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

I YEAR

Curriculum							Scheme of Examination								
Periods Per Week						S U B J E C T	Theory				Practical				Grand Total
Lec.	Tutorial	Draw	Lab	Work Shop	Total		Examination Dur.	Marks	Sess. Marks	Total Marks	Examination Dur.	Marks	Sess. Marks	Total Marks	
3	-	-	2	-	5	1.1 Professional Communication	2.5	50	20	70	3	20	10	30	100
3	2/2	-	-	-	4	1.2 Applied Mathematics-I	2.5	50	20	70	-	-	-	-	70
3	2/2	-	2	-	6	1.3 Applied Physics	2.5	50	20	70	3	40	20	60	130
3	-	-	2	-	5	1.4 Applied Chemistry	2.5	50	20	70	3	40	20	60	130
3	2/2	-	--	--	4	1.5 General Engineering-I	2.5	50	20	70	--	--	--	--	70
3	2/2	-	4	--	8	1.6 Organic Chemistry	2.5	50	20	70	3	60	30	90	160
3	2/2	-	4	--	8	1.7 Theory of Leather Manufacture-I	2.5	50	20	70	4	70	30	100	170
-	-	4	--	4	8	1.8 Drawing & Workshop Practice	--	--	--	--	4	80	40	120	120
21	5	4	14	4	48			350	140	490		310	150	460	950
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (30 + 20)															50
														AGGREGATE	1000

NOTE:- (1) Each period will be of 50 minutes duration.
(2) Each session will be of 32 weeks.
(3) Effective teaching will be at least 25 weeks.
(4) Remaining periods will be utilised for revision etc.

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

II YEAR

Curriculum							Scheme of Examination							
Periods Per Week						SUBJECT	Theory			Practical				Grand Total
Lec.	Tutorial	Draw	Lab	Work Shop	Total		Examination Dur.	Sess. Marks	Total Marks	Examination Dur.	Sess. Marks	Total Marks		
3	1	-	2	--	6	2.1 Elementary Microscopy & Microbiology	2.5	50	20	70	3	40	20	60	130
4	1	-	--	--	5	2.2 Theory of Leather Manufacture - II	2.5	50	20	70	--	--	--	--	70
4	1	-	2	--	7	2.3 Theory of Leather Manufacture - III	2.5	50	20	70	3	40	20	60	130
4	-	-	4	--	8	2.4 Process of Leather Manufacture - I	2.5	50	20	70	12	100	50	150	220
4	-	-	4	--	8	2.5 Process of Leather Manufacture - II	2.5	50	20	70	12	100	50	150	220
3	-	-	2	-	5	2.6 Leather Trade Engg.	2.5	50	20	70	3	60	30	90	160
3	-	-	2	-	5	2.7 General Engineering-II	2.5	50	20	70	3	40	20	60	130
1	-	-	3	--	4	2.8 Computer Application For Engineering	--	--	--	--	3	60	30	90	90
26	3	-	19	--	48			350	140	490		440	220	660	1150
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (30 + 20)															50
AGGREGATE															1200

NOTE:- (1) Each period will be of 50 minutes duration.
(2) Each session will be of 32 weeks.
(3) Effective teaching will be at least 25 weeks.
(4) Remaining periods will be utilised for revision etc.
(5) 6 weeks structured and supervised, branch specific, task oriented industrial/field exposure to be organised during summer vacation. Student will submit a report. There will be 60 marks for this ecposure. These marks will be awarded by project examiner in the final Year. (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.

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

III YEAR

Curriculum							Scheme of Examination								
Periods Per Week								Theory			Practical				Grand Total
Lec.	Tutorial	Draw	Lab	Work Shop	Total			Examination Dur.	Marks	Sess. Marks	Total Marks	Examination Dur.	Marks	Sess. Marks	Total Marks	
3	-	-	-	5	8	3.1	Process of Leather Manufacture - III	2.5	50	20	70	12	100	50	150	220
3	-	-	-	5	8	3.2	Elements of Footwear & Leather Goods Manufacture	2.5	50	20	70	4	100	50	150	220
4	1	-	-	--	5	3.3	Analytical Chemistry of Leather Manufacture	2.5	50	20	70	--	--	--	--	70
2	1	-	-	--	3	3.4	Industrial Management and Entrepreneurship Development	2.5	50	20	70	--	--	--	--	70
3	1	-	-	--	4	3.5	Financial,Cost & Management Accounting	2.5	50	20	70	--	--	--	--	70
3	1	-	-	--	4	3.6	Tannery Waste Management	2.5	50	20	70	--	--	--	--	70
-	-	-	5	--	5	3.7	Standardisation & Analysis of Leather/ Leather Manufactures	---	--	--	--	12	100	50	150	150
4	2	-	-	--	6	3.8	International Business Management & TQM	2.5	50	20	70	--	--	--	--	70
2	-	-	-	-	2	3.9	Environmental Education* Disaster Management	2.5	50	--	--	-	--	--	--	--
-	2	-	-	--	2	3.10	Project									
							(i) Project Work	---	--	--	--	3	70	40	110 }	
							(ii) Industrial Training	---	--	--	--		40	20	60 }	170
24	8		6	10	48				350	140	490		400	190	590	1110
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (30 + 20)																50
AGGREGATE																1160
30% Carry Over of I YEAR																300
70% Carry Over of IIYEAR																840
100% of III Year																1160
Grand Total																2300

NOTE:- (1) Each period will be of 50 minutes duration.
(2) Each session will be of 32 weeks.
(3) Effective teaching will be at least 25 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.

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I. MAIN FEATURES OF THE CURRICULUM

1.	Title of the Course	:	Diploma in Leather Technology
2.	Duration of the Course	:	Three Years
3.	Type of the Course	:	Full Time Institutional
4.	Pattern of the Course	:	Annual System
5.	Intake	:	60
6.	Entry Qualification	:	High School 10+ with Science-II and Mathematics-II
7.	Admission Criteria	:	State Joint Entrance Examination

II. LIST OF EXPERTS

List of experts who contributed in the revision of curriculum for three year diploma course in Leather Technology.

1. Shri P. Mukhopadhyay
   Deputy Director,
   Bearu of Indian Standards,
   UPICA Building, Kanpur.

2. Dr. B. C. Vasu
   Super Tannery,
   Zajmau, Kanpur.

3. Shri Prem Arora
   Pama Footwear, Civil Lines, Kanpur.

4. Shri R. P. Shukla
   Principal, Govt. Leather Institute,
   Kanpur.

5. Shri O. K. Chhonkar
   Principal, Govt. Leather Institute,
   Agra.

6. Dr. S. Ahsan
   New Light Tannery,
   Zajmau, Kanpur.

7. Shri Musarraf Ali
   Works Manager,
   Ordinance Equipment Factory,
   Kanpur.

8. Shri T. N. Misra
   Scientist, C. L. R. I.,
   Sooterganj, Kanpur.

9. Shri Shishir Misra
   Lecturer, Leather Technology
   H. B. T. I., Kanpur.

10. Shri Om Prakash
    Deputy Director Leather
    S.I.S.I.Fazalganj, Kanpur

11. Smt. Sushma Gaur
    Asstt. Professor
    Board of Technical Education
    U. P., Lucknow.

12. Shri B. Lal
    Asstt. Professor
    I. R. D. T., U. P., Kanpur.

The curriculum as developed, was reviewed by the following committee (constituted as per Govt. Letter No. 1471/92-Pra. Shi.-3-1992 Lucknow Dated-8/12 May 1992).

1.	Shri M.P. Bajpai	D. G. M., T.A.F.C.O., Kanpur
2.	Shri T. N. Misra	Scientist, C. L. R. I., Sooterganj, Kanpur.
3.	Dr. S. Ahsan	New Light Tannery, Zajmau, Kanpur.
4.	Shri Mahendra Sahai	Senior Manager (Marketing) U. P. State Leather Development & Marketing, Agra.
5.	Shri P. C. Dikshit	Director Institute of Research Development & Training U.P., Kanpur
6.	Shri J. L. Saha	Joint Director D. T. E., Kanpur.
7.	Smt. Sushma Gaur	Asstt. Professor Board of Technical Education, U.P., Lko.
8.	Shri R. P. Shukla	Principal, Govt. Leather Institute, Kanpur.

The members of the committee recommended its being adopted after a few ammendments which have been incorporated in the curriculum.

The curriculum as developed was reviewed by the following committee on dated 06-01-97 and 21-01-97.

1.	Shri Jane Alam	Chief Designer, Council for Leather Export Civil Lines, Kanpur
2.	" R.P. Shukla	Principal Govt. Leather Institute, Kanpur
3.	" M. M. Garg.	Rd. Manager Tannery and Footwear Corporation of India Limited, Kanpur
4.	" Sudhir Chandra	Development Officer

		Directorate of Industry, Kanpur
5.	" B.C. Vist	Project Officer S.I.S.I.,Kanpur
6.	" M. K. Singh	Asstt. Lecturer Govt. Leather Institute, Kanpur
7.	" J. P. Tripathi	Asstt. Lecturer Govt.Leather Institute Kanpur
8.	K. M. Gupta	Asstt. Professor I.R.D.T., Kanpur

The curriculum as developed was reviewed for semester system by the following committee on dated 10-04-99.

1.	Shri R. K. Singh	Principal, Government Leather Institute, Kanpur
2.	" Sudhir Chandra	Deputy Director (Leather) Directorate of Industry, Kanpur
3.	" Sumant Chatterji	Lecturer (Leather Technology) H.B.T.I., Kanpur
4.	" P. K. Saxena	Deputy Manager TAFCO, Civil Lines, Kanpur
5.	" Sanjeev Kumar Sharma	Government Leather Institute, Agra
6.	" V. K. Pandey	Government Leather Institute, Kanpur
7.	" M. K. Singh	Asstt. Lecturer Govt. Leather Institute, Kanpur
8.	" J. P. Tripathi	Asstt. Lecturer Govt.Leather Institute Kanpur
9.	K. M. Gupta	Asstt. Professor I.R.D.T., Kanpur

The curriculum as developed was reviewed by the following committee on dated 06-08-03.

1.	Shri M. K. Chakrivarty	Lethatech Associates,Kanpur
2.	Shr R. P. Shukla	Principal Government Leather Instt,Kanpur
3.	Shri O. K. Choker	Principal Govt. Leather Instt., Agra
4.	Shri P. K. Bhattacharya	Depty Director, C. L. R.I., Kanpur
5.	Shri Sumant Chatterjee	Lecturer, Leather Tech. H. B. T. I., Kanpur
6.	Shri Rizwan Ali	Deputy Director, Leather S. I. S. I., Kanpur
7.	Shri Ahamad Fahim	Nida Leather, Kanpur
8.	Shri K. B. Gupta	Scientist (Retd.) C. L. R. I., N. Delhi
9.	Smt. R. P. Alam	Assistant Professor I. R. D. T., U.P., Kanpur
1.	Shri Jane Alam	Chief Designer, Council for Leather Export Civil Lines, Kanpur
2.	" R.P. Shukla	Principal Govt. Leather Institute, Kanpur
3.	" M. M. Garg.	Rd. Manager Tannery and Footwear Corporation of India Limited, Kanpur
4.	" Sudhir Chandra	Development Officer Directorate of Industry, Kanpur
5.	" B.C. Vist	Project Officer S.I.S.I.,Kanpur
6.	" M. K. Singh	Asstt. Lecturer Govt. Leather Institute, Kanpur
7.	" J. P. Tripathi	Asstt. Lecturer Govt.Leather Institute Kanpur
8.	K. M. Gupta	Asstt. Professor I.R.D.T., Kanpur

List of experts who contributed in the revision of curriculum for three year diploma course in Leather Technology on dated 9.01.2008.

1.	Sri B. D. Dixit	Director, International Institute of Saddley Technology & Export Management, Banthar, Unnao
2.	Sri N. N. Upadhaya	Mirza International, Unit-2, Magarwara, Unnao
3.	Sri Soumendra Barik	Trade Stone, Fazalganj, Kanpur
4.	Sri Taj Alam	Kings International, Kanpur
5.	Sri Barun Bose	Faculty Management, C.S.J.M. University, Kanpur
6.	Sri R. K. Kapoor	Cheif Executive, Indian Academy of Foreign Trade Development,Kanpur
7.	Sri A. Fahim	Nada Leathers, Kanpur
8.	Sri Sumant Chatterjee	Faculty, Department of Leather H.B.T.I., Kanpur
9.	Sri P. K. Awasthi	G. L. I., Kanpur
10.	Sri B. K. Pandey	G. L. I., Kanpur
11.	Sri M. K. Singh	G. L. I., Kanpur
12.	Sri C. P. Misra	Consultant, Dyon Belgivn
13.	Sri. Durgesh Chandra	Asstt. Professor I.R.D.T., Kanpur
14.	Smt. R. P. Alam	Asstt. Professor I.R.D.T., Kanpur

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 woll prove useful for the students. The demand for middle level technical man power can be fulfiled in the industries through diploma passouts of Leather Technology.

IV. PROFILE DEVELOPMENT :

A tool in the form of questionnaire for getting information about job potential, job opportunities, man power 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 acknowledge 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 recieved and those through personal contacts were incarporated where found suitable. Finally revised curriculum was put before an exspert Committee approved by the "Government of Utter Pradesh" for its final approval. The Committees suggestions though very nominal too were respectfully incarporated 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.

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 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 re-gional variations	
	Raw hide and skin prices, weights, areas and yield	
	Proper trimming and utilization.	
	Strength proper-ties of skin fibres	
	Proper flaying of hides and skins	
	Purifaction and bacteria Storage, handling and transportation of raw hides and skins	
	Assorting and grading of raw hides and skins	

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	Sources of availability of various chemicals. Impurities present Minimum acceptable standards of Composition and properties of various chemicals Chemical reactions. Methods of Chemical analysis.	Experiments in the Laboratory concerned with qualitative and quantitative methods of chemical analysis involving these chemicals
1.3 Tests tanned and finished leather at every stage for conforming to prescribed standards of quality.	- Different methods of tanning and finishing - Analysis of vegetable tanned leather, sampling, preparation of the sample, analysis in full Determination of adulteration, acidity of vegetable tanned leathers - 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	Analysis of all chemical used in leather manufacture except dyes Analysis of vegetable and mineral tanning agents Analysis of vegetable, chrome other mineral and oil tanned leathers Physical testing of leathers

ACTIVITY	KNOWLEDGE	SKILLS
	- Dyes and dye stuffs preparation and systematic tests comparitive dyeing tests with various types of leathers. - Types of oil fats and waxes Analysis of oils and fats. Iodine value saporification values theory of saturation and maturation Analysis of oil tanned leathers. - 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. 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 - Analysis of limed pelt Analysis of used lime liquor, Bata liquor, Deliming liquors and the chemicals used in bating and deliming - Analyses of pickle liquor used and unused.	

ACTIVITY	KNOWLEDGE	SKILLS
	- 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 hydrolisable 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 reistance, 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.	-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 improtant types of heavy, light and sportsgoods leather their working on various machinery.

ACTIVITY		KNOWLEDGE	SKILLS
		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. 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.	
		-Probable defects and repairs. Power load requirements of machinery. Schematic drawinds and flow charts (ISI symbols and conventions).	-Blue print reading, Free Hand skectching charts.
2.3	Assists in the selections of site, layout and construction of tanneries	-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.	-Reading of Typical layouts and re-drawing them.
2.4	Demonstrates correct procedures for operating various machinery		-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

ACTIVITY		KNOWLEDGE	SKILLS
			setting them right; Tightening loose shafts, couplings bearings and other alignments, speed and strockes 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 ralation	
3.5	Estimating the unit cost of leather produced under his charge	-Use of money credit, depre-ciation, 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.	

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 techno-echonomic 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 techno-cart 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	

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 tecnho-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 Mocrobiology Theory of leather manufacture Process of leather manufacture.
3. Select the most apporopriate tanning method for various types of leathers.	Theory of leatner manufacture Process of leather manufacrure 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 involeve in the manufactre 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 mechinery, 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-	All the above subjects

economic surveys and preparing project reports for starting tanneries.	- Elementary economics and statistics - Engilish language course (For report writing as well as for oral communication)

SUBJECTS AND CURRICULUM AREAS

SUBJECT	CURRUCULUM AREA
Communication Technique	Language & Communication
Mathematics-I Physics Chemistry (Inorganic, Physical and Organic) Microscophy and Microbiology	Basic Sciences
General Engineering (Mech., Elect.) Workshop Drawing	Basic Engineering
Theory of Leather Manufacture Process of Leather Manufacture (Heavy, Light, Industrial, Sportgoods) Theory and Pracctice of deying and finishing Elements of Footwere 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	Leather Technology
Industrial Management and entrepreneurship development	Management and Entrepreneurship
Introduction to Computers	Computer awareness

X. CHANGES IN THE SYLLABUS

1. In Final Year Paper No. 3.5 "Financial, Cost & Management Accountancy" added in place of "Estamitaing, Costing and Accountancy For Lether Manufacture".

2. In Final Year Paper No. 3.8 "International Business Management and TQM" added.

3. Staff and Speace Requirement revised as per intake of 60 students.

XI. YEAR WISE DISTRIBUTION OF PAPERS

I YEAR

1.1	Professional Communication
1.2	Applied mathematics-I
1.3	Applied physics
1.4	Applied chemistry
1.5	General Engineering-I
1.6	Organic chemistry
1.7	Theory of leather manufacture-I
1.8	Drawing & Workshop practice

II YEAR

2.1	Elementary Microscopy and Microbiology
2.2	Theory of Leather Manufacture-II
2.3	Theory of Leather Manufacture-III
2.4	Process of Leather Manufacture-I
2.5	Process of Leather Manufacture-II
2.6	Leather Trade Engineering
2.7	General Enginnering-II
2.8	Computer Application For Engineering

III YEAR

3.1	Process of Leather Manufacture III
3.2	Elements of Footwear and Leather Goods Manufacture
3.3	Analytical Chemistry of Leather Manufacture
3.4	Industrial Management and Entrepreneurship Development
3.5	Financial, Cost & Management Accountancy
3.6	Tannery waste Management
3.7	Standardisation and Analysis of Leather & Leather Manufacture
3.8	International Business Management & TQM
3.9	Environmental Education & Disaster Mgt.
3.10	Project

I YEAR

1.1 PROFESSIONAL COMMUNICATION

[Common to All Engineering/Non Engineering Courses]

L	T	P
3	-	2

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.	20	-	-
3.	Development of expression through			
	A. Letters(English & Hindi)	10	-	-
	B. Report writing (English)	10	-	-
	Note making and minutes writing			
4.	Composition	10	-	-
5.	Grammer	20	-	-
		75	-	50

1. PART I : COMMUNICATION IN ENGLISH

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

1.2 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 Letters :
Kinds of letters:-
Official, demi-offical, unofficial , for reply or in reply, quotation, tender and order giving letters. Application for a job.

1.3.2 Report writing and Note making and minutes writing.

1.4 Grammer : Transformation of sentences, Preposition, Articles, Idioms and Phrases, One word substitution, Abbreviations.

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

2. PART II : COMMUNICATION IN HINDI

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.

(1) Paper should be in two parts, part I - English and part II Hindi.

COMMUNICATION AND PRESENTATION PRACTICES

1.A. Phonetic transcription
B. Stress and intonation :
(At least 10 word for writting and 10 word for pronunciation)

2. ASSIGNMENT : (Written Communication)

Two assignment of approximately 400 word each decided by the teachers.

SUGGESTED ASSIGNMENTS :

1. a picture/photograph
2. an opening sentence or phrase
3. a newspaper/magzine clipping or report
4. factual writting which should be informative

or argumentative.

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.

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/projct 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 COMMUNICATION TECHNIQUE PAPER

Distribution of Marks

Theory Paper : 50 Marks
Sessional : 20 Marks
Pratices : 30 Marks

Q1. Question based on the topics prescribed text material will be set to test the 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
B.	Hindi Letters	5 Marks

Q3. Report Writting on given outlines 5 Marks

Q4. There will be a number of short answer questions to test the candidates knowledge of functional grammer, 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 expresed 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 Noune 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 abbrevation, uses of idioms and Phrases.

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 ceteria 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.

1.2 APPLIED MATHEMATICS I

[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	18	6	-
2.	Trigonometry	7	2	-
3.	Coordinate Geometry	15	5	-
4.	Differential Calculus-I	15	5	-
5.	Integral Calculus-I	20	7	-
		75	25	-

DETAILED CONTENTS:

1. ALGEBRA-I :

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, Crammer's rule

1.4 Vector algebra : Dot and Cross product, Scaler and vector triple product. Application to work done, Moment of a force, Plane geometry.

2. TRIGONOMETRY :

2.1 Relation between sides and angles of a triangle : Statement of various formulae showing relation ship between sides and angle of a triangle.

2.2 Complex number.

Complex numbers, Representation, Modulus and amplitud Demoivre theorem, its application in solving algebraic equations, Mod. function and its properties..

3. CO-ORDINATE GEOMETRY :

3.1 Standard form of curves and their simple properties -

Parabola $x^2=4ay$, $y^2=4ax$,

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

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

Tangent and normals

3.2 Straight lines, planes and spheres in space -

Distance between two points in space, direction crossing and direction ratios, Finding equation of a straight line, and shortest distance between two lines

Under different conditions equation of a plane $lx+my+nz=c$, relation between lines and planes, sphere $x^2 + y^2 + z^2 + 2gx + 2fy + 2wz=d$

4. DIFFERENTIAL CALCULUS - I :

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.

4.2 Methods of finding derivative, - Function of a function, Logaritimic differentiation, Differentiation of implicit functions, Higher order derivatives, Leibnitz theorem.

4.3 Special functions (Exponential, Logarithmic, Hyperbolic, Inverse circular and function), Definition, Graphs, range and Domain and Derivations of each of these functions.

4.4 Application - Finding Tangants, Normal, Points of Maxima/Minima, Increasing/Decreasing functions, sketching of some simple curves (without assumptions, question, not to be asked in the examination), Rate, Measure, velocity, Acceleration, Errors and approximation.

5. INTEGRAL CALCULUS - I :

5.1 Methods of Indefinite Integration :- Integration by substitution, Partial fraction and by parts, Integration of special function of 4.3.

5.2 Meaning and properties of definite integrals, Evaluation of definite integrals.

5.3 Application : Finding areas bounded by simple curves, Length of simple curves, Volume of solids of revolution, centre of mean of plane areas.

5.4 Simpsons and Trapezoidal Rule : their application in simple cases, Concept of error for simple function.

1.3 APPLIED PHYSICS

[Common to All Engineering Courses]

L	T	P
3	2/2	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.	Measurement	4	1	-
2.	Vector	3	1	-
3.	Force and Motion	4	1	-
4.	Dynamics of rigid body (Rotational Motion)	4	1	-
5.	Fluid Mechanics and Friction	4	1	-
6.	Work,Power and Energy	4	2	-
7.	Elasticity	2	1	-
8.	Simple Harmonic Motion	4	1	-
9.	Heat Transfer & Radiation	4	2	-
10.	Application of Sound Waves,Acoustics and Ultrasonics	6	2	-
11. A.	Optics	4	1	-
B.	Fiber Optics	4	1	-
12.	D.C. Circuits	4	1	-
13.	Dielectrics	4	2	-
14.	Magnetic Fields and Materials	4	2	-
15.	Semi Conductor Physics	5	1	-
16.	Nuclear Physics	4	2	-
17.	Laser & its Application	4	1	-
18.	Non-conventional energy sources	3	1	-
		75	25	50

DETAILED CONTENTS:

1. Measurement
   a) Units and Dimensions

Fundamental and derived units :

S.I. Units & Dimensions of physical quantities, Dimensional

formula and dimensional equation. Principle of homogenity of dimensions and applications of homogenity 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.

b. Errors in measuremnts, accuracy and precision, random and systematic errors, estimation of probable errors in the results of measurement(Combination of erros in addition, substraction, multipication and powers). Significant figures, and order of accuracy in resprect to instruments, Standard deviation, Variance.

2. Vector :

Scalar and vector quantities; Addition, Subtraction, Resolution of vector- Cartesian components of vector, Scalar and vector product of two vector.

3. Force and Motion

Parabolic motion, projectiles thrown horizontally and at an angle. Problems on time of flight, horizontal range, and maximum horizontal range. Central forces. Circular motion, angular velocity,angular acceleration and centripetal acceleration.Relationship between linear and angular velocity and acceleration. Centripetal and centrifugal forces. Practical applications of centripetal forces. Principle of centrifuge. Gravitational force, Motion of satellites, Kepler's laws, Escape velocity, Geo-stationary satellite, Concept of Black holes, Jet propulsion theory, Motion of Multi-stage Rocket, SLV, PSLV and GSLV Rockets.

4. Dynamics of Rigid Body (Rotational Motion)

Rigid body,Rotational motion, Moment of inertia,Theorems(Perpendicular and Parallel axis) of moment of inertia (Statement). Expression of M.I. of regular bodies, Radius of gyration, angular momentum, Conservation of angular momentum, Torque, Rotational kinetic energy. Rolling down the slant planes.

5. Fluid Mechanics & Friction

Surface tension, Capillaries, Equation of continuity (A1V1=A2V2), Bernoulli's theorem, stream line and Turbulent flow, Reynold's number.

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

6. Work, Power and Energy

Work done by force on bodies moving on horizontal and inclined planes in the presence of frictional forces,Concept of power and its units. Calculation of power (simple cases). Concept of kinetic and potential energy, various forms of energy, Conservation of energy. Force constant of spring, potential energy of a stretched spring.

7. Elasticity

Elasticity, stress and strain. Hooke's law, elastic limit.Yielding point and breaking point. Modulus of elasticity Young's modulus, bulk modulus and modulus of rigidity, Poisson ratio, Resilience.

8. Simple Harmonic Motion

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

9. Heat Transfer and Radiation

Modes of heat transfer , coefficient of thermal conductivity and its determination by (i) Searle's method for good conductors, and (ii) Lee's method for poor conductors. Conduction of heat through compound media, Conduction and convection, Radial flow of heat, Blackbody radiation, stefan's law, Wein's displacement and raleigh-Jeans laws, Planck's Law.

10. Application of Sound Waves

Acoustics

Standing waves, Closed and Open organ pipes, Resonance, End-correction.Definition of pitch, loudness, quality and intensity of sound waves. Echo and reverberation and reverberation time. Sabine's formula. Control of reverberation time (problems on reverberation time). Accoustics of building defects and remedy.

Ultra-Sonic :

Generation, Magnetostriction, Piezoelectric effect, Application in new technology

11.A Optics

Quantum nature of light, Coherrence (Spatial and temporal), Duality of wave and particle, Concept of Interference, Biprism, Fraunhoffer single and N-slit diffraction, Grating, Resolving and dispersive power, Elementary concept of polarisation.

B. Fibre Optics :

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.

12. D.C. Circuits

Principle of Wheat Stone bridge and application of this principle in measurement of resistance (Meter bridge and Post Office Box); potentiometer, Kirchoff's Law and their simple application. Principle of Carey-Foster's bridge. Electric potential, potential energy, Energy of a changed capacitor. fleming left hand rule, torque on a current loop, Moving coil, Galvano meter. Charging/discharging of capacitors, Ballistic galvonometer, its charge sensitivity and Current sensitivity.

13. Dielectrics :

Electric dipole; effect of electric field on dielectrics, polarisation.

14. Magnetic Fields & Materials :

Dia, Para and Ferro-magnetism, Ferrites, Hysteresis, Methods of plotting, Hysteresis curve of a ferro magentic materials and their uses, Magnetic circuits, Energy stored in magnetic fields, Basic idea of super conductivity, Meissner's effect, Applications.

15.Semiconductor Physics

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, Effect of temperature in conduction in semiconductors, P-type and N-type semiconductors, P-N

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

16. Nuclear physics

Radioactivity, Nuclear stability, Radioactive emmission, radiation damage, Nuclear fission and fusion, Nuclear reactors (PHWR-type and fast breader) and their application, Mass-energy relation, Automatic mass unit, Mass defect and binding energy.

17. Lasers and its Applications

Absorbtion and Emission of energy by atom, Spontaneous and Stimulated Emission, Einstein's co-efficients, Poluation inversion, Main component of laser and types of laser- Ruby Laser, He-Ne and Semi-conductor laser and their applications. Principles of Holography, Introduction to MASER.

18. Non-conventional energy sources:

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

(b) Solar energy: Solar radiation and potentiality of solar radiation in India, unit of solar radiation, Solar constant measurement of solar radiation by pyrometer, and by Insolation meter (suryamapi) uses of solar energy: Solar Cooker, solar water heater, solar photovoltaic cells, solar energy collector, Solar PV plants in India, Modern applications in technology.

PHYSICS LAB

Note: Any ten experiments are to be performed.

1. Determination of coefficient of friction on a horizontal plane.

2. Determination of 'Y' (Young's Modulus) by Searle's Method.

3. Determination of 'g' by plotting a graph T2 verses l and using the formula g=4n2/Slope of the graph line

4. Determination of Spring constant.

5. Determination of viscosity coefficient of a lubricant by Stoke's law.

6. Determination of 'k' for good conductor (Searle's Method).

7. Determination of frequency of AC mains by melde's methods (Transverse and Longitudinal Mode)

8. Determination of velocity of sound by resonance tube.

9. Determination of E1/E2 by potentio meter.

10. Determination of specific resistance by Carry Foster bridge.

11. Determination of resitivity by P.O.Box.

12. Verification of Kirchoff's Law.

13. To observe Characteristics of p-n Junction diode on oscillscope.

14. To measure instantaneous and average wind velocity by indicating cup type anemometer/hand held anemometer.

15. To measure solar intensity (determine solar constant) with the help of Insolation meter (Suryamapi).

16. Demonstration of He-Ne laser (Interferometer)

17. Determination of internal resistance by potentiometer.

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.

1.4 APPLIED CHEMISTRY

[Common to All Engineering Courses]

L	T	P
3	-	2

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	3	-	-
4.	Instrumental Methods	4	-	-
5.	Electro Chemistry	6	-	-
6.	Chemical Kinetics	4	-	-
7.	Catalysis	3	-	-
8.	Solid State	3	-	-
9.	Colloids	3	-	-
10.	Lubricants	3	-	-
11.	Environmental Pollution and Control	3	-	-
12.	Water Treatment	5	-	-
13.	Corrosion	3	-	-
14.	Fuels	3	-	-
15.	Glass and Ceramics	3	-	-
16.	Streochemistry of Organic Compounds	4	-	-
17.	Organic Reactions	6	-	-
18.	Organic Materials	9	-	-
		75	-	50

DETAILED CONTENTS:

1. ATOMIC STRUCTURE :

Basic concept of atomic structure, Matter wave concept, Schrodinger wave equation, Quantum number, Haisenberg's Uncertainty Principle, Shaples of orbitals.

2. CHEMICAL BONDING :

Overview of basic concept, Hydrogen bonding, Valence bond theory, Hybridisation, VSEPR theory, Molecular orbital theory, Co-ordination bond, Crystal field theory for tetrahedral carbon.

3. CLASSIFICATION OF ELEMENTS :

Modern classification of elements (s,p,d and f blcok elements), Periodic properties : Ionisation potential electro negativity, Electron affinity, Born-Haber cycle.

4. INSTRUMENTAL METHODS :

UV-visible, IR and NMR spectroscopy, Basic principles, Beer-Lamberts Law and Application of spectroscopy.

5. ELECTRO CHEMISTRY :

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 it measurement by pH meter. Buffer solutions, Indicators, Solubility product, Common ion effect with their application, 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.

Concentration cells, reference electrodes (Hydrogen electrode) cells - Primary, Secondary and Fuel cell, Laclanche's or dry cell, Acid storage cell (Lead accumulator) and Alkali stroge cell (Edison accumulator), Fuel cell, Solar cell (Photovoltaic cell), Numerical problems based on topics.

6. CHEMICAL KINETICS :

Introduction, order and molecularity of rection. Activation energy, Rate loss, rate constants, Ist order reactions and 2nd order reactions.

7. CATALYSIS :

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

8. SOLID STATE :

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. COLLOIDAL STATE OF MATTER :

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

10. LUBRICANTS :

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

11. ENVIRONMENTAL POLLUTION AND ITS CONTROL :

Concept and various types of environmental pollution with special reference to air pollution and water pollution. General measures to control environmental pollution. depletion of Ozone layer, Green house effect, Acid rain, Smog formation, Chemical and photochemical reaction, Various species in atmosphere. Specific industrial pollution like Euro-I and Euro-II.

12. WATER TREATMENT :

Concept of hard and soft water, 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, Boiler feed water boiler scale formation, Corrosion, Caustic embritlement, primming and foarming.

Characteristics imparted by various impurities or contaminants such as colour, odour, taste and sediments and their analysis.

Analysis of Water :

A. Estimation of chlorides in water.
B. Determination of dissolved oxygen.

Disinfecting of Water :

By Chloramic, Ozone and Chlorination with its mechemism, Advantage and disadvantage of chlorinational, Break point chlorination (Free residual chlorination). Industrial waste and sewage, Municipality waste water treatment, Definition of BOD and COD. Recycling of water-Theory and Process. Numerical problems based on topics.

13. CORROSION :

Concept of metallic corrosion, Types of corrosion and factors affecting the corrosion rate, Chemical and electrochemical theory of corrosion, Oxide film formation and its characteristics, tarnishing fogging and rusting, Prevention of corrosion by various methods.

14. FUELS :

Definition of fuel, its classification and their composition, Calorific value and determination of calorific value of solid and liquid fuels by Bomb calorimeter by Dulong's formula.

Liquid fuel - Petroleum and its refining, distillate of petroleum (Kerosene oil, Disel 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, CNG and Solar energy

Numerical Problems based on topics

15. GLASS AND CERAMICS :

Concept of glass and its constitutents, Classification and uses of different glass, Elementary idea of manufacturing process of glass.Introduction to ceramics materials, Its constituent. Industrial application of glass and ceramic.

16. STEREOCHEMISTRY OF ORGANIC COMPOUND:

- Isomerism

- Types of isomerism

1. Structural isomerism
2. Steroisomerism (a) Geometrical (b) Optical

- Definition of chiral, achiral stereogenic centre, plane of symmetry.

- Types of steroisomers-

    1. Conformers or Rotamers (Only ethanes)
    2. Configurational isomers
        a. Enantiomers
        b. Diastereoisomers

17. ORGANIC REACTIONS :

1. Fundamental auspects -

    A. Regents electrophiles and nucleophiles
    B. Reaction Intermediates
        i. Free radical
        ii. Carbocation
        iii. Carbanion
    C. Various effects of substituents - Inductive, Mesomeric, Electromeric.

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

B. Mechanism of Substitution reactions (Nucleophillic-hydrolysis of alkyle halide, electrophillic substitution halogenation, Sulphonation, Niration and friedel-Craft reaction.

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

18. ORGANIC MATERIALS :

A. POLYMERS :

1. Introduction to basic terms used in polymer chemistry and technology. Monomers, Average degree of polymerisation, Average molecular weight,Polymers, Polymerisation.

2. Characteristics of Polymers and their classification

    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. Free radical polymerisation (Mechanism)

4. General idea of Bio polymers

5. Brief idea of bio degradable polymers.

6. Inorganic polymers - Silicones

B. SOAPS AND DETERGENTS :

1. Introduction - A. Lipids, B. Fats and Oils
2. Saponification of fats and oils , Manufacturing of soap.
3. Synthetic detergents, types of detergents and its manufacturing.

C. EXPLOSIVES: TNT, RDX, Dynamite.
E. Paint and Varnish
F. Adhesives

LIST OF PRACTICAL

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 E Br indicator.

4. To determine the strength of given HCl solution by NaOH solution using pH meter

5. To determine the Chloride content in supplied water sample by using Mohr's methods.

6. Determination method of temporary hard ness of water sample by O-hener's method.

1.5 GENERAL ENGINEERING -I

(Common with Leather Technology (CASD))

L	T	P
3	2/2	-

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	08	02	-
2.		Drives In Machineries			
	A.	Cams	08	03	-
	B.	Transmission	08	03	-
	C.	Gear Drives	08	03	-
	D.	Couplings	06	02	-
	E.	Bearings	08	03	-
3.		IC Engines	04	01	-
4.		Basic Workshop Technology	06	02	-
5.		Civil Engineering Materials	06	02	-
6.		Foundation	09	03	-
7.		Air conditionaing System	04	01	-
			75	25	-

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.

(b) Transmission of Power ;

Power transmission by chain, belt and gear drives. Specific applications, safety provisions, sliping 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.

1.6 ORGANIC CHEMISTRY

L	T	P
3	2/2	4

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, hologen and sulpher, unsaturated hydrocarbons and alkylhalides. Preparation and properties of Chloroform, Idoform, 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	06	02	-
3.	Qualitative and Quantitative Elemental analysis	04	02	-
4.	Empirical,Molecular and Structural Formula	05	01	-
5.	Strucutre of organic compounds	05	02	-
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	03	01	-
15.	Fats, Oils and Waxes	03	01	-
16.	Aromatic Compounds	08	02	-
17.	Enzyme Chemistry	01	01	-
18.	Petroleum and Petrochemicals	07	02	-
19.	Introduction	03	01	-
		75	25	100

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 :

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

3. QUALITATIVE AND QUANTITATIVE ELEMENTAL ABALYSIS :

Detection of elements (N, S and Malogens), estimation of hydrogen, Nitrogen, Halogen and sulpher.

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

6. SATURATED AND UNSATURATED HYDROCARBONS :

General, nomenclature, isomerism, occurence, general methods of formation, general physical characteristics, general chemical characterisitcs, preparation and properties of methane and ethane, ethylene and acelytene.

7. ALCOHOLS :

A monohydric alcohols, Dihydric and trihydric alchol, nomenclature, isomerism. General methods of formation, General physical characteristics, General chemical characteristics, Distinction between primary, secondary and tertiary alcohols. Preparation of ethyle 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 diethyle 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 :

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, monosaccaride carbohydrate glucose, fructose - Preparation, properties and uses. Disaccaride carbohydrate - Sucrose or can sugar - preparation, properties and uses. Polysaccaride - 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, occurence 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 benzeme 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 reing and in side chain.

B. Some useful reactions - friedel crafts reaction, Kolbe synthesis, Reimer tiemann reaction, Benzoin condensation, cannizaro reaction, perkin reaction.

17. ENZYME CHEMISTRY :

Knowledge of enzymens, simple application of different biological reactions.

18. PETROLEUM AND PETROCHEMICALS :

Occurence, 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 ammount 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 So4 & BaSo4 (Gravimetrically).

5. Estimation of calcium as calcium oxalate (gravimetrically).

6. Estimation of lead as lead chromate (gravimetrically).

7. Detection of CI, 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.

1.7 THEORY OF LEATHER MANUFACTURE-I

L	T	P
3	2/2	4

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 industrical atmosphere.

Sr. No.	Units	Coverage Time L	T	P
1.	Introduction	8	03	-
2.	Protiens	8	03	-
3.	Raw Hides	9	03	-
4.	Water Quality	3	01	-
5.	Curing and Preservation	5	02	-
6.	Pretanning Operations	12	04	-
7.	Types of Tannages	6	02	-
8.	Chrome Tanning	12	03	-
9.	Syntans	12	04	-
		75	25	100

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).

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.

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. SYNTANS:

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

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, Ascetic 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 prectically 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 lether 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 orientiation and skill improvement during their course of study

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

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

L	D	P
-	4	4

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

DETAILED CONTENTS:

DRAWING

1. Freehand sketching.
   Basic principles, freehand sketching of components used in leather machinery and leather goods.

2. Principles of projection:
   Recognition of objects from given pictorial view identification of surfaces from different objects and pictorial view.
   Exercise on missing surfaces.
   Sketching practice of pictorial views from objects.
   Principles of orthographic projections
   Three views of a given object.
   Some shapes of inclined surfaces.
   Invisible liner, centre lines, extension lines and dimensioned lines.
   Simple exercises in drawing plans, elevations and side views of components used in footwear and leather goods machinery.

3. Dimensioning technique.
   Principles and methods of dimensioning.
   Exercise on dimensioning a given drawing.

4. ISI standards, symbols and conventions.

Workshop Practice :

1. Description of work bench, holding device, files and hand tools.Specification of files,precautions while filing a Job.

   Job No. 1; Filing practice (Production of flat surfaces)
   Checking by straight edge.

2. Marking of jobs, use of marking and measuring tools,

   Job No. 2; Filing a dimensioned rectangle of square piece to an accuracy of + 0.25 mm.

3. Simple operation of hacksawing, description of various types of blades, their uses audhow to fit the blade.

   Job No. 3: Hacksawing practice.

4. Description of drills, selection of drills, tapping types, tapes drilling, reaming tapping and dieing operations.

   Job No. 4: Practice of drilling and dieing operations.

5. Brazing practice : Preparation of brazing joints.

   Job No. 5 : Brazing of two mild steel plates.

6. Job No. 6 : Soldering and welding : Preparation of soldering joints.
   joints- Preparation of welding joints,

7. Job No. 7: Heat treatment of tools.

8. Job No. 8: Grinding of blades, shears and knives used in 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.

II Year

2.1-ELEMENTRY MICROSCOPY AND MICROBIOLOGY

L	T	P
3	1	2

Rationale:

The scientific study of hides and skins requires microscopic observations. Hence diploma students in leather techonolgy 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	05	-
2.	Anatomical structure of hair and skin	12	04	-
3.	Role of Micro organism in different Processes	12	04	-
4.	Bacteriology			-
i.	Fundamentals	12	04	-
ii.	Action of Bacteria on hides and skins	12	04	-
5.	Moulds	12	04	-
		100	25	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, embodding, 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-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.

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, meng and mite, etc.

2.2-THEORY OF LEATHER MANUFACUTRE-II

L	T	P
4	1	-

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	Coverage T	Time P
1.	Vegetable tanning	14	03	-
2.	Oil tanning	14	03	-
3.	Aldehyde tanning	14	03	-
4.	Alum tanning	12	03	-
5.	Zirconium tanning	12	03	-
6.	Miscellaneous tannages	12	03	-
7.	Combination tannages	14	03	-
8.	Reactive tannage	4	02	-
9.	Tannage with polymers	4	02	-
		100	25	

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 invloved 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) hydrolysis, olation, oxolation and basification efect of masking salts machanism of aluminium tanning. Aluminium Slicate 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, Sulpher 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 machanisms (in brief).

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

9. Tanange with Polymer : Polymer tanning agent, Polyphosphates

2.3 THEORY OF LEATHER MANUFACTURE-III

L	T	P
4	1	2

Rationale:

Several processing steps are envolved in obtaining finished leather for manufacturing of leather goods from wet blue leather. This envolves selection of wet blue leather, neutralisation, dying, 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 L	Time T	P
1.	Selection	08	02	-
2.	Neutralisations	08	02	-
3.	Dying	08	02	-
4.	Retanning	06	02	-
5.	Fat Liquoring	08	02	-
6.	Stuffing	08	02	-
7.	Stripping and Bleaching	08	02	-
8.	Water Repellant Agents	08	02	-
9.	Machine Operations	14	03	-
10	Finishes	24	06	-
a.	Pigments			
b.	Binders			
c.	Compact finishes			
		100	25	50

DETAILED CONTENTS:

1. Selection of Wet blue leather, Sammying, Splitting and shaving operation.

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 dues, 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, Toxilogical Hazardous aspects of dyes.

4. RETANNING :

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

5. FAT LIQUORING:

Oils,fats, waxes and their sourses, emulsion and their types; Different types of fat and liquors including synthetic gat liquers 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. Propreity fat liquers and their uses. Water repellant 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 perference.

7. WATER REPELLANT AGENTS:

Different water repellant agents including properiety 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. Vaccum 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:
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 porperties 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, mucillage 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 proprieity 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 mentod 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

PRACTICALS

1. Exercises involving dying and finishing operations.

2. Guide lines for identification of finished leather for export as per Indian/International Standard.

2.4 PROCESS OF LEATHER MANUFACTURE-I

L	T	P
4	-	4

Rationale:

Before manufacture of footwear and leather goods processing of leather is required. Processing technique for heavy and industrial leathers envolve 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 maintananing export quality of leathers in the international market.

Sr. No.	Units	Coverage Time L	T	P
1.	Industrial Leathers			
a.	Selection of hides & skins	09	-	-
b.	Manufactur of textile leather	14	-	-
c.	Manufacture of roller leather	09	-	-
d.	Pickers and packing	12	-	-
e.	Combing	12	-	-
f.	Gill box leather	09	-	-
g.	Indian standards	09	-	-
h.	Hydraulic & mechanical leather	12	-	-
i.	Oil seal & Diaphragm leather	14	-	-
		100	-	100

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.

2.5 PROCESS OF LEATHER MANUFACTURE-II

L	T	P
4	-	4

Rationale:

Before manufacture of footwear and leather goods processing of leather is required. Processing technique for heavy and industrial leathers envolves 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	12	-	-
b.	Manufactur of sole leather	12	-	-
c.	Water proofing of sole leather, suit case leather, russet leather.	12	-	-
d.	Manufacture of harness	12	-	-
e.	Manufacture of belting leather	12	-	-
2.	Sports goods leathers			
a.	Lace & Strap leather	20	-	-
b.	Industrial glove leather	20	-	-
		100	-	100

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.

PRACTICALS

Manufacture of some important sports & heavy leathers.

2.6 LEATHER TRADE ENGINEERING

L	T	P
3	-	2

Rationale:

Different types of machinery and machine componets are used in leather industry. Awareness of slection 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	07	-	-
4.	Tannery Machinery	12	-	-
5.	Finishing Machines	12	-	-
6.	Conservation of energy and water	08		
6.	Plant Maintenance	12	-	-
		75	-	50

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 ofboilers,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 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 weigth 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 rotine 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.

2.7 GENERAL ENGINEERING II

(Common with Leather Technology, Footwear(CASD))

L	T	P
3	1	2

Rationale:

Electrical energy is presently most convinient, 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	-
2.	Basic qualities of electricity	12	4	-
3.	Electrical tariffs	12	4	-
4.	Motor's and Transformer	15	5	-
5.	Measuring Instruments	12	4	-
6.	Electrical Heating	12	4	-
7.	Electrical Safety	06	2	-
		75	25	50

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 :

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 inducction 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 must 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.

2.8 COMPUTER APLICATION FOR ENGINEERING

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

L	T	P
1	-	3

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	5	-	-
2.	Introduction To Operating System MS DOS/Windows	3	-	-
3.	Ms-Word	4	-	-
4.	Ms-Excel	3	-	-
5.	Ms-Power Point	3	-	-
6.	Ms-Access	3	-	-
7.	Introduction to Internet	2	-	-
8.	Concept of Programming	2	-	-
		25	-	75

DETAILED CONTENTS

1. Introduction to Computer:
Block Diagram of Computer, Types Of Computer Central Processing unit (Control unit, A.L.U.) & memory Unit. Types of Input and Output devices and memories. Visual Display Unit, Keyboard, Floppy disk drive, Hard disk drive, CD-ROM Drive, Magnetic & Tape Drive

Number system(Conversion) Binary, Octal, Hexa decimal number system,Conversion from Decimal to Other System and vice-versa Bit, Byte and Word.

2. INTRODUCTION TO OPERATING SYSTEMS (MS-DOS/MS-WINDOWS:)
What is operating system, its significance, Commands of DOS, Features/Application of window.

3. MS WORD:
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.
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.

4. MS EXCEL:
Introduction, Use of Tools/Icons for preparing simple applications.

5. MS POWER POINT :
Introduction, Use of Tools/Icons for preparing simple presentation on Power Point.

6. MS ACCESS :
Introduction, Use of Tools/Icons for preparing simple applications.

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. Concept of Programming :
Flowcharting, Algorithm techniques, etc.

List Of Practicals

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

III YEAR

3.1 PROCESS OF LEATHER MANUFACTURE-III

L	T	P
3	-	8

Rationale:

Leather for specific purpose like book Binding, Box, Morrocco 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	6	-	-
7.	Orthopaedic Leather	6	-	-
8.	Technical Leather	6	-	-
9.	Raw Skin Products	6	-	-
		75	-	200

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. Technical Leather
9. Raw Skin products.

PRACTICALS

Manufacture of some improtant leathers.

3.2-ELEMENTS OF FOOTWEAR AND LEATHER GOODS MANUFACTURE

L	T	P
3	-	6

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 necessery to devolop skill component along with knowledge components

Sr. No.	Units	Coverage Time L	T	P
1.	Anatomy of Human Foot	09	-	-
2.	Footwear Designing, Styling	09	-	-
	and Pattern Cutting	09	-	-
3.	Machines and Tools	09	-	-
4.	Layout, Casting and Marketing	09	-	-
5.	Importance of Leather Goods	09	-	-
6.	Materials for Leather Goods	09	-	-
7.	Leather Based Sports Goods	09	-	-
8.	Quality Assurance	12	-	-
		75	-	150

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 grinderies, 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.

PRACTICALS

1. FOOTWEAR:

   (i) Exercies in disinging and pattern cutting, visual examination of materials and grinderies.

   (ii) Fabrication of simple types of footwear such as chappal, sandal, derby shoe.

2. LEATHER GOODS:

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

3.3-ANALYTICAL CHEMISTRY OF LEATHER MANUFACTURE

L	T	P
5	1	-

Rationale:

Some chemicals are required for the analysis of water, curing and pretanning process. The knowledge of PF 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 rotine working is necessary to create self confidence in the students.

Sr. No.	Units	Coverage Time L	T	P
1.	Water Analysis	15	3	-
2.	Curing & Pretanning Chemicals	15	3	-
3.	Tanning Materials	15	3	-
4.	PH Measurement	15	2	-
5.	Indicators	12	2	-
6.	Tanned Leather Characteristics	15	3	-
7.	Testing of tanned Leathers	15	3	-
8.	Testing Instruments	15	3	-
9.	Conservation of Chemical & Water	08	3	-
		125	25	-

DETAILED CONTENTS:

Principle and methods (in brief) employed for the analysis of water, curing and pretanning chemicals including spent liquors, vagetable 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.

3.4 INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

L	T	P
2	2/2	-

Rationale:

The knowledge of this subject is required for all engineering technicians, but it becomes more important for those technicians who wish to choose industry as their career. This course is designed to develope understanding of various functions of management, role of workers, and engineers, industrial safety, trade unions, wages and incentives, marketing, entrepreneurship, inventory control and industrial legislation.

Sl.No.	Units	Coverage Time L	T	P
1.	Principles of Management	10	4	-
2.	Human Resource Management	3	2	-
3.	Human and Industrial Relations	4	3	-
4.	Personnel Management	6	3	-
5.	Financial Management	6	3	-
6.	Material Management	4	3	-
7.	Labour, Industrial and Tax Laws	4	2	-
8.	Entrepreneurship Development	8	4	-
9.	Intellectual Property Rights	5	1	-
		50	25	-

DETAILED CONTENTS

1. PRINCIPLES OF MANAGEMENT :

Definition of management, Administration organisation, Functions management, Planning, Organizing, Co-ordination and control, Structure and function of industrial organisations, Leadership- Need for ledership, Factors to be considered for accomplishing effective leadership, Communication -Importance, Processes, Barriers to communication, Making communication, Effective, formal and informal communication, Motivation - Factors determining motivation, Positive and negative motivation, Methods for imporving motivation, Incentives, Pay promotion and rewards, Controlling - Just in time, Total quality management, Quality circle, Zero defect concept. Concept of Stress Management

2. HUMAN RESOURCE DEVELOPMENT :

Introduction, Staff development and career development,

Training strategies and methods.

3. HUMAN AND INDUSTRIAL RELATIONS :

Human relations and performance in organisation, Understand self and others for effective behaviour, Industrial relatios and disputes, Charcteristics of group behaviour and Trade unionism, Mob psychology, Labour welfare, Workers participation in management.

4. PERSONNEL MANAGEMENT :

Responsibilities of human resource management - Policies and functions, Selection - Mode of selection - Procedure - training of workers, Job evalution and Merit rating - Objectives and importance wage and salary administration - Classification of wage, Payment schemes, Components of wage, Wage fixation.

5. FINANCIAL MANAGEMENT :

Fixed and working capital - resource of capital, Shares, types preference and equity shares, Debentureptypes, Public deposits, Factory costing, Direct cost, Indirect cost, Factory over head, Fixation of selling price of product, Depreciation- Causes, Methods.

6. MATERIAL MANAGEMENT :

Objective of a good stock control system - ABC analysis of inventory, Procurement and conumption cycle, Reorder level, Lead time, Economic order quantity, Pruchasing procedure, Stock keeping, Bin card.

7. LABOUR, INDUSTRIAL AND TAX LAWS :

Importance and necessity of industrial legistation, Types of labour laws and dispute, Factory Act 1948, Payment of Wages Act 1947, Employee State Insurance Act 1948, Various types of taxes - Production Tax, Local Tax, Trade tax, Excise duty, Imcome Tax.

8. ENTREPRENEURSHIP DEVELOPMENT :

Concept of entrepreneurship, need of entrepreneurship in context of prevailing employment conditions of the country. Sucessful entrepreneurship and training for entrepreneurship development. Idea of project report preparation.

9. INTELLECTUAL PROPERTY RIGHTS :

Introduction to IPR (Patents, Copy Right, Trade Mark), Protection of undisclosed information, Concept and history of patents, Indian and International Patents Acts and Rules, Patentable and Nonpatentable invention including product versus Process.

NOTE : Entrepreneurship Awareness camp to be organised at a stretch for Two or Three days. Lectures will be delivered on Entrepreneurship by industries experts at institute level.

3.5 FINANCIAL, COST & MANAGEMENT ACCOUNTING

L	T	P
3	1	-

Rationale:

Knowledge of raw hides and skins their availabity, 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, meterial 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	4	1	-
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	4	1	-
2.	Elements of Cost & Production Expenses	6	2	-
3.	Material & Materials Control	6	2	-
4.	Indrect Expenses and thrir Allocation	4	1	-
5.	Unit or Outpur Costing System	6	2	-
6.	Budget & Budgetory Control	6	2	-
7.	Standard Costing and Various Analysis	4	2	-
8.	Marginal Costing and Break Even Analysis	5	2	-
		75	25	-

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 accouting.

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.

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, Chaque, Kinds of cheque, Crossing and Indorsement of chaque, 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 :

Inportance 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, Classificaiton 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.

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, Dreak-even analysis, Contribution, Profit volume ratio, Break-even point, Margin of safety, Variable cost.

3.6 TANNERY WASTE MANAGEMENT

L	T	P
4	1	-

Rationale:

The control of environmental pollution is very essential to establish healthy working atmosphere in tanneries. The student should have knowledge of tannery wastes theatment 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	12	3	-
2.	Environmental Problems caused by Pollutants	16	4	-
3.	Recovery & Reuse of Chrome	16	4	-
4.	Treatment Meathods, Awareness of Clean Technology	14	4	-
5.	Sludge Treatment & Disposal	12	3	-
6.	Solid Wastes	16	4	-
7.	Manufacture of Glue & Gelatin	10	2	-
8.	Dog Chew leather	04	1	-
		100	25	-

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. Manufacture of Glue and Gelatin.

Manufacture of Leather Boards.

8. Dog chew leather.

NOTE: Special guest lectures of experts may be arranged at suitable times.

3.7-STANDARDISATION & ANALYSIS OF LEATHER & LEATHER MANUFACTURE

L	T	P
--	--	6

Rationale:

The purpose of introducing Standadisation and Analysis of Leather is to equip the diploma student with the necessary knowledge and skill component for manitaining 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	-	-	30
2.	Chemical Analysis/Chemical Testing of Leathers	-	-	60
3.	Physical Testing of leathers	-	-	60
		-	-	150

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

NOTE

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

3.8 INTERNATIONAL BUSINESS MANAGEMENT & TQM

(Common with Diploma In Saddlery Technology & Export Management)

L	T	P
4	2	-

1. INTERNATIONAL BUSINESS :An Overview:

   Introduction,Modes of international business, External influences on international business, Evoluation 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 characterisitics, Internal managerial transfers, Management recruitment and selection, International development of managers, Human resource management in the internationalization process

9. TOTAL QUALITY AND QUALITY MANAGEMENT :

What is quality, Total quality approach, Key element of total quality, Controbution 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, rational 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.

3.9 ENVIRONMENTAL EDUCATION & DISASTER MANAGEMENT

L	T	P
2	-	-

RATIONALE:

A diplima 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	3		
2.1	Water Pollution	8		
2.2	Air Pollution	8		
2.3	Noise Pollution	3		
2.4	Radio Active Pollution	4		
2.5	Solid Waste Management	5		
3.	Legislations	3		
4.	Environmental Impact Assessment	4		
5.	Disaster Management	6		
	TOTAL	50	-	-

DETAILED CONTENTS

1. INTRODUCTION :

- Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigration, 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 Biodegradibility, composting, bio remediation, Microbes .Use of biopesticidies 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 :

- 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 qulity 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, GO, 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 qulaity 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.

- 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 benifit 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.

3.10-PROJECT

The purpose of introducing project is to enable the students to apply the knowledge, skills and atitudes 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. Evalution of locally available tanning materials.

5. Work study in tanneries and suggesting measurement for increasing productivity.

6. Problems connected with the development of leather auxillaries.

7. Problems in marketing of leather and leather goods.

8. Case study on implemenation of standardisation and its benefits in Leather industries.

9. Group discussion, seminors, debate and interection 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

XI. STAFF STRUCTURE

	Intake of the course	60	
	Pattern of the course	3yrs (Annual system)	
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" in not needed in the institutions where diploma in "Electronics Engineering" is running.

Guest lectures may be organised at suitable time.

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	1	200% student
	with garrage		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	_____

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."

I. APPLIED PHYSICS LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
1.	Brass ball with hook 2 cm. dia	2	20	40
2.	Stop clock least count 0.1 Sec	2	500	1000
3.	Wall bracket with clamping arrangement	2	50	100
4.	Meter scale	5	20	100
5.	Convex lenses of focal length 10 cm.,20 cm., 50 cm.and 100 cm. 2 nos. of each	8	10	80
6.	Optical bench steel with pin and lense holders	2	500	1000
7.	Anstronomical telescope	1	500	500
8.	Searl's conductivity apparatus with copper & steel rods 25 X 4 cm. diameter with all accessaries	1 set	1000	1000
9.	Lea's conductivity app. complete with all accessaries	1 set	1000	1000
10.	Constant water flow arrangement	2	400	800
11.	Boiler made of copper 2 lt. cap.	4	200	800
12.	Platinum resistance thermometer	2	800	1600
13.	Potentiometer - 10 wires with jocky	1	500	500
14.	Meter bridge complete	1	250	250
15.	Lead accumulator 2.2 V. and 20 amp. hour capacity	2	250	500
16.	Moving coil galvenometer	3	200	600
17.	Moving coil ammeter 0-1 amp., 0-5 amp., 0-10 amp., 1 no of each	3	250	750
18.	Moving coil voltmeter 0-1 V. 0-5 V., 0-10 V. 1 No of each	3	250	750
19.	Lechlanche cell complete	3	100	300
20.	Resonance col. of steel tube with tuning forcs and other accessaries	1	500	500
21.	Tuning forcs set of different frequencies	1 set	1000	1000
22.	App. for determining coefficient of friction on a horrizontal plane	1 set	1000	1000
23.	Appratus for determining character-stics of P-N junction diode complete with all accessaries	1 set	1500	1500

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
24.	Post office box dial type	1	1200	1200
25.	Resistance box 0-10 ohm., 0-100 ohm. 2 nos. each	4	400	1600
26.	Rehostat of different ohm.capacity	8	250	2000
27.	Physical balance with weight box	2	800	1600
28.	Set of fractional weights	10	20	200
29.	Fortin's barometer with mercury	1	2500	2500
30.	Battery eleminator 6 V. & 3 amp.	1	250	250
31.	Lab tables	3	8000	24000
32.	Lab stools	10	100	1000
33.	Anemometer cup type	1	1000	1000
34.	Anemometer hand held	1	1000	1000
35.	Suryamapi	1	1500	1500
36.	Insolation meter	1	1500	1500
	Misc.	Lum Sum		5000
II.	APPLIED CHEMISTRY LAB			
1.	Test tube stand	15	10	150
2.	Funnel stand	15	10	150
3.	Burette stand	15	30	450
4.	Pipette stand	15	10	150
5.	Chemical balances with analytical weights 1gm -200gms	5	1500	7500
6.	Fractional weights set with rider	5sets	25	125
7.	Kipp's apparatus 1000 ml. polythen	2	500	1000
8.	Reagents bottles			
	250ml	120	10	1200
	500ml	5	15	75
	1000ml	5	25	125
9.	Wide mouth bottle 250 ml	15	15	225
10.	Winchester bottle 2.5 litre	15	30	450
11.	Test tubes 1/4" x 6"	75	1	75
12.	Boiling tube 1" x 6" hard glass	24	10	240
13.	Pestle and morter 10 cms	2	30	60
14.	Watch glass 7.5 cms	15	5	75
15	Beakers			
	100 ml.	10	15	150
	250 ml.	24	20	480
	400 ml.	12	25	300
	1000 ml.	5	30	150
16.	Weighing bottle 10 ml with lid	15	10	150
17.	Wash bottles	15	15	225
18.	Conical flask 250 ml.	15	30	450
19.	Flat bottom flask 500 ml.	6	40	240
20.	Flat bottom flask 250 ml.	15	25	375
21.	Burette 50 ml.	15	60	900

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
22.	Pipette 25 ml.	15	20	300
23.	Measuring flask 250 ml. with stopper	15	50	750
24.	Measring cylinder of various sizes (250 ml, 500 ml, 1000 ml) 3 no. of each	9	LS	250
25.	Bunsen's burner of brass	15	50	750
26.	Gas plant petrol 10 to 20 burners automatic	1	5000	5000
27.	Spirit lamp	15	30	450
28.	Tripod stand	15	10	150
29.	Wire gauge 15 X 15 cm. with asbestos	15	15	225
30.	Test tube holder	15	10	150
31.	Porcelain plates	15	20	300
32.	Funnel 15 cm.	15	16	240
33.	Blow pipe & work tools with electric blower for glass blowing	1 set	10000	10000
34.	Cork borers with sharpner	2 set	100	200
35.	Cork pressure	1 set	250	250
36.	Glass cutting knife	1	75	75
37.	Spatula hard & nickel/steel	2 each	50	100
38.	Water tapes with gooseneek	6	200	1200
39.	Gas taps two way	10	150	1500
40.	Pinch cock & screw	15	20	300
41.	Distilled water units (electrical)	1	5000	5000
42.	Distilled water units (solar)	1	5000	5000
43.	Open balance 1000 gms./10 mg.	1	600	600
44.	Platinium wire	5	25	125
45.	Brush for cleaning various type	40	10	400
46.	Jars 20 Lit. for keeping destilled water	5	100	500
47.	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
48.	Exhaust fans 18"	4	2000	8000
49.	Side racks and selves for bench reagents made of teak wood for 24 bottels each set	4	2000	8000
50.	Digital balance electronic	1	10000	10000
51.	Hot plates 7-1/2", 3" dia controled 2000 watts	1	1000	1000
52.	Hot air oven thermostatically controled with selves and rotary switches 350 x 350 x 25 high	1	8000	8000
	Miscellaneous	LS		10000

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.	Cylinderical Grinder	1	--	15000
6.	Power hacksaw	2	15000	30000
7.	Marking Tables	1	--	20500
8.	Surface Plates	3	3000	9000
9.	Welding Set & Soldering Brazing 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

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.	Sinle 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	1	--	10000
2.	Proctor Extractor	1	--	2000
3.	Muffle Furnace	1	--	8000
4.	Water distillation plant	1	--	5000
5.	Platinum Crussible	2	3000	6000
6.	Gas Plant	1	--	2000
7.	Oven	1	1000	1000
8.	Soxlet Apparatus	1	8000	8000
9.	pH Meter	1	5000	5000
10.	Magnetic Stirrer	1	2000	2000
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	50000
2.	Humidity & Temperature Control	1	--	10000
3.	Thickness Measuring Gauge	2	2500	50000
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

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		L.S.	25000
15.	Water Absorption Machine Static (Kubelca Method)	1	--	--
16.	Water Absorption Machine Dynamic (Heavy Leather)	1	--	--
17.	Water vapour permeability tester	1	--	--
18.	Flexometer	1	--	--
19.	Abrasion Tester	1	--	--
20.	Dynamic water Absorption tester	1	--	--
21.	Tensile Testing machine	1	--	--

VII. MICROSCOPY & MICROBIOLOGY LAB

1.	Refrigerator (160 ltrs)	1	--	6000
2.	Optical Microscope	3	500	1500
3.	Clintal Microscope	1	--	10000
4.	Microtome	1	--	--
5.	Slide Cabinet	1	--	--
6.	Stereo Microscope	1	--	--

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	1	0.25
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	2	0.05(Total)
7.	Fleshing and scudling beams	6	0.90
8.	Misc tools		0.30(Total)
9.	Mini Auto spray with 4 guns	1	12.00
10.	Auto toggling Humidily fixers	1	7.00
11.	Tamnox (Preferable stainless steel drum with 3 apartments) automatic M/C	1	3.50
12.	Alatec sharing M/C	1	12.00
13.	Dayana vac. drying M/C	1	18.00
14.	Molissa staker	1	10.00
15.	Finiflex	1	12.00
16.	Dusting off M/C	1	0.60
17.	Wooden drum	1	0.80
18.	Shaving Machine(Mechanical)	1	0.80
19.	Splitting Machine	1	5.00
20.	Sammying/Setting Machine	1	2.50
21.	Toggling Frame with Toggles	1	0.25
22.	Drying Chamber	1	3.00
23.	Slowcon Staking Machine/Molisa Staker	1	3.00
24.	Buffing Machine 1800 mm (Double Width)	1	1.00
25.	Ironing Machine	1	--
26.	Glazing Machine	1	0.50
27.	Area Measuirng Machine	1	1.70
28.	Dhakia Setting Machine (For Sole Leather)	1	2.50
29.	Hydraulic Press with 6 Different Plate	1	6.00
30.	Weigh Bridge/Balance	1	0.05
31.	Baby Boiler	1	--
32.	Vacuum Drying Machine	1	5.00
33.	Drying Drum With 3 Apartment	1	0.80
34.	Compressor	1	1.85
35.	Polishing Machine	1	1.00
36.	Roller Coater (Small Size)	1	1.00
37.	Hand Setting Mahcine	1	0.50
38.	Seasoning Table-II	1	0.20
39.	Aquamix (Rotomix)	1	2.50

X. FOOTWEAR & LEATHER GOODS MANUFACTURE SHOP

(Fig.in Lakhs Rs.)

Sl.No.	Name of Equipment	Qty Regd.	Unit Cost
1.	Upper splitting M/C	1	2.50
2.	Clicking press	1	1.25
3.	Sewing Machine		
	(a) Flat bed sewing M/C	10	0.03
	(b) Zig Zag sewing M/C	1	0.25
	(c) Post bed sewing M/C single needle	2	0.50
	(d) Post bed sewing M/C double needle	1	0.35
	(e) heavy duty cylindrical bed twin needle	1	0.40
	(f) Cording M/C	1	0.50
4.	Mechanical clicking press for bottom components	1	0.50
5.	Strap cutting M/C	1	0.20
6.	Glamping hand drive M/C	1	1.20
7.	Binding M/C	1	0.90
8.	Console Lasting M/C	1	1.75
9.	Putting over M/C	1	0.50
10.	Heel lasting M/C	1	1.00
11.	Pounding M/C	1	0.80
12.	Roughing M/C	1	0.35
13.	Edge trimming M/C	1	0.80
14.	Heel trimming M/C	1	0.40
15.	Macking Stitching M/C	1	2.00
16.	Working tables with stoob	20	0.40(Total)
17.	Decorative punching M/C	1	0.15
18.	Dies, toobs, moulds, lasts etc.	L.S.	1.00(Total)
19.	Tools boxes for students	60	0.20(Total)
20.	Thickness measuring gauge	2	0.03
21.	Pattern Grading M/C	1	8.00
22.	Pattern shear	1	1.50

Sl.No.	Name of Equipment	Qty Regd.	Unit Cost
23.	Pattern binding M/C	1	0.30
24.	Pattern Vaccum Forming M/C	1	1.50
25.	Pneumatic fusing M/C for ironing Fusible interlining drum type 60 mm	1	1.20
26.	Taping & Seam Rubbing M/C complete with devices.	1	1.25
27.	Top Cap applicator thermoplastic two stations.	1	0.50
28.	Lining trimming M/C with storepening device	1	0.40
29.	Automatic Eyeletting & punching M/C	1	0.70
30.	Stitch marking M/C	1	0.20
31.	Back part moulding M/C	1	1.20
32.	Mocassion performing M/C	1	2.50
33.	Mocassion performing M/C with one beating head (electric)	1	5.00
34.	Vamp clapping M/C	1	1.50
35.	Insole trimming & attaching M/C	1	0.80
36.	Conditioning M/C	1	0.30
37.	Forepart Lasting M/C with Adhesive tapes	1	5.00
38.	Conditioning for back port	1	0.25
39.	Heal setting plant with 4 chambers and single vaccum	1	3.50
39A.	Reactivating plant for sales	1	0.50
40.	Unlasting M/C	1	0.25
41.	Spray booth with sprayer etc.	1	0.50
42.	Simplex Matie 33 mts. conveyor with 1 Mech. tier	1	3.50
43.	Two colour hrizontal injection moulding M/C with moulds etc.	1	20.00
44.	D.M.S. M/C 4 bed with moulds etc.	1	8.00

COMPUTER APPLICATION FOR ENGINEERING (Common to all Trades)

COMPUTER CENTRE

S.No.	DESCRIPTION	QTY.	APPROX. COST (in Rs.)
1	PENTIUM-IV 2.4 Ghz or latest RAM-256 MB or latest HDD-80 GB latest MONITOR COLOUR 17" AGP 16 MB 52X MM KIT(52x CD Drive, Speaker,sound card) FDD - 1.44 MB Key Board - 107 Keys Multimedia Mouse - Optical Fibre Mouse 32 Bit PCI ETHERNET CARD(10/100) Mbps Pre loaded Windows XP OR WINDOWS 2000 Pre loaded Norton Anti Virus with licence media and manual OR Computer of latest Specification	16 (15+1Server)	8,000,00=00
Software :			
i.	Noval Netware/NT Latest Version	01	55000
ii	WINDOWS - XP/WINDOWS 2000 /Windows NT	01	6000
iii.	MS OFFICE XP	01	17000
iv.	Dos latest version.	01	5,000
v.	FoxPro 2.5 or Latest Version	01	
vi.*	Mechanical DeskTop Power Pack	01	70000
vii*	AutoCad Profession Serives (latest version)	01	300000
	(*->Only For Mechanical Engg.)		
3. Hardware			
	i. Internal Modem 56 kbps ii. Hubs-16 port, all accessories related to Networking.		
	iii.Scanner- A4	01	10,000
4.	132 Column 600 CPS or faster 9 Pin dot matrix printer with 500 million character head life	01	15,000
5.	Laser Jet	01	20,000
6.	5 KVA on line UPS with minimum 30 miniute battery backup along with sealed maintenance free batteries. Provision for connecting external batteries with network connectivity.	01	1,75000
7.	Window Air Conditioner 1.5 tones capctity with ISI mark alongwith electronic voltage stablizer with over viltage and time delay circuit	04	30,000(EACH)
8.	Room preparation and furniture	LS	

7. LEARNING RESOURCE MATERIALS

1.	Overhead Projector with screen	1	--	20000
2.	35 m.m. Slide cum Film Projector	1	--	50000
3.	Audio Cassette Recorder	1	--	15000
4.	V.C.R. with Monitor & Accessories	1	--	35000
5.	Photography Camera for Production of slide and film strips, 35 mm still camera dark room equipment.	1		100000
6.	Mathematical Typewriter	1	--	50000
7.	Cutting, Binding & Stitching equipment.	1	--	30000

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.Important 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 ----------%

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 conducts field survey to know users views regarding. Yes/No
1. Use of differnet leather goods.
2. Effect of climatic conditions
3. Any other
If yes ; pleas 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 procepects 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

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:-

R. P. ALAM
Asstt. 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)

ANNEXURE- II SUMMER TRAINING SCHEDULE

6 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 vacational 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. Effuent 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.

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.
. 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. Discripton 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.

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 & COo., 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

1. DISCIPLINE : APPLIED CHEMISTRY

Sl.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

Sl.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.

Sl.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