

C-18 - Curriculum

Diploma in Leather Technology



**State Board of Technical Education & Training
Telangana, Hyderabad**

IV Semester

C-18 IV SEMESTER DIPLOMA IN LEATHER TECHNOLOGY[illegible]

ADVANCED ENGINEERING MATHEMATICS

Course Title : ADVANCED ENGINEERING MATHEMATICS	Course Code : 18LT-401F
SEMESTER : IV	Course Group : Foundation
Teaching Scheme (L : T : P) : 45 :15 : 0 (in Periods)	Credits : 3 Credits
Type of Course : Lecture + Assignments	Total Contact Periods : 60
CIE : 60 Marks	SEE : 40 Marks
Program : Common to all Engineering Diploma Programs	

Pre requisites

This course requires the knowledge of Engg. Mathematics at Diploma first year level and Applied Engg. Mathematics at Diploma 3rd Semester level.

Course Outcome:COs

At the end of the course, the student will have the ability to:

CO 1	Solve simple Homogeneous Differential Equations
CO 2	Solve simple Non-Homogeneous Differential Equations
CO 3	Express $f(x)$ as a Fourier series in the given interval
CO 4	Express $f(x)$ as a Fourier Half-Range Cosine series and Sine series
CO 5	Find Laplace transforms of simple functions
CO 6	Find Inverse Laplace transforms of simple functions and solve Linear Differential Equations using Laplace Transformations.

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R		U	A	
1	Homogeneous Linear Differential equations with constant coefficients	05	Q4	Q1		Q9(a)	Q13(a)
2	Non-Homogeneous Linear Differential equations with constant coefficients	15					
3	Fourier series	10		Q2		Q10(a)	Q14(a)
4	Fourier Half-range series	05					
5	Laplace Transforms	10		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Inverse Laplace transforms	15			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		60	8		8	8	

Course Contents:

Unit – I

Duration: 05 Periods (L:3.0 – T:2.0)

Homogeneous Linear Differential equations with constant coefficients

Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.

Unit – II

Duration: 15 Periods (L: 12.0 – T:3.0)

Non-Homogeneous Linear Differential equations with constant coefficients

Non-homogenous linear differential equations with constant coefficients of the form $f(D)y = X$, where X is in the form k (a constant), e^{ax} , $\sin ax$, $\cos ax$, x^n , ($n = 1, 2, 3$) Complimentary Function (CF), Particular Integral (PI) and General Solution (GS).

Unit-III

Duration: 10 Periods (L: 8.0 – T: 2.0)

Fourier series

Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c, c+2\pi)$, Euler's formulae, sufficient conditions for existence of Fourier series for a function. Even, Odd functions and Fourier series over the Interval $(0, 2\pi)$ and $(-\pi, \pi)$

Unit – IV

Duration: 05 Periods (L: 3.0 – T: 2.0)

Fourier Half-range series

Representation of a function as Fourier Half-range Sine series and Cosine series over the interval $(0, \pi)$

Unit – V

Duration: 10 Periods (L: 7.0 – T: 3.0)

Laplace Transformations:

Definition, sufficient conditions for existence of Laplace Transform, Laplace Transform of elementary functions, linearity property, Change of scale property, First shifting theorem, multiplication by t^n , division by t , Laplace Transform of derivatives and integrals, unit step function, Laplace Transform of second shifting theorem

Unit – VI

Duration: 15 Periods (L: 12.0 – T: 3.0)

Inverse Laplace transforms:

Inverse Laplace transforms- shifting theorems and change of scale property, multiplication by s^n and division by s – Inverse Laplace Transform using partial fractions – convolution theorem (no proof) – application of Laplace Transformations to solve ordinary differential equations of second order with initial conditions.

Recommended Books:

1. Higher Engineering Mathematics, B.S.Grewal .
2. Laplace Transforms - Murray R. Spiegel .
3. Ordinary Differential Equations – R. S. Aggarwal.
4. Fourier Series – A.R. Vasishtha and Gupta.

Suggested E-Learning references:

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html
2. E-books: www.mathebook.net

Suggested Learning Outcomes

Unit-I

1.0 Solve Homogeneous linear differential equations with constant coefficients in engineering situations

- 1.1 Solve Differential equations of the type $(aD^2 + bD + c)y = 0$ when the roots of the auxiliary equation are real and different, real and repeated, complex.
- 1.2 Solve the higher order homogeneous Linear differential equations with constant coefficients.

Unit-II

2.0 Solve Non Homogeneous linear differential equations with constant coefficients in engineering situations

- 2.1 Explain the concept of complementary function, particular Integral and general solution of a differential equation.
- 2.2 Solve n^{th} order differential equation of the type $f(D)y = X$ where $f(D)$ is a polynomial of second order and X is a function of the form $k, e^{ax}, \sin ax, \cos ax, x^n$.
- 2.3 Solve simple problems on the above types of 2.2

Unit-III

3.0 Understand the Fourier series expansion of functions

- 3.1 Define the orthogonality of functions in an interval.
- 3.2 Define Fourier series of a function on the interval $(C, C+2\pi)$ and write the Euler's formulae for determining the Fourier coefficients.
- 3.3 Write sufficient conditions for the existence of Fourier series for a function.
- 3.4 Write Fourier series of simple functions in the range $(0, 2\pi)$ and $(-\pi, \pi)$.
- 3.5 Write Fourier series for even and odd functions in the interval $(-\pi, \pi)$
- 3.6 Solve simple problems on even and odd functions in the interval. $(0, 2\pi)$ and $(-\pi, \pi)$

Unit- I

4.0 Understand the Half – Range Fourier series expansion of functions

- 4.1 Write Half – Range Cosine series of a function in the range $(0, \pi)$.
- 4.2 Write Half – Range Sine series of a function in the range $(0, \pi)$.

- 4.3 Solve simple problems on Half – Range Cosine and Sine series over the interval $(0, \pi)$

Unit-V

5.0 Understand Laplace transforms

- 5.1 Write the definition of Laplace Transform and Laplace transform of standard functions.
- 5.2 Explain the sufficient conditions of existence of Laplace Transform.
- 5.3 Write the properties of Laplace Transform – Linearity property, First shifting theorem, Change of Scale property.
- 5.4 Solve simple problems using the above properties.
- 5.5 Write formulae for Laplace transform of $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u) du$ in terms of Laplace transform of $f(t)$
- 5.6 Solve simple problems using the above formulae.
- 5.7 Define unit step function and write the Laplace Transform of unit step function.
- 5.8 Write Second shifting theorem.

Unit-VI

6.0 Use Laplace transforms and Inverse Laplace transforms to solve differential equation in engineering problems

- 6.1 Define inverse Laplace Transform and write inverse Laplace Transforms of standard functions.
- 6.2 Solve simple problems on Inverse Laplace Transforms.
- 6.2 Write Shifting theorems and Change of scale property of inverse Laplace Transform.
- 6.3 Solve simple problems on 6.2
- 6.4 Write inverse Laplace Transforms corresponding to Laplace Transform of the functions $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u) du$
- 6.5 Solve simple problems on 6.4
- 6.6 Define convolution of two functions and state convolution theorem.
- 6.7 Solve simple problems on Convolution theorem.

6.8 Use Laplace and inverse Laplace Transforms to solve simple differential equations of Second order.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2. Quiz
3. Group discussion
4. Surprise tests
5. Seminars
6. Home Assignments.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	2	2	1			1			3	1,2,3,4,7,10
CO2	3	2	2	1			1			3	1,2,3,4,7,10
CO3	3	2	2	1			1			3	1,2,3,4,7,10
CO4	3	2	2	1			1			3	1,2,3,4,7,10
CO5	3	2	2	1			1			3	1,2,3,4,7,10
CO6	3	2	2	1			1			3	1,2,3,4,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	

			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed $\frac{1}{4}$ of a page, 1page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R		U		A
I	Q4	Q1	Q9(a)	Q13(a)	
II					
III		Q2	Q10(a)	Q14(a)	
IV					
V		Q3	Q5,Q6	Q9(b),	Q13(b),

				Q11(a), Q11(b)	Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions	8			8	8

Code: 18LT-401F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –I, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours

Max. Marks: 20

PART-A

Instructions:

1. Answer **ALL** questions

04 X 01 = 04

2 Each question carries **ONE** mark

- Write the General solution of $(aD^2+bD+c)y = 0$, whose roots of auxiliary equation are real and distinct.
- Find the roots of auxiliary equation of the differential equation $(D^2 + 2D + 1)y = 0$
- Find the Particular Integral of $(D^2 - 4D + 1)y = e^{3x}$
- Find the P.I of $(D^2 - 16)y = \sin 4x$

PART-B

Instructions:

1. Answer any **TWO** questions

02 X 03 = 06

2. Each question carries **THREE** marks

5 a) Solve: $(D^2 + 3D - 54)y = 0$

Or

5 b) Solve : $(D^2 + 16)y = 0$

6 a) Solve : $(D^2 + 4D + 4)y = e^{2x}$

Or

6 b) Find P.I of $(D^3 + D)y = \sin 2x$

PART C

Instructions: 1. Answer **ALL** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Solve : $(D^3 - 2D^2 - 4D + 8)y = 0$ Or

7 b) Solve : $(D^3 - D^2 - D + 1)y = 0$

8 a) Solve : $(D^2 + 36)y = \sin^2 x$ Or

8 b). Solve : $(D^2 + 3D + 2)y = x^2$ @@@

Code: 18LT-401F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –II, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours

Max. Marks: 20

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04

2 Each question carries **ONE** mark

1. Define periodic function and give one example
2. Define Fourier series of the function $f(x)$ in the interval $(0, 2\pi)$
3. Write Half-range sine series of $f(x)$ in the interval $(0, \pi)$
4. Find a_0 for $f(x) = e^x$ in $0 < x < \pi$

PART-B

Instructions: 1. Answer any **TWO** questions 02 X 03 = 06

2. Each question carries **THREE** marks

5 a). If $f(x) = x^2$ in $(0, 2\pi)$, then find the value of a_n in Fourier series of $f(x)$

Or

5 b) If $f(x) = |x|$ in $(-\pi, \pi)$, then find the value of a_1 in Fourier series of $f(x)$

6 a). Find the value of a_n in half-range Cosine series for the function $f(x) = e^x$ in $(0, \pi)$

Or

6 b). Obtain the Fourier Half – Range Sine series for $f(x) = (\pi - x)$ in the interval $(0, \pi)$

PART C

- Instructions: 1. Answer any **TWO** questions 02 X 05 = 10
2. Each question carries **FIVE** marks

- 7 a). Obtain the Fourier series for $f(x) = x$ in the interval $0 < x < 2\pi$ Or
7 b). Find the Fourier series for $f(x) = (x - x^2)$ in the interval $(-\pi, \pi)$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots + \frac{\pi^2}{12}$$

- 8 a) Express $f(x) = \pi x - x^2$ as a half-range Sine series in $(0, \pi)$ Or
8 b). Find the half –range cosine series for the function $f(x) = x^2$ in the interval $(0, \pi)$

18LT-401F

BOARD DIPLOMA EXAMINATION, (C-18)
SEMESTER END EXAM MODEL PAPER
IV SEMESTER EXAMINATION
ADVANCED ENGINEERING MATHEMATICS

Time: 2 hours

[Total Marks: 40]

PART-A

- Instructions: 1. Answer **ALL** questions 08 X 01 = 08
2 Each question carries **ONE** mark

1. Find the roots of auxiliary equation of the differential equation $(D^2 + 4D)y = 0$.
2. Define Fourier Series for the function $f(x)$ in the interval $(c, c+2\pi)$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^x$
4. Find $L(e^{2t} + \cos 3t)$
5. Find $L(t + 5\cos ht)$
6. State the First Shifting theorem of Laplace Transforms.
7. Find $L^{-1}\left(\frac{1}{s-3} + \frac{s}{s^2+4}\right)$
8. Find $L^{-1}\left(\frac{1}{2s+5}\right)$

PART-B

Instructions:

1. Answer any **FOUR** questions

04 X 03 = 12

2. Each question carries **THREE** marks

9. a) Solve: $(D^2 + D + 1)y = 4e^{3x}$

Or

9 b) Find $L(t \cos 3t)$

10 a) Find Half Range Sine Series of $f(x) = x$ in $(0, \pi)$

Or

10 b) Find $L^{-1}\left(\frac{s+1}{s^2+6s-7}\right)$

11 a) If $L\{f(t)\} = \frac{20-4s}{s^2-4s+20}$, find $L\{f(3t)\}$

Or

11 b) Find $\int_0^\infty t \cdot e^{-2t} \sin 3t dt$ using Laplace Transform Technique

12 a) Show that $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right) = \frac{1-\cos at}{a^2}$

12 b) Find $L^{-1}\left(\frac{s}{(s+2)^2+4}\right)$

PART C

Instructions:

1. Answer any **FOUR** questions

04 X 05 = 20

2. Each question carries **FIVE** marks

13. a) Solve : Solve: $(D^2 + D - 2)y = x + \sin x$

Or

13 b) Find $L[te^t \sin 3t]$

14 a) Expand $f(x) = x^2$ as a Fourier series in the interval $(-\pi, \pi)$

Or

14 b) Find $L^{-1}\left(\frac{s}{(s+1)^2(s^2+1)}\right)$

15 a) Find $L\left(\frac{\sin 3t \cdot \cos t}{t}\right)$

Or

15 b) Evaluate $L\left\{\int_0^t \frac{\sin t}{t} dt\right\}$

16 a) Find $L^{-1}\left(\frac{1}{(s+1)(s+2)}\right)$ using Convolution theorem . Or

16 b). Solve the differential equation $y'' - 2y' - 8y = \sin t$, when $y(0) = 3$, $y'(0) = 6$ by

Laplace Transform method.

18LT-402C- CHEMISTRY OF TANNAGES, POST TANNAGES AND MICROBIOLOGY

Course Title	CHEMISTRY OF TANNAGES, POST TANNAGES AND MICROBIOLOGY	Course Code	: 18LT-402C
Semester	: Semester IV	Course Group	: Core
Teaching Scheme in Hrs(L:T:P)	: 48:12:0	Credits	: 3
Type of course	: Lecture + Assignments	Total Contact Hours	: 60 periods
CIE	: 60 Marks	SEE	: 40 Marks

Prerequisite: Basic knowledge of chemistry and microbiology in secondary education and later.

Course Outcome: On successful completion of the course, the students will have ability to attain below Course Outcomes (CO):

CO1: Explain the formation of coordination complexes.

CO2: Explain and relate the tanning power of various elements with leather through complex formation.

CO3: Explain the properties, uses, and preparation of aldehydes, oils and syntans in tannage.

CO4: Appraise the methods and mechanisms of combination tannages .

CO5: Make use of the materials in post tannages

CO6: Examine the life cycles, growth of bacteria, fungi and insects on skin and develop the control methods.

COURSE CONTENTS

UNIT-1: Basics of Coordination Chemistry

Duration: 8 periods (L:6 –T:2)

Recapitulation of ionic, covalent, coordinate covalent bond, hydrogen bond and their difference in formation, Coordination chemistry - Concept of double salt, coordination complex their formation and differences between them. Terminology and definition of coordination chemistry like central metal atom, ligand, classification of ligands, primary and secondary valencies of metal, charge (or) valency of complex, coordination number, Werner's postulates of coordination compounds. Effective atomic number (EAN).

UNIT-2: Chemistry of Chrome, Aluminium, Zirconium and Iron Tannages

Duration: 12 periods (L:10 –T:2)

Introduction to Mineral Tannage, Tanning power of various elements, advantages and disadvantages for their use for tanning,

Chemistry of Chrome Tannage - Chemistry of Chrome complexes - Electronic configuration, valency, oxidation states of chromium. Coordination number, compounds of chromium, hydrolysis behaviour of chrome salts. Formation of cationic, anionic and non-ionic chrome complexes. Concept of normal and basic chrome salts, methods of preparation of chrome liquor. Tests for the identification of reduction of chromium. Ageing of chrome liquor. Changes due to ageing, masking, masking agents, and their advantages. Basicity – various methods of expressions, brief methods of chrome tanning – chemical control of chrome tanning. Mechanism of chrome tanning. Self basified chrome salts. Floatless and power tannage.

Chemistry of Aluminium Tannage -Electronic configuration, valency, oxidation states. Compounds of aluminium, complexing ability of aluminium, hydrolysis behaviour of aluminium salts. Basic aluminium tan liquor preparation, ageing basicity, critical concentration, temperature dependence of critical concentration, method and mechanism of aluminium tanning, chemical controls of aluminium tanning with a special reference to added salt and masking agent.

Chemistry of Zirconium Tannage - Electronic configuration oxidation states, valency reactivity of zirconium, preparation of zirconium, tan liquor, method and mechanism of zirconium tannage. Factors influencing zirconium tannage.

Chemistry of Iron tannage-Compounds used-Problems in tanning-Solutions-Mechanism of tannage

UNIT-3 : Chemistry of Aldehyde, Oil and Syntan Tannages

Duration: 10 periods (L:08 –T:2)

Chemistry of Aldehyde Tannage - Recapitulation of reactions of aldehydes. Aldehydes used for tanning. Methods and mechanism of formaldehyde-glutaraldehyde-dialdehyde starch tannages-properties-uses-limitations

Chemistry of Oil Tannage - Lipids – Definition – Oils, fats, waxes – Differences – Classification of oils – Suitability of oils for tanning, physical and chemical properties, method and mechanism of oil tanning. Properties of fish oil. Synthetic substitute.

Chemistry of Syntan Tannage - Definition – Comparison with vegetable tanning – Classification – Properties and differences – Methods of preparation – Tanning power of syntan – uses of syntans. Resin tannages-Impregnating agents-Urea formaldehyde, Dicynamide-formaldehyde-Resorcinol formaldehyde-Furfuryl alcohol resins-Styrene-maleic anhydride resins

UNIT-4 : Chemistry of Combination Tannage

Duration: 8 periods (L:8 –T:0)

Objectives of combination tannage. Method and mechanisms of combination tannages involving – (a) Chrome retanning with vegetable, (b) Vegetable retanning with chrome, (c) Chrome – syntan, (d) Chrome aluminium e) retanning with aldehyde f) retanning with oil

UNIT-5: Chemistry of Post-tanning Operations

Duration: 10 periods (L:8 –T:2)

Neutralization - Definition, objectives, materials used for neutralization – choice of neutralizing agent, neutralization of chrome tanned leather, effect of neutralisation on dyeing and fat liquoring.

Dyes and Dyeing - Definition, objectives and properties of dye, Witt's theory of colour and constitution, classification of dyes according to chemical composition and application. Dye levelling and fixing agents mechanism of dyeing.

Fat Liquoring and Stuffing - objectives, oils used for the preparation of fat liquor classification of fat liquors, method and mechanism of fat liquoring spew – reasons for formation – remedies.

UNIT-6: Bacteriology, Mycology and Entomology in Leather Processing

Duration: 10 periods (L:8 –T:2)

Bacteriology - Enzymes of bacteria- Action of bacteria on proteins and amino acids- Protein sparing effect- Putrefaction- Decay- Action on amino acids- Illustration of various biochemical properties of bacteria- liquefaction of gelatin, Indole test, Fermentation, Ammonia liberation, Hydrogen sulphide production - Changes in structure of the skin due to bacterial action - Bacteriology of curing soaking, liming, bating, vegetable tanning - Eco-friendly technological applications of bacteria.

Mycology-Definition-Difference of bacteria and fungi- Morphology of fungi-Reproductive structures- Fungal damages on live stock and in leather processing – Mildew resistance of leather.

Entomology-Definition-Parts of Insect-General Life Cycle- Insect damages in antemortem stage – Life cycle of insects-Warble fly, Ticks, Lice, Mange mites -Insect damages in postmortem stage – Life cycles of insects- Dermestes maculatus, Attagenus gloriosae and Anthrenus vorax beetles -Control of insects.

Specific Learning Outcomes :

Upon completion of the course, the student will have ability to

1.0 Basics of Coordination Chemistry

- 1.1 Recapitulate the formation of ionic, covalent, coordinate covalent bond, and hydrogen bond.
- 1.2 Define stoichiometry, double salt and coordination complex.
- 1.3 Distinguish between double salt and coordination complex.
- 1.4 List examples of double salt and coordination complexes.
- 1.5 Define donor- ligand, acceptor – central metal atom.
- 1.6 Classify the ligands based on charge into negative, positive and neutral ligands.
List examples for the above.
- 1.7 Classify the ligands on the basis of electron donation monodentate, bidentate, polydentate. List the examples for the above classes.
- 1.8 Define primary and secondary valencies of metal.
- 1.9 State condition required for the formation of a coordination complex.
- 1.10 Describe coordination number with example.
- 1.11 State the relationship between coordination number and secondary valency.
- 1.12 Describe the charge (or) valency of complex ion.
- 1.13 State postulates of Werners theory of coordination complex.
- 1.14 Describe effective atomic number (EAN).

2.0 Chemistry of Chrome, Aluminium, Zirconium and Iron Tannages

- 2.1 Introduction to Mineral Tanning. Identify the elements having tanning power.
List advantages and disadvantages to use them for tanning.
- 2.2 Chemistry of Chrome Tanning. List compounds of chromium. State electronic configuration of chromium. Identify the valency and oxidation states of chromium in compounds.
- 2.3 Describe the coordination number of chromium with examples.
- 2.4 Explain hydrolysis behavior of chrome complexes
Describe the formation of cationic, anionic and non-ionic chrome complexes.
- 2.5 State effect of addition of acid and alkali on charge of chrome complexes.
- 2.6 Distinguish between normal and basic chromium salts.
- 2.7 Describe quantities of materials required, methods followed for the preparation of chrome liquor using glucose, starch, molasses, sawdust, bisulphite and hypo as reducing agents.
- 2.8 State methods for testing complete reduction of chromium (two tests only).
- 2.9 Define ageing of chrome liquor. Describe the changes - oxidation, oxolation and polymerization due to ageing.
- 2.10 Define masking and masking agent. List out masking agents. State use of masking agent on affinity of chrome liquor. State merits and demerits of masking agents for their use.
- 2.11 Define basicity. State methods of expression of basicity – Schrollmer and Procter.
Inter conversion formulae for changing basicity
- 2.12 Describe differences between single bath and two-bath chrome tanning.

State reactions taking place in single bath and two-bath chrome tanning.

- 2.13 Describe the reaction of basic chrome liquor with collagen.
- 2.14 Study effect of P^H basicity, time, salt, concentration on chrome tanning.
- 2.15 Define self basified chrome salts. Write composition of self basified chrome salt, and its advantages.
- 2.16 State floatless tannage (or) powder tannage.
- 2.17 Chemistry of Aluminium Tannage. Write electronic configuration and valency of aluminium. List various compounds of aluminium
- 2.18 State Hansen's rule.
- 2.19 State complexing ability of aluminium.
- 2.20 Describe hydrolysis behaviour of aluminium. Distinguish between normal and basic aluminium salts.
- 2.21 Describe materials and method of aluminium tan liquor preparation.
- 2.22 Express basicity of aluminium tan liquor.
- 2.23 Define critical concentration of aluminium. State Effect of Temperature on Critical Concentration.
- 2.24 Describe ageing – oxolation, olation and polymerization.
- 2.25 Describe the interaction of aluminium tan liquor with pelt.
- 2.26 Study the effect of P^H , concentration, basicity, time, salt and masking agent on aluminium tanning.
- 2.27 Compare Cr and Al tanning
- 2.28 Chemistry of Zirconium Tannage. Write electronic configuration and valency of zirconium. List various compounds of zirconium.
- 2.29 State materials used and methods for preparation of zirconium tan liquor.
- 2.30 Study method of zirconium tannage.
- 2.31 Describe the reaction of zirconium with collagen.
- 2.32 Study the effect of concentration, time, basicity P^H on zirconium tannage.
- 2.33 Chemistry of Iron tannage Write electronic configuration and valency of iron. List various compounds of iron.
- 2.34 State the Problems with iron tannage and solutions.
- 2.35 Describe the formation of iron hydroxide.
- 2.36 State materials used, method followed for the iron tan liquor preparation.

2.37 Describe the mechanism of iron tannage.

UNIT-3: Chemistry of Aldehyde, Oil and Syntan Tannages

- 3.1 State the structure of aldehyde functional group.
- 3.2 List the aldehydes used for tanning.
- 3.3 Explain the reactivity of aldehyde group
- 3.4 State the Preparation and properties of Formaldehyde
- 3.5 Explain the mechanism of tanning with formaldehyde in acid and alkaline media
- 3.6 List the properties of formaldehyde tanned leathers
- 3.7 List the drawbacks of formaldehyde tanning
- 3.8 Explain the advantage, reactivity of Glutaraldehyde in tanning
- 3.9 State the structure of starch
- 3.10 Explain the formation of dialdehyde starch
- 3.11 Explain the reactivity of dialdehyde starch with collagen
- 3.12 Define lipids.
- 3.13 Classify lipids into oils, fats and waxes.
- 3.14 State the structure and composition of oil or fat.
- 3.14 State Saturated and Unsaturated Fatty acids-their structures and examples
- 3.15 Distinguish between oils, fats and waxes.
- 3.16 State physical properties of oils and fats.
- 3.17 Mention chemical properties like hydrogenation, oxidation, emulsification, drying, rancidification, sulphonation.
- 3.18 Classify oils based on their origin
- 3.19 Requirement for an oil to use for tanning.
- 3.20 Describe testing of suitability of oils for tanning (Mackey test).
- 3.21 Mention method of oil tanning.
- 3.22 Explain the mechanism of interaction of oil with pelt.
- 3.23 Realise the synthetic substitute for fish oil.-Immergan
- 3.24 Define syntan
- 3.25 State the necessity of syntans in leather manufacture
- 3.26 Explain similarity between vegetable tannins and syntans
- 3.27 Classify syntans

- 3.28 State the uses of syntans
- 3.29 Explain the preparation method, properties and mechanism of tanning for the following types of syntans. Auxiliary, Combination, Replacement, Amphoteric, Supra Syntans
- 3.30 Discuss the factors affecting tanning power of syntans
- 3.31 State Resin tanning agents and their role in tanning
- 3.32 Define an impregnating agent
- 3.33 Study the preparation and properties of the resin tanning agents:
- 3.34 Urea-formaldehyde, Dicynamide-formaldehyde resins, Resorcinol-formaldehyde resins, Furfuryl alcohol resins, Styrene-maleic anhydride resins

4.0 Chemistry of Combination Tannage.

- 4.1 State the objectives of retanning.
- 4.2 Distinguish between the properties of chrome tanned and vegetable tanned leather.
- 4.4 Explain the method of chrome retanning with vegetable tanning.
- 4.5 State Vegetable tanned leathers retanning with chrome.
- 4.8 Explain combination tanning with syntans.
- 4.10 Explain combination tanning with aldehyde.
- 4.11 Explain combination tanning with oils.

UNIT-5: Chemistry of Post Tanning Operations

- 5.1 List out various post-tanning and finishing operations.
- 5.2 State necessity of neutralization. List the chemicals used for neutralization.
Select neutralizing agent depending upon PH values and properties of leathers.
- 5.3 Describe the mechanism of neutralization of chrome tanned leather.
- 5.4 Describe the effect of neutralization on tanning, dyeing and fat liquoring and on leathers.
- 5.8 State the necessity for dyeing. Define dye.
- 5.9 Describe theory of colour production.
- 5.10 Define complementary colour. Define chromophore, chromogen, auxochrome, bathochrome and hypsochrome. List out examples .
- 5.11 Classify the dyes according to chemicals composition and application.
- 5.12 Define metal complex dyes. Define dye levelling agents and fixing agents.

List out examples.

- 5.13 Describe the mechanism of dyeing with different classes of dyes
- 5.14 State reasons for fat liquoring. Define fat liquor.
- 5.15 List materials used for fat liquor preparation.
- 5.16 Describe the method of preparation of fat liquor.
- 5.17 Classify the fat liquors – cationic, anionic, non-ionic, solvent and synthetic.
- 5.18 Specify the advantages of solvent fat liquors.
- 5.19 Describe the interaction of fat liquors with leather.
- 5.20 Describe spew and reasons for formation.
- 5.21 State remedies for spew.

6.0 Bacteriology ,Mycology and Entamology in Leather Processing

- 6.1 Describe the action of bacteria on proteins
- 6.2 Illustrate protein sparing effect
- 6.3 Compare putrefaction and decay
- 6.4 Illustrate the biochemical properties of bacteria such as liquefaction of gelatin, fermentation, peptonization, production of indole, production of hydrogen sulphide, liberation of ammonia
- 6.5 Comprehend the role of bacteria in leather processing
- 6.6 Define autolysis
- 6.7 Explain the mechanism of bacterial action on hides and skins
- 6.8 State the bacteriostatic effect of salt. Explain the quality of salt on bacterial flora in skins.
- 6.9 Describe the damages due to improper cure- Red heat, Hair slip , Salt stains, gelation, epidermal voids. State remedial measures.
- 6.10 State the factors favoring bacterial growth in soaking
- 6.11 List the bacterial damages in soaking
- 6.12 Describe bacteriology of liming
- 6.13 List the species involved in ‘Sweating’
- 6.14 Name the bacteria involved in bating
- 6.15 State the effects of fermentation of vegetable tan liquors by bacteria
- 6.16 Define the science Mycology. Comprehend the fungal damages on leather

- 6.17 Recognize the fungi as a plant species
- 6.18 State the characteristics of fungi
- 6.19 Differentiate bacteria from fungi
- 6.20 State the conditions favorable for mould growth
- 6.21 Draw the morphology of fungi
- 6.22 Explain the types of hyphae. Understand the method of reproduction in fungi
- 6.23 Describe the fungal damages on livestock, their mode of transmission, species involved, animals affected- Ringworm, Favus, Eczema, and streptothricosis
- 6.24 Identify the stages in leather processing favourable for mould growth
- 6.25 State the effects of mould growth on leathers, pickled pelts and tan liquors
- 6.26 State the eco-friendly technological applications of fungal enzymes in leather sector
- 6.27 State the preservation techniques for controlling mould growth
- 6.28 Define mildew resistance. Assess the mildew resistance of leathers
- 6.29 Define entomology. Understand the lifecycle and mode of damage by insects
Classify the insects with regard to type of damage
- 6.30 Describe the damage and life cycle of insects and parasites on living animals-Warble fly, Ticks, Lice, Mange mites
- 6.31 Describe the damage and life cycle of insects on stored hides and leathers- Dermestes, Anthrenus, Attagenus species of insects
- 6.32 Name the methods of control of insects

Reference Books :

1. Bianciewicz, Physical Chemistry of Leather Manufacture.
2. K.H.Gustavson, Chemistry of Tanning Processes.
3. Fred O Flaherty, Chemistry and Technology of Leather vol.1,2,3,4, Rober E. Krieger Publishing Co.
- 4 . S.S.Dutta, Introduction to the Principles of Leather Manufacture, ILTA, Calcutta.
5. Progress in leather science, BLMRA, London.
6. A.J.Salle, fundamental principles of bacteriology, MC.Graw Hill book company.
7. Histological characteristics of Indian Hides and Skins – CLRI publication.
8. J.C.Tancouse, Skin, hide and leather defects.
9. Veterinary, Parasitology, E.Gurr.

E - learning links:

<https://iupac.org/>

<https://www.youtube.com>

<https://www.khanacademy.org/>

www.nptel.ac.in

CO PO Mapping Matrix

CO	Course outcome	CL	Linked PO	Teaching periods
CO1	Explain the formation of coordination complexes	R/U/A	1,2,3	08
CO2	Explain and relate the tanning power of various elements with leather through complex formation	R/U/A	1,2,3,4,6,8,10	12
CO3	Explain the properties, uses, and preparation of aldehydes, oils and synatans in tannage.	R/U/A	1,2,3, 4,6,8,10	10
CO4	Appraise the methods and mechanisms of combination tannages .	R/U/A	1,2,3,6	08

CO5	Make use of the materials in post tannages	R/U/A	1,2,3,4,6,10	10
CO6	Examine the life cycles, growth of bacteria, fungi and insects on skin and develop the control methods.	R/U/A	1,2,3,4,6,10	10
	Total Periods			60

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R		U	A	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V	4	3	5, 6	9(b)	13(b)
					11(a)	
			7,8	11(b)	15(a)	15(b)
					10(b)	
6	VI			12(a)	16(a)	
				12(b)	16(b)	
Total Questions		8		8	8	

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

Model Paper for Mid Sem-I

BOARD DIPLOMA EXAMINATION, (C-18)

GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY-HYDERABAD

DLT-FOURTH SEMESTER, 18LT-402C

CHEMISTRY OF TANNAGES, POST TANNAGES AND MICROBIOLOGY

Time: 1 hr.

Total Marks: 20 M

Important Note: Wherever any question has choice, marks will be allotted only to first attempted question. **No marks will be allotted for extra questions answered**

PART-A

(4x1 = 4M)

Note: Answer **ALL** the questions. Each question carries 1 mark.

The length of the answer shall not exceed 1/4 of page

1. Define EAN
2. What are neutral ligands?
3. Define masking
4. Write the electronic configuration of chromium.

PART-B

(2 x 3 = 6M)

Note: Answer the following questions. Each question carries 3 marks. The length of the answer shall not exceed 1 page

5. a) Distinguish between double salt and coordination complex.

OR

- b) Explain primary valency and secondary valency with an example.

6. a) Why aluminium is less reactive than chromium? Explain

OR b) Distinguish between chrome and aluminium liquors.

PART-C

(2x5 = 10M)

Note: Answer the following questions. Each question carries 5 marks. The length of the answer shall not exceed 2 pages

- 7.a) Explain Werner's theory of coordination complexes.

OR

- b) Classify the ligands based on number of donor atoms and also the charge on ligands.

8. a) Explain the effect of masking agents in aluminium liquors.

OR b) Outline the preparation of chrome liquors by using reducing agents?

Model Paper for Mid Sem-II

BOARD DIPLOMA EXAMINATION, (C-18)

GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY-HYDERABAD

DLT-FOURTH SEMESTER, 18LT-402C

CHEMISTRY OF TANNAGES, POST TANNAGES AND MICROBIOLOGY

Time: 1 hr.

Total Marks: 20 M

Important Note: Wherever any question has choice, marks will be allotted only to first attempted question. **No marks will be allotted for extra questions answered**

PART-A

(4x1 = 4M)

Note: Answer **ALL** the questions. Each question carries 1 mark.

The length of the answer shall not exceed 1/4 of page

1. Define lipids.
2. What are syntans?
3. List out the aldehydes used in combination tannage
4. What is alum retanning?

PART-B

(2 x 3 = 6M)

Note: Answer the following questions. Each question carries 3 marks. The length of the answer shall not exceed 1 page

5. a) What is immergan? Explain

OR

- b) List the properties of formaldehyde tanned leathers.

6. a) Write about two objectives of combination tannage.
b) State the materials used in chrome retanning with vegetable tanning.

PART-C

(2x5 = 10M)

Note: Answer the following questions. Each question carries 5 marks. The length of the answer shall not exceed 2 pages

7. a) Discuss the factors affecting the tanning power of syntans.

OR

- b) Discuss the classification of lipids.

8. a) Distinguish between properties of chrome tanned and vegetable tanned leathers,

OR

- b) Explain the combination tanning with oils.

Model Paper for SEE

BOARD DIPLOMA EXAMINATION, (C-18)

GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY-HYDERABAD

DLT-FOURTH SEMESTER, 18LT-402C

CHEMISTRY OF TANNAGES, POST TANNAGES AND MICROBIOLOGY

Time :2 Hrs

Total Marks : 40

Important Note: Wherever any question has choice, marks will be allotted only to first attempted question. **No marks will be allotted for extra questions answered**

PART – A

(8x1 = 8M)

Note: Answer **ALL** the questions. Each question carries **1** mark.

The length of the answer shall not exceed 1/4 of page

1. Define double salt.
2. What is Mackey test?
- 3 What is retanning?
4. Define masking
5. Why leathers are to be neutralized?
4. Define chromophore.
6. Define enzyme.
8. Write the conditions favours for fungal growth.

PART- B

(4 x 3 = 12M)

Note: Answer the following questions. Each question carries **3** marks.

The length of the answer shall not exceed 1 page

9. (a) Calculate the oxidation number of chromium in (i) CrCl_3 and (ii) $\text{Cr}(\text{CO})_6$

OR

- (b) Write any three reasons for spew formation.

10. (a) List the properties of fish oil.

OR

- (b) State the effects of mould growth on leathers

11. (a) Write the properties of dye.

OR

(b) Mention the objectives of neutralization.

12. (a) Classify the enzymes of bacteria

OR

(b) Distinguish between bacteria and fungi.

PART - C

(4x5 =20M)

Note: Answer the following questions. Each question carries 5 marks

The length of the answer shall not exceed 2 pages

13. (a) How chrome liquors are prepared by organic reducing agents?

OR

(b) Explain the mechanism of fat liquoring.

14. (a). Write the problems encountered during retanning of chrome tanned leathers with vegetable tannins.

OR

(b) Explain the mechanism of bacterial action on hides and skins..

15. (a) Write the effect of neutralization on dyeing and fat liquoring.

OR

(b) Discuss Witts theory of color and constitution..

16. (a) Explain the terms (i) Red heat and (ii) Peptonization.

OR

(b) Narrate the life cycles of warble fly.

PROCESS OF LIGHT LEATHERS

Course Title : PROCESS OF LIGHT LEATHERS	Course Code : 18LT-403C
Semester : Semester IV	Course Group : Core
Teaching Scheme in Hrs(L:T:P) : 50: 10:0	Credits : 3
Type of course : Lecture + Assignments	Total Contact Hours : 60 periods
CIE : 60 Marks	SEE : 40 Marks

Pre Requisites:

This course requires the basic knowledge of pre-tanning operations, tanning, post-tanning operations done in leather processing

Course outcomes:

On successful completion of the course the student will be able to :

Course outcomes		Teaching Hours	Linked POs
CO1	Assort the raw hides and skins into different grades and select suitable raw material for making required type of leather	5	P1,P2
CO2	List and explain the manufacture of different chrome tanned leathers	15	P2, P3
CO3	Explain the processing of E.I Leathers from different raw material	8	P2,P3,P4
CO4	Explain the dressing of E.I Leathers into different types of leathers	12	P2,P3
CO5	Explain the manufacture of chamois, hair on tanned and shrunken grain leathers	10	P1,P2 ,P6
CO6	Make use of different chrome tanned and E.I Leathers like upper leathers, garment leathers, lining leathers e.t.c	10	P2,P6,P10
		60	

COURSE CONTENT:

Unit –I : Assortment:

Duration: 05 Periods (L: 05 – T:0)

The assortment of leathers – the need – the defects observed selection of skins for particular type of leather – size and defects.

Unit – II : Chrome Leathers:

Duration: 15 Periods (L:10 – T:5)

Processing of wet blue from W/S skins/hides to process different types of leathers i.e., uppers, garments, lining and leather goods leather glove leather etc.

Unit – III : E.I. Leathers:

Duration: 8 Periods (L: 08 –

T:0)

The purpose of making E.I. tanning – the processing of E.I tanned leather from W/S sheep, goatskins, buffalo, cow calf and reptile skins manufacturing of E.I. leather from pickled stocks.

Unit – IV : Dressing of E.I. Leathers:

Duration: 7 Periods (L: 7 – T:5)

The purpose of dressing E.I. leathers and operations involved in dressing of E.I. leathers and making of different types of leathers from E.I. skins for making upper, garments and book binding etc.

Unit – V : Miscellaneous Leathers:

Duration: 10 Periods (L: 10 – T:0)

Manufacturing of chamois leathers, special leathers, reptile leathers, and hair on tanned leathers. Properties and process controls in leather manufacture.

Unit – VI: Application of E.I leathers & chrome leathers Duration: 10 Periods (L: 10 – T:0)

Properties and uses of full chrome and semi-chrome shoe upper leathers, lining leathers, garment leathers, chamois leathers, glove leathers

SPECIFIC LEARNING OUTCOMES:

Unit I: Assortment:

- 1.1 List objectives of assortment
- 1.2 List defects observed in hides/skins.
- 1.3 Explain the selection of wet salted hides/skins for specific type of leather.
- 1.4 Explain the assortment of pickled leathers.
- 1.5 Explain the assortment of E.I. skins for making garment/upper leather etc.
- 1.6 Explain the grading of different leathers.

Unit II: Chrome Leathers:

2.0 Explain the Processing of wet blue from wet salted skin.

- 2.1 outline the manufacture of F/C goat upper leathers from wet salted goatskin.
- 2.2 Explain the manufacture of F/C glazed garment leathers from wet salted sheepskin.
- 2.3 Describe the manufacture of F/C suede garment leathers from wet salted sheepskin skins and goatskins.
- 2.4 Explain the manufacture of Grain garment leathers from wet salted sheep skin/goat skin.
- 2.5 Outline the manufacture of F/C upper leather from wet salted sheepskins.
- 2.6 Explain the manufacture of Upper leathers from wet salted cowhides.
- 2.7 Explain the manufacture of Lining leathers from wet salted cowhides.
- 2.8 Outline the manufacture of F/C suede upper leathers from wet salted goatskins.
- 2.9 Explain the manufacture of F/C suede upper leather from wet salted cowhides.
- 2.10 Explain the manufacture of Nubuck leathers from wet salted cowhides.
- 2.11 Explain the manufacture of Corrected grain upper leather from wet blue cow sides.
- 2.12 Outline the manufacture of Manufacture of white leathers.
- 2.13 Explain the manufacture of Upper leathers and from wet blue cow and buff calf skins.
- 2.14 Describe the manufacture of Upholstery leathers.
- 2.15 Explain the manufacture of Suede lining leathers.
- 2.16 Explain the manufacture of F/C leather goods nappa leather.
- 2.17 Describe the manufacture of F/C crust from wet blue sheep/goat skins.
- 2.18 Explain the manufacture of glove leathers from wet salted goatskins.
- 2.19 outline the Processing of chrome retanned crust from wet blue sheep/goat skins.

Unit III: E.I. Tanning:

- 3.1 List Specific reasons for E.I. tanning.
- 3.2 Explain the Processing of E.I. leathers from wet salted sheepskins.
- 3.3 Explain the Processing of E.I. leathers from pickled sheepskins
- 3.4 Describe the Processing of E.I. leathers from wet salted goatskins
- 3.5 Explain the Processing of E.I. leathers from pickled goatskins
- 3.6 Describe the Processing of E.I. leathers from reptile skins.
- 3.7 Explain the Processing of E.I. leathers from buffalo calf and cow calf

Unit IV: Dressing of E.I. Leathers:

- 4.1 List reasons for dressing of E.I. leathers.
- 4.2 describe operations involved in dressing of E.I. leathers.

- 4.3 List different types of leathers made from E.I. leathers.
- 4.4 Explain the manufacture of Semi chrome goat resin upper leather.
- 4.5 Explain the manufacture of Semi chrome goat glazed upper leather.
- 4.6 Explain the manufacture of Semi chrome glazed sheep nappa leather.
- 4.7 Explain the manufacture of Semi chrome sheep grain garments leathers.
- 4.8 Explain the manufacture of Semi chrome sheep shade garment leathers.
- 4.9 Explain the manufacture of Semi chrome sheep resin upper leather.
- 4.10 Explain the manufacture of Semi chrome aniline buffalo calf leather.
- 4.11 Explain the manufacture of Semi chrome lining leathers from E.I., goat/sheep skin.
- 4.12 Explain the manufacture of semi alum leathers.
- 4.13 Explain the manufacture of Book binding leathers.
- 4.14 Explain the manufacture of Morocco leathers.
- 4.15 Explain the manufacture of semi chrome Nappa for leather goods.

Unit V: Miscellaneous Leathers:

- 5.1 Explain the manufacture of chamois leathers from wet salted skins.
- 5.2 Explain the manufacture of hair on tanned leathers.
- 5.3 Explain the Processing of reptile skins.
- 5.4 Explain the manufacture of shrunken grain leathers.
- 5.5 Describe Process controls in processing of garment leather.
- 5.6 List Properties of different leathers.
- 5.7 Compare differences between resin and glaze finish.
- 5.8 Compare differences between semi chrome and full chrome leathers.
- 5.9 Compare differences between aniline finish and semi aniline finish leathers
- 5.10 Outline sandwich dyeing of leathers

UNIT VI: Application of E.I leathers & chrome leathers

- 6.1 List the Properties and uses of full chrome upper leather
- 6.2 Explain the Properties and uses of semi- chrome upper leather
- 6.3 List the Properties and uses of full chromelining leather
- 6.4 Explain the Properties and uses of semi- chrome lining leather
- 6.5 Explain the Properties and uses of full chrome grain garment leather
- 6.6 List the Properties and uses of full chrome suede garment leather
- 6.7 Explain the Properties and uses of semi- chrome suede garment leather
- 6.8 List the Properties and uses of hand glove leather
- 6.9 Explain the Properties and uses of chamois leather
- 6.10 List the Properties and uses of hair on tanned leather
- 6.11 Explain the Properties and uses of shrunken grain leather

SUGGESTED LIST OF STUDENT ACTIVITIES:

Note: The following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1. Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned Teacher and HOD.
2. Each student should conduct different activity and no repeating should occur

SUGGESTED BOOKS FOR REFERENCE:

- 1) C Koteswara Rao and M.S. Olivannan - Lecture notes on dyeing and finishing of leathers. C.L.R.I.,
- 2) The manufacture of upper leathers - D.H. Tuck, Tropical products institute, London 1981.
- 3) Gloving, clothing and special leathers -P.S. Briggs, Tropical products institute, London, 1981.
- 4) C.L.R.I. publication, Adyar, Madras – 20

SUGGESTED E- LEARNING REFERENCES:

1. <http://www.iltaonleather.org/jilta.html>
2. <https://www.clri.org/>
3. <http://alcajournal.com>

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM –II EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks	
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
6	VI				11(a)	15(a)	
		7,8	10(b)	14(b)			
			12(a)	16(a)			
			12(b)	16(b)			
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

BOARD DIPLOMA EXAMINATION, (C-18)
MIDSEM – I
FOURTH SEMESTER EXAMINATION
PROCESS OF LIGHT LEATHERS

TIME: 1 Hour

TOTAL MARKS: 20

Important Note: Wherever any question has choice, marks will be allotted only to first attempted question. **No marks will be allotted for extra questions answered**

PART - A**(4x1 = 4M)**

Note: Answer **ALL** the questions. Each question carries **1** mark.
 The length of the answer shall not exceed 1/4 of page

1. Define Ante mortem defects?
2. Define Assortment.
3. What are upholstery leathers?
4. Write the uses of Lining Leathers?

PART- B**(2 x 3 = 6M)**

Note: Answer the following questions. Each question carries **3** marks.
 The length of the answer shall not exceed 1 page

- 5 (a). Mention the different grades in wet salted Goat Skins?
 (OR)

(b). List some defects observed in assortment?

- 6 (a). List some unhairing agents?
 (OR)

(b). write the procedure for checking the completion of chrome tanning?

PART-C**(2x5=10M)**

Note: Answer the following questions. Each question carries **5** marks
 The length of the answer shall not exceed 2 pages

- 7 (a). Explain the assortment of wetblue and EI Leathers?
 (OR)

(b). Explain the assortment of pickled pelts?

- 8 (a). Explain the manufacture of Full chrome upper Leathers from wet blue cow sides?
 (OR)

(b). Explain the manufacture of glove Leathers from wetblue goat skins?

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BOARD DIPLOMA EXAMINATION, (C-18)
MIDSEM – II
FOURTH SEMESTER EXAMINATION
PROCESS OF LIGHT LEATHERS

TIME: 1 Hour

TOTAL MARKS: 20

Important Note: Wherever any question has choice, marks will be allotted only to first attempted question. **No marks will be allotted for extra questions answered**

PART - A**(4x1 = 4M)**

Note: Answer **ALL** the questions. Each question carries **1** mark.
 The length of the answer shall not exceed 1/4 of page

1. List some vegetable tanning materials used in EI Tanning?
2. What is oiling?
3. What is stripping?
4. What is meant by Bleaching?

PART- B**(2 x 3 = 6M)**

Note: Answer the following questions. Each question carries **3** marks.
 The length of the answer shall not exceed 1 page

- 5 (a). outline the principle of vegetable Tanning?
 (OR)

(b). Write the specific reasons for E I Tanning?

- 6 (a). List the reasons for dressing of EI Leathers?
 (OR)

(b). List the chemicals used in bleaching of EI leathers?

PART-C**(2x5=10M)**

Note: Answer the following questions. Each question carries **5** marks
 The length of the answer shall not exceed 2 pages

- 7 (a). Explain the Processing of wetsalted sheep skins into EI leathers by rapid method?
 (OR)
 (b). Describe the process for the manufacture of EI from wetsalted buff calf?
- 8 (a). explain the manufacture of semichrome goat suede from EI goat skins?.
 (OR)
 (b). Explain the major steps in the production of semichrome crust from EI goat skins?
 of a bar magnet.

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BOARD DIPLOMA EXAMINATION, (C-18)
END EXAMINATION
FOURTH SEMESTER EXAMINATION
PROCESS OF LIGHT LEATHERS

TIME: 2 Hour

TOTAL MARKS: 40

Important Note: Wherever any question has choice, marks will be allotted only to first attempted question. **No marks will be allotted for extra questions answered**

PART – A

Instructions: 1. Answer **ALL** questions.
2. Each question carries **ONE** mark.

8X1=08

1. List objectives of assortment?.
2. Why stripping is done for EI leathers?
3. What is shrunken grain Leather?
4. State the uses of Chamois leather?
5. What are semi chrome leathers?
6. What type of tanning is suitable for Hair-on Tanned Leather?
7. Name the properties of full chrome Lining Leathers?
8. What are the properties of Hand Glove Leathers?

PART – B

Instructions: 1. Answer the following questions.
2. Each question carries **THREE** marks.

4X3=12

- 9(a). Outline the processing of Wetblue from wetsalted skins?
(or)
9(b). Demonstrate the process controls in processing of garment Leathers?
- 10(a). Outline the dressing of EI Leathers?
(or)
10(b). Classify the different types of Garment leathers?
- 11(a). Compare aniline finished and semi aniline finished Leathers?
(or)
11(b). Demonstrate the properties of Lacquer finish?
- 12(a). Outline the properties of semichrome garment Leathers?
(or)
12(b). Compare fullchrome and semichrome suede Leathers?

PART – C

4X5 = 20

- Instructions:
1. Answer the following questions.
 2. Each question carries **FIVE** marks.

13(a). Explain the different stages of assortment?

(or)

13(b). Describe the manufacture of Chamois Leathers from wetsalted skins?

14(a). Explain the processing of EI Leathers From wetsalted goat skins?

(or)

14(b).). Explain the processing of full chrome upper Leather from Wetblue cow sides?

15(a).). Explain the processing of shrunken grain Leather?

(or)

15(b). Describe the manufacture of Leathers from reptile skins?

16(a).). Explain the processing of fullchrome grain garment leathers from wetblue sheep skins?

(or)

16(b). Explain the properties and uses of hair on tanned Leathers?

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18LT-404C- Leather Machinery Maintenance Engineering

Course Title :	Leather Machinery Maintenance Engineering	Course Code	18LT-404C
Semester	IV	Course Group	Core
Teaching Scheme in Periods(L:T:P)	3:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods :	60Pds
CIE	60 Marks	SEE	40 Marks

Legend: R: Remember, U: Understand A: Application An: Analyze

Rationale:

The objective of this course is to make student to understand working system of various leather manufacturing machinery, maintenance of machinery, plant maintenance procedures.

Pre requisites

Basic knowledge of Introductory Leather Pretanning operations, post tanning operations and light leathers manufacture.

Course Outcomes

- CO1 : Analyzing various factors influencing site selection for establishing an industry.
- CO2 : Explain objectives of plant maintenance, advantages and disadvantages of various plant maintenance procedures
- CO3 : Explain the impact of hard water on various tannery operations, importance of lubrication, Identify oils and lubricants used in maintenance of machines.
- CO4 : Explain the specific usage of different pits, functioning of paddle
- CO5 : Identify various pre tanning, tanning, explain working system and its maintenance.

CO6 : Identify various Post tanning machinery, explain working system and its maintenance.

Specific Learning Outcomes

Upon completion of the course the student should be able to

1.0 Selection of site.

1.1 Explain the influence of following factors in site selection of industry.

1.1.1 Raw materials

1.1.2 Transportation.

1.1.3 Availability of water

1.1.4 Power.

1.1.5 Availability of skilled labour.

1.1.6 Cost of labour.

1.1.7 Accession to market.

1.2 Study of the above factors with regard to Leather industry.

1.3 Identify advantages, disadvantages of site selection in rural and urban areas.

2.0 Plant maintenance

2.1 Explain objectives of plant maintenance

2.2 Identify various Plant maintenance procedures

2.3 Explain following maintenance procedures, list advantages and disadvantages

Preventive maintenance

Breakdown maintenance

Predictive maintenance

Scheduled maintenance procedures

2.4 Explain maintenance procedure followed in footwear machines

2.5 Identify various costs to be taken into account while estimating repair and maintenance cost.

3.0 Water, oils & lubricants

- 3.1 Requirement of water for various operations in tannery
- 3.2 Different sources of water
- 3.3 Water cycle
- 3.4 Impact of hard water on various processing operations
- 3.5 Different types of storage of water, distribution of water
- 3.6 Objectives of lubrication
- 3.7 Identify properties required for a good lubricant
- 3.8 Classify lubricants
- 3.9 Lubricants used for hydraulic machine – specification

4.0 Pits and paddles

- 4.1 State the uses of pits
- 4.2 List different types of pits
- 4.3 Explain Constructional details of Soaking and liming pits
- 4.4 Describe method of preparation of Vegetable tan liquor by leach pits
- 4.5 Explain maintenance of pits
- 4.6 State the purpose of Paddle
- 4.7 Explain Constructional details, working system and maintenance of paddle
- 4.8 Distinguish Pits & Paddles

5.0 Pre tanning and tanning Machinery

- 5.1 List various machines used in Pre tanning operations
- 5.2 Materials used for making drums
- 5.3 Constructional details , speeds of drums used for various operations
- 5.4 Calculate capacity of drum
- 5.5 Explain Working system, maintenance of wooden drum
- 5.6 Identify latest drums
- 5.7 Explain features and advantages of FRP drums, steel drums, compartmental drums
- 5.8 Describe working system and maintenance of unhairing machine
- 5.9 Describe working system and maintenance of Fleshing machine
- 5.10 Distinguish Unhairing machine and fleshing machine
- 5.11 Explain Unhairing, fleshing, scudding operations by hand

6.0 Post tanning machinery

- 6.1 List various machines used in Post tanning operations
- 6.2 Describe working system and maintenance of following Post tanning machines
 - 1. Splitting Machine
 - 2. Shaving machine
 - 3. Sammying machine

4. Staking machine.
 5. Slocomb Staking, hydraulic shaving machine.
 6. Shaving machine
 7. Setting machine
 8. Buffing machine (through feed, single width, double width machines)
 9. Hydraulic press
 10. Glazing machine
 11. Hand spray gun
 12. Spray booth
 13. Measuring machine
- 6.3 Explain unhairing, scudding and fleshing by hand
- 6.4 Understand how to perform setting out by hand and striking out by hand
- 6.5 Explain methods of drying (Toggling, Vacuum drying methods)

COURSE CONTENT

UNIT 1

Selection of site

Duration:06 Periods (L: 05– T:01)

Selection of site for setting footwear manufacturing unit-Variou factors influence the site selection: Raw material,Transportation,Availability of water, power, Labour & market-advantages and disadvantages of site selection in Rural and Urban Areas

UNIT2

Plant maintenance

Duration: 10 Periods (L: 06– T:02)

Importance-Variou maintenance procedures:Preventive maintenance, Predictive ,Routine maintenance,Breakdown maintenance- -Maintenance of various machines used in Leather Industry-Estimating the repair and the maintenance cost.

UNIT3

Water, Oils & Lubricants

Duration: 10 Periods (L: 06– T:02)

Requirement of water for various operations in tannery- sources of water- Water cycle- Impact of hard water on various processing operations- storage of water- lubrication- properties required for a good lubricant- Classification of lubricants.

UNIT 4

Pits and Paddles

Duration : 09 Periods (L: 07– T:02)

uses of pits- different types of pits- Constructional details of Soaking and liming pits- preparation of Vegetable tan liquor by leach pits- maintenance of pits- purpose of Paddle-working system and maintenance of paddle- Distinguish Pits & Paddles

UNIT5

Pre Tanning machinery

Duration:10 Periods (L: 08– T: 02)

List of Pre tanning machinery-uses of drums-Materials used for making drums-constructional details , speeds of drums- capacity of drum-Working system, maintenance of wooden drum-latest drums-features and advantages of FRP drums, steel drums, compartmental drums-working system and maintenance of unhairing machine, Fleshing machine-Distinguish Unhairing machine and fleshing machine- Unhairing, fleshing, scudding operations by hand

UNIT 6

Post Tanning Machinery

Duration: 15 Periods (L:12 – T03)

List of Post tanning machinery- working system and maintenance of following Post tanning machines

Splitting Machine

Shaving machine

Sammying machine

Staking machine.

Slocomb Staking, hydraulic shaving machine.

Shaving machine

Setting machine

Buffing machine (through feed, single width, double width machines)

Hydraulic press

Glazing machine

Hand spray gun

Spray booth

Measuring machine

unhairing, scudding and fleshing by hand- setting out by hand- striking out by hand- methods of drying : Toggling,Vacuum drying

Reference Books

1. Leather Technicians hand book –Sharp house
2. Introduction to the principles of leather manufacture SS Dutta
3. Theory and practice of Leather manufacture- K T Sarkar

Suggested E-Learning references

1. www.internationalleathermaker.com
2. <http://leatherworker.net>
3. <http://leathermakingcoursesonline.com>

CO PO Mapping Matrix

On Successful completion of the course, the student will be able to attain the following Course Outcomes (COs):

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Analyzing various factors influencing site selection for establishing an industry.	R/U	1,2,5,6,7	06
CO2	Explain objectives of plant maintenance, advantages and disadvantages of various plant maintenance procedures	U/A	2,3,4,5,6	11
CO3	Expalin the impact of hard water on various tannery operations, importance of lubrication,Identify oils and lubricants used in maintenance of machines	U/A	2,3,4,5,6	08
CO4	Expalin the specific usage of different pits, functioning of paddle	U/A	1,2,3,4,5,6	07
CO5	Identify various pre tanning, tanning, explain working system and its maintenance	R/U/A	1,2,3,4,5,10	15
CO6	Identify various Post tanning machinery, explain working system and its maintenance	R/U/A	1,2,3,4,5,10	13

CO/PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	✓	✓			✓	✓	✓				
CO2		✓	✓	✓	✓	✓					
CO3		✓	✓	✓	✓	✓					
CO4	✓	✓	✓	✓	✓	✓					
CO5	✓	✓	✓	✓	✓					✓	
CO6	✓	✓	✓	✓	✓					✓	

Unit No	Unit name	Periods	Questions for SEE			Marks weightage	%Weightage
			R	U	A		
1.	Selection of site	06	1	1	0	07	6.36
2	Plant Maintenance	10	2	1	1	19	17.27
3	Water,oils & Lubricants	10	1	1	1	17	15.46
4.	Pits &Paddles	09	1	0	1	12	10.91
5.	Pre tanning machinery	10	2	2	1	24	21.82
6.	Post tanning machinery	15	3	1	2	31	28.18
	Total	60	10	6	6	110	100

Internal Evaluation

Test	Units	Marks	Pattern
Mid Sem 1	1 ,2	20 (A-1x5=5, B-2.5x2=5, C-5x2=10)	Part A: 5 Short answer questions Part B: 2 Essay questions out of 3 Questions Part C :2 Essay questions out of 3 Questions
Mid Sem 2	3,4	20 (A-1x5=5, B-2.5x2=5, C-5x2=10)	Part A: 5 Short answer questions Part B: 2 Essay questions out of 3 Questions Part C: 2 Essay questions out of 3 Questions
Slip Test 1	1 ,2	5	2 Essay Questions out of 3 Questions
Slip Test 2	3,4	5	2 Essay Questions out of 3 Questions
Assignment	1	5	Different group assignments should be given
Seminars	1	5	
	Total	60	

MID SEM-I EXAM

Unit Name	R	U	A	Remarks
Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions	4	4	4	
MID SEM –II EXAM				
Unit Name	R	U	A	Remarks
Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions	4	4	4	

Semester End Examination

Unit No.	Questions to be set for SEE					Remarks	
	R		U	A			
I	4	1		9(a)	13(a)		
II							
III		2		10(a)	14(a)		
IV							
V		3	5, 6	9(b)	13(b)		
				11(a)	15(a)		
				11(b)	15(b)		
VI			7,8	10(b)	14(b)		
	12(a)	16(a)					
	12(b)	16(b)					
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

BOARD DIPLOMA EXAMINATIONS (C-18)
MID SEM-I
FOURTH SEMESTER EXAMINATION

Subject Name : Leather Machinery Maintenance Engineering

Subject Code : 18LT-404C

[Time Duration : 1 Hour]

[Total marks :20]

PART-A

Answer ALL Questions and each question carries 01 marks

4 x 1= 4 marks

1. When site selection question arises?
2. What are Raw materials for Leather Industries?
3. Mention two objectives of maintenance department.
4. What is Scheduled maintenance?

PART-B

Answer any TWO Questions s and each question carries 03 marks

2 x 3 = 6 marks

5. a) Explain the advantages of site selection in rural area for setting up of an industry.

(OR)

- b) Suggest suitable type of transportation facility required for export oriented Leather manufacturing industry and justify your answer.

6. a) Identify various causes for machine breakdown.

(OR)

- b) Explain objectives Predictive maintenance.

PART-C

Answer any TWO Questions and each question carries 05 marks

2 x 5= 10 marks

7. a) Explain site selection criteria for setting up of Leather Tannery.

(OR)

- b) Discuss the advantages and disadvantages of selecting site in Urban area for establishing an industry.

8. a) Discuss the maintenance procedure to be adopted for Finishing section of Tannery.

(OR)

- b) Explain Preventive maintenance procedure and its advantages.

BOARD DIPLOMA EXAMINATIONS (C-18)
MID SEM-II
FOURTH SEMESTER EXAMINATION

Subject Name : Leather Machinery Maintenance Engineering

Subject Code : 18LT-404C

[Time Duration : 1 Hour]

[Total marks :20]

PART-A

Answer ALL Questions and each question carries 01 marks

4 x 1= 4 marks

1. Mention the water requirement for soaking and liming of 1 kg skins/hides.
2. What is lubricant?
3. Mention the uses of pits .
4. Write any two advantages of paddles over pits.

PART-B

Answer any TWO Questions s and each question carries 03 marks

2 x 3 = 6 marks

5. a) Explain quality requirement of water used in leather processing operations.

(OR)

- b) Explain the objectives of machine lubrication.
6. a) Specify the constructional details of Soaking pits.

(OR)

- b) Explain maintenance of wooden Paddle.

PART-C

Answer any TWO Questions and each question carries 05 marks

2 x 5= 10 marks

7. a) Classify lubricants and mention their applications.

(OR)

- b) Discuss the impact of hard water on various pre tanning and tanning operations.
8. a) Discuss the method of extracting vegetable tan liquor by using leach pits.

(OR)

- b) Explain working principle of Paddle.

C18-LT-404C

BOARD DIPLOMA EXAMINATION, (C-18)

**LEATHER TECHNOLOGY
IV SEMESTER EXAMINATION**

LEATHER MACHINERY MAINTENANCE ENGINEERING

Time : 2 Hours]

[Total Marks: 40

PART-A

08X01=08

- Instructions :**
1. Answer **ALL** questions.
 2. Each question carries **ONE** mark.

1. List the advantages of selecting site in urban area for setting up of an industry.
2. State the objectives of machine lubrication.
3. Name the principle involved in pantograph.
4. What is lay out?
5. Mention any four advantages of FRP drums.
6. List various types of drums used in tannery.
7. Write the objective of Shaving operation.
8. Write a brief note on Perching.

PART-B

04X03=12

- Instructions :**
1. Answer any **FOUR** questions.
 2. Each question carries **THREE** marks.

9. (a) Outline the preventive maintenance procedure and mention its advantages .
(or)
9. (b) Distinguish unhairing machine and Fleshing machine.
10. (a) Classify various types of lubricants.
(or)
10. (b) Identify various adjustments provided in Splitting machine.

11. (a) Explain working system of Fleshing machine.
(or)
11. (b) Explain the advantages of compartmental drums.
12. (a) Differentiate vacuum drying and Toggling.
(or)
12. (b) Suggest list of suitable machinery for Post tanning operations

PART-C

04X5=20

- Instructions :**
1. Answer any **FOUR** questions.
 2. Each question carries **FIVE** marks.

13. (a) Explain the site selection criteria for establishing leather Tannery.
(or)
13. (b) Discuss latest developments of drums used in tannery.
14. (a) Explain how to prepare vegetable tan liquor by leaching method.
(or)
14. (b) Draw the neat sketch of hand spray gun and label its parts.
15. (a) Explain the working system of splitting machine.
(or)
15. (b) Discuss the Functioning of simple wooden drum with neat diagram.
16. (a) Explain the working system of Hydraulic Press.
(or)
16. (b) Discuss the working system of Slocomb Staking machine with neat sketch.

CHEMISTRY OF EFFLUENT TREATMENT AND WASTE MANAGEMENT

Course Title : Chemistry of Effluent Treatment and Waste Management Semester : Semester - IV Teaching Scheme in Hrs(L:T:P) : 30:15:0 Type of course : Lecture + Assignments CIE : 60 Marks	Course Code : 18LT- 405C Course Group : Elective Credits : 3 Total Contact Hours : 60 periods SEE : 40 Marks
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Prerequisite: Basic knowledge of chemistry in secondary education and diploma first year.

Course Objectives: After studying this course, the student will be able to

Understand and appreciate the role of basic concepts of Chemistry and its application in different areas of industries.

Course Outcome: On successful completion of the course, the students will have ability to attain below Course Outcomes (CO):

CO	Course outcome	CL	Linked PO	Teaching periods
CO1	Explain the causes of environmental pollution	R/U/A		08
CO2	Tell the usage of Water and Characteristics of tannery effluent	R/U/A		10
CO3	Explain how Effluent are treated	R/U/A		10
CO4	Explain How In Plant Management for Reduction of Pollution	R/U/A		08

CO5	Explain how Solid Waste Management is done	R/U/A		12
CO6	Explain about the Bio-Methanisation of Solid Waste	R/U/A		12
	Total Periods			60

Cognitive levels: R = Remember, U= Understand, A = Apply

Environmental pollution is one of the thrust areas of Science today. Tannery effluents are the major contributors for soil and water pollution. Knowledge of the pollutants and their treatment as well as disposal is necessary for leather technologists.

Course Content

Unit - I Basics of Environmental Pollution

Introduction to Environment and its pollution-Types of pollution-Sources-Pollutants-Limits and Control of Pollution

Unit - II Water and characteristics of tannery effluent

Sources of Water Pollution– Process and finishing yard pollutants – suspended solids – Dissolved solids – B.O.D. & C.O.D. – Specification for discharge of treated effluent.

Unit - III Effluent Treatment

Methods of treatment – Principles and General methods of Primary and Secondary treatments – Waste Water Drainage and collection Systems in Tanneries – Removal of suspended solids by sedimentation, coagulation, flocculation and filtration – Lagoon treatment – Aeration system – Tickling filter.

Unit - IV In Plant Management for Reduction of Pollution

House Keeping-Segregation of Waste Streams-Recovery of Valuable Waste-Reuse of valuable waste found in liquid effluents such as chromium and sulphides etc.

Unit - V Solid waste management

List various solid waste from tanneries-List sources-Explain various disposal method-Define sludge-Method of disposal of sludge from waste water-Secured land fill: leachability studies and management of leachates

Unit – VI Biomethanisation of Solid waste

Biomethanisation of Solid waste: with reference to energy recovery-Thermal incineration -Bacterial composting -Vermicomposting- Biodegradation-Bioremediation-types, reactions-Xenobiotics

SPECIFIC LEARNING OUTCOMES:

On completion of the course of study the student will be able to

Unit-I :Basics of Environmental Pollution

- 1.1.1 Tell the Composition of the environment
- 1.1.2 Define pollution
- 1.1.2 Classify the types of pollution-Air, Water, Soil, Chemical, Nuclear etc.
- 1.2.1 Define air pollution
- 1.2.2 Classify air pollutants into Particulates, gases with examples
- 1.2.3 Identify different sources of air pollution
- 1.2.4 Identify typical sources of air pollutants and their effect on man
- 1.2.5 Identify the recommended limits for air pollutants
- 1.2.6 List the Methods of prevention of air pollution
- 1.3.1 Define water pollution
- 1.3.2 Tell the important sources of water pollution
- 1.3.3 Classify different sources of water pollution into Physical, Chemical, Biological
- 1.3.4 Identify the limits of toxic substances of water
- 1.4.1 Define soil pollution

- 1.4.2 Explain sources of soil pollution
- 1.4.3 Classify soil pollution into-Biological, Chemical, Radioactive pollution
- 1.4.4 List the Methods of control of soil pollution

Unit –II : Water and Characteristics of tannery effluent

- 2.1.1 List some of the Water for tanning-sources
- 2.1.2 Tell Specification of water for tanning
- 2.2.1 Define Tannery effluent
- 2.2.3 Mention the Characteristics of composite tannery untreated effluent
- 2.2.4 List various types of effluents
- 2.2.5 List various effluents from beam house
- 2.2.6 Explain characteristics of effluents
- 2.2.7 List various effluents from tanning yard (veg & chrome)
- 2.2.8 Explain characteristics of above effluents
- 2.2.9 List various effluents from finishing yard
- 2.2.10 Explain characteristics of above effluents
- 2.3.1 Define dissolved oxygen (DO)
- 2.3.2 Define biological oxygen demand (BOD)
- 2.3.3 Define chemical oxygen demand (COD)
- 2.3.4 Outline method of estimation of above
- 2.4.1 Tell the need for Effluent disposal
- 2.4.2 List various types of methods for effluent disposal

Unit –III: Effluent Treatment

- 3.1.0 Explain what is meant by Primary treatment
- 3.1.1 Define waste water & drainage
- 3.1.2 mention the Constituents in drainage
- 3.1.3 List various collection systems
- 3.1.4 Discuss need to remove suspended solids
- 3.1.5 Define sedimentation and explain method
- 3.1.6 Define coagulation and explain meaning
- 3.1.7 Define and explain flocculation and filtration
- 3.2.0 Explain what is meant by Secondary treatment
- 3.2.1 Define Lagoon treatment
- 3.2.2 list some of the Methods of Lagoon treatment
- 3.2.3 state the Disadvantages of the Methods of Lagoon treatment
- 3.2.4 Define aeration
- 3.2.5 List various aeration systems
- 3.2.6 Explain trickling filter
- 3.3.1 explain the need for Effluent disposal
- 3.3.2 List different types of effluent disposal
- 3.3.3 List various specifications for discharge of tannery waste water

Unit-IV: In plant Management for Reduction of Pollution

- 4.1.1 Explain the In Plant Management for Reduction of Pollution
- 4.1.2 Explain the need for House Keeping
- 4.1.3 Explain the Segregation of Waste Streams
- 4.2.1 Explain how the Recovery of Valuable Waste
- 4.2.2 Mention the Reuse of valuable waste found in liquid effluents-chrome recovery and reuse
- 4.3.1 Brief introduction of Green Technology for leather industry

Unit-V: Solid Waste Management

- 5.1.0 Solid waste management
- 5.1.1 List various solid wastes from tanneries
- 5.1.2 Explain various disposal methods
- 5.2.1 Define sludge
- 5.2.2 Method of disposal of sludge from waste water
- 5.2.3 Secured land fill: leachability studies and management of leachates

Unit-VI :Bio-Methanisation of Solid Waste

- 6.1.0 Explain about Bio-Methanisation of Solid waste: with reference to energy recovery
- 6.1.1 Explain about Thermal incineration
- 6.1.2 Explain about Bacterial composting
- 6.1.3 Explain about Vermi composting
- 6.1.4 Explain about Biodegradation, Bioremediation-types-reactions,
- 6.1.5 Explain about Xenobiotics, Recalcitrant xenobiotics

6.1.6 List the Factors affecting biodegradation

6.1.7 Explain about the Chemical nature of the substrate

Suggested Books for REFERENCE:

1. Waste Water Engineering – Treatment, Disposal, Reuse by Mcaffee and Eddy – Inc. Tata, Mc. Graw Hill Publishing Co. Ltd., New Delhi.

2. Fundamentals of Pollution control for the Leather, Industry – Thomas C. Thortensen

E - learning links:

<https://iupac.org/>

<https://www.youtube.com>

<https://www.khanacademy.org/>

www.nptel.ac.in

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM –II EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks	
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
		12(a)			16(a)		
		12(b)			16(b)		
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

Model Paper for Mid Sem-1

BOARD DIPLOMA EXAMINATION, (C-18)

V Semester, 18LT-405C

Chemistry of effluent treatment & Waste management.

Time- 1 hour

Total Marks: 20

Part-A

(4x1=4M)

Note: Answer All the

questions. Each questions carries 1 mark

1. Define pollution.
2. What are Particulates.
3. Define B.O.D.
4. What are the sources of water pollution.

Part-B

(2x3=6M)

Note: Answer the following questions. Each questions carries 3 marks

- 5 (a) Classify pollutants based on ecological point of view.
(or)
(b) Write the methods to control soil pollution.
- 6 (a) What are the effects of tannery effluents on ground water.
(or)
(b) Write the various effluents from finishing yard.

Part-C

(2x5=10M)

Note: Answer the following questions. Each questions carries 5 marks

- 7 (a) Define Air pollution and write the preventive measures to control air pollution.
(or)
(b) What are the different sources of Soil pollution & Explain.
- 8 (a) Write the characteristics of effluents from Beam house.
(or)
(b) What are the effects of Air pollution on Human beings.

Model Paper for Mid Sem-2

BOARD DIPLOMA EXAMINATION, (C-18)

V Semester, 18LT-405C

Chemistry of effluent treatment & Waste management.

Time- 1 hour

Total Marks: 20

Part-A

(4x1=4M)

Note: Answer All the

- questions. Each questions carries 1 mark
1. Define Waste water.
 2. What are the various aeration system.
 3. Define House keeping.
 4. What is the segregation of waste streams.

Part-B

(2x3=6M)

Note: Answer the

following questions. Each questions carries 3 marks

- 5 (a) List the various collection system.
(or)
(b) What is the advantage of lagoon treatment.
- 6 (a) What is the need to recovery & Reuse chrome from

effluents.

(or)

- (b) What are the methods available in the inplant management to reduce pollution in tannery effluents.

Part-C

(2x5=10M)

Note: Answer the following questions. Each questions carries 5 marks

- 7 (a) Explain tickling filters.

(or)

- (b) Describe about lagoon treatment.

- 8 (a) What is Green Technology in Leather industry.

(or)

- (b) What is the need to recover valuable waste.

Model Paper for End Exam

GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY

V Semester Examination C-18

Diploma in Leather Technology

18 LT-405C Chemistry of effluent Treatment and Waste Management .

Time: 2 hrs

Max. Marks: 40

PART-A

8x1=8M

Instructions : 1. Answer all questions each question carries one marks.
2. Answer should be brief and straight to the point and shall not exceed four simple sentences.

1. Define the term pollution.
2. Define house keeping.
3. Write the various solid wastes from tanneries .
4. Define areation.
5. Write the various unit operation for sludge treatment.
6. Define Sludge.
7. Define Bio-remediation.
8. What are Xenobiotics.

PART - B

4X3=12

Answer all questions each question carries 3 marks.

9. (a) Define Air pollution and write the cause of Air pollution.
(or)
(b) Write the various Solid waste from tannery.
10. (a) What are various Collection systems.
(or)
(b) Write the chemical nature of substrate.
11. (a) Explain Secured land fill method of Leachates.
(or)
(b) Write the various solid wastes generated in tannery.
12. (a) Explain Bacterial composting .
(or)
(b) Explain vermi composting of tannery waste.

PART -C

4X5=20

Answer all questions each question carries 5 marks.

13. (a) Write the various effluents from Finishing yard.
(or)
(b) Write about Sanitary land filling for disposal of tannery waste.
14. (a) Explain the Trickling filter method.
(or)
(b) Write the factors effecting Bio degradation.
15. (a) Explain activated Sludge treatment method.
(or)
(b) Write the methods available in plant management to reduce pollution in tannery.
16. (a) Describe Thermal Incineration .
(or)
(b) Explain various Disposal methods.

LEATHER MICROBIOLOGY LAB

Course Title : LEATHER MICROBIOLOGY LAB	Course Code : 18LT- 406P
Semester : Semester IV	Course Group : Core
Teaching Scheme in Hrs(L:T:P) : 15:0:30	Credits : 1.5
Type of course : Lecture+ Practical	Total Contact Hours : 45 periods
CIE : 60 Marks	SEE : 40 Marks

RATIONALE:

The quality of the final leather depends on the quality of raw material, process variations and preservation techniques. Systematic microbiological techniques are aimed to develop the understanding and application skills in the student for better raw material selection, better process variations, upgradation of lower quality materials in leather making.

Pre requisites: Basic High school science and knowledge in Leather Technology

Course outcomes:

On successful completion of the course, the students will be able to

- CO1** Make use of microscope
- CO2** Adapt basic histological techniques.
- CO3** Identify the animal skins from their anatomical structures and grain surface patterns
- CO4** Assess leather processing microscopically
- CO5** Apply the methods in bacteriology
- CO6** Identify the insects and parasites , study the defects during the selection of raw material

LIST OF EXPERIMENTS

S. No	Name of the Experiment	Periods
1	To understand the functioning of a compound microscope and setting up for study objects.	3
2	To prepare paraffin block of embedded tissue	3
3	To process the given animal skin tissue for sectioning by using microtone.	3
4	To Identify different animal skins from their anatomical structures and grain surface patterns using microscope.	6
4	To identify the structural changes in curing, liming, bating and tanning	12
5	To understand the applicability of different methods of sterilization	3
6	To prepare common bacteriological media and understand inoculation method of growth	3
7	To estimate the number of bacteria in a given sample by plate count method.	3
8	To identify the shapes of bacterial cells and study their Gram characteristics by staining methods	3
9	To identify insects and parasites from their features	3
10	To identify and classify the defects into fungal and parasitic	3

The student will be given any one experiment from the above unit for 40 marks

References:

1. B.S malik – Practical Manual of Veterinary Bacteriology, Mycology and Virology – Tata Mcgrawhill Co.

2. F.W. Tanner, Practical Bacteriology, John Wiley.

Suggested E - learning links:

<http://www.iltaonleather.org/jilta.html>

<https://www.clri.org/http://alcajournal.com/>

www.nptel.ac.in

CO/ PO -MAPPAING

Course outcome		Linked Exercise	CL (R/U/A)	Linked PO	Teaching periods
CO1	Make use of microscope	1	U,A	1,2,3,4,10	3
CO2	Adapt basic histological techniques.	2	U,A	1,2,3,4,5,10	6
CO3	Identify the animal skins from their anatomical structures and grain surface patterns	3	U, A	1,2,3,4,10	6
CO4	Assess leather processing microscopically	4,5	U, A	1,2,3,4,10	12
CO5	Apply the methods in bacteriology	6,7,8	U,A	1,2,3,4,10	9
CO6	Identify the insects defects during the selection of raw material	9,10	U,A	1,2,3,4,10	9

MODEL QUESTION PAPER
BOARD DIPLOMA END-SEMESTER EXAMINATIONS (C-18)
GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY, H.S.DARGA, HYDERABAD
DLT –IV -SEMESTER
18LT-406P – LEATHER MICROBIOLOGY LAB

Duration:3 Hours

Maximum Marks: 40

Answer any One of the following Questions.

1. Identify the different parts of a compound microscope for study of different objects and draw it on the paper.
2. Do sectioning for the given animal tissue for microscopic study.
3. Identify different animal skins from their anatomical structures and grain surface patterns using microscope
4. Identify the shapes of bacterial cells and characterise by gram staining method.
5. To estimate the number of bacteria in a given sample by plate count method.
6. Identify the characteristics of parasites on living animals using compound microscope.
7. - Classify the defects into fungal , insect damages and process faults. Draw at least two in each category.
- 8 Identify the structural changes in curing, liming, bating and tanning with a neat diagram.

LEATHER DYEING LAB

Scheme	:	C - 18
Course Title	:	Leather Dyeing Lab
Semester	:	IV
Course Code	:	18LT-407P
Periods per week	:	03
Total periods per semester	:	45

Pre requisites: pretanning of leathers practice, post tanning of leathers practice, and Fullchrome Leathers Lab

Course outcomes:

At the end of the course the student will have the ability to

CO 1: Perform the neutralization operation on Leather

CO 2: Demonstrate the Retanning operations from the given wet blue stock.

CO 3: Differentiate the physio- chemical changes that take place in Dyeing and fatliquoring operations in the Leather Manufacture

CO 4: Know the different proprietary chemicals available in the leather trade

Course contents

Neutralisation

1. Neutralisation of F/c Upper leathers
2. Neutralisation of F/c Garment leathers
3. Neutralisation of F/c lining leathers
4. Neutralisation of s/c Upper leathers
5. Neutralisation of S/c suede garment leathers
6. Retanning of Goat wetblue for Upper leathers
7. Retanning of sheep wetblue for Garment leathers
8. Retanning of cow wetblue for softy Upper leathers
9. Dyeing of F/c Goat upper leathers
10. Dyeing of S/c Goat upper leathers
11. Dyeing of F/c Goat Grain Garment Leathers
12. Dyeing of S/c Goat Grain Garment Leathers
13. Dyeing of F/c sheep Grain Garment Leathers
14. Dyeing of S/c sheep Grain Garment Leathers
15. Sandwich dyeing for the manufacture of Aniline Leathers
16. Fatliquoring of F/c Leathers
17. Fatliquoring of S/c leathers
18. Fixing of Dyes & Fatliquors

Specific learning outcomes:

Upon the completion of study of this subject the student will be able to do neutralisation dyeing of leathers.

Full chrome leathers lab		
Name of the Experiment	Competencies	Key Competencies
1. Neutralisation of F/c Upper Leathers	Neutralisation: • Decide the selection of neutralization agent based on the type of Leather • To do neutralisation f/c leather • • To do neutralisation of semi chrome leather • Check for completion of Neutralisan for upper leathers	❖ Familiar The shape size of defects ❖ The types of defects ❖ Study the causes of defects its occurrence ❖ Familiar with defects on hides.
2. Neutralisation of F/c Garment leathers	• See the bromocresol Green Indicator for change in colour • See the bromocresol Green Indicator for change in pH • See the bromocresol purple Indicator for change in colour • See the bromocresol purple Indicator for change in pH • Observe the difference	❖ Study the preparation of soak liquor in pit ❖ The types of equipments used for soaking ❖ Chemicals used for soaking ❖ Duration of soaking for diff types of leather

3. Neutralisation of F/c lining leathers	in pH at the cross section • Distinguish the physio chemical change happened during neutralization •	
4. Neutralisation of s/c Upper leathers		❖ Study the preparation of lime liquor in pit ❖ The types of equipments used for liming ❖ Chemicals used for liming ❖ Duration of liming for diff types of leather ❖ Completion of liming ❖ Able to explain changes happening during liming
5. Neutralisation of S/c suede garment leathers		❖ Study the method of un hairing by hand using knife ❖ Observe the unhairing machine ❖ Observe the changes that take place during unhairing
6. Retanning of Goat wetblue for Upper leathers		❖ Study the method of un Fleshing by hand using knife ❖ Observe the Fleshing machine ❖ Observe the changes that take place during Fleshing

7.Retanning of sheep wetblue for Garment leathers		❖ Study the preparation of de lime liquor in drum ❖ The types of drums used for liming ❖ Chemicals used for De liming ❖ Duration of De liming for diff types of leather ❖ Test for completion of liming ❖ Ph changes observed during Deliming
8. Retanning of cow wetblue for softy Upper leathers		❖ Study the preparation of bate liquor in drum ❖ Chemicals used for bating ❖ Duration of bating for diff types of leather ❖ Test for completion of bating ❖ Factors affecting bating operation
9. Dyeing of F/c Goat upper leathers		❖ Study the method of scudding by hand using knife ❖ Observe the scudding machine ❖ Observe the changes that take place during scudding ❖ To do pickling for chrome tanning
10. Dyeing of S/c Goat upper leathers		❖ Study the preparation of chrome liquor ❖ Chemicals used for chrome tanning ❖ Duration of chrome tanning for diff types of leather ❖ Test for completion of chrome ❖ Ph changes observed during chrome tanning
11. Dyeing of F/c Goat Grain Garment Leathers		❖ The condition of the sammed leather ❖ The moisture content of the sammed leather ❖ various conditioning methods

12. Dyeing of S/c Goat Grain Garment Leathers		❖ The thickness of grain layer ❖ The condition of the split layer ❖ The splitting mechanism
13. Dyeing of F/c sheep Grain Garment Leathers		❖ The thickness of grain layer ❖ The condition of the shaved leather
14. Dyeing of S/c sheep Grain Garment Leathers		❖ Study necessary of chrome liquor ❖ Chemicals used for rechroming ❖ Duration of rechroming for diff types of leather ❖ Test for completion of rechroming ❖ Ph changes observed during rechroming
15. Sandwich dyeing for the manufacture of Aniline Leathers		❖ Purpose of neutralising leathers. ❖ Different chemicals used for neutralisation. ❖ Duration of neutralisation. ❖ P^H changes during neutralisation. ❖ Test for neutralisation. ❖ The effect of over neutralisation and under neutralisation
16. Fatliquoring of F/c Leathers	Retanning: • To do retanning f/c leather • To do neutralisation of semi chrome leather	❖ Purpose of retanning leathers. ❖ Different chemicals used for Retanning. ❖ Duration of Retanning. ❖ P^H changes during Retanning.

17. Fatliquoring of S/c Leathers	Dyeing : - To do dyeing of f/c leather - To do dyeing of semi chrome leather	- Purpose of dyeing leathers. - Different dyes used for dyeing. - Duration of dyeing. - P^H changes during dyeing - Fixation of dyes. - Colour matching
18. Fixing of Dyes & Fatliquors	Fatliquoring: - To do Fatliquoring of f/c leather - To do fatliquoring of semi chrome leather	- Purpose of Fatliquoring leathers. - Different Fatliquoring used for Fatliquoring - Duration of Fatliquoring. - P^H changes during Fatliquoring - Fixation of Fatliquoring. - Names of some fatliquors
	Samming : - To do samming for the chrome tanned leather - To do samming for the vegetable tanned leather	- The condition of the sammed leather - The moisture content of the sammed leather - various conditioning methods
	Setting : - To do setting for the chrome tanned leather - To do setting for the vegetable tanned leather	- The condition of the setted leather - The grain condition of the setted leather - various setting proceeedures
	Drying : - To do drying for the chrome tanned leather - To do drying for the vegetable tanned leather	- The condition of the dried leather - The grain condition of the leather - Different methods of drying like air drying, drying by nailing, toggle drying
	Conditioning : - To condition the chrome tanned leather - To condition the vegetable tanned leather	- The condition of the conditioned leather - The moisture content of the conditioned leather - Different methods of conditioning like saw dusting spraying etc.,

	Staking : • To do staking of chrome tanned leather • To do staking of the vegetable tanned leather	❖ The change in softness of leather ❖ The condition of the staked leather ❖ Different methods of staking machines
	Toggling : • To do toggling of chrome tanned leather • To do toggling of the vegetable tanned leather	❖ The change in softness of toggled leather ❖ The condition of the toggled leather ❖ different methods of toggling procedures
	Buffing / snuffing : • To do buffing of chrome tanned leather • To do buffing of the vegetable tanned leather	❖ The change in condition of buffed leather ❖ The various emery papers used for buffing ❖ Observation of the nap of buffed leather ❖ Dust off procedure
	Finishing : • To prepare the season for resin finish • To prepare the season for protein finish	❖ The change in condition of buffed leather ❖ The various emery papers used for buffing ❖ Observation of the nap of buffed leather ❖ Dust off procedure
	Glazing : • To do glazing for protein finished leather	❖ The change in condition of glazed leather ❖ Observe the gloss& appearance of the glazed leather
	Plating : • To do plating for resin finished leather	❖ The change in condition of plated leather ❖ Observe the grain & appearance of the plated leather
	Measuring / safety precaution : • To measure the area of finished leather	❖ Observe the area in square feet ❖ Precautions to be observed during the practicals in the tannery

	Assortment : - To know the different stages of assortment - Know the Basis of assortment	- Assortment grades in wet blue. - Grading in EI stage. - Grading of finished leathers - Defects observed in finished leathers
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References:

1. Practical Leather Technology – J H .Sharphouse
2. C L R I publications

CO and PO Mapping

CO	PO1	PO2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	MAPPIN OF POs WITH CO
CO 1	1	2	3		-	-	-	-	-	-	1,2,3,
CO 2		2	3	3	-	2	-	-	-	-	2,3,4,6
CO 3	2	2	-	-	-	2	-		-	-	1,2,6
CO 4	3	3		-	-	2	-	3	-	2	1,2,6 ,8,10

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

The student will be given any one experiment from the above units for 40 marks

MODEL QUESTION PAPER

BOARD DIPLOMA END-SEMESTER EXAMINATIONS (C-18)

GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY, H.S.DARGA, HYDERABAD

DLT –IV -SEMESTER

18LT-407P- LEATHER DYEING LAB

Duration:3 Hours

Maximum Marks: 40

Answer any One of the following Questions.

Do the given experiment as per allotted to you from the given WETBLUE/EI / crust Leather

1. Neutralisation of F/c Upper leathers
2. Neutralisation of F/c Garment leathers
3. Neutralisation of F/c lining leathers
4. Neutralisation of s/c Upper leathers
5. Neutralisation of S/c suede garment leathers
6. Retanning of Goat wetblue for Upper leathers
7. Retanning of sheep wetblue for Garment leathers
8. Retanning of cow wetblue for softy Upper leathers
9. Dyeing of F/c Goat upper leathers
10. Dyeing of S/c Goat upper leathers
11. Dyeing of F/c Goat Grain Garment Leathers
12. Dyeing of S/c Goat Grain Garment Leathers
13. Dyeing of F/c sheep Grain Garment Leathers
14. Dyeing of S/c sheep Grain Garment Leathers
15. Sandwich dyeing for the manufacture of Aniline Leathers
16. Fatliquoring of F/c Leathers
17. Fatliquoring of S/c leathers

SEMI CHROME LEATHERS LAB

Scheme	:	C - 18
Course Title	:	Semi chrome leathers lab
Semester	:	IV
Course Code	:	18LT-408P
Periods per week	:	03
Total periods per semester	:	45

Pre requisites: pretanning of leathers practice, post tanning of leathers practice

Course outcomes:

At the end of the course the student will have the ability to

CO 1: select suitable E.I Leather for making required type of leather

CO 2: process upper leather, lining leather and garment leather from the E.I Leather

CO 3: Differentiate the physio- chemical changes that take place in processing and List the chemicals discharged in to the environment

CO 4: know the different proprietary chemicals available in the leather trade

Course contents

- 1.0 Manufacture of E.I from wet salted hides and skins
- 2.0 Manufacture of Semi Chrome upper Leather from E.I goat skins
- 3.0 Manufacture of Semi Chrome upper Leather from E.I buffalo sides
- 4.0 Manufacture of Semi chrome lining leather from E.I sheepskins
- 5.0 Manufacture of Semi Chrome lining Leather from E.I cow sides
- 6.0 Manufacture of Semi Chrome grain garment Leather from E.I sheep skins
- 7.0 Manufacture of Semi Chrome suede garment Leather from E.I goat

Specific learning outcomes

Upon the completion of study of this subject the student will be able to manufacture semi-chrome upper leathers, semi-chrome lining leathers, semi-chrome garment leathers from EI Leathers

Semi chrome leathers lab

Name of the Experiment	Competencies	Key Competencies
1. Manufacture of Semi chrome goat upper Leathers	- To select suitable raw material for upper, lining, garment leathers - List of defects in skins - To do soaking for the green skins - To do soaking for the wet salted hides - To do soaking for the wet salted skins - To do liming for the soaked hides - To do liming for the soaked skins - To do paste liming for the soaked skins - To do unhairing for limed hides - To do unhairing for limed skins - To do Fleshing for limed hides - To do Fleshing for limed skins	- Familiar The shape size of defects - The types of defects - Study the causes of defects its occurrence - Familiar with defects on hides.
2. Manufacture of Semi chrome buff upper leather	- To do deliming for the limed pelt - To do Deliming for the limed pelt - To do Bating for the De limed pelt - To do scudding for bated pelts - To do pickling for the pelt	- Study the preparation of soak liquor in pit - The types of equipments used for soaking - Chemicals used for soaking - Duration of soaking for diff types of leather
3.Manufacture of Semi chrome sheep lining leather		- Study the preparation of lime liquor in pit - The types of equipments used for liming - Chemicals used for liming - Duration of liming for diff types of leather - Completion of liming - Able to explain changes happening during liming

4.Manufacture of Semi chrome cow lining leather		❖ Study the method of un hairing by hand using knife ❖ Observe the unhairing machine Observe the changes that take place during unhairing
5. manufacture of Semi chrome sheep grain garment leather		❖
6. manufacture of Semi chrome goat suede garment leather		❖ Study the method of un Fleshing by hand using knife ❖ Observe the Fleshing machine ❖ Observe the changes that take place during Fleshing

		❖ Study the preparation of de lime liquor in drum ❖ The types of drums used for liming ❖ Chemicals used for De liming ❖ Duration of De liming for diff types of leather ❖ Test for completion of liming ❖ Ph changes observed during Deliming
		❖ Study the preparation of bate liquor in drum ❖ Chemicals used for bating ❖ Duration of bating for diff types of leather ❖ Test for completion of bating ❖ Factors affecting bating operation
.		❖ Study the method of scudding by hand using knife ❖ Observe the scudding machine ❖ Observe the changes that take place during scudding ❖ To do pickling for chrome tanning
	Vegetable tanning: • To do vegetable tanning for the given pelt	❖ Study the preparation of veg tan liquor ❖ Leaching method of tan liquor preparation ❖ Duration of vegetable tanning for diff types of leather ❖ Test for completion of vegetable tanning ❖ Ph changes observed during vegetable
	Samming: ○ To do samming for the chrome tanned leather • To do samming for	❖ The condition of the sammed leather ❖ The moisture content of the sammed leather ❖ various conditioning methods

	the vegetable tanned leather	
	Splitting: • To do splitting of chrome tanned leather • To do splitting of the vegetable tanned leather	❖ The thickness of grain layer ❖ The condition of the split layer ❖ The splitting mechanism
	Shaving: • To do shaving of chrome tanned leather • To do shaving of the vegetable tanned leather	❖ The thickness of grain layer ❖ The condition of the shaved leather
	Chrome tanning: • To do Chrome tanning for E.I leather • To do semi chroming of the vegetable tanned leather	❖ Study necessary of chrome liquor ❖ Chemicals used for chrome tanning ❖ Ph changes observed during chrome tanning
	Neutralisation: • To do neutralisation f/c leather • To do neutralisation of semi chrome leather	❖ Purpose of neutralising leathers. ❖ Different chemicals used for neutralisation. ❖ Duration of neutralisation. ❖ pH changes during neutralisation. ❖ Test for neutralisation. ❖ The effect of over neutralisation and under neutralisation

	Retanning: - To do retanning f/c leather - To do neutralisation of semi chrome leather	- Purpose of retanning leathers. - Different chemicals used for Retanning. - Duration of Retanning. - P^H changes during Retanning.
	Dyeing : To do dyeing of f/c leather To do dyeing of semi chrome leather	- Purpose of dyeing leathers. - Different dyes used for dyeing. - Duration of dyeing. - P^H changes during dyeing - Fixation of dyes. - Colour matching
	Fatliquoring: - To do Fatliquoring of f/c leather - To do fatliquoring of semi chrome leather	- Purpose of Fatliquoring leathers. - Different Fatliquoring used for Fatliquoring - Duration of Fatliquoring. - P^H changes during Fatliquoring - Fixation of Fatliquoring. - Names of some fatliquors
	Samming : - To do samming for the chrome tanned leather - To do samming for the vegetable tanned leather	- The condition of the sammed leather - The moisture content of the sammed leather - various conditioning methods
	Setting : - To do setting for the chrome tanned leather - To do setting for the vegetable tanned leather	- The condition of the setted leather - The grain condition of the setted leather - various setting procedures
	Drying : - To do drying for the chrome tanned leather - To do drying for the vegetable tanned leather	- The condition of the dried leather - The grain condition of the leather - Different methods of drying like air drying, drying by nailing, toggle drying

	Conditioning : • To condition the chrome tanned leather • To condition the vegetable tanned leather	❖ The condition of the conditioned leather ❖ The moisture content of the conditioned leather ❖ Different methods of conditioning like saw dusting spraying etc.,
	Staking : • To do staking of chrome tanned leather • To do staking of the vegetable tanned leather	❖ The change in softness of leather ❖ The condition of the staked leather ❖ Different methods of staking machines
	Toggling : • To do toggling of chrome tanned leather • To do toggling of the vegetable tanned leather	❖ The change in softness of toggled leather ❖ The condition of the toggled leather ❖ different methods of toggling procedures
	Buffing / snuffing : • To do buffing of chrome tanned leather • To do buffing of the vegetable tanned leather	❖ The change in condition of buffed leather ❖ The various emery papers used for buffing ❖ Observation of the nap of buffed leather ❖ Dust off procedure
	Finishing : • To prepare the season for resin finish • To prepare the season for protein finish	❖ The change in condition of buffed leather ❖ The various emery papers used for buffing ❖ Observation of the nap of buffed leather ❖ Dust off procedure
	Glazing : • To do glazing for protein finished leather	❖ The change in condition of glazed leather ❖ Observe the gloss& appearance of the glazed leather

	Plating : To do plating for resin finished leather	❖ The change in condition of plated leather ❖ Observe the grain & appearance of the plated leather
	Measuring / safety precaution : To measure the area of finished leather	❖ Observe the area in square feet ❖ Precautions to be observed during the practicals in the tannery
	Assortment : - To know the different stages of assortment - Know the Basis of assortment	- Assortment grades in wet blue. - Grading in EI stage. - Grading of finished leathers - Defects observed in finished leathers

References:

1. Practical Leather Technology – J H .Sharphouse
2. C L R I publications

CO and PO Mapping

CO	PO1	PO2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	MAPPIN OF POs WITH CO
CO 1	1	2	3		-	-	-	-	-	-	1,2,3,
CO 2	2	2	3	3	-	-	-	-	-	-	2,3,4,6
CO 3	2	2	-	-	-	2	-		-	-	1,2,6
CO 4	3	3	3	-	-	-	-	3	-	-	1,2,8,10

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

MODEL QUESTION PAPER

BOARD DIPLOMA END-SEMESTER EXAMINATIONS (C-18)

GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY, H.S.DARGA, HYDERABAD

DLT –IV -SEMESTER

18LT-408P- SEMI CHROME LEATHERS LAB

Duration:3 Hours

Maximum Marks: 40

Answer any One of the following Questions.

Do the given experiment as per allotted to you from the given RAW HIDES/SKINS/WETBLUE/EI / crust Leather

1. Manufacture of E.I from wet salted hides and skins
2. Manufacture of Semi Chrome upper Leather from E.I goat skins
3. Manufacture of Semi Chrome upper Leather from E.I buffalo sides
4. Manufacture of Semi chrome lining leather from E.I sheepskins
5. Manufacture of Semi Chrome lining Leather from E.I cow sides
6. Manufacture of Semi Chrome grain garment Leather from E.I sheep skins
7. Manufacture of Semi Chrome suede garment Leather from E.I goat

FULL CHROM LEATHERS LAB

Scheme	:	C - 18
Course Title	:	Full chrome leathers lab
Semester	:	IV
Course Code	:	18LT-409P
Periods per week	:	03
Total periods per semester	:	45

Pre requisites: pretanning of leathers practice, post tanning of leathers practice

Course outcomes:

At the end of the course the student will have the ability to

CO 1: select suitable raw material for making required type of leather

CO 2: process upper leather, lining leather and garment leather from the wet blue stock.

CO 3: Differentiate the physio- chemical changes that take place in processing and List the chemicals discharged in to the environment

CO 4: know the different proprietary chemicals available in the leather trade

Course contents

- 1.0 Manufacture of wet blue from wet salted hides and skins
- 2.0 Manufacture of Full Chrome upper Leather from wet blue goat skins
- 3.0 Manufacture of Full Chrome upper Leather from wet blue buffalo sides
- 4.0 Manufacture of full chrome lining leather from wet blue sheepskins
- 5.0 Manufacture of Full Chrome lining Leather from wet blue cow sides
- 6.0 Manufacture of Full Chrome grain garment Leather from wet blue sheep skins
- 7.0 Manufacture of Full Chrome nappa Leather from wet blue cow sides\

Specific learning outcomes

Upon the completion of study of this subject the student will be able to manufacture fullchrome upper leathers, fullchrome lining leathers, fullchrome garment leathers from wetblue stock

Full chrome leathers lab

Name of the Experiment	Competencies	Key Competencies
1. Manufacture of Full chrome goat upper Leathers	- To select suitable raw material for upper, lining, garment leathers - List of defects in skins - To do soaking for the green skins - To do soaking for the wet salted hides - To do soaking for the wet salted skins - To do liming for the soaked hides - To do liming for the soaked skins - To do paste liming for the soaked skins - To do unhairing for limed hides - To do unhairing for limed skins - To do Fleshing for limed hides - To do Fleshing for limed skins - To do deliming for the limed pelt - To do Deliming for the limed pelt - To do Bating for the De limed pelt - To do scudding for bated pelts - To do pickling for the pelt	- Familiar The shape size of defects - The types of defects - Study the causes of defects its occurrence - Familiar with defects on hides.
2. Manufacture of Full chrome buffalo upper leather .		- Study the preparation of soak liquor in pit - The types of equipments used for soaking - Chemicals used for soaking - Duration of soaking for diff types of leather
3. Manufacture of Full chrome sheep lining leather		

4. Manufacture of Full chrome cow lining leather		❖ Study the preparation of lime liquor in pit ❖ The types of equipments used for liming ❖ Chemicals used for liming ❖ Duration of liming for diff types of leather ❖ Completion of liming ❖ Able to explain changes happening during liming
5. Manufacture of Full chrome sheep grain garment leather		❖ Study the method of un hairing by hand using knife ❖ Observe the unhairing machine ❖ Observe the changes that take place during unhairing
6. Manufacture of Full chrome cow nappa		❖ Study the method of un Fleshing by hand using knife ❖ Observe the Fleshing machine ❖ Observe the changes that take place during Fleshing
		❖ Study the preparation of de lime liquor in drum ❖ The types of drums used for liming ❖ Chemicals used for De liming ❖ Duration of De liming for diff types of leather ❖ Test for completion of liming ❖ Ph changes observed during Deliming

		❖ Study the preparation of bate liquor in drum ❖ Chemicals used for bating ❖ Duration of bating for diff types of leather ❖ Test for completion of bating ❖ Factors affecting bating operation
.		❖ Study the method of scudding by hand using knife ❖ Observe the scudding machine ❖ Observe the changes that take place during scudding ❖ To do pickling for chrome tanning
	• To do chrome Tanning for the given pelt	❖ Study the preparation of chrome liquor ❖ Chemicals used for chrome tanning ❖ Duration of chrome tanning for diff types of leather ❖ Test for completion of chrome ❖ Ph changes observed during chrome tanning
	To do samming for the chrome tanned leather • To do samming for the vegetable tanned leather	❖ The condition of the sammed leather ❖ The moisture content of the sammed leather ❖ various conditioning methods
	Splitting: • To do splitting of chrome tanned leather • To do splitting of the vegetable tanned leather	❖ The thickness of grain layer ❖ The condition of the split layer ❖ The splitting mechanism

	Shaving: • To do shaving of chrome tanned leather • To do shaving of the vegetable tanned leather	❖ The thickness of grain layer ❖ The condition of the shaved leather
	Rechroming: • To do rechroming of chrome tanned leather • To do semi chroming of the vegetable tanned leather	❖ Study necessary of chrome liquor ❖ Chemicals used for rechroming ❖ Duration of rechroming for diff types of leather ❖ Test for completion of rechroming ❖ Ph changes observed during rechroming
	Neutralisation: • To do neutralisation f/c leather • To do neutralisation of semi chrome leather	❖ Purpose of neutralising leathers. ❖ Different chemicals used for neutralisation. ❖ Duration of neutralisation. ❖ p^H changes during neutralisation. ❖ Test for neutralisation. ❖ The effect of over neutralisation and under neutralisation
	Retanning: • To do retanning f/c leather • To do neutralisation of semi chrome leather	❖ Purpose of retanning leathers. ❖ Different chemicals used for Retanning. ❖ Duration of Retanning. ❖ p^H changes during Retanning.
	Dyeing : • To do dyeing of f/c leather • To do dyeing of semi chrome leather	❖ Purpose of dyeing leathers. ❖ Different dyes used for dyeing. ❖ Duration of dyeing. ❖ p^H changes during dyeing ❖ Fixation of dyes. ❖ Colour matching

	Fatliquoring: • To do Fatliquoring of f/c leather • To do fatliquoring of semi chrome leather	❖ Purpose of Fatliquoring leathers. ❖ Different Fatliquoring used for Fatliquoring ❖ Duration of Fatliquoring. ❖ P^H changes during Fatliquoring ❖ Fixation of Fatliquoring. ❖ Names of some fatliquors
	Samming : • To do samming for the chrome tanned leather • To do samming for the vegetable tanned leather	❖ The condition of the sammed leather ❖ The moisture content of the sammed leather ❖ various conditioning methods
	Setting : • To do setting for the chrome tanned leather • To do setting for the vegetable tanned leather	❖ The condition of the setted leather ❖ The grain condition of the setted leather ❖ various setting proceeedures
	Drying : • To do drying for the chrome tanned leather • To do drying for the vegetable tanned leather	❖ The condition of the dried leather ❖ The grain condition of the leather ❖ Different methods of drying like air drying, drying by nailing, toggle drying
	Conditioning : • To condition the chrome tanned leather • To condition the vegetable tanned leather	❖ The condition of the conditioned leather ❖ The moisture content of the conditioned leather ❖ Different methods of conditioning like saw dusting spraying etc.,
	Staking : • To do staking of chrome tanned leather • To do staking of the vegetable tanned leather	❖ The change in softness of leather ❖ The condition of the staked leather ❖ Different methods of staking machines

	Toggling : • To do toggling of chrome tanned leather • To do toggling of the vegetable tanned leather	❖ The change in softness of toggled leather ❖ The condition of the toggled leather ❖ different methods of toggling procedures
	Buffing / snuffing : • To do buffing of chrome tanned leather • To do buffing of the vegetable tanned leather	❖ The change in condition of buffed leather ❖ The various emery papers used for buffing ❖ Observation of the nap of buffed leather ❖ Dust off procedure
	Finishing : • To prepare the season for resin finish • To prepare the season for protein finish	❖ The change in condition of buffed leather ❖ The various emery papers used for buffing ❖ Observation of the nap of buffed leather ❖ Dust off procedure
	Glazing : • To do glazing for protein finished leather	❖ The change in condition of glazed leather ❖ Observe the gloss& appearance of the glazed leather
	Plating : • To do plating for resin finished leather	❖ The change in condition of plated leather ❖ Observe the grain & appearance of the plated leather
	Measuring / safety precaution : • To measure the area of finished leather	❖ Observe the area in square feet ❖ Precautions to be observed during the practicals in the tannery
	Assortment : • To know the different stages of assortment • Know the Basis of assortment	• Assortment grades in wet blue. • Grading in EI stage. • Grading of finished leathers • Defects observed in finished leathers

References:

1. Practical Leather Technology – J H .Sharphouse
2. C L R I publications

CO and PO Mapping

CO	PO1	PO2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	MAPPIN OF POs WITH CO
CO 1	1	2	3		-	-	-	-	-	-	1,2,3,
CO 2		2	3	3	-	2	-	-	-	-	2,3,4,6
CO 3	2	2	-	-	-	2	-		-	-	1,2,6
CO 4	3	3		-	-	2	-	3	-	2	1,2,6 ,8,10

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM –II EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Semester End Examination							
Sl No	Unit No.	Questions to be set for SEE				Remarks	
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
			12(a)		16(a)		
			12(b)		16(b)		
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

MODEL QUESTION PAPER

BOARD DIPLOMA END-SEMESTER EXAMINATIONS (C-18)

GOVERNMENT INSTITUTE OF LEATHER TECHNOLOGY, H.S.DARGA, HYDERABAD

DLT –IV -SEMESTER

18LT-409- FULL CHROM LEATHERS LAB

Duration:3 Hours

Maximum Marks: 40

Answer any One of the following Questions.

Do the given experiment as per allotted to you from the given RAW HIDES/SKINS/WETBLUE/EI / crust Leather

1. Manufacture of wet blue from wet salted hides and skins
2. Manufacture of Full Chrome upper Leather from wet blue goat skins
3. Manufacture of Full Chrome upper Leather from wet blue buffalo sides
4. Manufacture of full chrome lining leather from wet blue sheepskins
5. Manufacture of Full Chrome lining Leather from wet blue cow sides
6. Manufacture of Full Chrome grain garment Leather from wet blue sheep skins
7. Manufacture of Full Chrome nappa Leather from wet blue cow sides\

Course Title	Advanced Communication Skills and Life Skills	Course Code	18LT-410 P
Semester	IV	Course Group	Foundation
Teaching Scheme in Periods- L: T:P	15:0:30	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45 Periods (3 Periods per Week)
CIE	60 Marks	SEE	40 Marks

Rationale:

This course is designed to impart writing skills and employability skills to the students of diploma which will help them in obtaining and maintaining the employment.

Prerequisites:

This course requires the basic knowledge of vocabulary, grammar and four language learning skills, viz. Listening, Speaking, Reading and Writing.

Course Outcomes:

Modules	At the end of the course the students will have the ability to:
Presentation Skills	Prepare a presentation. Use presentation aids effectively. Develop public speaking skills. Learn to make PowerPoint Presentations effectively. Present a Paper using appropriate body language.
Writing Reports	Learn kinds of reports. Learn the format of a report. Organise ideas. Develop essential vocabulary useful to write scientific and technical reports.

Interview Skills	Learn the techniques to face an interview. Learn the etiquette to communicate with employers. Learn the dos and don'ts of an interview. Learn the frequently asked questions in interviews. Use appropriate body language. Learn to face interviews telephonically. Gain the confidence to face an interview by attending mock interview.
Group Discussion	Learn the dos and don'ts of a Group Discussion. Participate in a Group Discussion in a healthy manner. Use effective non-verbal communication. Use appropriate phrases and expressions useful in a group discussion.
Workplace Awareness	Learn workplace etiquette. Identify the knowledge, skills and attributes useful at workplace. Build strong workplace relationships.

	Learn professional ethics. Understand gender equality at the workplace Develop a sense of responsibility towards the society.
Writing Skills Useful at Workplace	Learn various writing formats useful at workplace. Develop an ability to apply technical information in documentation. Revise and edit written documents effectively. Develop corresponding skills - learn the kinds of business letters - the format of a business letter. Learn effective e-mail writing skills. Learn Business Memos. Learn Notes and Narratives. Learn Forms and Applications. Prepare templates for different purposes. Prepare an agenda of a meeting. Prepare the minutes of a meeting. Prepare Notices / Circulars for various purposes. Prepare Press release.

CO-PO Matrix

	Course Outcome		Linked PO
CO 1	Making effective presentations	R/U/A	1, 2, 3,4, 5,6,7,8,9,10
CO 2	Writing scientific and technical reports	R/U/A	1,2,3,4, 5,6,7,8,9,10
CO 3	Learn to face oral and telephonic interviews	R/U/A	1,2,3,4, 7,9,
CO 4	Learn to face group discussion	R/U/A	1,2,3,7,8,9
CO 5	Learn to write various formats useful at workplace	R/U/A	1,2,3,5,7,8,9,10
CO6	Learn workplace etiquette and ethics	R/U/A	1,2,3,7,8,9,10

Course Contents:

I. Presentation Skills	Duration: 6 periods
II. Writing Reports	Duration: 9 periods
III. Interview Skills	Duration: 9 periods
IV. Group Discussion	Duration: 6 periods
V. Workplace Awareness	Duration: 6 periods
VI. Writing Skills Useful at Workplace	Duration: 9 periods

Suggested Student Activities:

- Paper Presentations
- Seminars
- Mock Interviews
- Telephonic Interviews
- Group Discussions
- Role Plays
- Creating advertisements

- Five-minute activities
- Creating a model of workplace

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

- | | |
|--------------------------------|----------|
| a. Mid Sem - I | 20 marks |
| Syllabus: | |
| i. Presentation Skills | |
| ii. Writing Reports | |
| b. Mid – II: | 20 Marks |
| Syllabus: | |
| i. Interview Skills | |
| ii. Group Discussion | |
| c. Internal assessment: | 20 marks |
| i. Seminars: | 10 marks |
| ii. Assignments: | 5 marks |
| iii. Lab record submission: | 5 marks |

II. Semester End Examination : 40 Marks

- | | |
|---|----------|
| a. Write an essay on a given topic or participate in an activity: | 15 Marks |
| b. Interview or Group Discussion: | 15 Marks |
| c. <i>Viva Voce</i> | 10 marks |

References:

Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.

Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.

Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004.

Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.

Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D

Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011

E-Learning Resources:

<http://www.dailywritingtips.com/>

<http://www.englishdaily626.com/c-errors.php>

<http://www.owlnet.rice.edu/~cainproj/>

<http://www.thehumorsource.com/>

<http://www.indiabix.com/group-discussion/topics-with-answers/>

<http://networketiquette.net/>

<https://public.wsu.edu/~brians/errors>

<http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15>

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER 18LT-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - I

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. Write the guidelines for preparing a PowerPoint presentation.
2. How do you prepare yourself for presenting a technical paper?
3. Mention a few presentation aids and how do you use them effectively?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. Write the format of a report and describe it.
5. Write a report on the accident you have seen recently.
6. Give the outline of a project report and describe it.

ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - II

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. What are the dos and don'ts for a formal interview?
2. What at least ten frequently asked questions in a formal interview?
3. How do you prepare for a telephonic interview?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. What are the dos and don'ts of a group discussion?
5. Mention some phrases and expressions commonly used in a group discussion.
6. Write a short paragraph on the steps you take while participating in a group discussion.

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER 18LT-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS
SEMESTER END EXAM

Time : 3 Hours

Total Marks: 40 Marks

Part – A

10 marks

Instruction: Pick any one question from the given lot.

1. Prepare the outline of a project report and describe it.
2. Write the guidelines for preparing the slides of a PowerPoint presentation.
3. Write the minutes of the meeting conducted at the Principal's chamber to conduct the annual day celebrations. Prepare the agenda of the annual day celebrations.
4. Describe the workplace etiquette.
5. Prepare a press note for the '*Job Mela*' which is going to be conducted at your institute.

Part – B

15 marks

6. Interview / Group Discussion

Part – C

15 marks

7. *Viva Voce*

Suggested Student Activities for IV SEMESTER
Suggested Student Activities for 18LT-401C

SKILL UPGRADATION IN - ADVANCED ENGINEERING MATHEMATICS

ACTIVITY ASSESSMENT Steps

- 1. Mathematical concepts**
- 2. Procedure**
- 3. Explanation**
- 4. Working with others**
- 5. Mathematical errors**

ACTIVITIES

1. List out the methods to find complimentary function and explain to solve a homogeneous Linear Differential equations.
2. List out the methods to find Particular integrals and explain the solution of Non-homogeneous Linear Differential equations.
3. Write short notes on expansion of simple functions as a Fourier series.
- 4 . Prepare a presentation on Laplace Transforms of simple functions.
- 5 . Prepare a presentation on Inverse Laplace Transforms of simple functions.
6. List out different applications of Laplace Transforms.
7. Solve the Differential equation by applying Laplace Transformations.

CO / PO - MAPPING OF ACTIVITIES

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1			1	3	2	3
CO2	3	2	2	1			1	3	2	3
CO3	3	2	2	1			1	3	2	3
CO4	3	2	2	1			1	3	2	3
CO5	3	2	2	1			1	3	2	3
CO6	3	2	2	1			1	3	2	3
CO7	3	2	2	1			1	3	2	3

Rubrics for Activity assessment

CATEGORY	4	3	2	1
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Procedures	Typically, uses an efficient and effective procedure to solve the problem(s).	Typically, uses an effective procedure to solve the problem(s).	Sometimes uses an effective procedure to solve problems, but does not do it consistently.	Rarely uses an effective procedure to solve problems.
Explanation	Explanation is detailed and clear.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	Explanation is difficult to understand and is missing several components OR was not included.
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

PASS SCORE: 2.5

STUDENT ASSESSMENT by RUBRICS

S.NO	PIN	CO1	CO2	CO3	CO4	CO5	CO6	CO7	AVERA
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									GE

Suggested Student Activities for 18LT-402C

STUDENT ACTIVITIES ON CHEMISTRY OF TANNAGES, POST TANNAGES AND MICROBIOLOGY

1. Quiz on Coordination chemistry **(PO-1, 8)**
2. Collect various chromium salts. Prepare different chrome liquors using reducing agents and record your observations. **(PO- 8)**
3. Compare Chromium, Aluminium, Zirconium and Iron tannages. Identify the solutions for the problems by using these tannages. Submit a report. **(PO-5, 8)**
4. Categorize the chemicals used in aldehyde, oil, syntan and combination tannages. Study their impacts on environmental context. Record the observation. **(PO- 6)**
5. Prepare power point presentation on post tanning operations. **(PO- 9)**
6. Visit nearby leather industry and observe the recent procedures adapted in tannage and control of microbes. Prepare a report. **(PO- 10)**
7. Collect various leather pieces from old leather goods . Observe the spew formation. Record your observation with remedies.
8. Conduct a seminar on a given topic. **(PO- 8, 9)**
9. Draw the life cycles of insects and parasites on living animals. Submit the drawings. **(PO- 8)**

10. Compare the damages of different insects on stored leathers. Collect the samples and submit a report. (PO-8)
11. Group discussion on Acts on wild life (PO-5)

Suggested Student Activities for 18LT-403C
ACTIVITIES for LIGHT LEATHER MANUFACTURE

- 1) Collect different finished leathers classify them as per usage and prepare a chart with their characteristics—P8
- 2) List different defects in garment leather. Observe the different defects present in it. Submit a record with necessary photos—P8
- 3) Discuss in a group about the job prospects in leather industry and give a presentation with necessary documents-P8, P9
- 4) Collect different upper leather samples and prepare a chart with their characteristics—P8
- 5) Survey on different raw material prices for making sole leathers and submit a report—P8, P10
- 6) Visit a nearby tannery and prepare a flow chart about the processing of lining leather with necessary photos of machinery and chemicals –
- 7) Visit a nearby tannery making chrome leathers and prepare a flow chart about the processing of effluents discharged into the environment—P5, P6, P8
- 8) Give a seminar presentation on purpose of preferring vegetable tanned leathers over chrome tanned leathers by using power point presentation—P8
- 9) Give a seminar presentation on list of chemicals used incrusting and finishing of leathers and their hazards, regulations by the government in using it.
- 10) Collect different buffing paper samples and submit a comparison report—P8
- 11) Collect from journals the recent processing techniques techniques adopted in tanneries to make upper and garment leathers and submit a report—P8, P10
- 12) Prepare a chart about the traffic rules- P7, P8

Suggested Student Activities for 18LT-404C
ACTIVITIES FOR LEATHER MACHINERY MAINTENANCE ENGINEERING

1. Collect Latest advanced tannery machinery pictures.
2. Collection of various Post tanning machinery pictures.
3. Watch working system of Pretanning machinery videos and prepare a report.
4. Watch working system of Post tanning machinery videos and prepare a report.

5. Draw different maintenance tools diagram and submit a seminar presentation in power point presentation
6. Discuss in group about the importance of maintenance in factory

Suggested Student Activities for 18LT-405C

ACTIVITIES FOR CHEMISTRY OF EFFLUENTS TREATMENT& WASTE MANAGEMENT

1. Collect Latest advanced tannery machinery pictures.
2. Collection of various Post tanning machinery pictures.
3. Watch working system of Pretanning machinery videos and prepare a report.
4. Watch working system of Post tanning machinery videos and prepare a report.

Suggested Student Activities FOR LMB

1. Collect various types of leather have distinct properties
 2. Compare the various hides microscopically and prepare a report
 3. Collect the samples with defects and identify the defect.
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1.RUBRICS FOR ACTIVITY - (VISIT) PO-08						
Dimension	Exemplary	Good	Satisfactory	Developing	Unsatisfactory	REMARKS

	5	4	3	2	1	
Attitude towards visit	Very eager about the about	Showing very much interest when opportunity comes	Showing interest under compulsion	Showing less interest	Reluctant	
Observation at the visit place	Very enthusiastic to know new things	Shows interest on existing things	Observation with less interaction	Observation without interaction	Not observing any thing	
Interaction with new persons at the visit place	Easily mingle and make friendship	Easily mingle	Less mingle	Reserved in nature	Not at all mingle	
Presentation about the visit	Excellent report with good presentation	Good report with fair presentation	Satisfactory report with fair presentation	Sufficient report with poor presentation	Insufficient report and not in order	

	2.RUBRICS FOR ACTIVITY - (Collection) Individual & Team work, Life long learning P-08,P-10					
Dimension	Exemplary	Good	Satisfactory	Developing	Unsatisfactory	
	5	4	3	2	1	
Subject/ Topic coordination	Concept linked to topic with advanced knowledge	Concept linked to topic with little knowledge	Concept linked to topic only	Concept not linked and not clear	Not at all linked with topic	
Sources used for the topic	Different sources with latest information	Different sources with sufficient information	Single source with limited information	Reproduced matter	Copied from others	
Quality and Quantity of the material /model /sample	Excellent in quality with enough quantity	Good quality with enough quantity	Appreciable in quality and quantity	Insufficient in quality and quantity	Irrelevant to the assigned topic/ Not submitted	
<u>Presentation ORAL/DOCUMENT</u>	Highly receptive/ Highly Exemplary	Receptive/ Exemplary	Moderately receptive/ Moderate	Mediocre/ Not in orientation	Non receptive Abstract/ Distorted	

	3.RUBRICS FOR SEMINAR / INDIVIDUAL PRESENTATION P-08,09					
Dimension	Exemplary	Good	Satisfactory	Developing	Unsatisfactory	
	5	4	3	2	1	
Personal Disposition	Poise	Disposition	Stance	Gait	Un pleasant	
Diction	vocabulary	continuous	confident	Lipsing	gibberish	
content	Thought Provoking	Alacrity	placid	Good	Insufficient inputs	
Interaction	Profound Reply	Ability to satisfy	Ability to respond	Misleading	evading	

	4.RUBRICS FOR GROUP DISCUSSION P-08,P-09,P-10					
Dimension	Exemplary	Good	Satisfactory	Developing	Unsatisfactory	
	5	4	3	2	1	
Participation towards the Topic	Initiative & Extempo	Contradictory	Pro initiative	Passive	Non inclined	
Dessimation of information	Updated presentation	Chronological	Only established facts	Misinterpretation of Facts	Distorted Dessimation	
Presence of mind	Focussed	Confident	Wavered	Confused	Vague	
Summation	Trouble shooter	Balanced	Convincing	In coherent	Mute spectator	

	5.RUBRICS FOR Group Discussion/seminar PO-05 & PO-06 ENVIRONMENT & SOCIETY					
Dimension	Exemplary	Good	Satisfactory	Developing	Unsatisfactory	
	5	4	3	2	1	

Awareness about the environment	Compassion	Concern	Responsibility	Compulsive	Irresponsible	
Concern towards the environment	Eco friendly	Close to nature	Recycle	Ignorant	Negligent	
Implementation	Penchant(craving)	Involvement	Commitment	No self motivation	Disinterested	
sustainability	Innovative	Incorporative	Practicing	Non reliable	irresponsible	
