

CURRICULUM FOR THREE YEAR
(SIX SEMESTER)
DIPLOMA COURSE IN

=====
: LEATHER TECHNOLOGY (TANNING) :
: Effective from Session :
=====

=====
:Semester System :
=====

=====
UNDER DEVELOPMENT
=====

Prepared By

=====
: Curriculum Development Cell :
=====

INSTITUTE OF RESEARCH DEVELOPMENT
& TRAINING, U.P., KANPUR

APPROVED BY

=====
: BOARD OF TECHNICAL EDUCATION :
: U.P. LUCKNOW, :
:CORRECTED AS SYLLABUS COMMITTEE OF:
: B.T.E. MEETING HELD ON 10.06.2015:
=====

Corrected and Approved By B.T.E. on Dated 10.06.2015

STUDY AND EVALUATION SCHEME FOR
THREE YEAR (SIX SEMESTER) DIPLOMA COURSE IN LEATHER TECHNOLOGY (Tanning)
(Effective From Session 200 -0)

I Semester

Curriculum						Scheme of Examination									
Periods Per Week						Theory				Practical			Grand Total		
Le	Tut	Dr	Lab	Work	Tot	Examination	Sess.	Total	Examination	Sess.	Total	Tot			
c.	ori	aw		Shop	al	Dur.	Marks	Marks	Dur.	Marks	Marks	al			
5	-	-	3	-	8	1.1 Professional Communication	2.5	50	20	70	3	20	10	30	100
3	1	-	-	-	4	1.2 Applied Mathematics-I(A)	2.5	50	20	70	-	-	-	-	70
3	1	-	-	-	4	1.3 Applied Physics-I	2.5	50	20	70	-	-	-	-	70
6	-	-	4	-	10	1.4 Applied Chemistry	2.5	50	20	70	3	40	20	60	130
-	-	8	-	8	16	1.5 Drawing & Workshop Practice	-	-	-	-	4	80	40	120	120
17	2	8	7	8	42	<-----TOTAL----->	-	200	80	280	-	140	70	210	490
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)													25		
TOTAL													515		

II Semester

3	1	-	-	-	4	2.1 Applied Mathematics-I(B)	2.5	50	20	70	-	-	-	-	70
3	1	-	4	-	8	2.2 Applied Physics-II	2.5	50	20	70	3	40	20	60	130
6	2	-	-	-	8	2.3 General Engineering-I	2.5	50	20	70	-	-	-	-	70
5	1	-	8	-	14	2.4 Organic Chemistry	2.5	50	20	70	3	60	30	90	160
5	1	-	8	-	14	2.5 Theory of Leather Manufacture-I	2.5	50	20	70	4	70	30	100	170
22	6	-	20	-	48	<-----TOTAL----->	-	250	100	350	-	170	80	250	600
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)													25		
TOTAL													625		

- NOTE:-
- (1) Each period will be of 50 minutes duration.
 - (2) Each session will be of 16 weeks.
 - (3) Effective teaching will be at least 14 weeks.
 - (4) Remaining periods will be utilised for revision etc.

Corrected and Approved By B.T.E. on Dated 10.06.2015

STUDY AND EVALUATION SCHEME FOR
THREE YEAR (SIX SEMESTER) DIPLOMA COURSE IN LEATHER TECHNOLOGY (Tanning)
(Effective From Session)

III SEMESTER

Curriculum						S U B J E C T	Scheme of Examination								
Periods Per Week							Theory				Practical				Grand Total
Lec.	Tutorial	Dr.	Lab	Work Shop	Total		Examination	Sess.	Total	Examination	Sess.	Total	Total		
						Dur.	Marks	Marks	Dur.	Marks	Marks	Marks			
6	2	-	4	--	12	3.1 Elementary Microscopy & Microbiology	2.5	50	20	70	3	40	20	60	130
8	2	-	--	--	10	3.2 Theory of Leather Manufacture - II	2.5	50	20	70	--	--	--	--	70
8	-	-	8	--	16	3.3 Process of Leather Manufacture - I	2.5	50	20	70	12	100	50	150	220
6	-	-	4	-	10	3.4 General Engineering-II	2.5	50	20	70	3	40	20	60	130
28	4	-	16	-	48	<-----TOTAL----->	--	200	80	280		180	90	270	550
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)													25		
TOTAL													575		

IV SEMESTER

8	-	-	4	--	12	4.1 Theory of Leather Manufacture - III	2.5	50	20	70	3	40	20	60	130
8	-	-	8	--	16	4.2 Process of Leather Manufacture - II	2.5	50	20	70	12	100	50	150	220
5	-	-	4	-	9	4.3 Leather Trade Engg.	2.5	50	20	70	3	60	30	90	160
2	-	-	5	--	7	4.4 Introduction To Computer	--	--	--	--	3	60	30	90	90
23	-	-	21	--	44			150	60	210		260	130	390	600
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (15 + 10)													25		
AGGREGATE													625		

- NOTE:-
- (1) Each period will be of 50 minutes duration.
 - (2) Each session will be of 16 weeks.
 - (3) Effective teaching will be at least 14 weeks.
 - (4) Remaining periods will be utilised for revision etc.
 - (5) 4 weeks structured and supervised, branch specific, task oriented industrial/field exposure to be organised after IV Semester. Student will submit a report. There will be 60 marks for this exposure. These marks will be awarded by project examiner in the VI Semester. (Examination marks : 40, Sess. marks : 20).
 - (6) Field visit and extension lectures are to be organised and managed at least twice in a month at institute level.

Corrected and Approved By B.T.E. on Dated 10.06.2015

STUDY AND EVALUATION SCHEME FOR
THREE YEAR (SIX SEMESTER) DIPLOMA COURSE IN LEATHER TECHNOLOGY (Tanning)
(Effective From Session)

V Semester

Curriculum						Scheme of Examination									
Periods Per Week						Theory				Practical			Grand Total		
Lec.	Tutorial	Dr.	Lab	Work Shop	Total	Examination	Sess. Marks	Total Marks	Examination	Sess. Marks	Total Marks				
						Dur.	Marks		Dur.	Marks					
6	2	-	-	--	8	5.1 Industrial Management and Entrepreneurship Development	2.5	50	20	70	--	--	--	70	
6	-	-	-	8	14	5.2 Process of Leather Manufacture - III	2.5	50	20	70	12	100	50	220	
6	-	-	-	8	14	5.3 Elements of Footwear & Leather Goods Manufacture	2.5	50	20	70	4	100	50	220	
8	2	-	-	--	10	5.4 Analytical Chemistry of Leather Manufacture	2.5	50	20	70	--	--	--	70	
26 4 - - 16- 46							200	80	280		200	100	300	580	
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (15 + 10)												25			
AGGREGATE												605			

VI Semester

4	-	-	-	-	4	6.1 Environmental Education* Disaster Management	2.5	50	--	--	--	--	--	--
6	2	-	-	--	8	6.2 Financial, Cost & Management Accounting	2.5	50	20	70	--	--	--	70
6	2	-	-	--	8	6.3 Tannery Waste Management	2.5	50	20	70	--	--	--	70
-	-	-	8	--	8	6.4 Standardisation & Analysis of Leather/ Leather Manufactures	--	--	--	--	12	100	50	150
6	4	-	-	--	10	6.5 International Business Management & TQM	2.5	50	20	70	--	--	--	70
-	4	-	-	--	4	6.6 Project (i) Project Work (ii) Industrial Training	--	--	--	--	3	70	40	110 } 60 } 170
22 12 8 - 42							150	60	210		210	110	320	530
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (15 + 10)												25		
AGGREGATE												555		
30% Carry Over of I & II Semester												342		
70% Carry Over of III & IV Semester												840		
100% Carry Over of V & VI Semester												1160		

NOTE:-

- (1) Each period will be of 50 minutes duration.
- (2) Each session will be of 16 weeks.
- (3) Effective teaching will be at least 14 weeks.
- (4) Remaining periods will be utilised for revision etc.
- (5) Field visit and extension lectures are to be organised and managed well in advance at institute level as per need.
- (6) (*) It is compulsory to appear & to pass in examination, But marks will not be included for division and percentage of obtained marks.

Corrected and Approved By B.T.E. on Dated 10.06.2015

CONTENTS

S.No.	Particulars	Page No.
	Study and Evaluation Scheme	
I.	Main features of curriculum	1
II.	List of Experts	2
III.	Need analysis	3
IV.	Profile development	4
V.	Job potential/Job opportunities	5
VI.	Job activities	6-7
VII.	Analysis of activities into knowledge and skill.	8-14
VIII.	Course objectives	15
IX.	Deriving Subjects of study from course objective	16-17

DETAILED COURSE CONTENTS

1	I Semester	
1.1.	Professional Communication	18-22
1.2.	Applied Mathematics-I(A)	23-24
1.3.	Applied Physics-I	25-26
1.4.	Applied Chemistry	27-31
1.5	Drawing & Workshop practice	32-34
2	II Semester	
2.1.	Applied Mathematics-I(B)	35-36
2.2.	Applied Physics-II	37-39
2.3	General Engineering-I	40-41
2.4	Organic chemistry	42-46
2.5	Theory of leather manufacture-I	47-49
3.	III Semester	
3.1	Elementary Microscopy and Microbiology	50-51
3.2	Theory of Leather Manufacture-II	52-53
3.4	Process of Leather Manufacture-I	54
3.7	General Engineering-II	55-57
4.	IV Semester	
4.1	Theory of Leather Manufacture-III	58-60
4.2	Process of Leather Manufacture-II	61
4.3	Leather Trade Engineering	62-64
4.4	Introduction To Computer	65-66
5.	V Semester	
5.1	Industrial Management and Entrepreneurship	68-69
5.2	Process of Leather Manufacture III	70
5.3	Elements of Footwear and Leather Goods Manufacture	71-72
5.4	Analytical Chemistry of Leather Manufacture Development	73
6.	V Semester	
6.1	Environmental Education & Disaster Mgt.	74-76

Corrected and Approved By B.T.E. on Dated 10.06.2015

6.2	Financial, Cost & Management Accountancy	77-79
6.3	Tannery waste Management	80
6.4	Standardisation and Analysis of Leather & Leather Manufacture	81-82
6.5	International Business Management & TQM	83-84
6.6	Project	85
XI.	Staff Structure	86
XII.	Space Requirement	87
XIII.	List of Equipments	88-102
XIV.	Learning Resource Material	103
XV.	Annexure-I. Questionnaire	104-106
	Annexure-II. Summer Training Schedule	107-108
XVI.	Recommended Books	109-114

Corrected and Approved By B.T.E. on Dated 10.06.2015

I. MAIN FEATURES OF THE CURRICULUM

1. Title of the Course : Diploma in Leather Technology (Tanning)
2. Duration of the Course : Three Years (Six Semester)
3. Type of the Course : Full Time Institutional
4. Pattern of the Course : Semester System
5. Intake : 60
6. Entry Qualification : Passed High School with 35% Marks
7. Admission Criteria : State Joint Entrance Examination

Corrected and Approved By B.T.E. on Dated 10.06.2015

LIST OF EXPERTS

List of experts who contributed in the Semester System of curriculum for Three Years (Six Semester) Diploma Course in Leather Technology at I. R. D. T., U. P., Kanpur dated 22-4-2015

1. Shri Bharat Singh H.O.D.
Govt. Leather Institute, Agra
2. Shri D. N. Swami Lecturer (Shoe Design)
Govt. Leather Institute, Kanpur
3. Shri Rajjan lal Pal Lecturer
G. G. P., Lucknow
4. Shri N. K. Singh Instructor
Govt. Leather Institute, Kanpur
4. Shri Pankaj Yadav Professor
I.R.D.T.,U.P., Kanpur

Corrected and Approved By B.T.E. on Dated 10.06.2015

III. NEED ANALYSIS :

Various types of leather articles are in use in every day life. There is continuous demand for such articles in the world market. Our country is third richest country in cattle stock. Therefore raw material in the form of leather is available in sufficient quantity.

Processing of leather for different purposes is an specialised job. Procurement of raw leather is a technical job which requires knowledge of Microscopy & Microbiology, Organic chemistry, Standardisation and quality control techniques, testing etc.

The student is supposed to have basic knowledge of different methods of leather processing. Knowledge of computers will be additional advantage to handle statistical information. There are bright prospects for external revenue generation through leather export.

Keeping in view the above factors, curriculum for three year diploma course in Leather Technology has been revised to suit the need of the industry. Environmental pollution and its control and Entrepreneurship development has also been included in the curriculum.

It is hoped that this new curriculum will prove useful for the students. The demand for middle level technical manpower can be fulfilled in the industries through diploma passouts of Leather Technology.

Corrected and Approved By B.T.E. on Dated 10.06.2015

IV. PROFILE DEVELOPMENT :

A tool in the form of questionnaire for getting information about job potential, job opportunities, manpower requirements and job activities of Diploma holder in Footwear and Leather Goods Technology was designed and sent to various organisations, industries and higher technological Institutions and Polytechnics. The response was not very much encouraging. So efforts were made to get feed back through mutual interaction with the experts of above organisations, industries, higher technological institutes and polytechnics. The feed back received was discussed and analysed in a workshop and a draft curriculum was prepared adopting the following procedure.

1. Listing job potential and job activities.
2. Analysing activities into knowledge and skill.
3. Determining course objectives.
4. Planning horizontal and vertical organisation of the subjects.
5. Developing study and evaluation scheme.
6. Development of detailed course content and coverage time keeping in view the knowledge and skill requirement.
7. Determination of resource input in the form of human resource, space, equipment etc.

The draft curriculum so prepared was sent for comments of experts in various higher technological institutions and senior personnel in industries. The suggestions thus received and those through personal contacts were incorporated where found suitable. Finally revised curriculum was put before an expert Committee approved by the "Government of Uttar Pradesh" for its final approval. The Committee's suggestions though very nominal too were respectfully incorporated to give it its final shape.

It is hoped that revised curriculum of Diploma in Footwear and Leather Goods Technology will be useful in producing middle level manpower for world of work.

V. JOB POTENTIAL / JOB OPPORTUNITIES

The following are the job opportunities for diploma holders in leather technology.

1. As a leather technologist to manufacture various types of heavy and light leathers, sports goods leathers, garment leather etc.
2. As supervisor/production manager in the tanneries/leather and allied industries in the following sections:

Liming Department, Tanning Department, Dyeing Department, Curing Department, Finishing Department, Testing and Quality control.
3. As research assistant for developing tanning processes for manufacture of various types of leathers.
4. As technical officer/sales officer in chemicals and auxiliary manufacturing companies.
5. As supervisor in quality control and purchases (Finished leather)
6. As an analyst in tanneries.
7. As supervisor or manager in raw hide curing, preservation and flaying centre.
8. As a field officer for procurement of new materials in shoe industry/Tannery
9. As a marketing officer in tanneries and allied industries.
10. As a laboratory assistant in leather test laboratories.
11. As assistant/ Deputy Director leather in Govt. departments.
12. As a design/planning supervisor in leather goods manufacturing and allied industries.
13. As a maintenance supervisor in leather industry.

Corrected and Approved By B.T.E. on Dated 10.06.2015

VI. JOB ACTIVITIES OF DIPLOMA HOLDERS IN LEATHER TECHNOLOGY

1. Activities connected with leather Manufacturing
 - 1.1 Examines hides and skins for various defects.
 - 1.2 Analyses various chemicals such as water, commonsalt, lime, sulphides, acids, dyes, vegetable and synthetic used in leather industry.
 - 1.3 Tests tanned and finished leathers at every stage for conformity to prescribed standards and quality.
 - 1.4 Determine correct and economical methods of tanning of hides and skins for various leathers.
 - 1.5 Assessment and assortment of raw hides and skins for processing into different kinds of leathers.
 - 1.6 Supervises curing beam house, tanning and finishing processes.
 - 1.7 Selection and grading of finished leathers.
 - 1.8 Measurement, weighment and yield of leather at various stages of manufactures.
 - 1.9 Packing of finished leathers.
2. Activities connected with leather Manufacturing
 - 2.1 Selects and installs new equipment and machinery
 - 2.2 Maintains and under takes minor repairs of the machinery installed in a tannery.
 - 2.3 Assists in the selection of site, layout and construction of tanneries.
 - 2.4 Demonstrates correct procedures for operating various machinery.
 - 2.5 Handles and uses various instruments.
3. Management Activities
 - 3.1 Plans and schedules production
 - 3.2 Allocates duties to various workers.
 - 3.3 Imparts training to workers engaged in the unit.
 - 3.4 Supervises the work of various sections in the tanneries.
 - 3.5 Estimates the unit cost of leather produced under his charge.
 - 3.6 Supervises the receiving , packing and forwarding of goods.
 - 3.7 Controls inventory of chemicals and raw materials and makes out a schedule of such materials to be kept in

Corrected and Approved By B.T.E. on Dated 10.06.2015

stock for continuous production.

3.8 Accounting and maintaining records.

3.9 Assists in ensuring working conditions in tanneries in accordance with labour and factory laws.

3.10 Supervises labour welfare schemes.

3.11 Marketing of leather.

3.12 Assists in conducting techno-economic surveys and preparing project reports for starting tanneries.

4. Activities connected with research and development

4.1 Assists in research and development in the fields of:

Curing and preservation;

Leather manufacture;

Auxillaries;

Utilization of bye-products

Treatment of effluents;

Utilizing local tanning resources;

VII. ANALYSIS OF ACTIVITIES INTO KNOWLEDGE AND SKILL

ACTIVITY	KNOWLEDGE	SKILLS
1.1 Examines, hides and skins for various defects	Histology of hides and skins	Flaying practice
	Anatomical structure	Curing and preservation practicals
	Different kinds of hides and skins	
	Different breeds of ovines and bovines and their characteristic grains.	Study of defects in hides and skins in the raw hide market
	Post mortem and ante-mortem defects on hides and skins and their effects on finished leather.	Microscopic and bacteriological examination of (At an elementary level)
	Remedial measures to overcome defects	
	Seasonal and regional variations	
	Raw hide and skin prices, weights, areas and yield	
	Proper trimming and utilization.	
	Strength properties of skin fibres Proper flaying of hides and skins Purification and bacteria Storage, handling and transportation of raw hides and skins Assorting and grading of raw hides and skins	

Corrected and Approved By B.T.E. on Dated 10.06.2015

ACTIVITY	KNOWLEDGE	SKILLS
1.2 Analyses various chemicals such as water, common salt, lime, sulphides, acids, dyes, oils and fats, tanning materials-mineral vegetable and synthetic used in leather industry	<p>Sources of availability of various chemicals. Impurities present</p> <p>Minimum acceptable standards of</p> <p>Composition and properties of various chemicals</p> <p>Chemical reactions.</p> <p>Methods of Chemical analysis.</p>	<p>Experiments in the Laboratory concerned with qualitative and quantitative methods of chemical analysis involving these chemicals</p>
1.3 Tests tanned and finished leather at every stage for conforming to prescribed standards of quality.	<ul style="list-style-type: none"> - Different methods of tanning and finishing - Analysis of vegetable tanned leather, sampling, preparation of the sample, analysis in full <p>Determination of adulteration, acidity of vegetable tanned leathers</p> <ul style="list-style-type: none"> - Analysis of chrome salts and chrome tanned leather. Determination of percentage basicity, distribution of acid in chromium complexes, chromium in chrome leather - Preparation of various types of chrome liquors and their analysis and tanning test, with them - Analysis of aluminium and zirconium tanning agents, systems and formaldehyde 	<p>Analysis of all chemical used in leather manufacture except dyes</p> <p>Analysis of vegetable and mineral tanning agents</p> <p>Analysis of vegetable, chrome other mineral and oil tanned leathers</p> <p>Physical testing of leathers</p>

Corrected and Approved By B.T.E. on Dated 10.06.2015

ACTIVITY	KNOWLEDGE	SKILLS
	<ul style="list-style-type: none"> - Dyes and dye stuffs preparation and systematic tests comparative dyeing tests with various types of leathers. - Types of oil fats and waxes <p>Analysis of oils and fats. Iodine value saporification values theory of saturation and maturation</p> <p>Analysis of oil tanned leathers.</p> <ul style="list-style-type: none"> - Tests for sulphonated oils, analysis of soaps and fat liquors - Analytical study and control of tanning process - Water analysis temporary and permanent hardness, methods of softening study of suitability of water for tanning purposes. - Analysis of curing materials. <p>Analysis of soaps liquors and soaking materials, analysis of lime in full, analysis of sodium sulphide, defects of lime and sulphide and other unhairing agents in liming</p> <ul style="list-style-type: none"> - Analysis of limed pelt <p>Analysis of used lime liquor, Bata liquor, Deliming liquors and the chemicals used in bating and deliming</p> <ul style="list-style-type: none"> - Analyses of pickle liquor used and unused. 	

Corrected and Approved By B.T.E. on Dated 10.06.2015

ACTIVITY	KNOWLEDGE	SKILLS
	<ul style="list-style-type: none"> - Analysis of vegetable tanning materials, methods of sampling; grinding and extraction, qualitative and quantitative analysis of vegetable tanning materials - Sampling and analysis of extracts, liquids or solids; comparative tannery tests with different blends of hydrolyzable and condensed tannins - Pigments, binders (Synthetic and natural); Nitrocellulose lacquers, lacquer emulsions, polyurethanes, plasticizers, solvents thinners, PVC lacquers etc. - Physical testing of leathers: Sampling and conditioning for tensile strength, tear and bursting strength, abrasion resistance, stretchiness, crack index apparent and real density, air and water vapour permeability water proofness, resilience and flexibility, wet and dry rub fastness, water absorption etc. 	
1.4 Determine correct and economical method of tanning of hides and skins for various leathers.	<ul style="list-style-type: none"> -Principles and methods of manufacture of different types of heavy, light and sportsgoods leather such as sole, harness, bolting, saddlery, leather for carriage and automobiles packing band leather, buffers, pickers, washers, hydraulic leathers, shoe upper leathers, lining leathers, gloving and clothing leathers, chamois leather, upholstery book binding and morocco leathers. 	-Practical exercise to manufacture important types of heavy, light and sportsgoods leather their working on various machinery.

Corrected and Approved By B.T.E. on Dated 10.06.2015

ACTIVITY	KNOWLEDGE	SKILLS
	<p>Glazed kid leather, buff, calf, upper, softy upper suede and sambhur leather, ammunition boot upper and sarunken grain leather, E.I. tanned sheep, goat, cow and buff leather, Reptile leather, game skins leather, semichrome and fullchrome football leather, hockey and cricket ball leather, batting/wicket keeping glove leather, shuttle cock leather, grip leather etc.</p> <p>Dressing of EII leathers /bag tanned leathers/wet blues.crust leather into finished leathers working of various tanning maching and their production machines, Alignment etc. Performance exercise. characteristics maintenance and replacement factors foundations for machine and erection.</p> <p>-Probable defects and repairs. Power load requirements of machinery. Schematic drawinds and flow charts (ISI symbols and conventions).</p>	<p>-Blue print reading, Free Hand skectching charts.</p>
2.3 Assists in the selections of site, layout and construction of tanneries	<p>-Factors to be considered in site selection, water supply, distributin and disposal system, sanitary fittings factory layout Power and steam piping, Biolers, fire protection safety measures.</p>	<p>-Reading of Typical layouts and re-drawing them.</p>
2.4 Demonstrates correct procedures for operating various machinery		<p>-Same as 2.1 & 2.2 + dismantling and assembling tanning machine + renewal of belts length and sizes of belts, checking of slackness of belts, their remedie, checking of pulleys and</p>

Corrected and Approved By B.T.E. on Dated 10.06.2015

ACTIVITY	KNOWLEDGE	SKILLS
		setting them right; Tightening loose shafts, couplings bearings and other alignments, speed and strokes of machine.
2.5 Handles and uses various instruments	-Hydrometers, pressure meters, vaccum gauges, Hydrometers, Ammeters, Voltmeters, pH meter, Calorimeter, thermostats, Ovens, Muffle furnaces, Balances, Glassware viscometer; microscope; sterilizer distillation and gasplants etc.	-Practical in using these instruments.
3.1 Plans and schedules production	-Stock of raw materials. Availability of workers, various production, capacities of machines and men; Bar charts and networking techniques.	
3.2 Allocates duties to workers	-Individual and group skills Elements of industrial psychology; Time and motion study.	
3.3 Imparts training to workers engaged in the unit	-Processes and machinery, training needs, methods of training and assessment. Qualities of leadership.	- Group discussion skills. - Demonstration skills - Visit to industries
3.4 Supervises the work of various sections in the tanneries	-Coordination, Economic and technical decision making. Selection of alternatives, Principles of supervision human relation	
3.5 Estimating the unit cost of leather produced under his charge	-Use of money credit, depreciation, earning and returns. Breakeven point, costing and book-keeping, competitions (Elements of economics with special reference to leather industry) Exercises in estimating the cost of production of some important types of leather.	
3.6 Supervises the receiving, packing and forwarding of goods	-Book-keeping; Receiving and despathching procedures. -Import-Export regulations; F.O.B., C.I.F. values and invoices methods of packing; handling and transprotation.	

Corrected and Approved By B.T.E. on Dated 10.06.2015

ACTIVITY	KNOWLEDGE	SKILLS
3.7 Controls inventory of chemicals and raw materials and makes out a suitable schedule such materials to be kept in stock for continuous productions.	-Principle of materials management; stores mangement and reordering level	
3.8 Accounting and maintaining records.	-Commerical accounting maintenance of job cards; stock registers	
3.9 Assists in ensuring working conditions in tanneries in accordance with labour and factory laws	-Factory rules workers welfare schemes, Trade unions, Minimum wages act, ESI, Gratuity, Retirement benefits,workmen compensation Act, Workers coop. stores schools, canteens etc.	
3.10 Supervises labour welfare schemes		
3.11 Marketing of leather	-Communication and public relations; Advertising quality control; competitions ; Internal price Export trade, sales promotion; Marketing intelligence.	
3.12 Assists in conducting technoeconomic surveys and preparing project reports for starting tanneries	-Sampling; Methods of Collecting data; Elementary Statistics, capital structure, capital structure; Ioans from financial institution and bakns; Govt. policy and concessions, Entrepreneurship and technocart schemes, production; profitability and balance sheet; leather economics; practical exercises in preparing project report.	
4.1 Assists in R&D in fields of curing and preservation, leather manufacture auxiliaries, utilization of bye products, treatment of effluents utilizing local tanning resorces	-As in all the activities Above Project work	

Corrected and Approved By B.T.E. on Dated 10.06.2015

VIII.

COURSE OBJECTIVES:

After completion of the course the student should be able to

1. Understand the physical, chemical and biological properties of raw hides and skins, finished leather and materials that go into leather manufacture.
2. Select and grade raw hides and skins for manufacture of different types of finished leather;
3. Select the most appropriate tanning method for various types of leathers;
4. Estimate the unit cost of manufacture of leather;
5. Plan, schedules, organises, direct, controls and co-ordinate operations and men involved in the manufacture of leather;
6. Test tanned and finished leathers at various stages to prescribed standards of quality;
7. Selects, instals, maintains and undertake minor repairs of machinery in a tannery;
8. Assists in selection of site, layout and construction of tannery.
9. Assists in conducting tecno-economic surveys and preparing project reports for starting tanneries.

IX. DERIVING SUBJECTS OF STUDY FROM COURSE OBJECTIVES:

COURSE OBJECTIVES	SUBJECTS
1. Understand the physical, chemical and biological properties of raw hides and skins and finished leather and materials that go into leather manufacture.	Mathematical, Physical, Inorganic and Organic chemistry, Microbiology, Theory of leather manufacture, Theory & practice of deying and finishing.
2. Select and grade raw hides and skins for manufacture of different types of finished leather.	Microscopy and Microbiology Theory of leather manufacture Process of leather manufacture.
3. Select the most appropriate tanning method for various types of leathers.	Theory of leather manufacture Process of leather manufacture Theory and Practice of deying and finishing General engineering Leather Trades Engineering Footwear and Leather goods manufacture.
4. Estimates the unit cost of manufactured leathers.	Theory and Practice of Leather manufacture, Leather Machinery Estimating and Costing.
5. Plans, Schedules organises, directs, controls and coordinates operations and men involve in the manufacture of leather.	Leather Trades Engineering Industrial Management Production Management
6. Test tanned and finished leathers at various stages to prescribed standards of quality.	Analytical chemistry of leather manufacture and testing.
7. Selects, instals, maintains and undertakes minor repairs of machinery in a tannery.	General Engineering, Workshop practice, Drawing and Blueprint reading, Maintenance of machinery, Leather Trades Engineering.
8. Assist in selection of site, layout and construction of tannery.	Leather Trades Engineering Theory & Process of Leather Manufacture
9. Assist in conducting techno-economic surveys and preparing project reports for starting tanneries.	All the above subjects - Elementary economics and statistics - English language course (For report writing as well as for oral communication)

Corrected and Approved By B.T.E. on Dated 10.06.2015

SUBJECTS AND CURRICULUM AREAS

SUBJECT	CURRICULUM AREA
Communication Technique	Language & Communication
Mathematics-I	Basic Sciences
Physics	
Chemistry (Inorganic, Physical and Organic)	
Microscopy and Microbiology	
General Engineering (Mech., Elect.)	Basic Engineering
Workshop Drawing	
Theory of Leather Manufacture	Leather Technology
Process of Leather Manufacture (Heavy, Light, Industrial, Sportgoods)	
Theory and Practice of dyeing and finishing	
Elements of Footwear Manufacture	
Leather Goods Manufacture	
Leather Trade Engineering	
Maintenance of Machinery	
Analytical Chemistry of Leather Manufacture	
Analysis of materials and products of leather manufacture	
Project work	
Industrial Management and entrepreneurship development	Management and Entrepreneurship
Introduction to Computers	Computer awareness

Corrected and Approved By B.T.E. on Dated 10.06.2015

[Common to All Engineering/Non Engineering Courses]

L	T	P
5	-	3

Rationale:

Communication forms an important activity of diploma holder. It is essential that he/she should be in a position to communicate in writing and orally with superiors, equals and subordinates. This subject aims at providing working knowledge of languages like Hindi and English so as to train the students in the art of communication. It is suggested that maximum attention should be given in developing Communication abilities in the students while imparting instructions by giving maximum emphasis on practice.

Sr.No.	Units	Coverage time		
		L	T	P
1.	Introduction to communication methods meaning, channels & media written and verbal.	5	-	-
2.	Development of comprehension of English & Hindi through study of text material & language exercises.	10	-	-
3.	Development of expression through			
	A. Letters (English & Hindi)	10	-	-
	B. Report writing (English)	10	-	-
	Note making and minutes writing			
4.	Paragraph writing, Essay writing, Proposal writing	10	-	-
5.	Composition	10	-	-
6.	Remedial Grammar & Vocabulary Building	15	-	-
		70	-	42

1. PART I : COMMUNICATION IN ENGLISH (40 Marks)

1.1 Concept of communication, importance of effective communication, types of communication, formal, informal, verbal and nonverbal, spoken and written. Techniques of communication, Listening, reading, writing and speaking, Barriers in communication, Modern tools of communication- Fax, e-mail, Telephone, telegram, etc.

1.2 Technical communication Vs. General Communication : Development of comprehension and knowledge of English through the study of text material and language exercises based on the prescribed text book of English.

1.3 Development of expression through:

1.3.1 Paragraph writing, Essay writing, Proposal writing.

Corrected and Approved By B.T.E. on Dated 10.06.2015

1.3.2 Business and personal correspondence (Letters) :

Kinds of letters:-

Official, demi-offical, unofficial , for reply or in reply, quotation, tender and order giving letters. Application for a job, Resume.

1.3.3 Report writing and Note making and minutes writing.

1.4 Functional Grammer : Study of sentences and parts of speech (word class), Preposition, Verb, Articles, Abbreviations.

1.5 Vocabulary Building : Homophones, One word substitution, Idioms and Phrases.

1.6 Composition on narrative, descriptive, imaginative, argumentative, discussion and factual topics.

2. PART II : COMMUNICATION IN HINDI (10 Marks)

2.1 Development of comprehension and knowledge of Hindi usage through rapid reading and language exercises based on prescribed text material developed by IRDT.

2.2 Development of expression through ;

Letter writing in Hindi:

Kinds of letters:-

Official, demi-offical, unofficial , for reply or in reply, quotation, tender and order giving letters, Application for a job, Press release in Hindi, Report writing.

Note: Paper should be in two parts, part I - English and part II Hindi.

REFERENCE BOOKS

1. Bookshelf worksheet of Professional Communication, New Delhi : Bookshelf 2008
2. Functional Skills in language and literature by R. P. Singh, New Delhi : Oxford University Press.
3. Oxford English Hindi English Dictionary, New Delhi : Oxford 2008

LANGUAGE LAB PRACTICE

For the practice/exercise the following is suggested :-

- 1.A. Phonetic transcription
B. Stress and intonation :
(At least 10 word for writing and 10 word for pronunciation)
2. ASSIGNMENT : (Written Communication)

Two assignment of approximately 400 word each decided by the teacher concerned.

THE FOLLOWING MODEL IS PROPOSED :

1. a picture/photograph
2. an opening sentence or phrase

Corrected and Approved By B.T.E. on Dated 10.06.2015

3. a newspaper/magzine clipping or report
4. factual writting which should be informative or argumentative.
(The students may refer to "Bookshelf worksheet" for technical communication)

3. Oral Conversation:

1. Short speeches/declamation : Bid farewell, Felicitate somebody, Celebrate a public event, Offer condolences
2. Debate on current problems/topics
3. MockInterview : Preparation, Unfolding of personality and Expressing ideas effectively
4. Group discussion on current topics/problems
5. Role Play/ general conversation : Making polite enquiries at Railway Station, Post Office, Banks and other Public places, Replying to such enquiries, enquiring about various goods sold in the market and discussing their prices. Complaining about service at Hotel, restaurant, Offering apologies in reply to such complaints, complain to a company about a defective product you have brought, reply to such complaints.
6. Presentation skill, Use of OHP and LCD.
7. Through drilling of model words involving different phonetic symbols (Vowels, Consonants, Difthongs).

4. Aural :

Listening to conversation/talk/reading of short passage and then writting down the relevant or main points in the specified number of words and answering the given questions

The assignments/project work are to be evaluated by the internal/ external examiner. The distribution of 30 marks e.g.

10 marks for assignment (Given by subject teacher as sessional marks)

10 marks for conversation and viva-voce

10 marks for phonetic transcription

STRUCTURE OF THE PAPER OF PROFESSIONAL COMMUNICATION

Distribution of Marks

Theory Paper : 50 Marks

Sessional : 20 Marks

Practices : 30 Marks

- Q1. Question based on the topics of the prescribed syllabus will be set for testing candidates ability to understand the content, explain words and phrases, making sentence of given words and ability to summarise will be included. All questions will have to be answered.

A. from English Text Book 10 Marks

B. from Hindi Text Book 5 Marks

- Q2. Candidates will be required to write one letter (English) and one letter in (Hindi) from a choice of two -

A. English Letters 5 Marks

Corrected and Approved By B.T.E. on Dated 10.06.2015

B. Hindi Letters 5 Marks

Q3. Report Writing on given outlines 5 Marks

Q4. There will be a number of short answer questions to test the candidates knowledge of functional grammar, structure and usage of the language. All the items in this question will be compulsory. The grammar questions has four parts -

(Total Part: A For 5 Marks, B For 3 Marks, C For 3 Marks and D For 4 Marks)

A. This part of the question has to do with the transformation of sentences. English uses several patterns of sentence formation and the same meaning can be expressed by several patterns e.g. Active to Passive voice and vice versa, Direct to Indirect and vice versa, Reframing sentences by changing part of speech e.g. Noun to Adjective, Interchanging degree of comparison.

Interchanging Moods - Affirmative to Negative, Assertive to Interrogative or to exclamatory

B. The second part usually requires blanks in a sentence to be filled in with a suitable preposition and articles.

C. The third part is usually an exercise on tenses.

D. The fourth part concerns with one word substitution and abbreviation, uses of idioms and Phrases, Homophones.

Q5. COMPOSITION : (About 300 Words) (5 marks)

Candidates will be required to select one composition topic from a choice of five. The choice will normally include narrative descriptive, argumentative, discussion and factual topics. The main criteria by which the composition will be marked are as follows

A. the quality of the language employed, the range and appropriateness of vocabulary and sentence structure the correctness of grammatical construction, punctuation and spelling.

B. The degrees to which candidate have been successfully in organising both the composition as a whole and the individual paragraphs.

Corrected and Approved By B.T.E. on Dated 10.06.2015

1.2 APPLIED MATHEMATICS I(A)
[Common to All Engineering Courses]

L T P
3 2/2 -

Rationale:

The study of mathematics is an important requirement for the understanding and development of any branch of engineering. The purpose of teaching mathematics to diploma engineering students is to impart them basic knowledge of mathematics which is needed for full understanding and study of engineering subjects.

S.N.	Units	Coverage Time		
		L	T	P
1.	Algebra- I	8	3	-
2.	Algebra- II	8	3	-
3.	Trigonometry	6	2	-
4.	Differential Calculus-I	10	3	-
5.	Differential Calculus-II	10	3	-
		42	14	-

DETAILED CONTENTS:

1. ALGEBRA-I : (10 Marks)
 - 1.1 Series : AP and GP; Sum, nth term, Mean
 - 1.2 Binomial theorem for positive, negative and fractional index (without proof). Application of Binomial theorem.
 - 1.3 Determinants : Elementary properties of determinant of order 2 and 3, Multiplication system of algebraic equation, Consistency of equation, Cramer's rule
2. ALGEBRA-II:(10 Marks)
 - 2.1 Vector algebra : Dot and Cross product, Scaler and vector triple product.
 - 2.2 Complex number.

Complex numbers, Representation, Modulus and amplitude, De Moivre theorem, its application in solving algebraic equations, Mod. function and its properties..
3. TRIGONOMETRY :(8 Marks)
 - 3.1 Relation between sides and angles of a triangle : Statement of various formulae showing relationship between sides and angle of a triangle.
 - 3.2 Inverse circular functions : Simple case only
4. DIFFERENTIAL CALCULUS - I : (12 Marks)
 - 4.1 Functions, limits, continuity, - functions and their graphs, range and domain, elementary methods of finding limits (right and left), elementary test for continuity and differentiability.

Corrected and Approved By B.T.E. on Dated 10.06.2015

- 4.2 Methods of finding derivative, - Function of a function, Logarithmic differentiation, Differentiation of implicit functions.
- 5. DIFFERENTIAL CALCULUS -II :(10 Marks)
 - 5.1 Higher order derivatives, Leibnitz theorem.
 - 5.2 Special functions (Exponential, Logarithmic, Inverse circular and function), Definition, Graphs, range and Domain and Derivations of each of these functions.
 - 5.3 Application - Finding Tangents, Normal, Points of Maxima/Minima, Increasing/Decreasing functions, Rate, Measure, velocity, Acceleration, Errors and approximation.

Corrected and Approved By B.T.E. on Dated 10.06.2015

1.3 APPLIED PHYSICS-I

[Common to All Engineering Courses]

L T P
3 2/2 -

Rationale:

Engineering physics is a foundation Course. Its purpose is to develop proper understanding of physical phenomenon and scientific temper in the students. While teaching the subject, teachers should make maximum use of demonstrations to make the subject interesting to the students.

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topics	L	T	P
1.	Units & Dimensions	3	1	-
2.	Errors in Measurement	3	1	-
3.	Circular Motion	4	1	-
4.	Motion of Planets	4	1	-
5.	Dynamics of rigid body (Rotational Motion)	5	1	-
6.	Fluid Mechanics and Friction	4	1	-
7.	Friction	4	1	-
8.	Harmonic Motion	5	2	-
9.	Heat & Thermodynamics	6	4	-
10.	Acoustics	4	1	-
		42	14	-

DETAILED CONTENTS:

1. Units and Dimensions (4 Marks)

S.I. Units & Dimensions of physical quantities, Dimensional formula and dimensional equation. Principle of homogeneity of dimensions and applications of homogeneity principle to:

- i) Checking the correctness of physical equations,
- ii) Deriving relations among various physical quantities,
- iii) Conversion of numerical values of physical quantities from one system of units into another. Limitations of dimensional analysis.

2. ERRORS AND MEASUREMENT (4 Marks)

Errors in measurements, accuracy and precision, random and systematic errors, estimation of probable errors in the results of measurement (Combination of errors in addition, subtraction, multiplication and powers). Significant figures, and order of accuracy in respect to instruments,

3. Circular Motion (5 Marks)

Central forces. Uniform Circular motion (Horizontal and Vertical cases), angular velocity, angular acceleration and centripetal acceleration. Relationship between linear and angular velocity and acceleration. Centripetal and

Corrected and Approved By B.T.E. on Dated 10.06.2015

centrifugal forces. Practical applications of centripetal forces. Principle of centrifuge.

4. MOTION OF PLANETS AND SATELLITES :(5 Marks)

Gravitational force, Acceleration due to gravity and its variation w.r. to height and depth from earth, Kepler's Law, Escape and orbital velocity, Time period of satellite, Geo-stationary, Polar satellites (Concept Only)

5. Dynamics of Rigid Body (Rotational Motion) (6 Marks)

Rigid body, Rotational motion, Moment of inertia, Theorems (Perpendicular and Parallel axis) of moment of inertia (Statement). Expression of M.I. of regular bodies (Lamina, Sphere, Disc, Cylinder), Concept of Radius of gyration, angular momentum, Conservation of angular momentum, Torque, Rotational kinetic energy. Rolling of sphere on the slant plane. Concept of Fly wheel.

6. Fluid Mechanics :(5 Marks)

Surface tension, Capillary action and determination of surface tension from capillary rise method, Equation of continuity ($A_1V_1=A_2V_2$), Bernoulli's theorem, and its application stream line and Turbulent flow, Reynold's number.

7. Friction :(4 Marks)

Introduction, Physical significance of friction, Advantage and disadvantage of friction and its role in every day life. Coefficients of static and dynamic friction and their measurements. viscosity, coeff. of viscosity, & its determination by stoke's method.

8. Harmonic Motion (6 Marks)

Periodic Motion, characteristics of simple harmonic motion; equation of S.H.M. and determination of velocity and acceleration. Graphical representation. Spring-mass system. Simple pendulum. Derivation of its periodic time. Energy conservation in S.H.M.. Concept of phase, phase difference, Definition of free, forced, undamped and damped vibrations, Resonance and its sharpness, Q-factor.

9. Heat & Thermodynamics: (6 Marks)

Modes of heat transfer (Conduction, Convection and Radiation), coefficient of thermal conductivity Isothermal and adiabatic process. Zeroth First, Second Law of Thermodynamics and Carnot cycle, Heat Engine (Concept Only).

10. Acoustics (5 Marks)

Definition of pitch, loudness, quality and intensity of sound waves. Echo, reverberation and reverberation time. Sabine's formula without Derivation. Control of reverberation time (problems on reverberation time). Acoustics of building defects and remedy.

1.4 APPLIED CHEMISTRY

[Common to All Engineering Courses]

L T P
6 - 4

Rationale:

Engineering Chemistry has profound and deep relationship with the industrial and environmental technology. This curriculum intends to impart technical knowledge alongwith productive practice to the students of the diploma engineering. The teachers are expected to guide the students in the classroom and the laboratories according to the curriculum by demonstrations and by showing relevant materials and equipments to inculcate interests in learning among students.

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topics	L	T	P
1.	Atomic Structure	4	-	-
2.	Chemical Bonding	6	-	-
3.	Classification of Elements	4	-	-
4.	Electro Chemistry-I	7	-	-
5.	Electro Chemistry-II	8	-	-
6.	Chemical Kinetics	4	-	-
7.	Catalysis	4	-	-
8.	Solid State	4	-	-
9.	Fuels	4	-	-
10.	Water Treatment	6	-	-
11.	Colloidal State	4	-	-
12.	Lubricants	4	-	-
13.	Hydrocarbons	7	-	-
14.	Organic Reactions & Mechanism	8	-	-
15.	Polymers	4	-	-
16.	Synthetic Materials	6	-	-
		84	-	56

DETAILED CONTENTS:

- ATOMIC STRUCTURE :(3 MARKS)
Basic concept of atomic structure, Matter wave concept, Quantum number, Haisenberg's Uncertainty Principle, Shaples of orbitals.
- CHEMICAL BONDING :(4 MARKS)
Covalent bond, Ionic & Co-ordinate, Hydrogen bonding, Valence bond theory, Hybridisation, VSEPR theory, Molecular orbital theory.
- CLASSIFICATION OF ELEMENTS :(3 MARKS)
Modern classification of elements (s,p,d and f blcok elements), Periodic properties : Ionisation potential electro negativity, Electron affinity.

Corrected and Approved By B.T.E. on Dated 10.06.2015

4. ELECTRO CHEMISTRY-I:(3 MARKS)

Arrhenius Theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of Acid and bases : Bronsted, Arrhenius and Lewis theory. Concept of pH and numericals. Buffer solutions, Indicators, Solubility product, Common ion effect with their application,

5. ELECTRO CHEMISTRY-II:(3 MARKS)

Redox reactions, Electrode potential(Nernst Equation), Electro-chemical cell (Galvanic and Electrolytic). EMF of a cell and free energy change. Standard electrode potential, Electro chemical series and its application. Chemical and Electrochemical theory of corrosion, Galvenic Series. Prevention of corrosion by various method.

6. CHEMICAL KINETICS :(3 MARKS)

Law of mass action, order and molecularity of rection. Activation energy, rate constants, Ist order reactions and 2nd order reactions.

7. CATALYSIS :(2 MARKS)

Definition Characteristics of catalytic reactions, Catalytic promotors and poison , Autocatalysis and Negative catalysis, Theory of catalysis, Application.

8. SOLID STATE :(2 MARKS)

Types of solids (Amorphous and Crystalline), Classification (Molecular, Ionic, Covalent, Metallic), Band theory of solids (Conductors, Semiconductors and Insulators), types of Crystals, FCC, BCC, Crystal imperfection.

9. FUELS :(3 MARKS)

Definition, its classification, high & low Calorific value.Determination of calorific value of solid and liquid fuels by Bomb calorimeter.

Liquid fuel - Petroleum and its refining, distillate of petroleum (Kerosene oil, Diesel and Petrol), Benzol and Power alchol. Knocking, Anti-knocking agents, Octane number and Cetane number.

Cracking and its type, Gasoling from hydrogenation of coal (Bergius process and Fischer tropsch's process)

Gaseous Fuel - Coal gas, Oil gas, Water gas, Producer gas, Bio gas, LPG and CNG.

Numerical Problems based on topics

10. WATER TREATMENT :(3 MARKS)

Hardness of water, Its limits and determination of hardness of water by EDTA method. Softening methods (Only Sods lime, Zeolote and Ion exchange resin process). Disadvantage of hard water in different industries, scale and sludge formation, Corrosion, Caustic embrittlement, primming and

Corrected and Approved By B.T.E. on Dated 10.06.2015

foaming in bioreactors.

Disinfecting of Water By Chloramine-T, Ozone and Chlorine. Advantage and disadvantage of chlorination, Industrial waste and sewage, Municipality waste water treatment, Definition of BOD and COD. Numerical Problems based on topics.

11. COLLOIDAL STATE OF MATTER : (3 MARKS)

Concept of colloidal and its types, Different system of colloids, Dispersed phase and dispersion medium. Methods of preparation of colloidal solutions, Dialysis and electro dialysis. Properties of colloidal solution with special reference to absorption, Brownian Movement, Tyndal effect, Electro phoresis and coagulation. relative stability of hydrophilic and hydrophobic colloids. Protection and protective colloids. Emulsion, Types, preparation, properties and uses. Application of colloids chemistry in different industries.

12. LUBRICANTS : (3 MARKS)

Definition, classification, Necessity and various kinds of lubricants. Function and mechanism of action of lubricants and examples. Properties of lubricants, Importance of additive compounds in lubricants, Synthetic lubricants and cutting fluids. Industrial application, its function in bearing.

13. HYDROCARBONS: (4 MARKS)

A. Classification and IUPAC nomenclature of organic compounds homologous series (Functional Group)

B. Preparation, properties and uses of Ethane, Ethene, Ethyne (Acetylene), Benzene and Toluene.

14. ORGANIC REACTIONS & MECHANISM: (4 MARKS)

1. Fundamental aspects -

- A. Electrophiles and nucleophiles, Reaction Intermediates, Free radical, Carbocation, Carbanion
- B. Inductive effect, Mesomeric effect, Electromeric effect.

2.A. Mechanism of addition reaction (Markovnikov's Rule, Cyanohydrin and Peroxide effect),

B. Mechanism of Substitution reactions; (Nucleophilic) hydrolysis of alkyl halide, electrophilic substitution halogenation, Sulphonation, Nitration and Friedel-Craft reaction.

C. Mechanism of Elimination reaction - Dehydration of primary alcohol, Dehydrohalogenation of primary alkyl halide.

15. POLYMERS : (3 MARKS)

1. Polymers and their classification. Average degree of polymerisation, Average molecular weight, Free radical polymerisation (Mechanisms)

Corrected and Approved By B.T.E. on Dated 10.06.2015

2. Thermosetting and Thermoplastic resins -
 - A. Addition polymers and their industrial application- Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon.
 - B. Condensation polymer and their industrial application : Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Decron, Polyurethanes.
3. General concept of Bio polymers, Biodegradable polymers and inorganic polymers(Silicon)
16. SYNTHETIC MATERIALS :(4 MARKS)
 - A. Introduction - Fats and Oils
 - B. Saponification of fats and oils , Manufacturing of soap.
 - C. Synthetic detergents, types of detergents and its manufacturing.
3. EXPLOSIVES: TNT, RDX, Dynamite.
4. Paint and Varnish

LIST OF PRACTICALS

1. To analyse inorganic mixture for two acid and basic radicals from following radicals
 - A. Basic Radicals :

NH₄⁺, Pb⁺⁺, Cu⁺⁺, Bi⁺⁺⁺, Cd⁺⁺, As⁺⁺⁺, Sb⁺⁺⁺,

Sn⁺⁺, Al⁺⁺⁺, Fe⁺⁺⁺, Cr⁺⁺⁺, Mn⁺⁺, Zn⁺⁺, Co⁺⁺

Ni⁺⁺, Ba⁺⁺, Sr⁺⁺, Ca⁺⁺, Mg⁺⁺
 - B. Acid Radicals :

CO₃⁻⁻, S⁻⁻, SO₃⁻⁻, CH₃COO⁻, NO₂⁻,

NO₃⁻, Cl⁻, Br⁻, I⁻, SO₄⁻⁻
2. To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.
3. To determine the total hardness of water sample in terms of CaCO₃ by EDTA titration method using Eriochroma black-T indicator.
4. To determine the strength of given HCl solution by titration against NaOH solution using Phenolphthalein as indicator.
5. To determine the Chloride content in supplied water sample by using Mohr's methods.
6. Determination of temporary hardness of water sample by O-Henry's method.

Corrected and Approved By B.T.E. on Dated 10.06.2015

1.5 DRAWING & WORKSHOP PRACTICE PRACTICALS
(Common with Leather Technology, Footwear (CASD))

L D P
- 8 -

Rationale:

Drawing is called the language of engineering. The pass out can hold independent responsibility of any nature if he is equipped with sufficient knowledge of engineering drawing. Workshop practice introduces a sense of self confidence in the students for shopflore supervision of work. Practice in various machine operations and processes are given to make the student fit for shopflore working and supervision. A well skilled middle level man power can have effective control over skilled workers.

DRAWING

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Free hand sketching	-	-	13
2.	Principles of projection	-	-	12
3.	Missing surfaces	-	-	13
4.	Sketching of pictorial views	-	-	12
5.	Three views of given objects	-	-	13
6.	Shapes of inclined surface	-	-	12
7.	Plan, Clevation, side views and Isometric views	-	-	13
8.	Dimensioning technique	-	-	12
		-	-	100

WORKSHOP

Rationale:

Workshop practice introduces a sense of self confidence in the students for shopflore supervision of work. Practice in various machine operations and processes are given to make the student fit for shopflore working and supervision. A well skilled middle level man power can have effective control over skilled workers.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Filing practice	-	-	09
2.	Use of marking & measuring tools	-	-	09
3.	Hack sawing practice	-	-	09
4.	Brazing practice	-	-	09
5.	Soldering practice	-	-	08
6.	Heat treatment of tools	-	-	08
7.	Grinding practice	-	-	08
8.	Plane turning	-	-	12
9.	Practice on turning lathe	-	-	12
10.	Practice on band saw & circular saw	-	-	08
11.	Wooden utility articles for leather industry	-	-	08
		-	-	100

Corrected and Approved By B.T.E. on Dated 10.06.2015

leather machineries.

9. Job No. 9: Preparation of a steel turning job on a centre lathe.
10. Demonstration of wood working machines:
 - (i) Demonstration on wood turning lathe.
 - (ii) Demonstration on circular saw.
 - (iii) Demonstration on bend saw.
 - (iv) Grinding of saws on circular saw grinder.
11. Job No. 10: Simple exercises involving making of wooden components for use in leather industries.

Corrected and Approved By B.T.E. on Dated 10.06.2015

II Semester

2.1 APPLIED MATHEMATICS I (B)
[Common to All Engineering Courses]

L T P
3 2/2 -

Rationale:

The study of mathematics is an important requirement for the understanding and development of any branch of engineering. The purpose of teaching mathematics to diploma engineering students is to impart them basic knowledge of mathematics which is needed for full understanding and study of engineering subjects.

S.N.	Units	Coverage Time		
		L	T	P
1.	Integral Calculus-I	12	4	-
2.	Integral Calculus-II	12	4	-
3.	Coordinate Geometry (2 Dimensional)	10	3	-
4.	Coordinate Geometry (3 Dimensional)	8	3	-
		42	14	-

DETAILED CONTENTS:

1. INTEGRAL CALCULUS - I : (14 Marks)
Methods of Indefinite Integration :-
 - 1.1 Integration by substitution.
 - 1.2 Integration by rational function.
 - 1.3 Integration by partial fraction.
 - 1.4 Integration by parts.
2. INTEGRAL CALCULUS -II :(14 Marks)
 - 2.1 Meaning and properties of definite integrals, Evaluation of definite integrals. Integration of special function.
 - 2.2 Application : Finding areas bounded by simple curves, Length of simple curves, Volume of solids of revolution, centre of mean of plane areas.
 - 2.3 Simposns 1/3rd and Simposns3/8th rule and Trapezoidal Rule : their application in simple cases.
3. CO-ORDINATE GEOMETRY (2 DIMENSION):(14 Marks)
 - 3.1 CIRCLE :
Equation of circle in standard form. Centre - Radius form, Diameter form, Two intercept form.
 - 3.2 Standard form and simple properties
Parabola $x^2=4ay$, $y^2=4ax$,

Corrected and Approved By B.T.E. on Dated 10.06.2015

$$\text{Ellipse } \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$\text{Hyperbola } \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

4. CO-ORDINATE GEOMETRY (3 DIMENSION):(8 Marks)

4.1 Straight lines and planes in space -

Distance between two points in space, direction cosine and direction ratios, Finding equation of a straight line and Plane (Different Forms),

4.2 Sphere $x^2 + y^2 + z^2 + 2gx + 2fy + 2wz = d$ (Radius, Centre and General Equation)

2.2 APPLIED PHYSICS-II

[Common to All Engineering Courses]

L T P
3 2/2 4

Rationale:

Engineering physics is a foundation Course. Its purpose is to develop proper understanding of physical phenomenon and scientific temper in the students. While teaching the subject, teachers should make maximum use of demonstrations to make the subject interesting to the students.

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topics	L	T	P
1.	Optics	4	1	-
2.	Introduction To Fiber Optics	4	1	-
3.	Laser & its Application	4	1	-
4.	Electrostatics	4	1	-
5.	D.C. Circuits	4	1	-
6.	Magnetic Materials & Their Properties	4	1	-
7.	Semi Conductor Physics	4	1	-
8.	Introduction Diode & Transistors	4	2	-
9.	Introduction To Digital Electronics	4	2	-
10.	Non-conventional energy sources	6	3	-
		42	14	56

1. Optics (4 Marks)

Nature of light, Laws of Reflection and Refraction, Snell's Law, Interference (Constructive and Destructive), Diffraction and Polarization (Concept Only), Law of Malus and Polaroids.

2. Introduction To Fibre Optics :(5 Marks)

Critical angle, Total internal reflection, Principle of fibre optics, Optical fibre, Pulse dispersion in step-index fibres, Graded index fibre, Single mode fibre, Optical sensor.

3. Lasers and its Applications (4 Marks)

Absorption and Emission of energy by atom, Spontaneous and Stimulated Emission, Population inversion, Main component of laser and types of laser- Ruby Laser, He-Ne laser and their applications. Introduction to MASER.

4. Electrostatics :(4 Marks)

Coulomb's Law, Electric field, Electric potential, Potential energy, Capacitor, Energy of a charged capacitor, Effect of dielectric on capacitors.

5. D.C. Circuits (5 Marks)

Corrected and Approved By B.T.E. on Dated 10.06.2015

Ohm's Law, Kirchoff's Law and their simple application, Principle of Wheat Stone bridge and application of this principle in measurement of resistance (Meter bridge and Post Office Box); Carey Foster's bridge, potentiometer.

6. Magnetic Materials and Their Properties: (5 Marks)

Dia, Para and Ferro-magnetism, Ferrites, Magnatic Hysteresis Curve and its utility. Basic idea of super conductivity, Meissner's effect.

7. Semiconductor Physics (4 Marks)

Concept of Energy bands in soldis, classification of solids into conductors, insulators and semiconductors on the basis of energy band structure. Intrinsic and extrinsic semi conductors, Electrons and holes as charge carriers in semiconductors, P-type and N-type semiconductors.

8. Junction Diode and Transister : (6 Marks)

Majority and Minority charge carriers, P-N junction formation, barrier voltage, Forward and reverse biasing of a junction diode, P-N junction device characteristics, Formation of transistor, transistor-action, Base, emitter and collector currents and their relationship LED's.

9. Introduction To Digital Electronics : (6 Marks)

Concept of binary numbers, Interconversion from binary to decimal and decimal to binary. Concepts of Gates (AND, NOT, OR).

10. Non-conventional energy sources: (7 Marks)

(a) Wind energy : Introduction, scope and significance, measurement of wind velocity by anemometer, general principle of wind mill.

(b) Solar energy: Solar radiation and potentiality of solar radiation in India, uses of solar energy: Solar Cooker, solar water heater, solar photovoltaic cells, solar energy collector.

PHYSICS LAB

Note: Any 4 experiments are to be performed.

1. Determination of coefficient of friction on a horizontal plane.
2. Determination of 'g' by plotting a graph T^2 versus l and using the formula $g = 4\pi^2 / \text{Slope of the graph line}$
3. Determine the force constant of combination of springs in case of 1. Series 2. Parallel.
4. To verify the series and parallel combination of Resistances with the help of meter bridge.
5. To determine the velocity of sound with the help of resonance tube.
6. Determination of viscosity coefficient of a lubricant by Stoke's law.
7. Determination of E_1/E_2 of cells by potentiometer.
8. Determination of specific resistance by Carey Foster bridge.
9. Determination of resistivity by P.O.Box.
10. Verification of Kirchoff's Law.
11. To draw Characteristics of p-n Junction diode.
12. To measure instantaneous and average wind velocity by indicating cup type anemometer/hand held anemometer.

NOTE :

Students should be asked to plot a graph in experiments (where possible) and graph should be used for calculation of results. Results should be given in significant figures only.

Corrected and Approved By B.T.E. on Dated 10.06.2015

2.3 GENERAL ENGINEERING -I

(Common with Leather Technology (CASD))

L T P
6 2 -

Rationale:

The purpose of introducing this paper in the first year of three years diploma course in Leather Technology is to expose the student with the fundamental knowledge about some main engineering materials used in the leather industry, Transmission of power by belt's and gears, machine components like Cams, Gears, Coupling and bearing. Basic workshop processes like brazing, soldering, welding, fitting and machine operations like turning, shaping, grinding and drilling and working of wood working machine will further enrich the knowledge of student for practical application in the world of work.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Engineering Materials	09	03	-
2.	Drives In Machineries			
	A. Cams	09	03	-
	B. Transmission	09	03	-
	C. Gear Drives	09	03	-
	D. Couplings	06	02	-
	E. Bearings	09	03	-
3.	IC Engines	04	02	-
4.	Basic Workshop Technology	06	02	-
5.	Civil Engineering Materials	06	02	-
6.	Foundation	12	04	-
7.	Air conditionaing System	05	01	-
		84	28	-

DETAILED CONTENTS:

1. ENGINEERING MATERIALS:-

An introduction to mechanical properties of materials. Types of wood and their uses in leather machinery. Ferrous and nonferrous metals; CI types and properties; carbon steel and alloy steel, stainless steel; Non-ferrous metals brass, bronze, copper, aluminium and magnisium alloys.
Tool materials cutting tools, blades, shears, and knives - Heat treatment tools and sharpening and grinding of tools.
An introduction to different mechanisms in machines.

2. DRIVES IN MACHINERIES:

(a) Cams;

Cams as means of producing given type of motion:
types of cams and their applications in machines.

Corrected and Approved By B.T.E. on Dated 10.06.2015

(b) Transmission of Power ;

Power transmission by chain, belt and gear drives. Specific applications, safety provisions, slipping of belts. Different types of pulleys and their application.

(ii) Gear drives.

Types - Feature of spur gears, helical gears, bevel gears and worm gears, Hydraulic pumps and hydraulic drive mechanisms.

(c) Couplings:

Flange coupling - Universal coupling - Fluid couplings.

(d) Bearings:

Bush bearings, ball and roller bearings - Lubrication of bearings -- types.

(e) Pneumatic Systems

3. I.C. ENGINES :

Classification and working of I.C. engines

4. BASIC WORK SHOP TECHNOLOGY:

Brazing, soldering and welding : Fitting and machine shop operations such as shaping, milling, lathework, drilling, reaming and grinding machine tools used for above work limits, Fits and tolerances - Fabrication of components for repair and maintenance, Principles of working of wood working machines.

5. CIVIL ENGINEERING MATERIALS:

General idea of raw materials, manufacturing process, properties and uses of Bricks, lime, cement and Timber.

6. FOUNDATION

(i) Bearing capacity of soil and its importance, need of foundation for electrical machines.

(ii) Foundations for heavy, light and vibrating machines.

(iii) Concrete proportion, mixing w/c ratio, workability RCC and its use.

7. AIR-CONDITIONING SYSTEM :

Brief concept of Refrigeration and Air-conditioning systems.

2.4 ORGANIC CHEMISTRY

L T P
5 1 8

Rationale:

Basic knowledge of organic chemistry is very much useful for diploma holders in leather technology. The student gets fundamental knowledge about purification of organic compounds, distillation and sublimation estimation of nitrogen, halogen and sulphur, unsaturated hydrocarbons and alkylhalides. Preparation and properties of Chloroform, Iodoform, Petroleum, and Petroleum Products, Alcohols, Glycols, Glycerol, Ether, Aldehydes, Ketones, Acids, Ester, Amines, Amino Acid, Coal, Aromatic Compounds also enrich knowledge of the student. Knowledge of lubrication and plastics will be useful for industry life.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Introduction, Classification and Nomenclature of organic compounds	06	02	-
2.	Purification of organic compounds	05	02	-
3.	Qualitative and Quantitative Elemental analysis	03	02	-
4.	Empirical, Molecular and Structural Formula	04	03	-
5.	Structure of organic compounds	04	03	-
6.	Saturated and unsaturated Hydrocarbons	03	01	-
7.	Alcohols	03	01	-
8.	Ether	02	01	-
9.	Aldehyde and Ketones	03	01	-
10.	Acids	04	01	-
11.	Esters	03	01	-
12.	Amines	03	01	-
13.	Carbohydrates	03	01	-
14.	Amino acids, Proteins and Peptides	04	01	-
15.	Fats, Oils and Waxes	04	01	-
16.	Aromatic Compounds	05	02	-
17.	Enzyme Chemistry	02	01	-
18.	Petroleum and Petrochemicals	05	02	-
19.	Introduction	04	01	-
		70	28	112

DETAILED CONTENTS:

1. INTRODUCTION, CLASSIFICATION AND NOMENCLATURE OF ORGANIC COMPOUNDS:

Introduction, definition and origin, importance of organic compounds. Sources of organic compounds, Classification of organic compounds, Classes of organic compounds, Homologous series. Nomenclature of organic compounds, rules for IUPAC nomenclature.

2. PURIFICATION OF ORGANIC COMPOUNDS :

Corrected and Approved By B.T.E. on Dated 10.06.2015

Criteria of purity, methods of purification - crystallisation, sublimation, distillation, solvent extraction, Different aspects of chromatography.

3. QUALITATIVE AND QUANTITATIVE ELEMENTAL ANALYSIS :

Detection of elements (N, S and Halogens), estimation of hydrogen, Nitrogen, Halogen and sulphur.

4. EMPIRICAL, MOLECULAR AND STRUCTURAL FORMULA :

Determination of Empirical formula, Determination of Molecular formula, Determination of structural formula.

Note :- Numericals based on above topic

5. STRUCTURE OF ORGANIC COMPOUNDS :

Atomic structure, Nature of chemical bonding, arrangement of electrons in orbitals, shapes of s and p orbitals, orbital theory of chemical bonding, factors affecting a covalent bond, inductive effect, mesomeric effect, conjugation, mesomerism, resonance, hydrogen bonding.

6. SATURATED AND UNSATURATED HYDROCARBONS :

General, nomenclature, isomerism, occurrence, general methods of formation, general physical characteristics, general chemical characteristics, preparation and properties of methane and ethane, ethylene and acetylene.

7. ALCOHOLS :

Monohydric alcohols, Dihydric and trihydric alcohols, nomenclature, isomerism. General methods of formation, General physical characteristics, General chemical characteristics, Distinction between primary, secondary and tertiary alcohols. Preparation of ethyl alcohol by fermentation of molasses. Preparation, properties and uses of ethyl alcohol, glycol and glycerol.

8. ETHER :

General nomenclature and isomerism, Preparation, Properties and uses of diethyl ether.

9. ALDEHYDE AND KETONES :

General, nomenclature and isomerism, general physical and chemical characteristics, Preparation, properties and uses of formaldehyde, acetaldehyde and acetone.

10. ACIDS :

Monocarboxylic and dicarboxylic acids, nomenclature and isomerism, General chemical and physical characteristics, Preparation, properties and uses of acetic acid, Lactic acid, Citric acid, tartaric acid, oxalic acid, malonic acid, succinic acids, Substituted acids - acetyl chloride, acetic anhydride, higher fatty acids, members from C12 to C18 (Saturated and unsaturated) sources, properties and uses (Saponification and acid value).

11. ESTERS :

Corrected and Approved By B.T.E. on Dated 10.06.2015

Esters and Esterification, ethyle acetate - preparation, properties and uses.

12. AMINES :

Primary, secondary and tertiary amines, Preparation, properties and uses of methyle and ethyle amines.

13. CARBOHYDRATES :

Introduction, classification, monosaccharide carbohydrate glucose, fructose - Preparation, properties and uses. Disaccharide carbohydrate - Sucrose or can sugar - preparation, properties and uses. Polysaccharide - starch - preparation, properties and uses.

14. AMINO ACIDS, PROTEINS AND PEPTIDES :

Methods and synthesis of a-amino acids (glycine), properties and uses of glycine, Composition of protein, Structure of protein, classification of proteins, physical and chemical characteristics of protein, uses of protein.

15. FATS, OILS AND WAXES :

Introduction to fats and oils, occurrence and extraction, analysis of oils and fats, chemical composition and uses of oils, fats and waxes.

16. AROMATIC COMPOUNDS :

A. Introduction, sources of aromatic compounds. Structural presentation of benzene and other benzenoid compounds, classification and nomenclature, benzene and its homologous, Difference between Aliphatic and aromatic compounds- Aromaticity, orientation and aromatic substitution, Preparation of benzene from coaltar and its uses, substitution in benzene ring and in side chain.

B. Some useful reactions - Friedel Crafts reaction, Kolbe synthesis, Reimer Tiemann reaction, Benzoin condensation, Cannizzaro reaction, Perkin reaction.

17. ENZYME CHEMISTRY :

Knowledge of enzymes, simple application of different biological reactions.

18. PETROLEUM AND PETROCHEMICALS :

Occurrence, composition of petroleum, fractional distillation, Different petroleum products and their uses, Petrochemicals, Properties of chloroform and iodoform.

19. Introduction to Bio-technology and its application.

PRACTICALS

1. Estimation of amount of the Copper-volumetrically.
2. Estimation of Calcium in solution using EDTA solution.
3. Estimation of chlorides by using standard solution of silver nitrate and potassium chromate indicator.
4. Estimation of SO_4 & BaSO_4 (Gravimetrically).
5. Estimation of calcium as calcium oxalate (gravimetrically).
6. Estimation of lead as lead chromate (gravimetrically).
7. Detection of Cl, Br, I, S and N present in organic compounds.
8. Detection of functional groups like aldehyde, ketone, carbohydrate, amino, carboxylic groups
9. Identification of enzymes.

Corrected and Approved By B.T.E. on Dated 10.06.2015

2.5 THEORY OF LEATHER MANUFACTURE-I

L T P
5 1 8

Rationale:

The objective of this paper is to equip the student with the fundamental knowledge of history of leather manufacture, anatomical structure and composition of hides and skins, protiens, curing and preservation, pretanning operations, chrome tanning and syntans etc which will prove very useful in real industrial atmosphere.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Introduction	6	03	-
2.	Protiens	6	04	-
3.	Raw Hides	9	04	-
4.	Water Quality	3	01	-
5.	Curing and Preservation	5	02	-
6.	Pretanning Operations	12	04	-
7.	Types of Tannages	5	02	-
8.	Chrome Tanning	12	04	-
9.	Cleaning Process	12	04	-
		70	28	112

DETAILED CONTENTS:

1. INTRODUCTION :
History of leather manufacture and its uses.
2. PROTIENS:
Nature and types of protiens, physical and chemical composition, Properties of hide protens.
3. RAW HIDES :
 - i. Raw stock : Mainly used raw hides and skins, General structural conditions for raw hides, Skin defects
 - ii. Anatomical structure of hides and skins.
 - iii. Chemical composition and constituents of hides and skins.
4. WATER QUALITY :
Classification according to sources, Possible defects due to substances contained water.
5. CURING AND PRESERVATION:
Methods and chemistry of curing of hides and skins.
Merits and demerits of each method. Code of practice for curing and preservation of cattle hides as per I.S. 7656(1995).

Corrected and Approved By B.T.E. on Dated 10.06.2015

6. PRETANNING OPERATIONS:

Principles and objectives involved in

- (a) Soaking
- (b) Liming
- (c) Deliming
- (d) Bating
- (e) Pickling
- (f) Depickling
- (g) Bleaching
- (h) Degreasing.

7. TYPES OF TANNAGES :

Introduction of vegetable tannage, mineral tannage aldehyde and oil tannage, etc.

8. CHROME TANNING:

Werners coordination theory of chrome compounds, Chemistry of chromium complexes, Preparation of chrome liquors, Self basifying chrome powder-Hydrolysis, Olation, Oxolation, Polymerization, Theory of Valancey.

Factors influencing chrome tanning like pH, concentration time, temperature and neutral salts. Basification and Basicity principles and chemistry of various chrome tanning methods, mechanism of chrome tanning. Mechanism of chrome tranning, Basic knowledge and cheome recovery and its use. Toxilogical aspect and Hazards of chrome tanning, Defects Caused by chrome tanning. Standards for wet-blue.

9. CLEANING PROCESSES:

Hair shaving process, Sulphide free unharing process, Cleaner process in Beam House/Tan Yard Practices, Role of enzymes of pretanning operation.

PRACTICALS

1. Microscopic examination of hides and skins as per Indian/Inter-National Standard
2. Quantitative chemical analysis of Sodium Chloride, Sodium Sulphide, Lime, Ammonium Chloride, Ammonium Sulphate, Boric Acid, Formic Acid, Hydrochloric Acid, Sulphuric Acid, Ascorbic acid and Oxalic acid.
3. Analysis of Chrome Tanning materials and Wet Blue Leathers.
4. Tannery Practice :-
Practice in all Beam House and Chrome Tanning Operations.
5. Glossary of terms relating to Hides and Skins as per Indian/Inter-National Standard.
6. Grading of raw Hides and Skins as per Indian/Inter-National Standard. Identification of defects of raw hides
7. Knowledge of pH and indicators.
8. List of standard tannery chemical suppliers.

NOTE :

All the above noted operations should be practically demonstrated to the students in the tanneries, so that students should be able command practical leather making knowledge. Every week students should be taken to leather processing units as a part of structured-cum-industrial visit. Well designed and detailed programme of such visits should be chalked out in advance for result orientation and skill improvement during their course of study

Each visit of the students to tanneries should be guided by the subject teacher and technical observations, etc. may be observed and verified by the subject teacher

III Semester

3.1-ELEMENTARY MICROSCOPY AND MICROBIOLOGY

L T P
6 2 4

Rationale:

The scientific study of hides and skins requires microscopic observations. Hence diploma students in leather technology can only effectively analyse the raw materials if they are equipped with practical working knowledge of microscopes, bacteriology and moulds etc. Life cycle of small micro organisms bacteria provides scientific handling and treatment of leather and leather goods.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Microscopy	15	06	-
2.	Anatomical structure of hair and skin	8	04	-
3.	Role of Micro organism in different Processes	8	04	-
4.	Bacteriology			-
	i. Fundamentals	8	04	-
	ii. Action of Bacteria on hides and skins	8	04	-
5.	Moulds	12	06	-
		84	28	50

DETAILED CONTENTS:

1. Microscopy:
 - (i) Different types of microscopes-mechanical and optical parts in microscope.
 - (ii) Slide preparation for microscopic study:
Preparation of materials, fixing, embedding, section cutting, staining and mounting.
 - (iii) Application of microscopy:
2. Anatomical structure of hair and wool, grain patterns of hides and skins-Fibre structure of leather-microscopic assessment of leather, application of microscopy to note the changes that may take place in processing i.e. curing, soaking, liming, deliming, bating, pickling, tanning and finishing.
3. Role of micro-organism in different processes.
4. BACTERIOLOGY:
 - (i) Fundamentals of Bacteriology:
Microscopic forms of life, recognition under microscope their culture, preparation of various culture media-

Corrected and Approved By B.T.E. on Dated 10.06.2015

sterilisation morphological characteristics of bacteria, staining of bacteria and classification-Biochemical properties of bacteria-bacteria count.

(ii) Action of Bacteria on hides and skins:

Damage caused by bacterial infestation, hair slip, liberation of ammonia-Halophilic bacteria, problem of mod heat and its cure-Bacterial analysis of various tannery substrates in the prevention of growth by use of preservatives as bacteriostatic and bacteriocida agents, determination of productive activity of bacteria.

5. MOULDS:

Moulds and their difference from bacteria-damages that can be produced by moulds to leather, tan liquor, pickled skins and mould prevention. Mould growth to finished vegetable tanned leather/bed blue chrome. Study of preservative in leather science, Action of fungus on leather, Different types of fungus.

PRACTICALS

1. Setting up of microscope.
2. Examination of hides, skins and leather under microscope.
3. Preparation of slides and assessment of leathers.
4. Preparation of culture, staining and identification.
5. Observation of insects, ticks, mung and mite, etc.

3.2-THEORY OF LEATHER MANUFACUTRE-II

L T P
8 2 -

Rationale:

Various methods are used for tanning of leather like Vegetable tanning, Oil tanning, Aldehyde tanning, Alum tanning and Zirconium tanning. A thorough study of various tanning techniques and tannages decide the suitability of particular process and selection of tannages for the under consideration.

Sr. No.	Units	Coverage		
		L	T	P
1.	Vegetable tanning	12	04	-
2.	Oil tanning	12	04	-
3.	Aldehyde tanning	12	04	-
4.	Alum tanning	10	03	-
5.	Zirconium tanning	10	03	-
6.	Miscellaneous tannages	10	03	-
7.	Combination tannages	12	03	-
8.	Reactive tannage	3	02	-
9.	Tannage with polymers	3	02	-
		84	28	

DETAILED CONTENTS:

1. VEGETABLE TANNING:

Classification, identification, physical and chemical properties-Study of vegetable tanning materials. Preparation of tanning liquors by leaching and preparation of extract, Types of extracts, sulphitation of tan liquors. Factors involved in vegetable tanning, mechanism of vegetable tanning. Crushers and grinders for bark and nuts, etc. Bleaching, Filling, Fixation of vegetable tanned leather, Controls of vegetable tannage, Defects o vegetable tannage.

2. OIL TANNING:

Types of oils based, their properties, mechanism of oil tanning. Chamois tannage, tannage with Sulpha Chlorides, Tannage with fatty alcohols sulphites.

3. ALDEHYDE TANNING:

Reactions of formeldehyde with protiens, mechanism of aldehyde tanning. Use of glutaraldehyde and dialdehyde in leather manufacture. Hazardous behaviour of Formaldehyde, Glutaraldehyde with leather during processing.

4. ALUM TANNING :

Chemistry of aluminium salts (chlorides and sulphates)

Corrected and Approved By B.T.E. on Dated 10.06.2015

hydrolysis, olation, oxolation and basification effect of masking salts mechanism of aluminium tanning. Aluminium Silicate Tanning.

5. ZIRCONIUM TANNING :

Zirconium sulphates and chlorides hydrolysis, basification and mechanism of zirconium tanning. Use of zirconium salts in tanning.

6. MISCELLANEOUS TANNAGES :

Application of iron and silicon salts in tanning processes, Sulphur tannages.

7. COMBINATION TANNAGES |

Application of the vegetable oil and synthetic tannins in various combinations in the production of semi chrome and chrome retanned and alum, chrome and alum retan, sulphur, oil-vegetable tannage, chrome zirconium tannage, oil aldehyde tannage their mechanisms (in brief), Sources of effluent of different tannages.

8. Reactive Tannages : Reactive Tannage, Resin Tanning agent.

9. Tanage with Polymer : Polymer tanning agent, Polyphosphates

3.3 PROCESS OF LEATHER MANUFACTURE-I

L T P
8 - 8

Rationale:

Before manufacture of footwear and leather goods processing of leather is required. Processing technique for heavy and industrial leathers involve many steps. The students must be conversant with the processing techniques of different types of leathers used in the industry. This is very much useful for maintaining export quality of leathers in the international market.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Industrial Leathers			
a.	Selection of hides & skins	12	-	-
b.	Manufacture of textile leather	14	-	-
c.	Manufacture of roller leather	12	-	-
d.	Pickers and packing	12	-	-
e.	Combing	12	-	-
f.	Gill box leather	12	-	-
g.	Indian standards	12	-	-
h.	Hydraulic & mechanical leather	12	-	-
i.	Oil seal & Diaphragm leather	14	-	-
		112	-	112

DETAILED CONTENTS:

1. INDUSTRIAL LEATHERS:

Selection of Hides and Skins, Manufacture of textile leather, Roller leathers, Pickers and Picking band leathers, Buffer and Check strap leathers, Combing, Condenser tape, Gillbox leathers and their uses with Indian standards, Hydraulic and mechanical leathers, Cup and Pump, Hydraulic ram, Oil seal Leather, Diaphragm Leather, Gas meter leather with their uses and Indian Standards. Leather for musical instruments.

PRACTICAL

Manufacture of some important industrial leathers.

Corrected and Approved By B.T.E. on Dated 10.06.2015

3.4 GENERAL ENGINEERING II

(Common with Leather Technology, Footwear(CASD))

L	T	P
6	-	4

Rationale:

Electrical energy is presently most convenient, neat and clean source of energy. The students when engaged in the industry will require to handle different types of electrical equipment and machines. A fundamental knowledge of terms associated with electricity, tariff system and working of motor's generators, measuring instruments and electric heating will be very useful in day to day working.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Advantages of electricity	6	-	-
2.	Basic qualities of electricity	15	-	-
3.	Electrical tariffs	15	-	-
4.	Motor's and Transformer	15	-	-
5.	Measuring Instruments	15	-	-
6.	Electrical Heating	12	-	-
7.	Electrical Safety	06	-	-
		84	-	56

DETAILED CONTENTS:

1. Application and advantages of electricity :
Various applications of electricity, advantages of electrical energy over other forms of energy.
2. Basic qualities of electricity :
Idea of voltage, current, power, energy - their units; conversion of mechanical units into corresponding electrical units and vice versa : difference between A.C. and D.C., frequency time period, maximum and RMS value, concept of phase and phase difference, power factor, practical importance of power factor.
3. Electrical Tariff System :
Different type of tariffs, effect of low power factor, on tariffs, economics of power factor improvement.
4. Electrical Motors :
Single phase and three phase motors, equipment for starting and protection of motors, rating of motors. Working Principle of transformer and brief concept of constructional details.
5. Electrical Measuring Instruments :

Corrected and Approved By B.T.E. on Dated 10.06.2015

Working principles and use of the following electrical measuring instruments : Ammeter, Voltmeter, Wattmeter, Energymeter, Multimeter.

6. Electrical Heating :

Advantages of Electric heating : Various methods of heating
: Simple description of electric oven.

7. Electrical Safety Measures :

Importance of earthing, safety provisions in Indian Electricity Rules, Treatment of electric shock.

PRACTICALS:

1. Starting of a three phase induction motor :
 - (i) Direct on lines
 - (ii) Through star-delta starter
2. (a) Practical instructions of safety precautions while handling electrical apparatus and live circuits.

(b) Demonstration of treatment against electric shock.
3. Connection of lamp, ceiling fan, socket outlets, Flurosent tube, etc.
4. Reversing the direction of rotation of a:
 - (i) Single phase induction motor
 - (ii) Three phase induction motor
5. Measurement of voltage, current, power and power factor of a single phase A.C. circuit.
6. Measurement of resistance of the following by ammeter voltmeter method by a multimeter :
 - (i) Winding resistance of an electrical motor
 - (ii) Resistance of a high value rheostat
7. Trouble shooting on a three phase motor.
Note : The students should be able to detect most common faults like loose connections, blown fuse, single phasing, incorrect direction of rotation etc. which may occur in a three phase motor.
8. Study of a transformer and determination of its turn ratio by measurement of primary and secondary voltage.
9. Preparing the layout plan of electrical supply system of an institute starting from the indoor substation by actual observation.
10. Starting and reversing the direction of rotation of a single phase induction motor.

Corrected and Approved By B.T.E. on Dated 10.06.2015

L	T	P
8	-	4

Rationale:

Several processing steps are involved in obtaining finished leather for manufacturing of leather goods from wet blue leather. This involves selection of wet blue leather, neutralisation, dyeing, fat liquoring, stuffing, stripping and bleaching and water proofing. The knowledge of post tanning operations like sammying, setting and drying, sawdusting, buffing, snuffing is also essential for diploma students in leather technology. Awareness about pigments and binders will provide an aided advantage to the students.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Selection	10	-	-
2.	Neutralisations	10	-	-
3.	Dyeing	10	-	-
4.	Retanning	08	-	-
5.	Fat Liquoring	10	-	-
6.	Stuffing	10	-	-
7.	Stripping and Bleaching	08	-	-
8.	Water Repellant Agents	08	-	-
9.	Machine Operations	14	-	-
10	Finishes	24	-	-
	a. Pigments			
	b. Binders			
	c. Compact finishes			
		112	-	56

DETAILED CONTENTS:

1. Selection of Wet blue leather, Sammying, Splitting and shaving operation, Wet back rechroming.
2. NEUTRALISATION (Deacidification):
Principle of neutralisation and the reactions, Different chemicals used in neutralisation and their application in order to preference. Controls of Neutralisation.
3. DYEING:
Various types of dyes including natural dyes, light, fastness, penetration, washing and colour matching of dyes and their elementary chemistry and behaviour towards leathers. Different types of dyeing auxiliary (leveling, fixing agents and mordents, etc.). Principle and methods of dyeing and uses for different end products with different recipes. Restricted/Banned Aryle Amine base dyes, Toxicological Hazardous aspects of dyes.
4. RETANNING :

Corrected and Approved By B.T.E. on Dated 10.06.2015

Various types of retanning agents including their properties and uses. Types of retanning.

Classification, general methods of preparation, reactions with skin proteins, use in leather manufacture. Types and use of various Resin tanning agents. Syntans used in trade, Phenol free syntans.

5. FAT LIQUORING:

Oils, fats, waxes and their sources, emulsion and their types; Different types of fat and liquors including synthetic fat liquors and new development and their uses. Preparation of fat liquors and their properties and formulation in the manufacture of different types of leathers. Factors effecting choice of fat liquor, mechanism of fat liquoring. Propriety fat liquors and their uses. Water repellent and water proof fat liquors. Controls, errors and possible defects of fat liquoring.

5. STUFFING:

Various types of fats, oil and waxes used their properties, recipes and uses. Application of stuffing.

6. STRIPPING AND BLEACHING:

Principle involved in stripping and bleaching of leathers, effect of bleaching and stripping chemicals in their order of preference, Methods of bleaching.

7. WATER REPELLANT AGENTS:

Different water repellent agents including propriety products and their application.

8. FINISHING:

MACHINE OPERATIONS:

(A) Sammying, setting drying:

Object of sammying and setting. Drying process and method of drying with reference to vegetable tanned leather, chrome tanned leather and softy leathers. Vacuum drying-Elementary mechanism and application.

(B) Sawdusting Or Conditioning:

Method and object of conditioning-Nailing and toggling. Object of nailing and toggling, staking.

(C) Buffing And Snuffing:

Object of buffing and snuffing. Use of emery paper for different purpose.

FINISHES:

(A) Basic products for finishing

(B) Composition And Classification:

Corrected and Approved By B.T.E. on Dated 10.06.2015

General structure and composition of different types of finishes and finishing agents. Classification of finishes. Eco-friendly finishes

(C) Materials:

(i) PIGMENTS:

Classification of pigments, their properties and uses in leather finishing. Preparation of pigments and applications including colour matching (In organic and Organic colour lakes).

(ii) BINDERS

Type of binders (casein, shellac, mucilage and gums) properties and use.

Plasticizers, lusters, names of various materials used and method of their application. Resin binder or polymer binders-Types and classification of different binders available in the market and its propriety effect. Waxes and PU finishes.

Filling and impregnation agents and methods.

Nitro cellulose lequer properties and use.

N.C. Lacquer emulsion, classification formulation, dilutable with water or organic solvent with reference to fastness to wet rubbing. Elementary knowledge of PVC lacquer, polyvinyl acetateco-polymer lacquer and polyurethane their applications.

Solvents and diluents.

iii. Compact finishing materials.

(C) Techniques:

Seasons, their formulation and method of applications.

1. Brushing
2. Padding
3. Roller coating
4. Spraying and Polishing
5. Glazing, Burnishing and Brushing
6. Hot Plating.
7. Measuring.
8. Packaging
9. Sources of effluents of post tanning operation.

PRACTICALS

1. Exercises involving dying and finishing operations.
2. Guide lines for identification of finished leather for export as per Indian/International Standard.

Corrected and Approved By B.T.E. on Dated 10.06.2015

4.2 PROCESS OF LEATHER MANUFACTURE-II

L T P
8 - 8

Rationale:

Before manufacture of footwear and leather goods processing of leather is required. Processing technique for heavy and industrial leathers involves many steps. The students must be conversant with the processing techniques of different types of leathers used in the industry. This is very much useful for the maintaining export quality of leathers in the international market.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Heavy Leathers			
a.	Selection of hides	14	-	-
b.	Manufactur of sole leather	14	-	-
c.	Water proofing of sole leather, suit case leather, russet leather.	14	-	-
d.	Manufacture of harness	14	-	-
e.	Manufacture of belting leather	14	-	-
2.	Sports goods leathers			
a.	Lace & Strap leather	21	-	-
b.	Industrial glove leather	21	-	-
		112	-	112

DETAILED CONTENTS:

1. HEAVY LEATHERS

Selection of hides and skin , Manufacture of vegetable and chrome sole leather and water proofing of sole leather insole leather suit case leather; Russet leather; manufacture of harness and saddlery leather etc..

2. SPORTS GOODS LEATHER:

Leathers for inflated balls (Football, Basketball, Volleyball, Handball, Rugby ball etc.) hockey and cricket ball leather, grip leather, batting and wicket keeping glove leather, golf glove leather and industrial glove leather. Lace and strap leather for legguards, Bag Tanning.

PRACTICALS

Manufacture of some important sports & heavy leathers.

Corrected and Approved By B.T.E. on Dated 10.06.2015

4.3 LEATHER TRADE ENGINEERING

L T P
5 - 4

Rationale:

Different types of machinery and machine components are used in leather industry. Awareness of selection of site and equipments used in tannery is very much useful for diploma student in leather technology. The leather trade engineering is directly utilised in industrial atmosphere. The students are supposed to possess knowledge about selection of site, water and power, transmission of power, drums, paddles, pits and tannery machinery.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Selection of site and layout	12	-	-
2.	Water & Power	12	-	-
3.	Drums, Paddles and Pits	06	-	-
4.	Tannery Machinery	10	-	-
5.	Finishing Machines	10	-	-
6.	Conservation of energy and water	08	-	-
6.	Plant Maintenance	12	-	-
		70	-	56

DETAILED CONTENTS:

1. SELECTION OF SITE AND LAYOUT :

Location of tannery, factors influencing the selection of the site, geographical background, soil and water, power, transport facilities, facilities for disposal of effluents, port facilities for export and import of tannery goods.

Location of Tannery: Ground and size of the tannery, layout of different sections with various pots, drums and other machinery, a general idea of the construction of building for free air, light and ventilators, window, doors, roof natural and artificial lighting arrangements.

2. WATER AND POWER:

Sources of water supply and its storing, distribution of water by pipe lines, valves etc. Production of steam for power, steam boilers, different types of boilers, their main components and functions, advantages and disadvantages of machine power and electrical power.

3. DRUMS, PADDLES AND PITS:

Size and description of drums, paddles along with their weight and cost, their rection and construction. Drives for drums and paddles, routine maintenance and repair arrangement of different pits, construction details of pits size and

Corrected and Approved By B.T.E. on Dated 10.06.2015

cost of pits, preparation of estimate for the construction of the pits, building, total cost of tannery yards with and without machinery.

4. TANNERY MACHINERY

General construction, descriptive idea of various tanning machinery like flashing, unhairing, scudding, setting, shaving splitting, buffing, stacking etc. Mode of working, fuel and speed, power required, types of driver for each machine, total power in kw, general maintenance and repair; repair, size weight and cost of each machine and its availability.

5. FINISHING MACHINES:

Principle of working of various finishing machines with free hand drawing, weight, cost and capacities power required, total power for finishing yard, maintenance and repair of machinery, safety precautions to be observed in case of each machine.

6. Conservation of energy and water.

7. PLANT MAINTENANCE :

1. Functions of maintenance department.
2. Maintenance Procedure-Preventive maintenance, Routine maintenance and breakdown maintenance of leather machineries and accessories.
3. Lubrication and Oiling procedure in routine maintenance and development of lubrication charts.
4. Fabrication and repair of components for breakdown maintenance.
5. Estimating the repair and maintenance cost.
6. Safety - Definition, Importance, Causes of Accidents, Accident Prevention rules, General safety devices.

PRACTICALS

1. Study of various working parts of the tanning machines, their make, function etc. Checking alignment and rectifying defects therein,
2. Removal of parts for general maintenance and routine service repair, renewal and reassembly.
3. Replacement of worn out knives of splitting machine and their renewal.
4. Adjustment of grinding wheels and other attachments of splitting, shaving and fleshing machines.
5. Removal and refixing of the glazing glass, rollers and seaks in the stacking machines shafts in buffing machine and old grinder in the shaving machine;
6. General check up of all the electrical equipment motors, starters, switches, fuses etc.
7. Replacement of belts, fastening, checking slacknes of belts. their remedies, checking of pullies, tightening loose shafts, bearing and other alignments.
8. Study of spray guns and drying chambers.
9. Demonstration of correct methods of operating machines first aid training.
10. Blue print reading of tannery layout and installation drawing.

Corrected and Approved By B.T.E. on Dated 10.06.2015

4.4 INTRODUCTION TO COMPUTER

[Common with Civil Engg., Civil (Spl. With Rural), Mechanical Engg., (Specialisation in Production, Automobile, Refrigeration and Air conditioning), Electronics Engg., Instrumentation and Control Engg., Dairy Engg., Leather Technology, Footwear and Leather Goods Tech., Ceramics, Chemical Engg. (Four year Sandwich), Chemical Tech. (Rubber & Plastic), Chemical Tech. (Fertilizer)]

L T P
2 - 5

Rationale:

Computers are being used for design and information processing in all branches of engineering. An exposure to fundamentals of computer programming is very essential for all diploma holders. This subject has been included to introduce students in the use and application of computers in engineering.

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Units	Coverage Time		
		L	T	P
1.	Introduction to Computer	4	-	-
2.	Introduction To Operating System (MS DOS/Windows)	3	-	-
3.	Word Processing	4	-	-
4.	Worksheet	4	-	-
5.	Presentation	4	-	-
6.	Data Base Operation	3	-	-
7.	Introduction to Internet	2	-	-
8.	Introduction to advance tools	4	-	-
		28	-	70

DETAILED CONTENTS

1. Introduction to Computer:
 - A. Block Diagram of Computer.
 - B. Types Of Computer
 - C. Types of Input and Output devices
 - D. Memories Devices (Its Types and Basic).
2. INTRODUCTION TO OPERATING SYSTEMS (MS-DOS/MS-WINDOWS:)

What is operating system, its significance, Commands of DOS, Features/Application of window.
3. WORD PROCESSING:

File : Open, Close, Save, Save as, Search, Send to, Print Preview, Print and Page Setup

Edit : Cut, Copy, Paste, Office Clipboard, Select All, Find, replace, Goto, etc.

View : Normal/Web Layout/Print Layout; Tool Bars; Header/Footer; Zoom, etc.

Insert: Break, Page Number, Date & Time, Symbol, Comment, Reference, etc.

Corrected and Approved By B.T.E. on Dated 10.06.2015

Format: Font, Paragraph, Bullets & Numbering, Borders & Shading, Column, Change case, Back ground, etc.
Tools : Spelling & Grammer, Language, Word Count, Letters & Mailing, Options, Customize, etc.
Table : Draw, Insert, Delete, Select, Auto Format, AutoFit, Convert, Sort, Formula, etc.
Mail Merge

4. WORKSHEET:

Introduction, Use of Tools/Icons for preparing simple Mini Project.

5. PRESENTATION :

Introduction, Use of Tools/Icons for preparing simple presentation on Power Point.

6. DATABASE OPERATION :

Create database using MS Access, Create Table and Creating Reports.

7. Introduction to Internet:

What is Network, How to send & receive messages, Use of Search Engines, Surfing different web sites. Creating Mail ID, Use of Briefcase, Sending./replying emails.

8. INTRODUCTION TO ADVANCE TOOLS :

I. Steps requires to solving problems.
A. Flow Chart
B. Algroithm
C. Programming

II. Use of advance Tools such as Skype, Teamviewer, Installation of Modem, use of WiFi, Etc.

INTRODUCTION TO COMPUTER LAB

List Of Practicals

1. Practice on utility commands in DOS.
2. Composing, Correcting, Formatting and Article (Letter/Essay/Report) on Word Processing tool Word and taking its print out.
3. Creating, editing, modifying tables in Database tool.
4. Creating labels, report, generation of simple forms in Database tool.
5. Creating simple spread sheet, using in built functions in Worksheet tool..
6. Creating simple presentation.
7. Creating mail ID, Checking mail box, sending/replying e-mails.
8. Surfing web sites, using search engines.

Note : In the final year, related students have to use the concept of MS Word/MS Excel/MS Access/ MS Power Point in their respective branch's project work such as creating project report through MS Word/Creation of statistical data in MS Excel/Creation of database in MS Excel/Demonstration of project through Power Point Presentation.

Corrected and Approved By B.T.E. on Dated 10.06.2015

5.1 INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

L	T	P	
6	2	-	-

RATIONALE

The knowledge of this subject is required for all engineers/technicians who wish to choose industry/field as their career. This course is designed to develop understanding of various functions of management, role of workers and engineers and providing knowledge about industrial and tax laws.

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Units	Coverage Time		
		L	T	P
1.	Principles of Management	8	-	-
2.	Human Resource Development	10	-	-
3.	Wages and Incentives	4	-	-
4.	Human and Industrial Relations	6	-	-
5.	Professional Ethics	2	-	-
6.	Sales and Marketing management	10	-	-
7.	Labour Legislation Act	10	-	-
8.	Material Management	8	-	-
9.	Financial Management	8	-	-
10.	Entrepreneurship Development	8	-	-
11.	Fundamental of Economics	5	-	-
12.	Accidents and Safety	5	-	-
		84	-	-

DETAILED CONTENTS

1. **Principles of Management**
 - 1.1 Management, Different Functions: Planning, Organising, Leading, Controlling.
 - 1.2 Organizational Structure, Types, Functions of different departments.
 - 1.3 Motivation: Factors, characteristics, methods of improving motivation, incentives, pay, promotion, rewards, job satisfaction, job enrichment.
 - 1.4 Need for leadership, Functions of a leader, Factors for accomplishing effective leadership, Manager as a leader, promoting team work.
2. **Human Resource Development**
 - 2.1 Introduction, objectives and functions of human resource development (HRD) department.
 - 2.2 Recruitment, methods of selection, training strategies and career development.
 - 2.3 Responsibilities of human resource management - policies and functions, selection - Mode of selection - Procedure - training of workers, Job evaluation and Merit rating.
3. **Wages and Incentives**
 - 3.1 Definition and factors affecting wages, methods of wage payment.
 - 3.2 Wage incentive - type of incentive, difference in wage, incentive and bonus; incentives of supervisor.
 - 3.3 Job evaluation and merit rating.
4. **Human and Industrial Relations**
 - 4.1 Industrial relations and disputes.
 - 4.2 Relations with subordinates, peers and superiors.
 - 4.3 Characteristics of group behaviour and trade unionism.
 - 4.4 Mob psychology.
 - 4.5 Grievance, Handling of grievances.

Corrected and Approved By B.T.E. on Dated 10.06.2015

- 4.6 Agitations, strikes, Lockouts, Picketing and Gherao.
- 4.7 Labour welfare schemes.
- 4.8 Workers' participation in management.
- 5. **Professional Ethics**
 - 5.1 Concept of professional ethics.
 - 5.2 Need for code of professional ethics.
 - 5.3 Professional bodies and their role.
- 6. **Sales and Marketing management**
 - 6.1 Functions and duties of sales department.
 - 6.2 Sales forecasting, sales promotion, advertisement and after sale services.
 - 6.3 Concept of marketing.
 - 6.4 Problems of marketing.
 - 6.5 Pricing policy, break even analysis.
 - 6.6 Distribution channels and methods of marketing.
- 7. **Labour Legislation Act (as amended on date)**
 - 7.1 Factory Act 1948.
 - 7.2 Workmen's Compensation Act 1923.
 - 7.3 Apprentices Act 1961.
 - 7.4 PF Act, ESI Act.
 - 7.5 Industrial Dispute Act 1947.
 - 7.6 Employers State Insurance Act 1948.
 - 7.7 Payment of Wages Act, 1936.
 - 7.8 Intellectual Property Rights Act
- 8. **Material Management**
 - 8.1 Inventory control models.
 - 8.2 ABC Analysis, Safety stock, Economic ordering quantity.
 - 8.3 Stores equipment, Stores records, purchasing procedures, Bin card, Cardex.
 - 8.4 Material handling techniques.
- 9. **Financial Management**
 - 9.1 Importance of ledger and cash book.
 - 9.2 Profit and loss Account, Balance sheet.
 - 9.3 Interpretation of Statements, Project financing, Project appraisal, return on investments.
- 10. **Entrepreneurship Development**
 - 10.1 Concept of entrepreneur and need of entrepreneurship in the context of prevailing employment conditions.
 - 10.2 Distinction between an entrepreneur and a manager.
 - 10.3 Project identification and selection.
 - 10.4 Project formulation.
 - 10.5 Project appraisal.
 - 10.6 Facilities and incentives to an entrepreneur.
- 11. **Fundamental of Economics**
 - 11.1 Micro economics.
 - 11.2 Macro economics.
- 12. **Accidents and Safety**
 - 12.1 Classification of accidents based on nature of injuries, event and place.
 - 12.2 Causes and effects of accidents.
 - 12.3 Accident-prone workers.
 - 12.4 Action to be taken in case of accidents with machines, electric shock, fires and erection and construction accidents.
 - 12.5 Safety consciousness and publicity.
 - 12.6 Safety procedures.
 - 12.7 Safety measures - Do's and Don'ts and god housing keeping.

5.2 PROCESS OF LEATHER MANUFACTURE-III

L T P
6 - 8

Rationale:

Leather for specific purpose like book Binding, Box, Morocco leather, Corrected grain leather, glazed kid leather, Suede upper leather, Leather for gloves and Garments, Num bulk leather and Chamois leather require different type of treatment. A student is supposed to possess knowledge and skill of treatment for these specific leathers. The knowledge will be further reenforced if he is familiar with fancy leathers.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Selection of Hide & skins	9	-	-
2.	E.I & Vegetable Tanned Leathers	9	-	-
3.	Leather for Special Purposes	15	-	-
4.	Garment, Gloves and Hat Leather	9	-	-
5.	Fancy & Fine Leather	9	-	-
6.	Leathers with Hair	9	-	-
7.	Orthopaedic Leather	9	-	-
8.	Chrome & Chrome Free	9	-	-
9.	Raw Skin Products	6	-	-
		84	-	112

DETAILED CONTENTS:

1. Selection of hides and skins.
2. Manufacture of E.I. and vegetable tanned leathers from sheep, Goat skins and cow hides.
3. Book binding and Morocco leather. Manufacture of box and willow shoe upper, shoe inside leather, Shoe under side leather leathers, corrected grain leathers, glazed kid leather, suede upper leathers, Leather for sports equipment, Furniture and Upholstery, Nu-Buck leathers upholstery leather. Manufacture of chamois leather. Manufacturing of lining leather. Manufacture of oil pull-up. Brush-off, Burnish and shrunken grain leather.
4. Gloving and grain garment leathers, suede garment leathers.
5. Manufacture of fancy and fine leathers, leathers from splits, patent leathers, Leather for softy and work protection,
6. Leathers with hair,
7. Orthopaedic Leather.
8. Chrome & Chrome Free Tanned Leather
9. Raw Skin products.

PRACTICALS

Manufacture of some improtant leathers.

Corrected and Approved By B.T.E. on Dated 10.06.2015

5.3-ELEMENTS OF FOOTWEAR AND LEATHER GOODS MANUFACTURE

L T P
6 - 8

Rationale:

Some times the diploma holders in leather technology have to bear dual responsibility of holding positions as leather and leather goods manufacturing technician. To deal with such circumstances knowledge of leather goods and footwear manufacture is very much essential. Direct on the job training is necessary to develop skill component along with knowledge components

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Anatomy of Human Foot	8	-	-
2.	Footwear Designing, Styling and Pattern Cutting	8	-	-
3.	Machines and Tools	8	-	-
4.	Layout, Casting and Marketing	8	-	-
5.	Importance of Leather Goods	10	-	-
6.	Materials for Leather Goods	10	-	-
7.	Leather Based Sports Goods	10	-	-
8.	Quality Assurance	12	-	-
		84	-	112

DETAILED CONTENTS:

1. FOOTWEAR:

Brief knowledge of foot anatomy, foot care and foot comfort and their relation to footwear.

Different types of footwear designing, styling and pattern cutting characteristics of various materials used for upper, lining and bottom parts. Modern methods of construction and machinery, Standardisation of footwear grinders, hand tools and quality control. Elementary knowledge of layout, costing and marketing.

2. LEATHER GOODS:

Leather goods industry, its impact and importance in modern life. Classification of leather goods such as travelling goods, hand bags and other pretty articles.

Characteristics of materials and their selection. Modern methods of fabrication and machinery. Standardisation of materials, fitting, hand, tools, quality assurance and Planning and Production control. Designing, styling and pattern cutting, layout costing and marketing (only elementary). Study of manufacture of leather based sports goods (elementary).

3. Grading of leathers, common defects in leather, sorting.

Corrected and Approved By B.T.E. on Dated 10.06.2015

PRACTICALS

1. FOOTWEAR:

- (i) Exercises in disinging and pattern cutting, visual examination of materials and grinders.
- (ii) Fabrication of simple types of footwear such as chappal, sandal, derby shoe.

2. LEATHER GOODS:

Exercise in designing and pattern cutting. Visual examination of fittings. Fabrication of simple types of leather goods, Manufacture of leather based sports goods.

5.4-ANALYTICAL CHEMISTRY OF LEATHER MANUFACTURE

L T P
8 2 -

Rationale:

Some chemicals are required for the analysis of water, curing and pretanning process. The knowledge of PH measurement, degree of tannage and mineral oxide content is helpful in quality control of tanned leather. Physical testing helps in analysing qualities of leather. The knowledge about some common instruments which are necessary in routine working is necessary to create self confidence in the students.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Water Analysis	12	3	-
2.	Curing & Pretanning Chemicals	12	3	-
3.	Tanning Materials	12	3	-
4.	PH Measurement	12	3	-
5.	Indicators	12	3	-
6.	Tanned Leather Characteristics	12	3	-
7.	Testing of tanned Leathers	12	3	-
8.	Testing Instruments	15	4	-
9.	Conservation of Chemical & Water	08	3	-
		112	28	-

DETAILED CONTENTS:

Principle and methods (in brief) employed for the analysis of water, curing and pretanning chemicals including spent liquors, vegetable tanning materials and extracts, chrome liquors and extracts, aluminium and zirconium tanning salts, PH measurements indicators and their uses in testing. Vegetable, mineral and combination tanned leathers for characteristics like degree of tannage, mineral oxide contents etc.

Physical testing of various types of leathers for tensile strength, elongation, dynamic water absorption, abrasion resistance rub fastness, shrinkage etc.

Use of instruments such as spectrophotometer, colorimeter, ion exchange resins etc. in testing of tanning chemicals.

Conservation of chemicals and water in the tannery.

Different practice and quality control of different methods of pretanning process as applied to light and heavy leather process control in pretanning and post tanning operation.

Corrected and Approved By B.T.E. on Dated 10.06.2015

VI Semester

6.1 ENVIRONMENTAL EDUCATION & DISASTER MANAGEMENT

L T P
4 - -

RATIONALE:

A diploma student must have the knowledge of different types of pollution caused due to industrialisation and construction activities, so as he may help in balancing of eco-system and control pollution by providing controlling measures. They should be also aware of the environmental laws for effectively controlling the pollution of environment. The topics are to be taught in light of legislation Para-3.

TOPIC WISE DISTRIBUTION OF PERIODS:

SL. NO.	TOPIC	L	T	P
1.	Introduction	6		
2.	Pollution	4		
2.1	Water Pollution	8		
2.2	Air Pollution	8		
2.3	Noise Pollution	4		
2.4	Radio Active Pollution	6		
2.5	Solid Waste Management	6		
3.	Legislations	4		
4.	Environmental Impact Assessment	4		
5.	Disaster Management	6		
TOTAL		56	-	-

DETAILED CONTENTS

1. INTRODUCTION :

- Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigation, urbanization, road development and other engineering activities and their effects on ecology and eco system, Mining and deforestation and their effects.
- Lowering of water level , Urbanization.
- Biodegradation and Biodegradability, composting, bio remediation, Microbes .Use of biopesticides and biofungicides.
- Global warning concerns, Ozone layer depletion, Green house effect, Acid rain,etc.

2. POLLUTION :

Sources of pollution, natural and man made, their effects on living environments and related legislation.

2.1 WATER POLLUTION :

Corrected and Approved By B.T.E. on Dated 10.06.2015

- Factors contributing water pollution and their effect.
- Domestic waste water and industrial waste water. Heavy metals, microbes and leaching metal.
- Physical, Chemical and Biological Characteristics of waste water.
- Indian Standards for quality of drinking water.
- Indian Standards for quality of treated waste water.
- Treatment methods of effluent (domestic waste water and industrial/ mining waste water), its reuse/safe disposal.

2.2 AIR POLLUTION :

Definition of Air pollution, types of air pollutants i.e. SPM, NOX, SOX, CO, CO₂, NH₃, F, CL, causes and its effects on the environment.

- Monitoring and control of air pollutants, Control measures techniques. Introductory Idea of control equipment in industries i.e.
 - A. Settling chambers
 - B. Cyclones
 - C. Scrubbers (Dry and Wet)
 - D. Multi Clones
 - E. Electro Static Precipitations
 - F. Bog Fillers.
- Ambient air quality measurement and their standards.
- Process and domestic emission control
- Vehicular Pollution and Its control with special emphasis of Euro-I, Euro-II, Euro-III and Euro IV.

2.3 NOISE POLLUTION :

Sources of noise pollution, its effect and control.

2.4 RADISACTIVE POLLUTION :

Sources and its effect on human, animal, plant and material, means to control and preventive measures.

2.5 SOLID WASTE MANAGEMENT :

Municipal solid waste, Biomedical waste, Industrial and Hazardous waste, Plastic waste and its management.

3. LEGISLATION :

Preliminary knowledge of the following Acts and rules made thereunder-

- The Water (Prevention and Control of Pollution) Act - 1974.
- The Air (Prevention and Control of Pollution) Act - 1981.

Corrected and Approved By B.T.E. on Dated 10.06.2015

- The Environmental Protection (Prevention and Control of Pollution) Act -1986. Rules notified under EP Act - 1986 Viz.
 - # The Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000
 - # The Hazardous Wastes (Management and Handling) Amendment Rules, 2003.
 - # Bio-Medical Waste (Management and Handling) (Amendment) Rules, 2003.
 - # The Noise Pollution (Regulation and Control) (Amendment) Rules, 2002.
 - # Municipal Solid Wastes (Management and Handling) Rules, 2000.
 - # The Recycled Plastics Manufacture and Usage (Amendment) rules, 2003.

4. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) :

- Basic concepts, objective and methodology of EIA.
- Objectives and requirement of Environmental Management System (ISO-14000) (An Introduction).

5. DISASTER MANAGEMENT :

Definition of disaster - Natural and Manmade, Type of disaster management, How disaster forms, Destructive power, Causes and Hazards, Case study of Tsunami Disaster, National policy- Its objective and main features, National Environment Policy, Need for central intervention, State Disaster Authority- Duties and powers, Case studies of various Disaster in the country, Meaning and benefit of vulnerability reduction, Factor promoting vulnerability reduction and mitigation, Emergency support function plan.

Main feature and function of National Disaster Management Frame Work, Disaster mitigation and prevention, Legal Policy Frame Work, Early warning system, Human Resource Development and Function, Information dissemination and communication.

6.2 FINANCIAL, COST & MANAGEMENT ACCOUNTING

L T P
6 2 -

Rationale:

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

Sr. No.	Units	Coverage Time		
		L	T	P
A. FINANCIAL ACCOUNTING				
1.	Book Keeping & Accountancy	6	2	-
2.	Concepts & Conventions of Accounting	6	2	-
3.	Journal, Ledger & Trail Balance	6	2	-
4.	Cash Book & Other Books	6	2	-
5.	Final Accounts with Adjustment	6	2	-
6.	Banking Transactions	6	2	-
B. COST & MANAGEMENT ACCOUNTING				
1.	Introduction & Need of Cost Management Accounting	6	2	-
2.	Elements of Cost & Production Expenses	6	2	-
3.	Material & Materials Control	6	2	-
4.	Indirect Expenses and their Allocation	6	2	-
5.	Unit or Output Costing System	6	2	-
6.	Budget & Budgetary Control	6	2	-
7.	Standard Costing and Various Analysis	6	2	-
8.	Marginal Costing and Break Even Analysis	6	2	-
		84	28	-

DETAILED CONTENTS:

A. FINANCIAL ACCOUNTING

1. BOOK KEEPING & ACCOUNTANCY :

Meaning, characteristics, difference, advantages of book keeping and accountancy, Meaning, characteristics and advantages of double entry system.

2. CONCEPTS AND CONVENTIONS OF ACCOUNTANCY :

Concepts of accounting, conventions of accounting.

3. JOURNAL, LEDGER AND TRIAL BALANCE :

Journal, rules for journaling, Ledger, Need of ledger, Rules of posting, Trial balance, Methods of preparing trial balance, Disclosed and undisclosed errors in trial balance, suspense A/c.

Corrected and Approved By B.T.E. on Dated 10.06.2015

4. CASH BOOK AND OTHER BOOKS :

Meaning, Advantages and classification of cash book, Contra entry, Petty cash book. Purchase book, Purchase return book, Sales book, Sales return book, Bills receivable book, Bills payable book.

5. FINAL ACCOUNTS WITH ADJUSTMENTS :

Trading A/c, Manufacturing A/c, Profits and loss A/c, Balance sheet with all adjustments.

6. BANKING TRANSACTIONS :

Meaning and functions of bank, Bank account opening methods, Cheque, Kinds of cheque, Crossing and Indorsement of cheque, Dishonoured cheque.

B. COST & MANAGEMENT ACCOUNTING

1. INTRODUCTION AND NEED OF COST AND MANAGEMENT ACCOUNTING:

Introduction, meaning, need, functions of cost of management accounting, Emergence of management accounting, Difference between management and financial accounting, Different methods of cost finding.

2. ELEMENTS OF COST AND PRODUCTION EXPENSES :

Production expenses and their classification, Direct and indirect expenses, Direct and indirect material, Direct and indirect labour, Classification of indirect expenses, Components of total cost.

3. MATERIALS AND MATERIAL CONTROL :

Importance of materials, Objects of material control, Kinds of materials, Management and organisation of stores, Purchasing, Storing and issuing of materials, receipt of materials, Issue of materials, returns and transfer of materials, Methods of pricing the materials, LIFO and FIFO methods, Inventory systems, Inventory control, Stock levels, Economic order quantity, ABC techniques of inventory control, Bin card.

4. INDIRECT EXPENSES AND THEIR ALLOCATION :

Indirect expenses and their kinds, Classification of overheads, Difference between oncost and overheads.

5. BUDGETS AND BUDGETARY CONTROL :

Meaning of unit costing system, Preparation of statement of cost, Cost sheet and tender statement.

6. BUDGETS AND BUDGETARY CONTROL :

Budget and budgetary control, Essential of effective budgeting, type of budgets, Preparation of production budget, Material budget, Sales budget, Sales and distribution overhead budget, Master budget, Flexible budget, Computation of semi-variable expenses.

Corrected and Approved By B.T.E. on Dated 10.06.2015

7. STANDARD COSTING AND VARIANCE ANALYSIS :

Standard cost, Standard costing, Essentials for success of standard costing system, Objects, Advantages and disadvantages, Difference between standard costing and budgetary control, Variance analysis, Calculation of material variances, Labour variances and overhead variances.

8. MARGINAL COSTING AND BREAK-EVEN ANALYSIS :

Marginal costing and marginal cost, Advantages, Limitations, Cost volume-profit analysis, Break-even analysis, Contribution, Profit volume ratio, Break-even point, Margin of safety, Variable cost.

6.3 TANNERY WASTE MANAGEMENT

L T P
6 2 -

Rationale:

The control of environmental pollution is very essential to establish healthy working atmosphere in tanneries. The student should have knowledge of tannery wastes treatment and disposal to check atmospheric pollution. Tannery wastes can also be utilised for manufacturing of certain products.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Sources, Composition, Types & Characteristics	10	3	-
2.	Environmental Problems caused by Pollutants	14	5	-
3.	Recovery & Reuse of Chrome	14	5	-
4.	Treatment Methods, Awareness of Clean Technology	12	5	-
5.	Sludge Treatment & Disposal	10	3	-
6.	Solid Wastes	14	4	-
7.	Utilization of Solid waste	8	2	-
8.	Visit	2	1	-
		84	28	-

DETAILED CONTENTS:

- 1 Sources, Composition, Types and Characteristics of tannery wastes.
- 2 Environmental problems caused by various pollutants. Methods of disposal, B.I.S./C.P.C.B./S.P.C.B standards for disposal.
- 3 Recovery and reuse of chrome from waste chrome liquor.
4. Different treatment methods-Primary, Secondary and Tertiary.
5. Sludge treatment and disposal, Model treatment plants. Awareness of clean technology. Flow sheet diagram from NEERI/CLRI.
6. Various solid wastes their composition and characteristics.
Environmental problems in handling tannery solid wastes.
Utilization and disposal of tannery solid wastes.
7. Utilization of Solid Waste by making tannery by product Glue and Gelatin, Leather Boards, Dog chew leather.
8. Visit - Effluent Treatment Plant (ETP), Common Effluent Treatment Plant (CETP).

NOTE: Special Guest Lectures of experts may be arranged at suitable times.

Corrected and Approved By B.T.E. on Dated 10.06.2015

Rationale:

The purpose of introducing Standardisation and Analysis of Leather is to equip the diploma student with the necessary knowledge and skill component for maintaining and testing the quality of leather produced in the tanneries. Certain standard norms are required for maintaining export quality of the leather as per B.I.S.. A diploma holder must be aware of norms and standards required for quality maintenance in production.

Sr. No.	Units	Coverage Time		
		L	T	P
1.	Analysis of Chemicals	-	-	20
2.	Chemical Analysis/Chemical Testing of Leathers	-	-	46
3.	Physical Testing of leathers	-	-	46
		-	-	112

DETAILED CONTENTS:

1. Analysis of different types of chemicals used in the manufacture of leather such as water and sodium bichromate, chrome powder and extracts, basicity of chrome liquors, oil and fats in fat Liquors.
2. CHEMICAL TESTING :
 - (a) Analysis of chrome leather and other mineral tanned leather for chrome content and other mineral contents, total ash , oil and fats, PH of water solubles differential numbers, hide substance, moisture etc. analysis of spent liquors.
 - (b) Analysis of vegetable tanning material, extracts and spent liquors for tannins and non tannins etc.
 - (c) Analysis of vegetable tanning leathers. Fixed tannins, oils and fats, hide substance, total ash, water soluble, soluble and insoluble ash and degree of tannage.
 - (d) Analysis of combination tanned leather for their constituents.
 - (e) Indian Standard of Leathers
3. PHYSICAL TESTING:

Measurement of thickness, water absorption, apparent density, tensile strength, elongation at break and specified load, stitch tear resistance, abrasion, shrinkage, air and water vapour, permeability wet rub fastness cracks in leather, shower proofing flexural endurance, grain crack index, Rubber testing (Physical) (i) Sole Adhesion, Full

Corrected and Approved By B.T.E. on Dated 10.06.2015

shoe flex test, Ross flexing, Hardness test, Finish adhesion test .

NOTE

Sampling for physical and chemical analysis of leathers should be in accordance with Beuro of India Standards.

Corrected and Approved By B.T.E. on Dated 10.06.2015

6.5 INTERNATIONAL BUSINESS MANAGEMENT & TQM

(Common with Diploma In Saddlery Technology & Export Management)

L	T	P
6	4	-

1. INTERNATIONAL BUSINESS :An Overview:

Introduction, Modes of international business, External influences on international business, Evaluation of strategy in the Internationalization Processes
2. FOREIGN DIRECT INVESTMENT :

Introduction, The Meaning of foreign direct investment, The relationship of trade and factor mobility, Motivations for handling international business through direct investment, Market expansion- Investment versus trade, Resource-Acquisition investment, Diversification- Oriented investments, Political motives, Buy-versus build decision, Advantages of foreign direct investment, The strategy of direct investment in the internationalization process, direct investment patterns.
3. FOREIGN EXCHANGE :

Introduction, Terms and definitions, How the foreign exchange market works, Convertibility, Exchange restriction, The use of foreign exchange, Market in internationalization process.
4. THE DETERMINATION OF EXCHANGE RATES :

Introduction, The international monetary system, Exchange rate arrangements, The determination of exchange rate, Forecasting exchange rate-movements, Business implications of exchange rate changes.
5. MARKETING :

Introduction, Market size analysis, Product policy, Marketing in internationalization process, Pricing, Promotion, Branding, Distribution.
6. EXPORT AND IMPORT STRATEGIES :

Introduction, Export strategy, Export intermediaries, Foreign freight forwarders, Export financing, Counter trade, The import strategy.
7. GLOBAL OPERATION MANagements AND SOURCING STRATEGIES:

Introduction, Global manufacturing, Strategies in the Internationalization process, Quality, Global sourcing, Purchasing and supplier relations, Inventory systems, Product design.
8. HUMAN RESOURCE MANAGEMENT :

Introduction, Management qualification and characteristics, Internal managerial transfers, Management recruitment and selection, International development of managers, Human resource management in the internationalization process

Corrected and Approved By B.T.E. on Dated 10.06.2015

9. TOTAL QUALITY AND QUALITY MANAGEMENT :

What is quality, Total quality approach, Key element of total quality, Contribution of deming and juran, Why Total Quality efforts sometimes fail, The future of Quality Management.

10. QUALITY CULTURE :

Understanding what a quality culture is ? Activating Cultural Change, Laying the Groundwork for Quality Culture, Learning What a Quality Culture looks like, Countering Resistances to Cultural Change, Establishing a Quality Culture.

11. QUALITY TOOLS :

Total Quality defined , Pareto chart, Cause and effect diagram, Check sheet.

12. JUST IN TIME :

Just in time defined, rationale for JIT, Development of JIT, Relationship of JIT to Total quality and World Class Manufacturing, Benefits of JIT, Requirements of JIT, Automation and JIT.

13. AN OVERVIEW OF ISO CERTIFICATION :

ISO- 9K Series (Quality), ISO-14K Series (Environment), ISO-18K Series (Occupational Health and Safety), Six Sigma and Its Impact on Business Operation.

6.6 -PROJECT

The purpose of introducing project is to enable the students to apply the knowledge, skills and attitudes acquired during the entire course to the solution of specific problem. Some suggested problems are listed below.

1. Preparation of a project report for setting up a tannery.
2. Improvement in flaying, collection, curing and preservation of raw hides and skins available in the country side.
3. Problems associated with the development of rural tanning industry.
4. Evaluation of locally available tanning materials.
5. Work study in tanneries and suggesting measurement for increasing productivity.
6. Problems connected with the development of leather auxiliaries.
7. Problems in marketing of leather and leather goods.
8. Case study on implementation of standardisation and its benefits in Leather industries.
9. Group discussion, seminars, debate and interaction with industry.

Problems suggested by industry may also be considered for project work. The student will have to go through all the steps in problem solving such as defining the problem, analysis of the problem, collection of required information and materials, formulation of alternative solution to the problems, selecting the best solution and reduction in practice.

Student will be assessed on the basis of the project report and viva voce examination.

DIPLOMA IN LEATHER TECHNOLOGY
STAFF STRUCTURE

XI.

Intake of the course	60	
Pattern of the course	3yrs (Six Semester)	
1. Principal	1	
2. H.O.D.	1	
3. Lecturer (Lether Technology)	3	
4. Lecturer (Lether Microbiology)	1 (Part Time)	
5. Lecturer Maths/Physics	1	
6. Lecturer Chemistry	1	
7. Lecturer Language	1	part time
8. Lecturer In Mechanical Engg. cum Workshop Incharge	1	
9. Lecturer In Commerce/Accountancy	1	
10. Computer Programmer	1	
11. Instructor In Electrical Engg.	1	
12. Foreman	1	
13. Instructor Lether Technology	3	
14. Instructor (Fitting Shop)	1--	
15. Instructor (Welding Shop)	1	
16. Instructor (Machine Shop)	1	
17. Instructor (Carpentry Shop)	1	Common With
18. Drawing Instructor	1	Footwear Tech.
19. Steno typist	1	
20. Accountant/Cashier	1	
21. Student/Library Clerk	1	
22. Store Keeper	1	
23. Class IV	6--	
24. Sweeper		Part time as per requirement.

The posts of Choukidar and Mali will be sanctioned according to the justification of institution. Services for existing staff in other disciplines of the institute may be utilised if possible.

Staff qualifications will be as given in the service rules.

Staff development for teaching industrial management and entrepreneurship development may be done by the institute.

The post of "Computer Programmer" is not needed in the institutions where diploma in "Electronics Engineering" is running.

Guest lectures may be organised at suitable time.

Corrected and Approved By B.T.E. on Dated 10.06.2015

XII. SPACE REQUIREMENT

A.	Total Land Area	No	M2
B.	Administrative Block		
1.	Prinicipal's room	1	30
2.	Steno room	1	6
3.	Confidential room	1	10
4.	Office room	1	80
5.	Library (common with other disciplines)	1	150
6.	Common room	1	80
7.	Class rooms	3	225
8.	Store	1	100
9.	Model room	1	90

C. Laboratories/Workshops

1.	Drawing Hall @ 8 sq.m. per student	1X2	120
2.	General Engineering-II Lab @ 5 Sq.m. per student.	1X2	75
3.	Workshop. @ 8 Sq.m. per student.	1X2	120
4.	Mocroscopy & Microbiology Lab. @ 5 Sq. m. per student.	1X2	75
5.	Testing Lab. (Standardisation & Analysis Lab) @ 5 Sq.M. per student	1X2	75
6.	Process of Leather Manufacture Shop (Experimental Tannery/Leather Trade Engg.) @ 8 Sq.m. per student.	1X2	120
7.	Footwear & Leather Goods Manufacture Shop. @ 5 Sq.m. per student.	1X2	75
8.	Computer room @ 4 Sq.m. per student.	1X2	60

Note: Labs of physics, chemistry and computer science will be common for all dicsiplines in the institute.

D. Common Facilities

1.	Dispensary	1	40
2.	Canteen & tuck shop	1	50
3.	Parking space/cycle stand with garrage	1	200% student 50% student
4.	N.C.C. block	1	70
5.	Guest room	1	30

E. Residential Facilities

1.	Hostel for students	1	for 40% student
2.	Staff quarters		
	Principal	1	Type IV
	HOD/Warden	2	Type IV
	Sr. Lect./Lect.	2	Type IV
	Technical/Ministerial staff	2	Type II
	Class IV	6	Type I
3.	Play ground (common)	1	_____

Corrected and Approved By B.T.E. on Dated 10.06.2015

LIST OF EQUIPMENTS

Only those of the equipments given below which are essentially required for the conduction of practicals mentioned in the curriculum are to be procured by the institutions.

"Machine/Equipments/Instruments of old BTE list which are not included below are to be retained in the Lab/Shop for Demonstration purpose but not to be demanded fresh for purchase."

NOTE : Equipment for different shop and lab of latest version should be purchased.

I. APPLIED PHYSICS LAB

S.No.	Name of Equipment	No.	@ Rs. Aprox.	Amt.in Rs. Aprox.
1.	Brass ball with hook dia 1.8 Cm to 2 Cm diameter	2	50	100
2.	Stop watch least count Least Count 0.1 Sec.(non-magnetic) 0.01 sec to 0.001 sec (Electronic Desirable)	4	750	3000
3.	Wall bracket with clamping arrangement 8" to 10" length	2	50	100
4.	Meter scale Least count 0.1cm, wooden 1meter	5	40	200
5.	Meter scale Least count 0.1cm, wooden 50 Cm	5	40	200
6.	Searl's conductivity apparatus with copper & steel rods 25 cm length 4 cm.diameter with all accessories	2 set	1500	3000
7.	Constant Level Water Flow Container of one liter capacity vertical stand & rubber tubing	2	250	500
8.	Thermometer 0-110oC(Least count 0.1oC desirable)	4	100	400
9.	Potentiometer - 10 wires (1 meter length of each wire) with jockey, sunmoical top	4	750	3000
10.	Moving coil galvenometer 30-0-30 with moving mounting	5	300	1500
11.	Rheostat 50 ohm., 100 Ohm., 150 Ohm. 16 capacity	16	300	4800
12.	Lead Accumulator 2V, 6V (1 No. Each)	2	250	500
13.	Meterbridge 1 meter length, sunmica top copper strips fitted with scale	2	300	600
14.	Resistance Coil (Standard) 1 ohm. to 10 ohm.	10	50	500
15.	Moving coil ammeter 0-1 amp., 0-2 amp., 0-5 amp. with mounting	8	250	2000
16.	Moving coil voltmeter 0-1 V., 0-2V 0-5 V., 0-10 V. with mounting	8	250	2000
17.	Denial cell with complete accessories	2	250	500

Corrected and Approved By B.T.E. on Dated 10.06.2015

S.No.	Name of Equipment	No.	@ Rs. Aprox.	Amt.in Rs. Aprox.
18.	Leclanche Cell with complete accessories	2	250	500
19.	Standard Cadmium Cell with complete accessories	2	250	500
20.	Battery Charger with complete accessories	1set	1800	1800
21.	Battery Eliminator Multi range	2set	750	1500
22.	Multimeter(Digital)	1set	800	800
23.	Carey Foster Bridge (With all accessories)	2set	4500	9000
24.	Resistance Box (2 No. Each) 0-1 Ohm, 0-100 Ohm.	4	850	3400
25.	Fractional Resistance Box 0-1 Ohm.	2	1200	2400
26.	Post office box Key type	2	1200	2400
27.	Post office box Dial type	2	1200	2400
28.	Resistance Wire(100 Gm.) (Constanton/Maganin)	1 lacchi	100	100
29.	Connecting Wire Copper(1/2 Kg.) (Cotton Insulated)	1 lacchi	700	700
30.	Screw gauge L.c 1/100 mm	5set	150	750
31.	Vernier Callipers L.c. 1/10 mm	5set	100	500
32.	Appratus for determining character- stics of P-N junction diode complete with all accessories	2 set	1500	3000
33.	Resonance Column of steel One Meter length and 3-4 Cm diameter fitted with scale & water level arrangement	2	1600	3200
34.	App. for determining coefficient of friction on a horrizontal plane (Complete with all accessories)	2 set	700	1400
35.	Tuning Fork's Sets Set of different frequency (with rubber pad)	3set	350	1050
36.	Physical balance with weight box Complete with Fractional weight	2	800	1600
37.	Anemometer with counter cup type	1	1000	1000
38.	Spring Force Constant Apparatus with graduated mirror & pointer, weight set with hanger	2	1200	2400
39.	Viscosity Apparatus (Stock law) with steel balls and viscous liquid & timer	2set	1600	3200
40.	Thermometer of different range Mercury thermometer 0-50oC to 0-110oC	10set	100	1000
41.	Wall Thermometer Alcohol Filled 0-50oC	2set	20	40
42.	Sprit Level Technical Type	1set	60	60
43.	Drilling Machine Electric with different size bits	1set	800	800
44.	LPG Gas Burner with Cylinder	1set	800	800
45.	Tool Kit with different tools Complete	1set	800	800
46.	Lab stools	30		

Corrected and Approved By B.T.E. on Dated 10.06.2015

S.No.	Name of Equipment	No.	@ Rs. Aprox.	Amt.in Rs. Aprox.
47.	Lab tables	8		
48.	Plug Keys One Way	5	50	250
49.	Plug Keys Two Way	5	100	500
50	Helical Springs - Soft, 10 cm each	6	100	600

Corrected and Approved By B.T.E. on Dated 10.06.2015

II. APPLIED CHEMISTRY LAB

S.No.	Name of Equipment	No.	@ Rs. Aprox.	Amt. in Rs. Aprox.
1.	Test tube stand (Plastic/Tafflon)	30	20	600
2.	Funnel stand (Plastic/Tafflon)	30	20	600
3.	Burette stand Stainless Steel/Wooden/Iron	30	50	1500
4.	Pipette stand Stainless Steel/Wooden/Plastic	30	20	600
5.	Chemical balances with analytical weights 1gm -200gms	5	1500	7500
6.	Fractional weights set with rider 10 mg to 500 mg with rider	5sets	25	125
7.	Kipp's apparatus 1000 ml. Plastic/ Tafflon	2	500	1000
8.	Reagents bottles			
	250ml	120	20	2400
	500ml	25	25	625
	1000ml	5	30	150
9.	Wide mouth bottle 250 ml Glass	50	15	750
10.	Winchester bottle 2.5 litre Plastic/Tafflon	15	30	450
11.	Test tubes 1/4" x 6"			
	i. Corning or Borosil	200	9	1800
	ii. Glass	200	2	400
12.	Boiling tube 1" x 6"			
	i. Corning or Borosil	100	16	1600
	ii. Glass	100	5	500
13.	Pestle and mortar Dia 10 cms 15 cms (Ceramics)	2	30	60
14.	Watch glass 5.0 cms, 7.5 cms glass	15	5	75
15.	Beakers (Glass/Brosil/Corning Plastic)			
	250 ml.	50	20	1000
	500 ml.	50	20	1000
16.	Weighing Tube 10 ml with lid (Plastic)	30	10	300
17.	Wash bottles (Plastic/Tafflon)	30	15	450
18.	Conical flask 250 ml. Glass (Brosil/Corning/Plastic) Transparnt	100	30	3000
19.	Flat bottom flask 500 ml. Glass	15	40	600
20.	Flat bottom flask 250 ml. Glass	15	25	375
21.	Burette 50 ml. (Plastic/Tafflon)	30	60	1800
22.	Pipette 25 ml. (Plastic/Tafflon)	30	20	600
23.	Measuring flask 250 ml. with stopper	30	50	1500
24.	Measring cylinder of various sizes (100 ml, 250 ml, 500 ml, 1000 ml) 3 no. of each	12	30	360
25.	Bunsen's burner of brass	30	50	1500
26.	Gas plant petrol/LPG 10 to 20 burners automatic	1	5000	5000
27.	Spirit lamp (Brass)	30	30	900
28.	Tripod stand (Steel/Iron) Large/Medium	30	30	900
29.	Wire gauge 15 X 15 cm. with asbestos	30	15	450
30.	Test tube holder wodden	50	10	500

Corrected and Approved By B.T.E. on Dated 10.06.2015

S.No.	Name of Equipment	No.	@ Rs. Aprox.	Amt. in Rs. Aprox.
31.	Porcelain plates Ceramic	30	20	600
32.	Funnel 15 cm. Glass Borosil Corning/Plastic	60	16	960
33.	Spatula hard & nickel/steel	2 each	50	100
34.	Distilled water units (electrical)	1	10000	10000
35.	Distilled water units (solar)	1	5000	5000
36.	Open balance 1000 gms./10 mg.	1	600	600
37.	Brush for cleaning Hydro Fiber Acid & Alkali Resistant	100	10	1000
38.	Jars 20 Lit. for keeping distilled water	5	100	500
39.	Lab table 2 m. x 1.2 m. x 1 m. hight with central sink and cup boards (Teak wood) with drawers and two built in almirah on each side with reagent racks, better tile top	4	8000	32000
40.	Exhaust fans 18" (GEC make/Crompton)	4	2000	8000
41.	Side racks and selves for bench reagents made of teak wood for 24 bottels each set	4	2000	8000
42.	Digital balance electronic Electronics upto 2 decimal places	1	10000	10000
43.	Hot plates 7-1/2", 3" dia controled 2000 watts	1	1000	1000
44.	Hot air oven thermostatically controled with selves and rotary switches 350 x 350 x 25 high	1	8000	8000
45.	pH Meter (Digital)	1	1000	1000
46.	Glass Electrode	2	850	1700
47.	Reference Electro	2	850	1700
48.	Weight Box 1gm, 2gmX2, 5gm, 10 gm 20gmX2, 50gm, 100gm with for cep Miscellaneous	LS		15000

Corrected and Approved By B.T.E. on Dated 10.06.2015

III. WORKSHOP EQUIPMENT

A. MACHINE SHOP

1.	Lathes 4.5 Ft.	1	--	35000
2.	Shaping M/C	1	--	20000
3.	Milling M/C	1	--	45000
4.	Universal Cutter & Tool Grinder	1	--	15000
5.	Cylindrical Grinder	1	--	15000
6.	Power hacksaw	2	15000	30000
7.	Marking Tables	1	--	20500
8.	Surface Plates	3	3000	9000
9.	Welding Set & Soldering Brazeing Kits.	One Set		40000
10.	Tools & Instruments		L.S.	30000

B. FITTING SHOP

1.	Marking Table With Stand	5	1000	5000
2.	Double Wheel Grinder	2	4000	8000
3.	Bench Drilling M/C	2	4000	8000
4.	Power Hacksaw	2	15000	30000
5.	Different types of Tools		L.S.	15000

Corrected and Approved By B.T.E. on Dated 10.06.2015

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
C. CARPENTRY SHOP				
1.	Workbenches	8	2500	20000
2.	Wood Turning Lathe	2	20000	40000
3.	Circular Saw & Band Saw	One Set	15000	15000
4.	Portable Band & Circular Saw Grinder.	1	--	15000
5.	Standard Tool Kit	6 Set	3000	18000
6.	Assorted Tools Etc.		L.S.	10000
IV. GENERAL ENGINEERING LAB				
1.	Three Phase Induction Motor	2	5000	10000
2.	Single Phase Induction Motor	2	1000	2000
3.	Single Phase Transformer	2	3000	6000
4.	A.C. Ammeters (0-5/10 A)	6	500	3000
	(0-1/2 A)	2	500	1000
	(10/20 A)	3	500	1500
5.	D.C. Ammeters (0-3/5 A)	2	500	1000
6.	A.C Voltmeters(0-300/600 V)	4	500	2000
	(150/300 V)	2	500	1000
7.	D.C. Ammeter (0-15/30 V)	2	500	1000
8.	Multimeter	2	2000	4000
9.	Wattmeter (Single Phase)	6	1500	9000
10.	Single Phase Energy Meter	2	500	1000
11.	Starter for 3 Phase Induction Motor 3 H.P.			
12.	DOL Starter	1	--	1000
13.	Star Delta Starter	1	--	150
14.	Rheostats	6	500	3000
V. TESTING LABORATORY (Standardisation & Analysis Lab)				
A. Chemical Testing:				
1.	Single Pan Balance	2	--	20000
2.	Proctor Extractor	1	--	2000
3.	Muffle Furnace	2	--	16000
4.	Water distillation plant	1	--	5000
5.	Platinum Crucible	2	3000	6000
6.	Gas Plant	1	--	2000
7.	Oven	2	1000	2000
8.	Soxlet Apparatus	2	10000	20000
9.	pH Meter	2	5000	10000
10.	Magnetic Stirrer	2	2000	4000
11.	Hot plate & Mantle Heater	2	1000	2000
12.	Refrigerator	1	6000	6000
13.	Fuming cup board	1	1000	1000
14.	Mantle Heater set	1	1000	1000
b. Physical Testing Lab.				
1.	Shrinkage Tester	2	2500	5000
2.	Humidity & Temperature Control	1	--	10000
3.	Thickness Measuring Gauge (Bench Type)	2	2500	5000
4.	Hardness tester	1	--	10000
5.	Ross Flening M/C	1	--	27000
6.	Flexometer For Upper Leather	1	--	30000
7.	Colour Fastness Tester	1	--	15000

Corrected and Approved By B.T.E. on Dated 10.06.2015

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
8.	Precision Lasto Meter	1	--	20000
9.	SATRA Type Sole Adhesion Tester	1	--	10000
10.	SATRA Tensile Tester	1	--	25000
11.	Shoe Hardness Tester for Rubber	1	-	5000
12.	Bally Cantrometer	1	--	60000
13.	Fibre Board Flexing M/C	1	--	45000
14.	Furniture & Fixture	1	L.S.	25000
15.	Water Absorption Machine Static (Kubelca Method)	6	--	70000
16.	Water Absorption Machine Dynamic (Heavy Leather)	1	--	80000
17.	Water vapour permeability tester	1	--	50000
18.	Flexometer	1	--	70000
19.	Abrasion Tester	1	--	90000
20.	Dynamic water Absorption tester	1	--	70000
21.	Tensile Testing machine (Computerised)	1	--	200000

VII. MICROSCOPY & MICROBIOLOGY LAB

1.	Refrigerator (160 ltrs)	1	--	15000
2.	Optical Microscope	6	500	6000
3.	Clintal Microscope	2	--	20000
4.	Microtome	1	--	1000
5.	Slide Cabinet	1	--	2500
6.	Stereo Microscope	1	--	10000
7.	Compount Microscope	5	10000	50000

VIII. PROCESS OF LEATHER MANUFACTURE SHOP
(Experimental Tannery/Leather Trade Engg.)

			Rs. In Lacs
1.	Wooden paddle	2	0.70(Total)
2.	Small experimental drum steel	2	2.00(Total)
3.	Spray booth with compressor & exhaust fan & guns etc.	1	0.50
4.	Tubewell with pump & motor	1	0.60
5.	Wooden houses	8	0.10(Total)
6.	Fleshing and scudling Knives	6	0.20(Total)
7.	Fleshing and scudling beams	6	0.90
8.	Misc tools		0.30(Total)
9.	Mini Auto spray with 4-6 guns	1	15.00
10.	Auto toggling Humidily fixers	1	7.00
11.	Shaving M/c	1	12.00
12.	Dayana vac. drying M/C	1	18.00
13.	Molissa staker	1	10.00
14.	Finiflex	1	12.00
15.	Dusting off M/C	1	0.60
16.	Wooden Sample Drum	1	1.50
	Operated : 3 Phase Induction Motor 440 Volt Supply Power :1.5 HP Capacity : 5 Kg-50Kg Rawide Size : 10 Fit Diameter		
17.	Shaving Machine(Mechanical)	1	2.00
18.	Splitting Machine	1	5.00
19.	Sammying/Setting Machine	1	2.50
20.	Toggling Frame with Toggles	1	0.25

Corrected and Approved By B.T.E. on Dated 10.06.2015

21.	Drying Chamber	1	3.00
22.	Slowcon Staking Machine/Molisa Staker	1	3.00
23.	Buffing Machine 1800 mm (Double Width)	1	2.00
24.	Glazing Machine	1	1.50
25.	Area Measuirng Machine	1	1.70
26.	Dhakia Setting Machine (For Sole Leather)	1	2.50
27.	Hydraulic Press (Ironing & Embossing) Operated :3 Phase Induction Motor 440 Volt Supply Power :1.5 HP At the Temp. up to 60oC embossing	1	10.00
28.	Weigh Bridge/Balance	1	0.10
29.	Baby Boiler	1	0.20
30.	Vacuum Drying Machine	1	5.00
31.	Compressor	1	1.85
32.	Polishing Machine	1	1.00
33.	Roller Coater (Small Size)	1	2.00
34.	Hand Setting Mahcine	1	0.50
35.	Seasoning Table-II	1	0.50
36.	Aquamix (Rotomix)	1	2.50
37.	Spray Gun Capacity 500 ml, Made of Stainless Steel		
38.	Thickness Measuring Gauge Capacity :1mm-35mm for thickness of raw hide Operated :Electronic Power :3 Phase Induction Motor: 1.5 HP		
39.	Electronic Balance Capacity:001 ml.gm to 1/2 mlg. Operated :Electrically, Non-Corrosive base		
40.	Experimental Drum Operated: 3 Phase Induction 440 Volt Supply Power: 1.5 HP Capacity: 250gm-1 Kg Rawhide Size: 03 Fit Diameter		
41.	Hand Flashing Knife Lenth: 1.5 Feet Length Width: 6 inches Use: For Flashing One Side (Sharp) and scudding one side(Blunt)		

Corrected and Approved By B.T.E. on Dated 10.06.2015

X. FOOTWEAR & LEATHER GOODS MANUFACTURE SHOP

(Fig.in Lakhs Rs.)

Sl.No.	Name of Equipment	Qty Regd.	Unit Cost
1.	Upper splitting M/C Feeding Speed : 4 Ele-Mec/Vario-Opz Installed Pauer : 2.7 KW Knife Dimensions : 0.7X50X3100mm Max. Splitting Thickness : 8mm Min. Splitting Thickness : 0.6/0.2mm Working width : 420mm	1	6.50
2.	Clicking press Maximum Cutting Power : 20-30 Ton Maximum Stroke : 100 mm Cutting Table : 900X450 mm Arm width : 380mm Motor : 1.5 HP Net Weight (With Oil) : 780Kg. Size : 900X1000X1370 mm	2	3.25
3.	Sewing Machine		
	(a) Flat bed sewing M/C Stickiness Per Minute : 200-3200 Max. Stitch Length : 7mm Life To Presser Foot (Hand/Knee) 5.5/10mm(Standart) Max. 13mm Needle System : DBX1#21(#19-#23) Thickneww of the sewn products: Heavy	10	0.15
	(b) Zig Zag sewing M/C Stitches Per minute : 2000-2600 S.P.M. Stitch Length :5mm Width of Zig Zag : 8mm-12mm Needle : DPX17 Needle bar strocke : 34-35mm Thickness of the sewn products :Light- Medium upto 10mm	1	0.50
	(c) Post bed sewing M/C single needle Stitches Per minute : 2200-2600 S.P.M. Maximum Stitch Length :6mm Lift of pressure foot : 11mm (by knee) Needle : DPX5 Needle bar strocke : 36mm Hook Type : Vertical Rotating Hook Link Take Up Lever	5	0.50
	(d) Post bed sewing M/C double needle	1	0.35
	(e) Cording M/C	1	0.50
	(f) Stroebel Stitching Machine	1	1.50
	(g) G Heavy Duty Sewing M/c	2	0.50
4.	Mechanical clicking press for bottom components	1	0.50
5.	Strap cutting M/C Cutting Width : 2-350 mm Cutting Thickness : 10mm Working Width : 350mm	2	0.80

Corrected and Approved By B.T.E. on Dated 10.06.2015

Dimensions : 1200X550X110mm
Power : 550W, 220V

6.	Glamping hand drive M/C	1	1.20
7.	Binding M/C Stitches per minute 2500 S.P.M. Maximum Stitch Length : 5.5 mm Lift of pressure foot : 100 mm (by knee) Needle System : DP X 17 Niddle bar stroke : 34 mm Alternating Movement : 2-6 mm Feed Type : Unison Feed Diameter of cylinder Bed : 46mm	1	0.90
8.	Pull over M/C	1	0.50
9.	Heel lasting M/C	1	1.00
10.	Pounding M/C Dimensions : 650X500X1300mm Power : 550W,220V Voltage : 440 V Production : 3000 pairs/8 hour	1	0.80
11.	Roughing M/C	1	0.60
12.	A. Edge trimming M/C (For Lining) Power : 0937 KW Net Weight : 64 Kg. Dimensions : 1100 X 530 X 1165 mm	1	1.50
	B. Edge trimming M/c (For Sole) Suitable for Flush Trimming for Sole Made of PU,TPR, EVA and Rubber Power : 0.37 KW Net Weight : 64 KG Dimensions : 1100 X 530 X 1165 mm	1	1.00
	C. Hell Attaching Machine (For Lining)	1	0.40
13.	Heel trimming M/C	1	0.40
14.	Ironing Machine	1	2.00
15.	Working tables with stoob	60	1.00(Total)
16.	Decorative punching M/C	1	0.15
17.	Dies, toobs, moulds, lasts etc.	L.S.	1.00(Total)
18.	Tools boxes for students	60	0.20(Total)
19.	Thickness measuring gauge	2	0.03
20.	Pattern Shear	2	1.50
21.	Pattern Binding M/c	1	0.03
22.	Pattern Vaccum Forming M/C	1	1.50

Corrected and Approved By B.T.E. on Dated 10.06.2015

Sl.No.	Name of Equipment	Qty Regd.	Unit Cost
23.	Pneumatic fusing M/C for ironing Fusible interlining drum type 60 mm	1	1.20
24.	Taping & Seam Rubbing M/C complete with devices.	1	1.25
25.	Top Cap applicator thermoplastic two stations.	1	0.50
26.	Lining trimming M/C with storepening device	1	0.40
27.	Automatic Eyeletting & punching M/C	1	0.70
28.	Stitch marking M/C	1	0.20
29.	Back part moulding M/C	1	1.20
30.	Mocassion performing M/C	1	2.50
31.	Mocassion performing M/C with one beating head (electric)	1	5.00
32.	Vamp clapping M/C	1	1.50
33.	Insole trimming & attaching M/C	1	0.80
34.	Conditioning M/C	1	0.30
35.	Forepart Lasting M/C with Adhesive tapes	1	5.00
36.	Conditioning for back port	1	0.25
37.A.	Heal setting plant with 4 chambers and single vaccum	1	3.50
B.	Reactivating plant for sales	1	0.50
38.	Delasting (Slip Last) M/c	1	0.25
39.	Spray booth with sprayer etc. Dimensions : 900 X 850 X 1900 mm Power : 0.55 KW Net weight : 300 Kg Voltage : 380V/50 Hz	1	0.50
40.	DVP Two Station Machine Dimension : 1400 X 1150 X 2042 MM Mould Frame Size (LXWXH) 420X200X30mm Press Last Power : 6.5 Mpa Clamping Stroke : 130 mm Press Mould Stroke : 80mm Lift of core formation : 15mm Rotation Angle of Shoe Last 180 Degree Motor Power : 2.2 KW Heat Power : 8.6 KW	1	1.50
41.	Thickness Measuring Machine	1	0.50

Corrected and Approved By B.T.E. on Dated 10.06.2015

Capacity : 1mm-35mm For Thickness
of raw hide
Operated : Electronic
Power : 3 Phase Induction Motor 1.5 HP

42.	Compressor For Pneumatic machine Motor : 2HP Tank Capacity : 115 Lit. Air Delivery : 340L/min. Pressure : 10 Bar	1	1.00
43.	Punching Machine Punching Width : 36 mm Feed : 0-60 mm Speed : 250-350/min. Motor : 200W Net Weight : 45 Kg. Dimension 365 X 370 X 360 mm OR Standard	1	0.60
44.	Simplex Matie 33 mts. conveyor with 1 Mech. tier	1	3.50
45.	Two colour hrizontal injection moulding M/C with moulds etc.	1	20.00
46.	D.M.S. M/C 4 bed with moulds etc.	1	8.00

Corrected and Approved By B.T.E. on Dated 10.06.2015

INTRODUCTION TO COMPUTER (Common to all Trades)

COMPUTER CENTRE

S.No.	DESCRIPTION	QTY.	APPROX. COST (in Rs.)
1.	Core-2 Quad Processor, 4GB RAM 1 GB SATA HDD, 19" TFT Monitor/ Server of Latest Specification OS-Windows 2007/2008/Latest Version	02 Server	1,20,000=00
2.	General Desktop Computer-Intel i5 60 node or Higher(with latest Specification Pre loaded latest Anti Virus with Life time Subscription, Licence Media and Manual with UPS 660 VA with latest window OS Including licence OR Computer of latest Specification With latest window os including licence		36,00,000=00
3.	Software :((Latest Version)		
	i. MS OFFICE 2010/Latest Version		LS LS
	ii. COMPILER 'C', C++, JAVA-7		LS LS
4.	Hardware		4,50,000.00 LS
	i. Switch-32 Port		02
	ii. Router		02
	iii. Hub		04(8 Port)
	iv. Ext. Modem		02
	v. Wireless N/W Adaptor		02
	vi. Series Access Point		02
	vii.LAN Cable Meter		05
	viii. LAN Cable Analyzer		05
	ix. Crimping Tool		15
	and all other accessories related to Networking		
5.	Scanner- Flat Bed A4/Auto Lighter (Bit depth 48)		02 20,000
6.	132 Column 600 CPS or faster 9 Pin dot matrix printer with 500 million character head life		02 50,000
7.	Laser Jet-A4 All In one 20 page per min (2 Each)		04 50,000
8.	Desk Jet-A4 Photo Smart (2 Each)		04 40,000
9.	5 KVA on line UPS with minimum 30 minute battery backup along with sealed maintenance free batteries. Provision for connecting external batteries with network connectivity.(For 2 Labs)		04 8,00000

Corrected and Approved By B.T.E. on Dated 10.06.2015

10.	Split Air Conditioner 1.5 tones capacity with ISI mark along with electronic voltage stabilizer with over voltage and time delay circuit	08	35,0000
11.	Room preparation and furniture	LS	
12.	19" rack, 24-port switch. connector RJ-45 Cat-6 cabling for network	LS	10,0000
13.	2 KVA Inverter Cum UPS	02	6,0000
14.	Fire Extinguisher (2 Kg.)	04	15000
15.	Fire Extinguisher (5 Kg.)	04	25000
16.	Vacuum Cleaner	02	25000
17.	LCD Projector 3000 Lumen with all Accessories	02	350000
18.	Pen Drive 16 GB	10	10000
19.	DVD Writer External	02	10000
20.	HDD External 500 GB	02	15000
21.	PAD (Latest Configuration)	02	15000
22.	Broadband For Internet(Speed Min. 8mbps)	04	LS
23.	USB Modem	02	8000
24.	Generator 15 KVA Water Coolant	01	450000

Corrected and Approved By B.T.E. on Dated 10.06.2015

LEARNING RESOURCE MATERIALS

1.	LCD Projector with Screen	1	--	20000
2.	Handicam	1	--	30000
3.	Cutting, Binding & Stitching equipment.	1	--	30000
4.	Desk Top Computer with Internet Core i5/i7- 760, Processor, Genuine Windiw 7, Professional 18 inch HD, Flat Panel Monitor Optical Mouse, Key Board & all related media or latest version	1	--	40000
5.	Home Theater Support Disc type CD. CDR/CDRW DVDR/DVDRW, VCD Supported with USB Port Support-DIVX/JPEG/MP3	1	--	25000
6.	Commerical P A System 16 W-220W output, AC & 24V DC Operated, 5 Mic. & 2 Auxilary input, Speaker output 4 Ohm, 8 Ohm, 17 V & 100 V	1	--	20000
7.	Interactive Board	1	--	50000

ote :

1. This center will be only one at the institute level irrespective of all branches.

Corrected and Approved By B.T.E. on Dated 10.06.2015

ANNEXURE- I QUESTIONNAIRE

INSTITUTE OF RESEARCH,DEVELOPMENT AND TRAINING U.P.KANPUR -208024

SUBJECT: Questionnaire for ascertaining the job potential and activities of diploma holder in Leather Technology.

PURPOSE: To design and develop diploma curriculum in Leather Technology.

NOTE: 1.Please answer the questions to the points given in the questionnaire.
2.Any other point or suggestion not covered in this questionnaire may be written on a separate paper and enclosed with the questionnaire.

1.Name of the organisation:_____

2.Name & Designation of the officer _____
filling the questionnaire _____

3.Name of the department/section/ _____
shop _____

4.Importent functions of the _____
department/section/shop _____

5.Number of diploma holder employees _____
under your charge in the area of _____
Leather Technology.

6.Please give names of modern equipments/machines handled by a diploma holder in Leather technology.

1. 2. 3.
4. 5. 6.

7.What proficiencies are expected from a diploma holder in Leather Technology.

1. 2. 3.
4. 5. 6.

8.Mention the approximate percentage of the following desired in Diploma teaching.

1. Theoretical knowledge -----%
2. Practical knowledge -----%
3. Skill Development -----%

Corrected and Approved By B.T.E. on Dated 10.06.2015

9. Do you think " on the job training" / Industrial training should form a part of curriculum. (Yes/ No)

if yes then

- (a) Duration of training -----
(b) Mode of training 1. Spread over different semesters
2. After completion of course
3. Any other mode

10. What mode of recruitment is followed by your organisation.

1. Academic merit
2. Written test
3. Group discussion
4. Interview
5. On the job test.

11. Mention the capabilities/ Qualities looked for while recruiting diploma holder in Leather Technology.

- (a) Technical knowledge -----
(b) Practical skill -----
(c) Etiquettes and behaviour -----
(d) Aptitude -----
(e) Health habit and social background -----
(f) Institution where trained -----

12. Does your organisation have any system for the survey of Leather processing techniques of different countries/States. Yes/No

13. Does your organisation conduct field survey to know users views regarding. Yes/No

1. Use of different leather goods.
 2. Effect of climatic conditions
 3. Any other
- If yes ; please give brief account of each.

14. Which type of assignment do you suggest for an entrepreneur in Leather Technology.

15. In which types of organisations can a diploma holder in Leather Technology work ?

- | | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |

16. Job prospects for the diploma holder in Leather Technology the next ten years in the state / country.

17. In your opinion what should be the subjects to be taught to a diploma student in Leather Technology.

Theory Practical

Corrected and Approved By B.T.E. on Dated 10.06.2015

18. Kindly mention particulars regarding topics/areas which should be given more emphasis in the curriculum .

Theory

Practical

19. Kindly state whether your organisation can contribute towards improvement of curriculum in above field. Yes/ No
If yes : Pleas give names of experts in your organisation to whom contact.

20. Kindly give your valuable suggestions for being considered at the time of finilisation of curriculum.

21. What changes in technologies or to be incorporated in the development of curriculum on Leather Technology.

(Signature)

Kindly mail the above questionnaire duly filled to:-

Pankaj Yadav
Professor
Institute of Research,Development & Training,U.P.
Govt. Polytechnic Campus
Kanpur-208024

(Please note that all information in this survey is confidential for the use of curriculum design only)

Corrected and Approved By B.T.E. on Dated 10.06.2015

ANNEXURE- II SUMMER TRAINING SCHEDULE

4 weeks structured, supervised, branch specific, task oriented industrial/field exposure to be organised during summer vacation after second year annual examination.

The student during the vocational training must undertake training in any one of the following.

1. Raw hide collection, storage, curing and preservation methods including various types of transportaion in common use.
2. Students are required to gather full details regarding different sections of a tannery including its layout, machines used with specification, source of supply of spare parts and maintenance schedule.
3. Beam house operations, process involved in making leather upto wet blue. Full details including processing etc. are to ne onserved during training period.
4. Tanning and finishing operations of a tannery including dyeing, measuring etc.
5. Effluent treatment methods adopted in a tannery including primary and secondary treatment, tannery waste mangement.
6. Chemical and physical testing of leather, marketing of leather and exoprt documentation practice.

Corrected and Approved By B.T.E. on Dated 10.06.2015

The students will work and focus their attention during the training on the following points which will be incorporated by them in their reports.

1. Name & Address of the unit
2. Date of
 - i. Joining.
 - ii. Leaving.
3. Nature of Industry
 - i. Product.
 - ii. Services.
 - iii. Working Hrs.
4. Sections of the unit visited and activities there in.
5. Details of machines/Tools & instruments used in working in the section of the unit visited.
6. Work procedure in the section visited.
7. Specifications of the product of the section and materials used.
8. Work of repair and maintenance cell.
9. Details of the shops
10. Name of checking and Inspecting Instruments and their details.
Quality controls measures taken.
11. Details of hadraulics/pneumatic/thermal units or appliances used if any.
12. Discription of any breakdown and its restoring.
13. Use of computer - if any.
14. Visit of units store, Manner of keeping store items, Their receiving & distribution.
15. Safety measures on work place & working conditions in general - comfortable, convenient & hygeinic.

Corrected and Approved By B.T.E. on Dated 10.06.2015

RECOMMENDED BOOKS

List of standard Text Books recommended for diploma level institutions of Uttar Pradesh

1. DISCIPLINE : APPLIED PHYSICS

Sl.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
1.	ANUPRAYUKT BHAUTKI	GUPTA & GUPTA	HINDI	1995	75.00	ASIAN PUBLISHERS, 85-C NAI MANDI, MUZAFFAR NAGAR
2.	ENGINEERING BHAUTKI	Dr. BHARGAVA	HINDI	1995	60.00	DHANPAT RAI & SONS
3.	ANUPRAYUKT BHAUTKI	KUMAR & TYAGI	HINDI	1995	75.00	NAV BHARAT PRAKASHAN, BEGUM BRIDGE ROAD, MEERUT
4.	ANUPRAYUKT BHAUTKI	Dr. R.C.PANDEY	HINDI	1994	75.00	NAV BHARAT PRAKASHAN, BEGUM BRIDGE ROAD, MEERUT
5.	APPLIED PHYSICS-I (Vol - I)	Dr. H.H.LAL	ENGLISH	1993	45.00	TATA MCGRAW HILL
6.	APPLIED PHYSICS-II (Vol - II)	Dr. H.H.LAL	ENGLISH	1993	54.00	TATA MCGRAW HILL
7.	MODERN COLLEGE PHYSICS	WHITE	ENGLISH	1995	110.00	C. B. S.
8.	PHYSICS Vol - I & II	HOLLIDAY AND RESNIC	ENGLISH	1993	100.00	WILEY EASTERN

1. DISCIPLINE : APPLIED MATHEMATICS

Sl.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
1.	APPLIED MATHEMATICS (Math-I & Math-II)	KAPOOR & TARAMAN	HINDI	1994	75.00	NAV BHARAT PRAKASHAN, MEERUT
2.	APPLIED MATHEMATICS (Math-I & Math-II)	Dr KAILASH SINHA	HINDI	1994	60.00	BHARAT BHARATI PRAKASHAN, MEERUT
3.	APPLIED MATHEMATICS (I & II)	LUTHERA	HINDI	1994	65.00	B. Tec. PRAKASHAN, LUCKNOW
4.	APPLIED MATHEMATICS (I & II)	P. GUPTA	HINDI	1994	65.00	ASIAN PUBLISHERS, MUZAFFAR NAGAR
5.	ADVANCE Engg. MATHS	H. K. DAS	ENGLISH	1994	125.00	S. CHAND & CO., RAM NAGAR NEW DELHI

1. DISCIPLINE : COMMUNICATION TECHNIQUES

Sl.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
1.	ENGLISH FOR COMMUNICATION	V. SHASHIKUMAR M. N. K. BOSE	ENGLISH	1987	21.00	I. R. D. T. U. P., KANPUR
2.	SAMPRESHAN TAKNIK	Prof. R. PAL Dr. Smt NEERAJ SHUKLA Dr. SUBHASH GARG	HINDI	1989	15.00	I. R. D. T. U. P., KANPUR

Corrected and Approved By B.T.E. on Dated 10.06.2015

DISCIPLINE : APPLIED CHEMISTRY

S1.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
1.	ANUPRAYUKT RASAYAN	KHANNA & KHANNA & BOUNTRA	HINDI	1994	60.00	BHARAT BAARTI PRAKASHAN, MEERUT
2.	PRAYUKT RASAYAN	MAHENDRA AND SRIVASTAVA	HINDI	1994	58.00	B.TECH. PUBLISHERS, AMMINABAD LUCKNOW
3.	PRAYUKT RASAYAN SHASTRA	S. CHANDRA	HINDI	1994	60.00	NAV BHARAT PRAKASHAN, BEGUM BRIDGE ROAD, MEERUT
4.	APPLIED CHEMISTRY	V. P. MEHITA	HINDI	1993	60.00	ASIAN PUBLISHERS, 85-C NAI MANDI, MUZAFFAR NAGAR
5.	ENGINEERING RASAYAN	Dr. LALIT	HINDI	1994	45.00	DHANPAT RAI & SONS, 1682 NAI SARAK, DELHI
6.	ENGINEERING CHEMISTRY	P. C. JAIN	ENGLISH	1994	100.00	DHANPAT RAI & SONS, 1682 NAI SARAK, DELHI

1. DISCIPLINE : LEATHER TECHNOLOGY

S1.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
1.	ENVIRONMENT CHEM.	SAWYER	ENGLISH	LATEST		
2.	WASTE WATER ENGG. TREATMENT DISPOSAL & REUSE	METCALFA & EDDY	ENGLISH	LATEST		
3.	BIOLOGICAL WASTE TREATMENT	RAO, DUTTA	ENGLISH	LATEST		
4.	PRACTICAL INTRODUCTION TO THE DYES & FINISHING OF WOOD FABRICS	I. E. BEAKPARK	ENGLISH	1986	\$ 7.50	DYEIS CO. PUBLICATIONS TRUST
5.	PHYSICAL CHEMISTRY OF LEATHER MAKING	Z.K.BIENKIEWIEZ	ENGLISH	1983	\$49.00	KRIEGER PUBLISHING Co.
6.	GLOVING, CLOTHING & SPEICAL LEATHER	P. S. BRIGGS	ENGLISH	1981	\$ 5.00	TROPICAL PRODUCT INSTT., U.K.
7.	AUTOMATIC SPRAYING M/c FOR LEATHER PRODUCTION	D. N. PRICE	ENGLISH	LATEST	\$45.00	SHOE TRADES PUB., U.S.A.
8.	FARMING & ABBITION PRACTICES LEADING TO IMPARIED LEATHERS QUALITY	COMPILED	ENGLISH	1987	\$20.00	BRITHSH LEATHER CONFEDRATION
9.	FUNGICIDES USED ON LEATHER	C. CALNAN	ENGLISH	1985	\$ 6.00	LEATHER CONSERVATION CENTRE
10.	LEATHER DEFECTS- A GUIDE TO THEIR MECROSCOPY	M. DEMPSEY	ENGLISH	1974	\$19.70	LEATHER & SHOE RESEARCH ASSOCIATION
11.	FUNDAMENTAL OF LEATHERS MANF.	HEIDEMANN	ENGLISH	1993	\$61.80	EDNARD ROETHER
12.	HIDE SKINS IMPROVEMENTS IN DEVELOPING COUNTRIES	H. M. S. O.	ENGLISH	1985	\$ 9.00	H. M. S. O.
13.	SAFE GARDING OF MULTI ROLLER M/c USED IN THE LEATHER PRODUCING INDUSTRIES		ENGLISH	1981	\$ 8.00	LEATHER PRODUCIRS ASS.
14.	SAFE GARDING OF TANNERY DRUMS		ENGLISH	1980	\$ 6.70	LEATHER PRODUCIRS ASS.
15.	SUPPLMENT TO SAFE GARDING OF TANNERY DRUMS		ENGLISH	1984	\$ 5.35	LEATHER PRODUCIRS ASS.
16.	TAINNING OF HIDES & SKINS	LOCKHART SMITH C. J. ELLIOTT	ENGLISH	1974	\$ 0.70	TROPICAL PRODUCT
17.	MODERN RATIONAL DYEING AND FINISHING OF VEG-SOLE LEATHER	J. MOSIEWICA J.	ENGLISH	1982	\$19.99	SHOE TRADES PUB. CO., U.S.A.

Corrected and Approved By B.T.E. on Dated 10.06.2015

S1.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
18.	MODERNISATION RATIONAL PIT DRUMS TANNAGE OF VEG. SOLE LEATHER	MOSIEWICZ J.	ENGLISH	1976	\$17.95	SHOE TRADES PUB. CO., U.S.A.
19.	CHEMISTRY AND TECH. OF LEATHER 4 VOLUME	F. O. FLAHERTY	ENGLISH	1992	\$199.99	KALLEN BERGER W. E.
20.	LEATHER TECHNICIAN HAND BOOK	J.H. SHERPHOUSE	ENGLISH	1989	\$18.50	LEATHER PRODUCIRS ASS.
21.	SKIN, HIDS & LEATHER AFICTS	J. J. TANCOUS	ENGLISH	1959	\$57.00	TANNIRS COUNCIL, U. S. A.
22.	SURVEY OF MODERN VEG. TANNAGE		ENGLISH	1974	\$25.20	TANNING EXPRACT PRO. FEDERATION
23.	DYES HOUSE LABORATORY PRACTICE	T. M. THOUMPSON	ENGLISH	1983	\$ 7.20	DYES Co. PUBLICATION TRUST
24.	PRACTICAL LEATHER TECH.	T. C.THOSTENSEN	ENGLISH	1992	\$34.95	KRIEGER PUBLISHING CO.,U.S.A
25.	MANF. OF UPPER LEATHER	D. H. TUCK	ENGLISH	1981	\$ 5.00	TROPICAL PRODUCTS
26.	OILS AND LUBRICATION USED IN LEATHER	D. H. TUCK	ENGLISH	1983	\$ 6.50	LEATHER CONSERVATION CENTRE
27.	FUNDAMENTALS OF POLLUTION CONTROL FOR LEATHER INDUSTRY	T.C. THORTENSEN	ENGLISH			SHOE TRADER PUB. Co., U.S.A.
28.	CHEMICALS FOR LEATHER INDUSTRY	COMPILED	ENGLISH	1994	200.00	N. L. D. P., MADRAS
29.	RAW MATERIALS FOR INDIAN LATHER	COMPILED	ENGLISH	1994	250.00	N. L. D. P., MADRAS
30.	MODERNISATION OF LEATHER INDUSTRY & DEV. OF LEATHER IN INDIA	COMPILED	ENGLISH	1994	200.00	N. L. D. P., MADRAS
31.	THEORY OF PRACTICE OF LEATHER MANF.	K. T. SARKAR	ENGLISH			
32.	LECTURE NOTES OF DYEING AND FINISHING	C. K. RAO	ENGLISH			C. L. R. I., MADRAS
33.	AN INTRODUCTION TO THE PRINCIPLE OF PHYSICAL TESTING OF LEATHER	S. S. DUTTA	ENGLISH		50.00	I. L. T. A., CALCUTTA
34.	PRACTICAL ASPECT OF THE MANF. OF UPPER LEATHER	J. DEY	ENGLISH		50.00	I. L. T. A., CALCUTTA

Corrected and Approved By B.T.E. on Dated 10.06.2015