. Edwards, C.A., “Orthopaedic shoe technology”, Precision Printing Co., Indiana, 1964

Required Facilities:Laboratory facilities

1. Footwear Design lab
2. Footwear Cutting lab
3. Shoe Upper Closing lab
4. Footwear Fabrication Lab
5. Footwear CAD lab

Industrial facilities

1. Sara Suole Private Limited
Sy No.192/1/2/3 CKPalya Sakalwara Post CKPalya Sakalwara, Post, Bengaluru, Karnataka 560083
2. VKC Footprints Global Pvt Ltd
Shivapura, Peenya, Bengaluru, Karnataka 560058

3. Paragon Footwear S&D Office
3rd Main Rd, Peenya Industrial Area Phase IV, Peenya, Bengaluru, Karnataka 560058
4. India Shoes Exports PVT LTD
151, 4, Mount Poonamallee Rd, Parthasarathy Nagar, Ramapuram, Chennai, Tamil Nadu 600125
5. FARIDA SHOES PVT LTD
No. 17, Jalal Road, Mootukollai, Ambur, Tamil Nadu 635802
6. TATA INTERNATIONAL LIMITED (BACHI SHOES DIVISION)
No.148, SIDCO Industrial Estate, SIPCOT, Ranipet, Tamil Nadu 632403
7. Delta Shoes Pvt Ltd
No 17, Jalal Rd, Gangapuram, Thutipet, Ambur, Tamil Nadu 635802
8. Kenmore Shoes India Pvt.Ltd
Kenmore, Poonamallee Bypass Rd, Senneer Kuppam, Chennai, Tamil Nadu 600056
9. Apache Footwear India Pvt Ltd
Tada Mandal, Mambattu, Andhra Pradesh 524121
10. Lotus Footwear Enterprises Limited
No.3B, Sipcot Industrial Park, Mangal Village, Mathur Post, Cheyyar Taluk, Tiruvannamalai District, Mangal, Tamil Nadu 631701
11. Aston Shoes Private Limited
MC Road, Naganadi, Ambur, Tamil Nadu 635802
12. CALLIDUS SHOEMAKERS PRIVATE LIMITED
NO.2/2A, M.C Road Kulithigai Vilage Madhanur , Vellore, Tamil Nadu, India,635804.

List of learning website

1. <https://www.youtube.com/watch?v=vmaamFEcvgc>
2. <https://www.youtube.com/watch?v=ShqOJiu2AUw>
3. <https://thedapperman.in/blogs/blog/goodyear-weltd-construction>
4. <https://www.youtube.com/watch?v=UdW23-A0twc>
5. <https://www.findsourcing.com/articles/construction/cementing>
6. <https://www.youtube.com/watch?v=Kof-qlFfw6k>
7. <https://www.linkedin.com/pulse/vulcanization-process-footwear-elias-gr%C3%B6ndal>
8. <https://www.youtube.com/watch?v=blJCKExg7vc>

9. <https://www.linkedin.com/pulse/direct-injection-process-footwear-elias-gr%C3%B6ndal>
10. <https://www.youtube.com/watch?v=qVt8GALl8iw>
11. <https://www.the-scientist.com/image-of-the-day/image-of-the-day-foot-biomechanics-67203>
12. <https://www.physio-pedia.com/Gait>
13. <https://www.youtube.com/watch?v=1u6d1CX7o9c>
14. <https://www.memorialhermann.org/services/human-performance/gait-analysis>
15. <https://www.youtube.com/watch?v=5mDbF1zHHjw>
16. <https://dir.indiamart.com/impcat/orthopedic-shoes.html?biz=10>
17. <https://www.youtube.com/watch?v=9K1SRlIcxqg>
18. <https://www.youtube.com/watch?v=AS5TDHTB7Q4>
19. <https://dir.indiamart.com/impcat/medical-shoes.html?biz=10>
20. <https://www.youtube.com/watch?v=2lgfiPoqyIQ>
21. <https://qs36shop.com/product/procam-dimensions-5-1-full-2d-3d/>
22. <https://www.youtube.com/watch?v=2SxH0cA8ERk>
23. <https://www.youtube.com/watch?v=YU07pGtvL1I>
24. <https://www.youtube.com/watch?v=MjH3tjOl8vU>
25. <https://atom-shoemaster.com/en/p/shoe-patterns/>



Government of Karnataka
DEPARTMENT OF COLLEGIATE and TECHNICAL EDUCATION

Program	Leather & Fashion Technology	Semester	V
Course Code	20LT53I	Type of Course	L:T:P (104: 52: 312)
Specialization	Leather & Non-leather Apparel & Accessories Technology	Credits	24
CIE Marks	240	SEE Marks	160

Introduction:

Welcome to the curriculum for the Specialisation Pathway - Leather & Non-leather Apparel & Accessories Technology. This specialisation course is taught in Bootcamp mode. Bootcamps are 12 weeks, intense learning sessions designed to prepare you for the practical world – ready for either industry or becoming an entrepreneur. You will be assisted through the course, with development-based assessments to enable progressive learning. In this course, you'll learn how to design & develop various apparel & accessories and exploit apparel & accessories manufacturing industries in a range of manufacturing and industrial applications that are needed for today's job market.

Leading to the successful completion of this bootcamp, you shall be equipped to either do an internship in apparel & accessories manufacturing industries or do a new research project in the related field. After the completion of your Diploma, you shall be ready to take up roles like Designer, Merchandiser, Supervisor, Sample Developer, Quality Controller and can rise up to the level of Manager, also can become Entrepreneur in the related field and more.

Pre-requisite

Before the start of this specialisation course, you will have prerequisite knowledge gained in the first two years on the following subjects:

1st year -Engineering Mathematics, Communication Skills, Computer Aided Engineering Graphics, Statistics & Analytics, IT Skills, Fundamentals of Electrical and Electronics Engineering, Project Management Skills, Leather Chemistry and Basics of Leather.

2nd year- Tanning & Post Tanning Operations, Footwear Science & Technology – I, Elements of Fashion Illustration, Leather Goods & Garment Technology, Leather Finishing & Surface Upgradation Techniques, Footwear Science & Technology – II, Pattern Designing and Leather Biotechnology & Microbiology.

Instruction to course coordinator

1. Each Pathway is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. Single faculty shall be the Cohort Owner.
3. This course shall be delivered in boot camp mode

4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.
5. The cohort owner shall identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for industrial visits.
7. Cohort owner shall maintain and document the industrial assignments and weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom can augment or use for supplementally teaching on line courses available although reliable and good quality online platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademic, SWAYAM, etc.
10. Cohort owner shall guide the cohort for the execution of mini project

Course Outcomes: At the end of the Course, the student will be able to:

CO-01	Apply the working methodology of various divisions of apparel & accessories manufacturing industries
CO-02	Develop the designs according to the requirements of Market/ Industry
CO-03	Design the apparel & accessories through CAD designing software
CO-04	Maintain the work area, tools & Machineries of apparel & accessories manufacturing with proper safety measures
CO-05	Design & develop leather & non-leather apparel / accessories based on specific theme

Detailed course plan

Week	C O	P O	Days	1 st session (9am to 1 pm)	L	T	P	2 ND session (1.30pm to 4.30pm)	L	T	P		
1	CO 1	PO 1,4	1	Present an overview on Leather Goods & Apparel industry from procurement of raw materials to finished products	2		2	Present overview on organizational structure of Apparel Industry.	1		2		
			2	Present an overview on different departments related to Apparel & Accessories industries <ul style="list-style-type: none"> • Marketing Department • Designing Department • Merchandising Department 	2		2	Present an overview on different departments related to Apparel & Accessories industries <ul style="list-style-type: none"> • CAD/ Pattern Making Department • Sampling Department • Sourcing Department 	1		2		
			3	Present an overview on different departments related to Apparel & Accessories industries <ul style="list-style-type: none"> • Production Planning and Control Department • Cutting Department • Sewing Department 	2		2	Present an overview on different departments related to Apparel & Accessories industries <ul style="list-style-type: none"> • Industrial Engineering Department • Finishing Department • Quality control/ Quality Assurance department 	1		2		
			4	Virtual tour on Apparel & Accessories industries of different departments			4	Virtual tour on Apparel & Accessories industries of different departments				3	
			5	Developmental Assessment						Assessment Review and corrective action			3
			6	Industry Class +Industry assessments			5						
2	CO 2	PO 1,3,4	1	PEER Discussion on Industry Assignment		4		Design Concepts- Explain the significance of Elements and Principle in designing Apparels & Accessories	3				
			2	Explain & Demonstrate Elements of Designing process: Different Art Media and its application- wet & Dry Colour Media	2		2	Explain & Demonstrate various Fashion Illustration techniques and Fashion figures	1		2		
			3	Leather Apparel and Accessories working sketch practice			4	Explain & Illustrate the Fashion Silhouettes	1		2		

			4	Explain the various types of Jackets, Silhouettes etc... Illustrate the portfolio of any one Fashion designer with his/ her collections	1		3	Illustrate & Discuss a specific theme based Apparel Collection (Min 5)			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
3	CO 2	PO 1,3, 4	1	PEER Discussion on Industry Assignment		4		Explain the various Categories of Accessories and its production	1		2
			2	Design the various types of Accessories on specific theme (6 types) • Bags			4	Design the various types of Accessories on specific theme (6 types) • Gloves			3
			3	Design the various types of Accessories on specific theme (3 types) • Headgears			4	Design the various types of Accessories on specific theme (6 types) • Belts			3
			4	Explain the profile of famous Fashion designers (Indian & International) Discuss on their achievements related to Apparel & Accessory industry	2		2	Illustrate the portfolio of any one Fashion Accessory designer with his/ her collections			3
			5	CIE 1- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
4	CO 2	PO 1,3, 4	1	PEER Discussion on Industry Assignment		4		Explain Design and development of Patterns by Manual Method	1		2
			2	Pattern design and development – measurement/ sizing for various types of apparel & various types of accessories	1		3	Develop a Specification sheet for Leather / Non Leather Accessories by Manual Method			3

			3	Develop a Specification sheet for Leather / Non Leather Apparel by Manual Method			4	Demonstrate & develop patterns for any two accessories through Manual method			3
			4	Demonstrate & develop patterns for any two garments through Manual method	1		3	Demonstrate & develop a patterns for any two garments through Manual method			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
5	CO 3	PO 1,2,3,4	1	PEER Discussion on Industry Assignment		4		Explain Design and development of Patterns by CAD method	1		2
			2	Prepare a Specification sheet for Leather / Non Leather Apparel through CAD software	1		3	Prepare a Specification sheet for Leather / Non Leather Apparel through CAD software			3
			3	Prepare a Specification sheet for Leather / Non Leather Accessories through CAD software	1		3	Prepare a Specification sheet for Leather / Non Leather Accessories through CAD software			3
			4	Demonstrate Digitizing of ready patterns through CAD software			4	Demonstrate & develop patterns for any two accessories through CAD software(2 Styles)			3
			5	CIE 2- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
6	CO 3	PO 1,2,3,4	1	PEER Discussion on Industry Assignment		4		Demonstrate & develop patterns for any one Kids garment through CAD software	1		2
			2	Demonstrate & develop patterns for any one Kids garment through CAD software			4	Demonstrate & develop patterns for any one Women's garment through CAD software			3

			3	Demonstrate & develop patterns for any one Women's garment through CAD software			4	Demonstrate & develop patterns for any one Men's garment through CAD software			3
			4	Demonstrate & develop patterns for any one Men's garment through CAD software Explain pattern grading & Marker efficiency for leather/ non leather Apparel	1		3	Demonstrate & Develop grading & Marker efficiency for leather/ non leather Apparel			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
7	CO 4	PO 1,4	1	PEER Discussion on Industry Assignment		4		Explain the overview of Tools used in Apparels & Accessories production Demonstrate Tools used in Apparels & Accessories production	1		2
			2	Overview of Industrial Machines used in Apparels & Accessories Production - Features, mechanism, working principle & application	2		2	Explain about the various types of seams & stitches & application Parts & Classification of Needles and its application	1 2		
			3	Demonstrate & Practice on Industrial Sewing Machines- SNLS, DNLS, Zigzag, overlock.			4	Demonstrate & Practice on Industrial Sewing Machines- SNLS, DNLS, Zigzag, overlock.			3
			4	Demonstrate & Practice on Advanced machineries used in Goods & Garments Industry- Skiving Machine, Strap Cutting Machine, Hand Stitching Machine, Embroidery Machine.			4	Demonstrate & Practice on Advanced machineries used in Goods & Garments Industry- Skiving Machine, Strap Cutting Machine, Hand Stitching Machine, Embroidery Machine.			3
			5	CIE 3- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						

8	CO 2,5	PO 1,3, 4	1	PEER Discussion on Industry Assignment		4	Preparation of pattern and pattern laying on leather or non-leather of accessories (any one Men's Accessory)	2		1
			2	Preparation of pattern and pattern laying on leather or non-leather of accessories (any one Men's Accessory)		4	Leather/ Non Leather and reinforcement material cutting and lining material cutting of accessories (any one Men's Accessory)			3
			3	Pre-assembly operations of accessories (any one Men's Accessory)		4	Stitching operations of accessories (any one Men's Accessory)			3
			4	Stitching operations of accessories (any one Men's Accessory)		4	Finishing operations of accessories (any one Men's Accessory)			3
			5	Developmental Assessment			Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5					
9	CO 2,5	PO 1,3, 4	1	PEER Discussion on Industry Assignment		4	Preparation of pattern and pattern laying on leather or non-leather of accessories (any one Women's Accessory)	2		1
			2	Preparation of pattern and pattern laying on leather or non-leather of accessories (any one Women's Accessory)		4	Leather/ Non Leather and reinforcement material cutting and lining material cutting of accessories (any one Women's Accessory)			3
			3	Pre-assembly operations of accessories (any one Women's Accessory)		4	Stitching operations of accessories (any one Women's Accessory)			3
			4	Stitching operations of accessories (any one Women's Accessory)		4	Finishing operations of accessories (any one Women's Accessory)			3
			5	CIE 4- Written and practice test			Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5					
10	CO 2,5	PO 1,3, 4	1	PEER Discussion on Industry Assignment		4	Preparation of Garments pattern and pattern laying on leather or non-leather of any one Kids Apparel	2		1

			2	Preparation of Garments pattern and pattern laying on leather or non-leather of any one Kids Apparel			4	Leather/ Non Leather and reinforcement material cutting and lining material cutting of any one Kids Apparel			3
			3	Pre-assembly operations of any one Kids Apparel			4	Stitching operations of any one Kids Apparel			3
			4	Stitching operations of any one Kids Apparel			4	Finishing operations of any one Kids Apparel			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
11	CO 2,5	PO 1,3,4	1	PEER Discussion on Industry Assignment			4	Preparation of Garments pattern and pattern laying on leather or non-leather of any one Women's Apparel	2		1
			2	Preparation of Garments pattern and pattern laying on leather or non-leather of any one Women's Apparel			4	Leather/ Non Leather and reinforcement material cutting and lining material cutting of any one Women's Apparel			3
			3	Pre-assembly operations of any one Women's Apparel			4	Stitching operations of any one Women's Apparel			3
			4	Stitching operations of any one Women's Apparel			4	Finishing operations of any one Women's Apparel			3
			5	CIE 5- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
12	CO 2,5	PO 1,3,4	1	PEER Discussion on Industry Assignment			4	Preparation of Garments pattern and pattern laying on leather or non-leather of any one Men's Apparel	2		1
			2	Preparation of Garments pattern and pattern laying on leather or non-leather of any one Men's Apparel			4	Leather/ Non Leather and reinforcement material cutting and lining material cutting of any one Men's Apparel			3

			3	Pre-assembly operations of any one Men's Apparel			4	Stitching operations of any one Men's Apparel			3
			4	Stitching operations of any one Men's Apparel			4	Finishing operations of any one Men's Apparel			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
13	C05	PO 1,3, 4	1	PEER Discussion on Industry Assignment			4	Mini Project- Design & Develop a theme based Leather or non-leather Apparel /Accessory of your own from Designing to Finishing of the product			3
			2	Mini Project- Design & Develop a theme based Leather or non-leather Apparel /Accessory of your own from Designing to Finishing of the product			4	Mini Project- Design & Develop a theme based Leather or non-leather Apparel /Accessory of your own from Designing to Finishing of the product			3
			3	Mini Project- Design & Develop a theme based Leather or non-leather Apparel /Accessory of your own from Designing to Finishing of the product			4	Mini Project- Design & Develop a theme based Leather or non-leather Apparel /Accessory of your own from Designing to Finishing of the product			3
			4	Mini Project- Design & Develop a theme based Leather or non-leather Apparel /Accessory of your own from Designing to Finishing of the product			4	Mini Project- Design & Develop a theme based Leather or non-leather Apparel /Accessory of your own from Designing to Finishing of the product			3
			5	Presentation & Discussion on the Mini Project performed during the week			4	Presentation & Discussion on the Mini Project performed during the week			
			6	Presentation & Discussion on the Mini Project performed during the week			4				

CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

* The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE

Note: Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam - 4 hours

Programme	Leather & Fashion Technology	Semester	V		
Course	Leather & Non-leather Apparel & Accessories Technology	Max Marks	30		
Course Code	20LT53I	Duration	4 hours		
Name of the course coordinator					
Note: Answer one full question from each section.					
Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) - 10 marks					
1.a)	Interpret the working process of Merchandising department related to apparel industry.	L3	1	1,4	5
b)	Analyse the working procedure of Sourcing department in detail.	L4	1	1,4	5
2.a)	Illustrate Various types of Silhouettes with brief explanation.	L3	2	1,3, 4	5
b)	Analyse the profile of any one accessory designer and Fashion designer.	L4	2	1,3, 4	5
Section-2 (Practical) - 20 marks					
3)	Illustrate any 3 types of accessories of women. Explain.	L3	2	1,3, 4	20
4)	Sketch various types of Fashion Silhouettes. Explain.	L4	2	1,3, 4	20

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme : Leather & Fashion Technology			Semester : V	
Course : Leather & Non-leather Apparel & Accessories Technology			Max Marks : 100	
Course Code : 20LT53I			Duration : 3 Hrs	
Instruction to the Candidate: Answer one full question from each section.				
Q.No	Question	CL	CO	Marks
Section-1				
1.a)	Interpret the working process of Merchandising department related to apparel industry.	L3	1	10
b)	Differentiate between Finishing department and Quality Assurance department.	L4		10
2.a)	Write the various types of samples developed in Apparels & Accessories industry.	L3		10
b)	Analyse the working procedure of Sourcing department in detail.	L4		10
Section-2				
3.a)	Demonstrate the various types of principles required in designing.	L3	2	10
b)	Analyse the profile of any one accessory designer and Fashion designer.	L4		10
4.a)	Illustrate Various types of Silhouettes with brief explanation.	L3		10
b)	Distinguish between warm colours and cool colours.	L4		10
Section- 3				
5.a)	Write the various tools used in CAD Designing software.	L3	3	10
b)	Analyse the advantages and disadvantages of CAD Designing software.	L4		10
6.a)	Interpret the working procedure to design a pattern through CAD software.	L3		10
b)	Compare Grading and Marker making in CAD.	L4		10
Section-4				
7.a)	Demonstrate the various sewing Machines used in Apparels & Accessories Manufacturing.	L3	4	10
b)	Differentiate between Skiving and splitting Machine.	L4		10
8.a)	Sketch a Sewing Machine & label its parts with brief explanation.	L3		10
b)	Analyse the various parts & classification of needle with brief explanation.	L4		10
Section-5				
9.a)	Illustrate an accessory/apparel on specific theme with related explanation.	L3	5	10
b)	Distinguish between pre-operative process and bench work process.	L4		10

10.a)	Demonstrate the step by step process involved in developing a leather Apparel/ Accessory.	L3	10
b)	Compare working procedure of Leather and Non-leather products.	L4	10

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Project submission	20
2	Project presentation	20
3	Project innovation	20
4	Result	20
5	Viva voce	20
Total		100

Project Submission / Content Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Identification of the main issues / problem	Identifies and understands all the main issues in the problem statement	Identifies and understands most of the main issues in the problem statement	Identifies and understands some of the issues in the problem statement	Identifies and understands a few of the issues in the problem statement	Identifies limited issues in the problem statement	5
Analysis of the issues	Insightful and thorough analysis of all the issues	Thorough analysis of most of the issues	Superficial analysis of some of the issues in the problem statement	Incomplete analysis of the issues	No analysis of the issue	4
Comments on effective solutions / strategies (The solution may be in the problem statement already or proposed by you)	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues in the problem statement	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues in the problem statement	Superficial and / or inappropriate solutions to some of the issues in the problem statement	Little and/or inappropriate solutions to all of the issues in the problem statement	No action to all issues in the problem statement	2
Links to course learning and additional research	Excellent research into the issues with clearly documented links to course learnings and beyond.	Good research and documented links to the materials read during the course	Limited research and documented links to any readings	Incomplete research and links to any reading.	No research or links to any reading	3
Total						14/20

Project Presentation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Delivery & Enthusiasm	Very clear and concise flow of ideas Demonstrates passionate interest in the topic and engagement with class / examiner	Clear flow of ideas Demonstrates interest in the topic and engagement with class / examiner	Most ideas flow but is lost at times Limited evidence of interest in and engagement with the topic	Hard to follow the flow of ideas Lack of enthusiasm and interest	No flow in the presentation Poor presentation skills	4
Visuals	Visuals augmented and extended comprehension of the issues in unique ways	Use of visuals related to the topic	Limited use of visuals loosely related to the topic	No use of visuals	Poor visuals used and some visuals are not easy to understand its relevance.	2
Staging	Uses stage effects such as props, sound effects, and speech modulation in a unique and dramatic manner that enhances the understanding of the issues in the problem statement.	Uses stage effects such as props, sound effects, and speech modulation in an effective manner to extend the understanding of the issues in the problem statement.	Limited use of stage effects and/or used in a manner that did not enhance the understanding of the issues in the problem statement.	No use of stage effects	Poor stage effects usage	5
Involvement of the class / Examiners • Questions • Discussions • Activities	Excellent and salient discussion points that elucidated material to develop a deep understanding Appropriate and imaginative activities used to extend understanding in a creative manner	Questions and discussions addressed important information that developed understanding Appropriate activities used to clarify understanding	Questions and discussions addressed important superficial issues of the problem statement Limited use of activities to clarify understanding	Little or no attempt to engage the class / examiner in demonstrating their learning	Did not engage the class / examiner and poor listening skills	1
Total						12/20

Project Results Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Problem outcome	The topic was well researched and all information and data included are accurate and from reliable sources of information like high impact journals standards, etc. The proof was enough backed up with accurate data, analysis and reasoning beyond the class learning. Outcome achieved beyond the problem brief	The topic was researched and most information and data were from reliable sources of information. The proof was backed up with good data and reasoning as taught in the class. Outcome achieved as per the problem brief	The topic was researched but information and data were only partly from reliable sources of information. The proof was not fully backed up with good data or reasoning as taught in the class. Partial outcome achieved as per the problem brief	The topic was researched and data were not from reliable sources. The proof was not backed up with data, analysis or reasoning as taught in the class. Some outcome obtained as per the problem brief	Desired results not obtained, but some relevant research was done. Outcome not obtained as per the problem brief	4
Application of class learning in problem solving	Made effective use of class principles, models and theories. Also used creativity to find effective results appropriate to industry beyond class learning.	Made good use of class principles, models and theories Some creative ideas were explored to find desired outcome but within the framework of class learning	Made some use of class principles, models and theories No creative ideas or models explored	Made limited use of class principles, models and theories	Poorly applied class principals, models and theories	3
Response to Class /	Queries Excellent response to	Good response to questions and	Satisfactory response to questions and	Limited response to questions and	Poor or no response to	2

Examiners Queries	comments and discussion with appropriate content supported by theory/research	discussions with some connection made to theory/research	discussions with limited reference to theory/research	discussions with no reference to theory/research	questions and did not participate in the discussions.	
Conclusions	Provides detailed and appropriate conclusion for the problem statement	Provides appropriate conclusion for the problem statement	Provides adequate and mostly appropriate conclusions for the problem statement	Provides limited and somewhat appropriate conclusions for the problem statement	Has not provided appropriate conclusions for the problem statement.	4
Total						13/20

Project Innovation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Finding new processes / models / approaches	The newly discovered processes / models / approaches are of good quality and relevant	The newly discovered processes / models / approaches are of appropriate quality but limited relevance	The newly discovered processes / models / approaches have limited application but relevant to the problem	The newly discovered processes / models / approaches has restricted application	No new processes / models / approaches were identified	5
Proposing ideas and innovative solutions in terms of processes / models / approaches and how they can be applied to solve the problem on hand	Various ideas and innovative solutions have been proposed and their application have been clearly outlined	Various ideas and innovative solutions have been proposed as well as the outline of the process to apply them	Some ideas or innovative solutions have been proposed but the process of applying them hasn't been specified	Few ideas have been proposed	No ideas or innovative solutions have been proposed	3
Using creativity techniques to provide and reason good ideas which are original and unconventional	Wherever necessary creativity techniques are utilized to analyse and solve the problem	Creativity techniques are frequently utilized in more than 50% of the occasions	Creativity techniques are utilized at times in less than 50% of the occasions	Creativity techniques are used a few times only	Creativity technique are not utilized to analyse and solve the problem	2
Finding constraints and weak points in existing processes / models / approaches or methods	Constraints and weak points are understood	Constraints and weak are identified	A critical analysis is undertaken	Only a description of the working process and methods are provided	No constraints or weak points have	3

					been identified.	
Total						13/20

Reference:

1. Patterns: A source book by Graham Leslie McCallum, Bats ford, 2006
2. "Fashion Concept to Consumer" By Gini Stephens Frings, Publisher Pearson.
3. Elements of fashion apparel and design , G.J Sumathi, New Age International, 2007
4. Dynamics of Fashion, Elaine Stone.
5. Inside Fashion Business – Sharon Lee Tata.
6. Leather fashion design by Francesca Sterlacci, Laurence king publishing,2010
7. Fashion Design Course: Accessories, Jane Schaffer& Sue Saunders, Thames and Hudson,
8. Leather goods manufacture – Course material – CLRI Publication
9. Manual for Lr Accessories and Lr Goods – Subramanian Natesan, Retired Scientist, CLAD,CLRI
10. Manual of Leather Garment Making - Subramanian Natesan, Retired Scientist, CLAD – CLRI
11. Leather Garment Course Material – CLRI Publication
12. Manual of Garment Pattern Designing – CLRI Publication
13. Quality Control for Leather Garment Technology – Getachew Adhena, Leather and Leather product
14. Pattern Making for Fashion Design – Helen Joseph Armstrong, Pearson Publication.
15. Zarapkar System of Cutting, Arvind Zarapkar, Navneet Publication.
16. CAD for Fashion Design by Renee Weiss Chase, Prentice hall Pub
17. Winfred Aldrich, Metric Pattern Cutting, Blackwell Science, UK.1988
18. Fashion Pattern Making Techniques (vol.3), Antonio Donnannao, PromPress,2016
19. Sewing for the Apparel Industry (Clarie B. Shaeffer)

Required Facilities:Laboratory facilities

1. Apparel & Accessories Designing lab
2. Cutting lab
3. Apparel & Accessories Fabrication Lab
4. Apparel & Accessories CAD lab

List of learning website

1. <https://youtu.be/lhEY3ZxPw4I>
2. <https://youtu.be/m0cBB4Cqhhc>
3. <https://youtu.be/9yYPsEDUdZg>
4. <https://youtu.be/0qxRLcm3RyM>
5. <https://youtu.be/SdAc4slRoqs>
6. <https://youtu.be/xhY19ZuVuLE>
7. <https://youtu.be/yYa3Y2NwDfl>
8. <https://youtu.be/M4jErtKogNc>
9. <https://youtu.be/B9nWtCk4ZT0>
10. <https://youtu.be/1itGlx7eQRc>



Government of Karnataka
DEPARTMENT OF COLLEGIATE and TECHNICAL EDUCATION

Program	Leather & Fashion Technology	Semester	V
Course Code	20LT54I	Type of Course	L:T:P (104: 52: 312)
Specialization	Testing of Leather & Non Leather Materials	Credits	24
CIE Marks	240	SEE Marks	160

Introduction:

Welcome to the curriculum for the Specialisation Pathway - Testing of Leather & Non Leather Materials. This specialisation course is taught in Bootcamp mode. Bootcamps are 12 weeks, intense learning sessions designed to prepare you for the practical world – ready for either industry or becoming an entrepreneur. You will be assisted through the course, with development-based assessments to enable progressive learning. In this course, you'll learn the chemical analysis of leather chemicals & leather and also the various physical testing of leather, non-leather materials, products & related accessories.

Leading to the successful completion of this bootcamp, you shall be equipped to either do an internship in chemical & physical testing laboratories or can develop a new testing methodology in the related field. After the completion of your Diploma, you shall be ready to take up roles like a lab technician, testing lab in charge and testing laboratory consultancy and more.

Pre-requisite

Before the start of this specialisation course, you will have prerequisite knowledge gained in the first two years on the following subjects:

1st year -Engineering Mathematics, Communication Skills, Computer Aided Engineering Graphics, Statistics & Analytics, IT Skills, Fundamentals of Electrical and Electronics Engineering, Project Management Skills, Leather Chemistry and Basics of Leather.

2nd year- Tanning & Post Tanning Operations, Footwear Science & Technology – I, Elements of Fashion Illustration, Leather Goods & Garment Technology, Leather Finishing & Surface Upgradation Techniques, Footwear Science & Technology – II, Pattern Designing and Leather Biotechnology & Microbiology.

Instruction to course coordinator

1. Each Pathway is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. Single faculty shall be the Cohort Owner.
3. This course shall be delivered in boot camp mode
4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.

5. The cohort owner shall identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for industrial visits.
7. Cohort owner shall maintain and document the industrial assignments and weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom can augment or use for supplementally teaching on line courses available although reliable and good quality online platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademic, SWAYAM, etc.
10. Cohort owner shall guide the cohort for the execution of mini project

Course Outcomes: At the end of the Course, the student will be able to:

CO-01	Test & analyze the chemical properties of various leather processing Chemicals.
CO-02	Analyze the chemical properties of leather through chemical testing
CO-03	Analyze the various strength, comfort & fastness properties of leather through physical testing
CO-04	Demonstrate the purpose, working principle & maintenance of various testing equipment & tools
CO-05	Test & analyze the quality of given leather & non-leather materials, products & accessories

Detailed course plan

Week	C O	P O	Day s	1 st session (9am to 1 pm)	L	T	P	2 ND session (1.30pm to 4.30pm)	L	T	P
1	CO1	PO1, 4	1	Present an overview on importance of testing of leather & non-leather raw materials, products and related accessories.			4	Present an overview on importance of testing of leather & non-leather raw materials, products and related accessories.			3
			2	Present an Overview of the testing standards for various leather & non-leather raw materials, products and related accessories.			4	Present an Overview of the current testing laboratories including Industry			3
			3	Introduction to the Analysis of Leather Pre-Tanning Chemicals	4			Analysis of common salt 1. Moisture content 2. Purity of salt			3
			4	Analysis of common salt 1. Moisture content 2. Purity of salt			4	Analysis of soak liquor			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
			2	PEER Discussion on Industry Assignment				4		Analysis of Lime - Determinations of Total Bases	
			2	Analysis of Lime - Determinations of purity of lime			4	Analysis of unhairing agent - Determination of sulphide content			3

			3	Analysis of used lime liquor/lime pelt			4	Analysis of Deliming agent - Analysis of purity of ammonium salts			3
			4	Analysis of Deliming agent - Estimation of purity of boric acids			4	Analysis of pickle liquor (HCl - NaCl system)			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
3	CO1	PO1, 4	1	PEER Discussion on Industry Assignment			4	Introduction to the Analysis of Leather Chrome Tanning Chemicals	3		
			2	Analysis of Basic Chromium Sulphate - Determination of chrome content as Cr ₂ O ₃			4	Analysis of Basic Chromium Sulphate - Determination of chrome content as Cr ₂ O ₃			3
			3	Analysis of Basic Chromium Sulphate - Determination of acid combined with chromium			4	Analysis of Basic Chromium Sulphate - Determination of acid combined with chromium			3
			4	Analysis of Basic Chromium Sulphate - Degree of Basicity			4	Analysis of Basic Chromium Sulphate - Degree of Olation			3
			5	CIE 1- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
4	CO1	PO1,4	1	PEER Discussion on Industry Assignment			4	Introduction to the Analysis of Leather Vegetable Tanning Chemicals	3		
			2	Analysis of Veg tannin - Qualitative Analysis - (Iron Alum Test & HCL-Formaldehyde Test)			4	Analysis of Veg tannin - Qualitative Analysis - Gelatin Test			3

			3	Analysis of Veg tannin - Qualitative Analysis - Lead Acetate Test			4	Analysis of Veg tannin - Quantitative Analysis - Determination of Moisture content			3
			4	Analysis of Veg tannin - Quantitative Analysis - Determination of Total Solids & Total Soluble content			4	Analysis of Veg tannin - Quantitative Analysis - Determination of Non-tannins percentage			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
5	CO1, CO2		1	PEER Discussion on Industry Assignment			4	Introduction to the Analysis of Leather Post Tanning Chemicals	3		
			2	Analysis of oils & fats - Determination of iodine value			4	Analysis of oils & fats - Determination of acid value			3
			3	Analysis of Oils/Fats - Determination of saponification value	1		3	Analysis of formaldehyde: Determination of % purity of Formaldehyde			3
			4	Analysis of vegetable tanned leather - Sampling position & Preparation of sample	2		2	Analysis of vegetable tanned leather - Moisture content			3
			5	CIE 2- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class	5						
6	CO2	PO1, 4, 5	1	PEER Discussion on Industry Assignment			4	Analysis of vegetable tanned leather - oils & fats			3
			2	Analysis of vegetable tanned leather - Total Ash			4	Analysis of vegetable tanned leather - water soluble matter			3

			3	Analysis of vegetable tanned leather – Solvent extractable / (insoluble ash)			4	Analysis of vegetable tanned leather – Hide Substance			3
			4	Analysis of vegetable tanned leather – Fixed tannins & degree of tannage			4	Analysis of Chrome tanned leather – Chrome content in Leather			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
7	CO3	PO1, 4,7	1	PEER Discussion on Industry Assignment			4	Introduction to physical testing – destructive & non- destructive tests	3		
			2	Statistical method of testing	1		3	Demonstration of various visual tests use to assess quality of leather			3
			3	Selection of sample from a lot for visual/ laboratory testing. Preparation & conditioning of selected sample for physical testing Measurement of strength properties of leather – Tensile strength			1 1 2	Determination of tensile strength, modulus elongation & % elongation at break			3
			4	Measurement of strength properties of leather – Tear strength a) Single edge b) double edge c) Double hole stitch	1		3	Measurement of strength properties of leather – Tear strength a) Single edge b) double edge c) Double hole stitch			3
			5	CIE 3- Written and practice test				Assessment Review and corrective action			3

			6	Industry Class +Industry assessments	5					
8	CO3	PO1, 4,7	1	PEER Discussion on Industry Assignment		4		Measurement of grain crack strength of upper leather	1	2
			2	Measurement of flexing endurance property of upper leather (vamp Flex test method)	1		3	Measurement of water resistance of leather in dynamic condition	1	2
			3	Measurement of colour fastness to rubbing in leather (crockmeter)	1		3	Measurement of Scuff resistance (Rub proofness) of leather	1	2
			4	Measurement of water vapour permeability of leather	1		3	Specification and requirement of different types leather (upper , lining, garment, sole, upholstery, etc)	3	
			5	Developmental Assessment				Assessment Review and corrective action		3
			6	Industry Class +Industry assessments	5					
9	CO3, CO5	PO1, 4,7	1	PEER Discussion on Industry Assignment		4		Measurement of water/perspiration resistance of leather		3
			2	Testing methods for fabrics & coated fabric materials	4			Determination of tensile strength & seam strength of fabric upper material		3
			3	Determination of Martindale abrasion resistance of fabric upper material			4	Determination of breaking load (lastometer) of fabric upper material		3
			4	Testing of coated fabric – Adhesion strength of coated fabric			4	Testing of coated fabric – Vamp flex resistance		3

			5	CIE 4- Written and practice test			Assessment Review and corrective action			3	
			6	Industry Class +Industry assessments	5						
10	C05	PO1, 4,7	1	PEER Discussion on Industry Assignment		4	Testing for toe puffs and stiffeners	1		2	
			2	Testing and quality assessment of footwear adhesives (solid content, viscosity, drying time, tack, shelf life, peel strength & pot life)	1		3	Testing & quality assessment of Threads	1		2
			3	Testing & quality assessment of Heels (impact resistance, heel fatigue test & heel attachment strength)	1		3	Testing & quality assessment of Heels (impact resistance, heel fatigue test & heel attachment strength)			3
			4	Testing & quality assessment of Fastener Testing & quality assessment of Fasteners (Laces, Zipper, Velcro & Buckle)	1		3	Testing & quality assessment of Fasteners (Laces, Zipper, Velcro & Buckle)			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
11	C05	PO1, 4,7	1	PEER Discussion on Industry Assignment		4	Testing methods for leather soling materials	1			
							Determination of apparent density of sole leather			2	

			2	Determination of water resistance of sole leather in static condition (KUBELKA)			4	Testing methods for non-leather soling materials Determination of Hardness & Density of soling material	1		2
			3	Determination of flexing resistance of soling material (Bata flex test method)			4	Determination of compressibility of sole material			3
			4	Determination of water resistance of soling material (Dynamic method)			4	Determination of abrasion resistance of soling material (DIN)			3
			5	CIE 5- Written and practice test				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
12	C04, C05	PO1, 4,7	1	PEER Discussion on Industry Assignment			4	Testing of full shoe - Full shoe flex test			3
			2	Testing of full shoe - Sole adhesion test			4	Introduction to Working principle of various testing equipment	3		
			3	Demonstrate the working principle of various testing equipment			4	Demonstrate the working principle of various testing equipment			3
			4	Demonstrate the working principle of various testing equipment			4	Demonstrate the working principle of various testing equipment			3
			5	Developmental Assessment				Assessment Review and corrective action			3
			6	Industry Class +Industry assessments	5						
13	C05	PO1, 2, 4	1	PEER Discussion on Industry Assignment			4	Mini Project – Prepare the testing report by performing the required test methods for the given sample or product			3

			2	Mini Project – Prepare the testing report by performing the required test methods for the given sample or product			4	Mini Project – Prepare the testing report by performing the required test methods for the given sample or product			3
			3	Mini Project – Prepare the testing report by performing the required test methods for the given sample or product			4	Mini Project – Prepare the testing report by performing the required test methods for the given sample or product			3
			4	Mini Project – Prepare the testing report by performing the required test methods for the given sample or product			4	Mini Project – Prepare the testing report by performing the required test methods for the given sample or product			3
			5	Presentation & Discussion on the Mini Project performed during the week			4	Presentation & Discussion on the Mini Project performed during the week			
			6	Presentation & Discussion on the Mini Project performed during the week			4				

CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

* The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE

Note: Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam - 4 hours

Programme	Leather & Fashion Technology	Semester	V		
Course	Testing of Leather & Non Leather Materials	Max Marks	30		
Course Code	20LT54I	Duration	4 hours		
Name of the course coordinator					
Note: Answer one full question from each section.					
Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) - 10 marks					
1.a)	Interpret the analysis of purity of ammonium salt.	L3	1	1,4	5
b)	Analyse the sampling position & preparation of sample for physical testing of the given sample	L4	3	1,4,7	5
2.a)	Write the specification & requirements of shoe upper leather	L3	5	1,4,7	5
b)	Examine the procedure for calculating chrome content in the chrome tanned leather	L4	2	1,4,5	5
Section-2 (Practical) - 20 marks					
3)	Demonstrate the determination of purity of lime & total base in lime.	L3	1	1,4	20
4)	Test the quality of given upper leather material. (Perform Any two test)	L4	5	1,4,7	20

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme : Leather & Fashion Technology		Semester : V		
Course : Testing of Leather & Non Leather Materials		Max Marks : 100		
Course Code : 20LT54I		Duration : 3 Hrs		
Instruction to the Candidate: Answer one full question from each section.				
Q.No	Question	CL	CO	Marks
Section-1				
1.a)	Interpret the following analysis of salt : i. Moisture content ii. Purity of salt	L3	1	10
b)	Examine the degree of olation & basicity of BCS	L4		10
2.a)	Write the procedure for the analysis of the following i. pickle liquor ii, limed pelt	L3		10
b)	Examine the saponification (SAP) value & iodine value of fatliquor. Describe in brief.	L4		10
Section-2				
3.a)	Illustrate the procedure for calculating chrome content in the chrome tanned leather	L3	2	10
b)	Analyse the sampling position & preparation of sample for chemical testing of the given sample	L4		10
4.a)	Interpret the procedure for calculating degree of tannage & fixed tannin in vegetable tanned leather	L3		10
b)	Test method for qualitative analysis of vegetable tannin. Discuss in brief	L4		10
Section- 3				
5.a)	Choose the test method for assessing the strength properties of leather. Explain in brief about any two test procedure with neat sketches.	L3	3	10
b)	Analyse the colour fastness property of leather using crockemter with neat and clean sketch.	L4		10
6.a)	Write the procedure for assessing the water resistance capacity of leather in dynamic condition.	L3		10
b)	Appraise the need of flexing endurance test in upper leather and explain its test procedure with clean and neat sketch.	L4		10
Section-4				
7.a)	Illustrate the various parts of lastometer with a neat and clean sketch. Explain its working principle in detail.	L3	4	10
b)	Examine working principle of sole adhesion tester. Draw and label the various parts of it.	L4		10
8.a)	Sketch the various parts of wet and dry rub fastness tester (circular rubbing). Explain its working principle.	L3		10

b)	Categories the list of test that can be performed using universal testing machine. Mention in brief about any one test procedure with suitable diagram.	L4		10
Section-5				
9.a)	Choose the test method for assessing the quality of zipper. Explain in brief with suitable diagrams	L3	5	10
b)	Experiment for calculating the abrasion resistance of soling material with neat sketch of it.	L4		10
10.a)	Illustrate the test method for assessing the quality of heel. Explain in brief with suitable diagrams	L3		10
b)	Test the quality of fabric upper material. Discuss about the test methods employed in detail.	L4		10

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Project submission	20
2	Project presentation	20
3	Project innovation	20
4	Result	20
5	Viva voce	20
Total		100

Project Submission / Content Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Identification of the main issues / problem	Identifies and understands all the main issues in the problem statement	Identifies and understands most of the main issues in the problem statement	Identifies and understands some of the issues in the problem statement	Identifies and understands a few of the issues in the problem statement	Identifies limited issues in the problem statement	5
Analysis of the issues	Insightful and thorough analysis of all the issues	Thorough analysis of most of the issues	Superficial analysis of some of the issues in the problem statement	Incomplete analysis of the issues	No analysis of the issue	4
Comments on effective solutions / strategies (The solution may be in the problem statement already or proposed by you)	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues in the problem statement	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues in the problem statement	Superficial and / or inappropriate solutions to some of the issues in the problem statement	Little and/or inappropriate solutions to all of the issues in the problem statement	No action to all issues in the problem statement	2
Links to course learning and additional research	Excellent research into the issues with clearly documented links to course learnings and beyond.	Good research and documented links to the materials read during the course	Limited research and documented links to any readings	Incomplete research and links to any reading.	No research or links to any reading	3

Total	14/20
--------------	--------------

Project Presentation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Delivery & Enthusiasm	Very clear and concise flow of ideas Demonstrates passionate interest in the topic and engagement with class / examiner	Clear flow of ideas Demonstrates interest in the topic and engagement with class / examiner	Most ideas flow but is lost at times Limited evidence of interest in and engagement with the topic	Hard to follow the flow of ideas Lack of enthusiasm and interest	No flow in the presentation Poor presentation skills	4
Visuals	Visuals augmented and extended comprehension of the issues in unique ways	Use of visuals related to the topic	Limited use of visuals loosely related to the topic	No use of visuals	Poor visuals used and some visuals are not easy to understand its relevance.	2
Staging	Uses stage effects such as props, sound effects, and speech modulation in a unique and dramatic manner that enhances the understanding of the issues in the problem statement.	Uses stage effects such as props, sound effects, and speech modulation in an effective manner to extend the understanding of the issues in the problem statement.	Limited use of stage effects and/or used in a manner that did not enhance the understanding of the issues in the problem statement.	No use of stage effects	Poor stage effects usage	5

Involvement of the class / Examiners <ul style="list-style-type: none"> • Questions • Discussions • Activities 	Excellent and salient discussion points that elucidated material to develop a deep understanding Appropriate and imaginative activities used to extend understanding in a creative manner	Questions and discussions addressed important information that developed understanding Appropriate activities used to clarify understanding	Questions and discussions addressed important superficial issues of the problem Limited use of activities to clarify understanding	Little or no attempt to engage the class / examiner in demonstrating their learning	Did not engage the class / examiner and poor listening skills	1
Total						12/20

Project Results Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Problem outcome	The topic was well researched and all information and data included are accurate and from reliable sources of information like high impact journals standards, etc. The proof was enough backed up with accurate data, analysis and reasoning beyond the class learning. Outcome achieved beyond the problem brief	The topic was researched and most information and data were from reliable sources of information. The proof was backed up with good data and reasoning as taught in the class. Outcome achieved as per the problem brief	The topic was researched but information and data were only partly from reliable sources of information. The proof was not fully backed up with good data or reasoning as taught in the class. Partial outcome achieved as per the problem brief	The topic was researched and data were not from reliable sources. The proof was not backed up with data, analysis or reasoning as taught in the class. Some outcome obtained as per the problem brief	Desired results not obtained, but some relevant research was done. Outcome not obtained as per the problem brief	4
Application of class learning in problem solving	Made effective use of class principles, models and theories. Also used creativity to find effective results appropriate to industry beyond class learning.	Made good use of class principles, models and theories Some creative ideas were explored to find desired outcome but within the framework of class learning	Made some use of class principles, models and theories No creative ideas or models explored	Made limited use of class principles, models and theories	Poorly applied class principals, models and theories	3
Response to Class /	Queries Excellent response to	Good response to questions and	Satisfactory response to questions and	Limited response to questions and	Poor or no response to	2

Examiners Queries	comments and discussion with appropriate content supported by theory/research	discussions with some connection made to theory/research	discussions with limited reference to theory/research	discussions with no reference to theory/research	questions and did not participate in the discussions.	
Conclusions	Provides detailed and appropriate conclusion for the problem statement	Provides appropriate conclusion for the problem statement	Provides adequate and mostly appropriate conclusions for the problem statement	Provides limited and somewhat appropriate conclusions for the problem statement	Has not provided appropriate conclusions for the problem statement.	4
Total						13/20

Project Innovation Evaluation Rubrics

Evaluation Parameters	5	4	3	2	1	Student Score
Finding new processes / models / approaches	The newly discovered processes / models / approaches are of good quality and relevant	The newly discovered processes / models / approaches are of appropriate quality but limited relevance	The newly discovered processes / models / approaches have limited application but relevant to the problem	The newly discovered processes / models / approaches has restricted application	No new processes / models / approaches were identified	5
Proposing ideas and innovative solutions in terms of processes / models / approaches and how they can be applied to solve the problem on hand	Various ideas and innovative solutions have been proposed and their application have been clearly outlined	Various ideas and innovative solutions have been proposed as well as the outline of the process to apply them	Some ideas or innovative solutions have been proposed but the process of applying them hasn't been specified	Few ideas have been proposed	No ideas or innovative solutions have been proposed	3
Using creativity techniques to provide and reason good ideas which are original and unconventional	Wherever necessary creativity techniques are utilized to analyse and solve the problem	Creativity techniques are frequently utilized in more than 50% of the occasions	Creativity techniques are utilized at times in less than 50% of the occasions	Creativity techniques are used a few times only	Creativity technique are not utilized to analyse and solve the problem	2
Finding constraints and weak points in existing processes / models / approaches or methods	Constraints and weak points are understood	Constraints and weak are identified	A critical analysis is undertaken	Only a description of the working process and methods are provided	No constraints or weak points have been identified.	3

Total	13/20
-------	-------

Reference:

1. Analytical Chemistry of leather manufacture – P.K.Sarkar
2. Official methods of analysis- Society of leather technologists/chemist-U.K.-1981
3. Technological controls in leather manufacture – S.Bangaraswamy-CLRI Publications
4. Methods of chemical testing of leathers –BIS-IS-582-1970
5. A Practical Guide for Chemical Analysis and Physical Testing of Leather- TSK Mahadevan
6. Testing and Quality Assessment of Footwear and Footwear Material– B. Venkatappaiah.
7. An Introduction to the Principal of Physical Testing of Leather – Prof.S.S. Dutta
8. Methods of Physical Testing of Leathers, IS: 5914-1970, BIS, New Delhi.
9. SATRA T testing manuals on footwear and footwear materials.
10. BIS testing manuals on leather & related product materials.

Required Facilities:Laboratory facilities

1. Chemical testing laboratory
2. Physical testing laboratory

List of learning website

1. <https://youtu.be/pfkwjKGUW8s>
2. <https://www.blcchemicaltesting.com/chemical-testing-of-materials-products/leather-testing/>
3. https://www.youtube.com/watch?v=SkMfzj_ujHI
4. <https://www.youtube.com/watch?v=q4F1zWbxm7M>
5. <https://www.indiamart.com/proddetail/abrasion-tester-for-sole-leather-3643793788.html>
6. https://www.youtube.com/watch?v=Pz_2xpiimtE
7. <https://www.youtube.com/watch?v=abml7QrFWRk>
8. <https://www.youtube.com/watch?v=RYYOWSRvzpU>
9. <https://www.youtube.com/watch?v=GGHAbpXfpgQ>

10. <https://yasuda-seiki.co.jp/en/product/fiber/school-vibration-wear-tester/>
11. <https://www.youtube.com/watch?v=idwgIaOqdZU>
12. https://www.youtube.com/watch?v=N_iMXni5s4E
13. https://www.satara.com/accreditation/lab_accreditation.php
14. <https://www.satara.com/footwear/safety.php>
15. <https://www.satara.com/research/>
16. <https://www.satara.com/footwear/everyday.php>
17. <https://www.youtube.com/watch?v=7Sx0LBAADmI>
18. <https://www.satara.com/visionstitch/>