CURRICULUM FOR THREE YEAR
(SIX SEMESTER)
DIPLOMA COURSE IN

LEATHER TECHNOLOGY,FOOTWEAR(CASD)
Effective from Session :

Semester System

Prepared By

Curriculum Development Cell

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

APPROVED BY

BOARD OF TECHNICAL EDUCATION
U.P. LUCKNOW,
CORRECTED AS SYLLABUS COMMITTEE OF:
B.T.E. MEETING HELD ON 04.05.2017

Corrected and Approved By B.T.E. on Dated 04.05.2017

STUDY AND EVALUATION SCHEME FOR
THREE YEAR (SIX SEMESTER) DIPLOMA COURSE IN LEATHER TECHNOLOGY, FOOTWEAR
(COMPUTER AIDED SHOE DESIGN)
(Effective From Session 200 -200)

I Semester

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.	Sess. Marks	Total Marks		Examination Dur.	Sess. Marks	Total Marks		
4	-	-	-	-	4	1.1 Foundational Communicaton	2.5	50	20	70	-	--	--	70	
3	1	-	-	-	4	1.2 Applied Mathematics-I(A)	2.5	50	20	70	-	-	-	70	
3	1	-	-	-	4	1.3 Applied Physics-I	2.5	50	20	70	-	--	--	70	
6	-	-	4	-	10	1.4 Applied Chemistry	2.5	50	20	70	3	40	20	60	130
-	-	10	--	10	20	1.5 Drawing & Workshop Practice	--	--	--	--	4	100	50	150	150
16	2	10	4	10	42	<---------TOTAL---------->	--	200	80	280		140	70	210	490
						Games/NCC/Social and Cultural Activities + Discipline (15 + 10)									25
													TOTAL		515

II Semester

3	1	-	-	-	4	2.1 Applied Mathematics-I(B)	2.5	50	20	70	-	-	-	70	
3	1	-	4	-	8	2.2 Applied Physics-II	2.5	50	20	70	3	40	20	60	130
6	2	-	--	--	8	2.3 General Engineering-I	2.5	50	20	70	--	--	--	--	70
4	2	-	--	--	6	2.4 Materials for Footwear Manufacture	2.5	50	20	70	--	--	--	--	70
4	2	-	16	-	22	2.5 Footwear Technology-I	2.5	50	20	70	4	125	65	190	260
20	8	-	20	-	48	<---------TOTAL---------->	--	250	100	350		165	85	250	600
						Games/NCC/Social and Cultural Activities + Discipline (15 + 10)									25
													TOTAL		625

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

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STUDY AND EVALUATION SCHEME FOR THREE YEAR (SIX SEMESTER) DIPLOMA COURSE IN LEATHER TECHNOLOGY, FOOTWEAR (COMPUTER AIDED SHOE DESIGN)

(Effective From Session)

III SEMESTER

Curriculum							Scheme of Examination								
Periods Per Week						S U B J E C T	Theory			Practical			Grand Total
Lec.	Tutorial	Drawing	Lab	Workshop	Total		Examination Dur.	Sess. Marks	Total Marks	Examination Dur.	Sess. Marks	Total Marks	
4	2	-	4	-	10	3.1 General Engineering - II	2.5	50	20	70	3	40	20	60	130
4	2	-	4	-	10	3.2 Footwear Design - I	2.5	50	20	70	4	60	30	90	160
4	2	-	8	-	14	3.3 Footwear Design - II	2.5	50	20	70	4	80	40	120	190
4	2	-	8	-	14	3.4 Footwear Technology - II	2.5	50	20	70	4	100	50	150	220
18	6	-	24	-	48	<---------TOTAL---------->	--	200	80	280		280	140	420	700
						Games/NCC/Social and Cultural Activities + Discipline (15 + 10)									25
													TOTAL		725

IV SEMESTER

4	-	-	-	-	4	4.1 FunctionalCommunicaton	2.5	50	20	70	-	--	--	--	70
4	1	-	8	-	13	4.2 Footwear Engineering	2.5	50	20	70	4	40	20	60	130
4	2	-	8	-	14	4.3 Leather Goods Manufacture-I	2.5	50	20	70	4	60	30	90	160
4	2	-	-	--	6	4.4 Elementary Leather Tech.	2.5	50	20	70	-	-	-	-	70
2	-	-	4	--	6	4.5 Computer Principles and Applications					3	60	30	90	90
3	-	-	2		5	4.7 Energy Conservation	2.5	50	20	70	3	20	10	30	100
21	5	-	22	-	48			250	100	350		180	90	270	620
						Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (15 + 10)									25
													AGGREGATE		645

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 exposure.
These marks will be awarded by project examiner in the Final Exam. (Examination marks : 40, Sess. marks : 20).
(6) Field visit and extension lectures are to be organised and managed at least twice in a month well in advance at institute level.

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STUDY AND EVALUATION SCHEME FOR

THREE YEAR (SIX SEMESTER) DIPLOMA COURSE IN LEATHER TECHNOLOGY, FOOTWEAR (COMPUTER AIDED SHOE DESIGN)

(Effective From Session)

V SEMESTER

Curriculum								Scheme of Examination									
Periods Per Week							S U B J E C T	Theory			Practical					Grand Total	
Lec.	Tutorial	Dr aw	Lab	Work Shop	Total			Examination Dur.	Sess. Marks	Total Marks	Examination Dur.	Sess. Marks	Total Marks				
-	-	-	4	-	4	5.1	IntegrativeCommunicaton	2.5	--	--	--	3	40	20	60	60	
6	2	-	-	--	8	5.2	Industrial Management and Entreprenurship Development	2.5	50	20	70	--	--	--	--	70	
4	-	-	6	-	10	5.3	Leather Garment Manufacture	2.5	50	20	70	4	60	30	90	160	
4	-	-	6	--	10	5.4	Testing and Quality Control	2.5	50	20	70	3	70	30	100	170	
4	-	-	6	--	10	5.5	Leather Goods Manufacture - II	2.5	50	20	70	4	60	30	90	160	
18	2	-	22	-	42				200	80	280		230	110	340	620	
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (15 + 10)																25	
AGGREGATE																645	

VI SEMESTER

4	-	-	-	-	4	6.1	Environmental Education * & Disaster Management	2.5	50	--	--	-	--	--	--	--	
8	-	-	8	-	16	6.2	Footwear Technology-III	2.5	50	20	70	4	60	30	90	160	
6	2	-	-	--	8	6.3	Costing Analysis and Accountaning	2.5	50	20	70	--	--	--	--	70	
6	2	-	-	--	8	6.4	Industrial Promotion, Marketing & Export	2.5	50	20	70	--	--	--	--	70	
2		-	4	--	6	6.5	CAD/CAM For Footwears	2.5	50	20	70	3	80	50	130	200	
						6.6	Project										
	4				4		(i) Project Work	---	--	--	--	3	60	30	90		
							(ii) Industrial Training	---	--	--	--		40	20	60	150	
26	8	-	12	-	46				200	80	280		240	130	370	650	
Games/NCC/Social and Cultural Activity/Community Development Work + Discipline (15 + 10)																25	
AGGREGATE																675	
30% Carry Over of I & II Semester																342	
70% Carry Over of III & IV Semester																959	
100% Carry Over of V & VI Semester																1320	

NOTE:- (1) Each period will be of 50 minutes duration.

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(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

(5) Field visit and extension lectures are to be organised and managed well in advance at institute level as per need.

(6) (*) It is compulsory to appear & to pass in examination, But marks will not be included for division and percentage of obtained marks.

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C O N T E N T S

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I. MAIN FEATURES OF THE CURRICULUM

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

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II LIST OF EXPERTS

List of experts who contributed in the Semester System of curriculum for three years Diploma Course in Footwear and Leather Goods Technology.

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

List of experts who contributed in the review/revision of curriculum for three years Diploma Course in Footwear and Leather Goods Technology 24.10.2016

1.	Shri Anurag Sachan	Deputy Manager, Lanxes Pvt. Ltd., Kanpur
2.	Shri Narendra Kumar	Technical Off, C.L.R.I.,Jajmau, Kanpur
3.	Shri Bharat Singh	H.O.D.,Govt.Leather Institute, Agra
4.	Shri Jitendra Kumar	H.O.D., Govt.Leather Institute, Kanpur
5.	Shri Ashok Yadav	B.T.E., Lucknow
6.	Shri D. N. Swami	Lecturer, Govt. Leather Institute, Kanpur
7.	Shri Satendra Singh	Lecturer, Govt. Leather Institute, Kanpur
8.	Shri M. K. Singh	Instructor,Govt. Leather Institute, Kanpu
9.	Dr. Kshama Mishra	Assistant Prof.,I.R.D.T.U.P., Kanpur

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LIST OF EXPERTS

A Curriculum Workshop for Development of Curriculum on the Subject " Energy Conservation" was held on 22nd January, 2018 at NITTTR, Chandigarh. The following participated in the workshop:-

S. No.	Name, Designation and Official address
From Field/Industries/Institutions of Higher Learning	
1.	Shri Jotinder Singh, Engineer-in-Chief(Retd.) Punjab State Power Corpn. Ltd.(PSPCL), Punjab
2.	Shri Punit Sharma, Asstt.General Manager, Electrical & Energy Management, Godrej Appliances Ltd. Mohali, Punjab
3.	Ms. Anu Singla, Associate Professor, Chitkara University, Rajpura, Punjab
4.	Shri Girish Kumar, UP New and Renewable Energy Development Authroity (UPNEDA), Lucknow, U.P.
5.	Sh. Lal Ji Patel, TBO/ CDC Officer, IRDT Kanpur, U.P.
6.	Shri Ravinder Kumar, Research Assistant, IRDT, Kanpur, U.P.
From NITTTR, Chandigarh	
7.	Dr. AB Gupta, Professor & Head, Curriculum Development Centre, **Coordinator**

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III. NEED ANALYSIS :

Footwear industry has a bright potential for growth in the years to come.Leather and leather goods are important source for generation of foreign exchange .The emphasis of the government is to export footwear and leather goods in place of semi processed and finished leather.Therefore there are bright prospects of job opportunities for middle level technical manpower.

On account of fast technological advancements;new machines and equipments are replacing conventional ones.The advanced countries have already switched over to shoe designing and manufacture based on CAD technique . To face the coming challange , it is required to prepare quality concious middle level technical man power to produce worldclass designers capable of solving problems associated with Last and Shoe designing and manufacture.Application of computers in footwear manufacture has vigorously taken place and it is expected that in the coming future nearly all the poineering industries in the field of shoe designing will be using computer added design(CAD)and computer added manufacture(CAM).To provide foundation for understanding CAD and CAM an introductry course in computer application has been included in the curriculum.To expedite self employment some orientation on entrepreneurship development has also been given in the curriculum.Environmental pollution and control has also been dealtwith at suitable places.

Development of skill has been emphasised by providing six months compulsory industial training.For developing industry institute interaction provision for guest lectures

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has been provided in the curriculum.

It is hoped if this curriculum implemented in right spirit will produce desired type of middle level technical manpower useful for footwear industry.

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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.

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V. JOB POTENTIAL / OPPORUNITIES

The following are the job opportunities for diploma holdrs in Footwear and Leather Goods Technology :

1. As Supervisor/Foreman in various departments of footwear factories/leather goods industries.

2. As Supervisor in quality control departments in footwear and leather goods industries.

3. As Design Assistant to assist in developing designs for various types of footwear/leather goods.

4. As Marketing manager/Sales officer in footwear/leather goods manufcaturing companies.

5. As Inspector in quality control and purchase (in footwear and leather goods) in government agencies.

6. As Field officer/Investigator in small industries organisations.

7. As Research Assistant in research and development units.

8. As Supervisor in the fabrication of surgical footwear and artificial limbs.

9. As Supervisor in last manufacturing units and ancillaries.

10. Self Employment :

10.1 As technologist to manufacture various types of children footwear, ladies footwear and gents civilian and heavy duty footwear.

10.2 As manufacturer of various types of small, medium and heavy leather goods.

10.3 As manufacturer of leather based sports goods.

10.4 As manufacturer of artistic leather goods.

10.5 As manufacturer of leather garments.

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VI. JOB ACTIVITIES

The following are the activities of diploma holders in Footwear and Leather Goods Technology. These activities are classified under the following headings.

1. Activities connected with footwear manufacture;

2. Activities connected with leather goods and artistic leather goods manufacture;

3. Activities connected with manufacture of leather based sports goods;

4. Activities connected with leather apparels and outfits;

5. Activities connected with management;

6. Activities connected with plant and machinery;

7. Activities connected with research and development.

1. Activities Connected With Footwear Manufacture :.

1.1 Studies the anatomical structure of human foot.

1.2 Selects/prepare the last.

1.3 Shoe design and development.

1.4 Estimating the cost of finished footwear.

1.5 Pattern making, grading of various types of footwear and pattern cutting.

1.6 Selection of basic raw materials used for uppers and bottoms.

1.7 Determine corect and economical methods for footwear manufacture.

1.8 Selection and purchase of grinderies.

1.9 Clicking, closing and preoa ation of upper lining and bottom components.

1.10 Lasting, making and finishing of differnt footwear by various methods of manufacture (attachments).

1.11 Exercises quality control in the manufacture of differnt kinds of footwear.

1.12 Packing of finished footwear.

2. Activities connected with Leather Goods and Artistic Leather Goods Manufacture :

2.1 Design and development of leather goods and artistic

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leather work.

2.2 Estimating the cost of finished leather goods and artistic leather articles.

2.3 Pattern cutting and pattern making of various types of leather goods and artistic leather articles.

2.4 Selection of natural and man made material required for leather goods and artistic leather articles.

2.5 Selection and purchase of grinderies and fittings.

2.6 Determines correct and economical methods of manufacture of leather goods and artistic leather articles.

2.7 Supervises clicking, assembly, stitching, finishing and fiting operations.

2.8 Supervises preparation of leather for modelling, embossing, poker, batik for artistic leather work.

2.9 Exercise quality control in the manufacture of leather goods and artistic leather articles.

2.10 Packing and forwarding finished leather goods and artistic leather articles.

3. Activities connected with the Manufacture of Leather Based Sports Goods :

3.1 Design and development of sports goods articles.

3.2 Estimating the cost of finished sports goods articles.

3.3 Selects leather and other material required for the manufacture of football anf volley ball covers, hockey and cricket balls etc.

3.4 Cuts components for items mentioned under 3.3.

3.5 Stitching various components for making finished products.

3.6 Application of various finishes to the products mentioned under item 3.3.

3.7 Exercises quality control over materials and operations involved in the manufacture of leather based sports goods.

3.8 Stamping, packing and forwarding.

4. Activities connected with the Manufacture of Leather apparels and Outfits :

4.1 Designing and development of leather apparels, various types of gloves, ties, head wears etc.

4.2 Estimating the cost of finished leather apparels and outfits.

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4.3 Selection of natural and man made materials and grinderies.

4.4 Pattern cutting, grading and pattern making of the items mentioned under 4.1.

4.5 Matching of colours, cutting, preparation and stitching of various components for making goods mentioned under item 4.1.

4.6 Exercise quality control in the manufacture of leather apparels and outfits.

4.7 Packing and forwarding.

5. Activities connected with management :

5.1 Controls inventory of raw materials, grinderies and fittings and makes out a schedule of materials to be kept in stock for continuous production.

5.2 Plans and schedules production.

5.3 Allocates duties to workers.

5.4 Imparts training to workers engaged in the unit.

5.5 Supervises the work of various sections in the footwear and leather goods manufacturing.

5.6 Supervises receiving, packing and forwarding of goods.

5.7 Accounting and maintenance of records.

5.8 Assist in ensuring working conditions in footwear and leather goods factories in accordance with labour and factory laws.

5.9 Supervises labour welfare schemes.

5.10 Marketing of footwear, leather goods, leather based sports goods, leather apparels and artistic leather articles.

5.11 Assists in conducting techno-economic surveys and preparing project reports for starting footwear and leather goods manufacturing units.

5.12 Liasing with different agencies engaged in production, financing, export, inspection and marketing of footwear and leather goods.

6. Activities connected with plant and machinery :

6.1 Selects and installs equipment and machinery.

6.2 Maintains and undertake minor repairs of the machinery installed in the footwear, leather goods and leather garments industry.

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6.3 Assists in the selection of site, layout and construction of footwear and leather goods units.

6.4 Demonstrates correct procedures for opearting various machinery.

7. Activities connected with research and developemnt :

7.1 To assist in research and development in the field of :

(i) Adhesives
(ii) Grinderies
(iii) Wood and last
(iv) Natural and man made material in the manufacture of footwear and leather goods.
(v) Fashion and design
(vi) Footwear and foot comfort

7.2 Product and process development.

7.3 Refer technical literature such as books, journals market information, manufactures literature etc.

7.4 Work study.

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VII. ANALYSIS OF ACTIVITIES INTO KNOWLEDGE AND SKILL

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
1.1	Studies the anatomical structure of human foot.	Bone structure of the leg and foot. Their muscles,ligaments ,joints. Movements of the foot Foot diseases and abnormalities. Arches & their functions. Growth of foot from infancy to adulthood. structure of the skin and galdns. Study of various types of feet. Pressure exerted by foot on different parts while walking.	Identification of vbarious parts of the foot such as bones, muscles etc. through models, charts, drawings and X-ray photographs. Exercises in taking measurements of the foot and comparative study of different feet (age wise, sex wise).
1.2	Selects/prepares last	Importance of last. Woods used and their structure. properties and seasoning of woods measurements for a last-girth and length wise. English, continental and Mondopoint systems of measuremnt and their interrelationships. Allowances and deductions for a last. Spring, pitch, twist and range of last. Last for different designs of footwear. Making of last and its finishing. Sources of availability Determination of cost. Specification of various materials used in last manufacture.	Identification woods used in last manufacturing Demonstration of seasoning methods (visits). Measurements of the last in relation to the foot. Determination of heel heights. Selection of last for a specific type of shoe. Making of lst. Demonstration of last making in industry (visit).
1.3	Shoe design and development	Purpose of shoe. Shoe materials. Methods of shoe construction. Fashion trends in particular areas in re-	Compiling fashion information on colour, texture, looks, styling.

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S.No.	ACTIVITY	KNOWLEDGE	SKILLS
		occupation, bying power, climatic condition etc. Study of colours and chromatic cycle. Detailings/motifs study of looks Analysis of trends in design	on basic designs Preparing pull overs Exercises in colour combinations, texture combinations in relations to the feel and weight. Designing children, gents and ladies shoes (atleast 18 designs and pullovers)
1.4	Estimating the cost of finished footwear	Quantities of raw materials and grinderies and fittings required for different types of footwear and their market prices. Labour and machine component. Depreciation interest. overheads. Packing and forwarding profits, Analysis of rates. Allowance for fluctuation. Exercises on estimating costs for different types of footwear.	
1.5	Pattern cutting and grading of various types of footwear and pattern making.	Tools, marking the last, various methods of cutting formes, Construction of standard of ground model and section patterns and allowances. Bottom stock patterns. Geometrical/comparative grading, Grading upper and bottom patterns in English, continental and Mondopoint grading by machine. Cutting metallic and card board by shear. Binding patterns by binding machine.	Preparation of patterns for men's ladies and childrewn footwear (open and closed) covering the catogories of casual and formal shoes. Exercises on hand-grading by geometrical, comparative and radial tool grading. Practical demonstration of pattern grading machine.

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S.No.	ACTIVITY	KNOWLEDGE	SKILLS
			Exercises on pattern shear and binding machine.
1.6	Selection of basic raw materials used for uppers and bottoms in footwear industry.	Hides and skins. Sources of availability. Methods of preservation. Methods of tanning including preliminary processes. Leather finishes. Characteristics of upper and bottom. Leathers and other natural, synthetic and man made materials (Rubber, synthetic rubbers, PU, PVC Jutes, Hessian, Textiles) factors influencing selection such as comfort fashion cost etc.	Identification of hides and skins, leathers, rubber, textiles and synthetics in the mark Exercises in tanning (chrome and vegetable) Demonstration of grading leathers; Exercises in the use of dyes and finishes. Hardness and tensile testing of rubber Abrasion and tensile tests on textiles.
1.7	Determine correct and economical methods of footwear manufacture.	Principles involved in footwear manufacture Different methods of construction - their. merits and demerits. Different items of footwear. Various stages of manufacture. Upper clicking; upper preparation; upper closing; bottom clicking; bottom stock preparation; tasting and making finishing; Manual, semi-machanised and mechanised production systems. Machinery employed and their outputs. Costing, Reffering to manufacture's catalogues.	Exercises in the manufacture of all types of footwear. -Handmade -Machine made. Demonstration visit to factories.
1.8	Selection and purchase of grinderies	Grinderies used in footwear industry, their classification and sui-	Testing grinderies in the laboratory and

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S.No.	ACTIVITY	KNOWLEDGE	SKILLS
		tability. Availability in the market. Specifications. Preservation and storage of grinderies. Quantities required and units of measurement. Methods of testing. Comparative costs.	workshop. Visit to market for surveying the availability of grinderies.
1.9	Clicking, closing and preparation of upper, lining and bottom components.	Principles and methods of clicking. Upper and bottom components. Comparative study of hand clicking and machine clicking.	Exercises in Hand clicking and machine clicking. Exercises in laying out patterns.
		Machinery and tools employed in clicking qualities of a good clicker.	
		Economical method of clicking, reduction in wastage. Estimating quantity of raw material required samping and marking	Practical exercises involving splitting, skiving, edge treatment and bottom stock, preparation such as insole, toe puff, stifner and heel building.
		Upper operations : Uniformity of the substance, Reinforcements, skiving, edge, treatment, perforations.	
		Bottom stock preparations : Uniformity of the substance. Preparation of insoles and soles for various constructions. Preparations of toe puffs. stiffners and welts heel building, size marking	
		Machinery and tools, used in preparations.	
		Methods of closing such as various and fitted up methods; Machinery and tools used in closing.	Exercises in operating sewing machines Exercises in closing uppers by various methods.

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		Sequence of operations Layout for conveyor system	Layout and sequence

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
		Types of stitches. Identification of closing machinery and attach-ments for specific operations; Finishing, recording and stocking.	of operations. Demonstration of conveyor systems through factory visits.
1.10	Lasting, making and finishing of different footwear by various methods of manufacture.	Lasting: Principles of lasting Types of lasting Hand lasting and machine lasting; Machinery and tools involved in lasting; Sequence of operations in lasting and layout. Grinderies for lasting.	Practice on hand and machine lasting Demonstrations on machine lasting (different types) in factories.
		Making: Methods of cons-truction and principles involved. Suitability and choice method. Machines and tools involved in making sequence of operations for various methods of construction. Grinderies for making differnt methods and materials of bottom filling.	Exercises in different (both hand and machine)
		Different finishing materials and auxi-lliaries. Physical and chemical properties of fini-shing materials with their application in shoe finishing Use of fungicides Finishing tools and machinery Marking and stamping	Exercises in shoe finishing using different materials and surfaces Exercises on decorative

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1.11	Exercises quality control in manufacture of different kinds of	Standard specifications for leather & other materials (National and Inter-	Visual examination. In-process testing

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
	footwear	national standards) and footwear Important physical and chemical tests Methods of testing and intepretation of test results In process quality control	Visits to testing laboratories to see demonstrations of various tests
1.12	Packing and finished footwear	Packing materials, their properties and costs; Methods of packing and storage Export packaging.	Exercise in domestic and export packing. Visits to factories to see packing.
2.1	Design and development of leather goods and artis-	Types of leather goods items for various uses. Materials used in manufacture of leather goods. Classification of leather goods (Industrial and consumer) factors influencing design such as material, fashion, utility, cost, colour, texture and combination. Detailings/motifs study of looks Analysis of trends in design from catalogues and other sources. Embossing, moulding, carving, batik, tho ging and colouring.	Freehand sketching and basic designs. Compiling fashion information on colour, texture, books, styling. Preparing models based on designs developed (5 to 6) Balancing and symmetry.
2.2	Estimating the cost of finished	Quantities of raw materials and grin-	

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	leather goods and artistic leather articles.	deries and fittings required for differe-nt types of leather goods and artistic leather articles and their market prices.	

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
		Labour and machine compo-nent. Depreciation inte-rest. Overheads, packaging and forwarding, profits; allowance for fluct-uation. Exercises on esti-mating costs for differnt types of leather goods and artistic leather articles.	
2.3	Pattern cutt-ing and pattern making of various types of leather goods and artistic lea-ther articles.	Cutting of patterns for various types of leather goods and artistic leather ar-ticles as per designs; tools used.	Exercises in pattern cutting for articles designed.
2.4	Selection of natural and man made mater-ials required for various leather goods and artistic leather articles.	Same as in 1.6	Same as in 1.6
2.5	Selection and purchase of grinderies and fittings.	Grinderies and fitt-ings used in leather goods and artistic lea-ther goods industry, their classification and suitability. Avai-lability in the market. Specifications. Preservbation and storage of grinderies and fittings. Quantities requires and units of measurement. Methods of testing.	Same as in 1.8

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		Comparative costs.	
2.6	Determine correct and economical methods of manufacture of leather goods and artistic	Principles involved in leather goods manufacture. Methods of construction Stages of manufacture Clicking; Preparation; Assembling and stitching.	

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
	leather arti-cles.	Fittings and finishing; Machinery and their output. Costing; Referring to catalogues.	
2.7	Supervises click-ing assembly, ftitching, finish-ing and fitting operations	Normal defects occuring in clicking, assembling stitching and finishing operations, their causes and prevention.	Exercises in the manufacture of designed items (5 to 6) Demonstrations duting factory visits.
2.8	Supervises prepara-tion of leather for modelling, embossing poker, batik for artistic leather work.	Selection and prepara-tion of leather. Tools, equipment and methods used for artistic leathre work.	Exercise on modelling, embossing, poker and batik work.
2.9	Exercises quality control in the manu-facture of various leather goods and artistic leather articles.	Standadization of In-process inspection checks. (other same as covered under footwear in this activity)	Visual examina-leather goodstion.
2.10	Packing of fini-shed leather goods and artistic leather articles & their forwarding.	Same as in 1.11	Same as in 1.11
3.0	Design and develop-ment of sports goods articles.	Purpose and classifi-cation of leather based sports goods. Football and other leathers balls. Hockey and cricket balls; sports gloves, and other soft leather goods. Standard specifications. Comfort, style, durability, material, colours in	Exercises in designing of sports items; Exercises in colour matching sketching of

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		designing. Selection of motifs. National and international trends in games; influence of game on designing. Referring to catalouges. Methods of manufacture.	
3.1	Estimating the cost of finished	Quantities of raw materials, grinderies and fittings	

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
	sports goods articles.	required for diferent types of sports goods and their market prices. Labour and machine component Depreciation interest. Overheads packaging and forwarding. profits. Analysis of rates. Allowance for fluctuation. Exercises on estimating costs for different types of sports goods.	
3.2	Select leather and other materials required for the manufacture of football and volleyball covers, hockey and cricket balls and soft leather goods.	Special types of leathers required for sports goods with their characteristics. Reprocessing of semifinished leathers and finishing. Standard specifications for materials. Other materials used in manufacture of sports goods such as cork,threads, wool, rubber, fabric, foam etc.	Exercise on reprocessing and finishing.
3.3	Cuts components for items mentioned under 3.2	Principles of cutting leather by hand and machine. Prepunch dies, machines and tools used. Maintenance of tool components, staking panels,sorting of panels as per texture, substance, quality etc.	Exercises on hand and machine cutting; staking of panels.
3.4	Stitching various components for making finished products.	Types of stitches needles/ pighairs and threads;fictures and equipment and machinery specifications for stitching.	Practical exercises in stitching various components for sports goods.
3.5	Application of	Types of finish required	Practical

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	various finishes to the products mentioned under 3.2	for various sports goods; finishing materials such as dyes,pigments,binders,wax, emulsions, lacquers, lacquer-emulsions, P.U. etc, preparation and application of finishes by hand and spray.	exercises on preparation and application of various finishes.
3.6	Exercises quality control ocer materials and operations involved in	Specifications for materials and finished products; Inprocess inspection.	Carrying out physical and visual tests. Visit to quality

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
	the manufacture of leather based sports goods.	Testing and testing equipment. Interpretation of test results; quality marking schemes.	marking centre.
3.7	Stamping, packing and forwarding.	Same as in 1.12 + methods of stamping sports goods, materials and machinery used.	Stamping practice + same as in 1.12
4.1	Design and development of leather apparels, various types of gloves, ties, headwear etc.	Tailoring principles with emphasis on sizes, measurements and fittings. Materials used in leather garments machinery; Trends in leather garment design motifs, styling, colour, texture, feel. Reference to catalogues and fashion magazines.	Sketching design taking measurement for sizes and fittings, Designing of a few items of garment gloves, ties and headwear.
4.2	Estimating the cost of finished leather apparels and outfits.	Types of materials used for leather gar,ments and their prices, quantities of materials and grinderies required; Wastage and their recovery, labour of machine component of costs overheads, interest, depreciation, packinh and forwarding. Analysis of rates, Estimating costs of different leather garments.	
4.3	Selection of materials (natural and man made mater-	Types of leathers used in garment manufacture and their characteroist-	Visit to market to survey the materials avai-

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	ials) and grinderies.	ics. Lining materials, and backers and padding, other accessories such as fastners and decoratives, types of threads used.	lable.
4.4	Pattern cutting grading and pattern making of the items under 4.2	Principles of pattern cutting; various allowances required in fabrication. Principles of grading materials used for pattern making. Machinery and tools used.	Preparation of patterns and their grading for a few items.

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
4.5	Matching of colours cutting, stitching and stitching of various components for goods in 4.1	Variations in sheads of leather and their assortment. DRaping qualities of leather, Nap in suede and sambhar leather. Principles of cutting w.r.t colour matching, texture, feel etc. Sequence of operations equipment and machinery required at various stages. Types of stitching and attachments used.	Practice in cutting and stitching of garments and other items.
4.6	Exercises quality control in the manufacture of leather apparels and outfits.	Defects in leather and in fabrication. checking of measurements.	Visits to factories.
4.7	Packing and forwarding	Same as in 1.12	
5.1	Controls inventory of raw materials, grinderies,fittings and makes out schedule of materials to be kept in stock for cont. production.	Principles of materials management. Stores management and reordering level.	
5.2	Plans and schedules production.	Stocks of raw material. Availability of workers, various processes of production, capacities of machines and men; Bar charts and nerworking techniques.	
5.3	Allocates dutoes	Individual and group	

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	to workers.	skills; Elements of industrial psychology. Time and motion study.	
5.4	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; Visits to industries.
5.5	Supervises the work of various sections in the footwear and leather goods manufacturing.	Co-ordination, Economic and technical decision making. Selection of alternatives. Principles of supervision Human relations.	

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
5.6	Supervises receiving, packing and forwarding of goods.	Bookkeepin, receiving nad despatching procedures. Import-export regulations. F.O.B.,C.I.F., values and invoices, methods of packing, handling and transportation.	
5.7	Accounting and maintenance of records.	Commercial accounting maintenance of job cards, stock registers.	
5.8	Marketing of footwear, leather goods, leather based sports goods leather apparels and artistic leather articles.	Communication and public relations, advertising quality control, competitions, internal price structure and import export trade, sales promotion, marketing intelligence.	
5.9	Assists in conducting techno-economic surveys and preparing project reports for starting footwear and leather goods manufacturing units.	Sampling, methods of collecting data; elementary statistics, capital strucrure, loans from financial institutions and banks Govt. policy and concessions Entrepreneurship and technocrat schemes, estimates of cost of production; profitability and balance sheet; leather economics; practical exercises in preparing project report.	
5.10	Liasing with	Organisational set up	

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	different agencies engaged in production, financing export, inspection and marketing of footwear and leather goods.	and functions of tanneries, , export promotion councils, STC quality marking centres, etc.	
6.1	Selects and instals new equipment & machinery.	Materials of construction (wood, mild, steel, alloy steel, C.I. brass, copper) Gunmetal etc. Moving and static parts (Functions and mechanisms).	Basic workshop skills in carpentry, fitting and machine shop, welding and bracing, drilling machines.
6.2	Maintains and undertakes minor repairs of the	Size, specifications and capacity for important machinery used in footwear	Basic workshop skills as in Leather technology

S.No.	ACTIVITY	KNOWLEDGE	SKILLS
	machinery installed in the footwear, leather goods and leather garments industry.	leather goods, sports goods and garments such as industrial sewing machines (flat bed, cylinder bed, footbed) clicking press, skiving splitting, upperfolding, lasting, cementing press, edge trimming, heel attaching and finishing machine, spherifying machine etc. Maintenance and simple repairs of above machinery Erection and installation of machine. Spare parts required and their inventory.	Training in machine yard practice on F/W and leather goods manufacture. Alignment exercises. Blue print reading.
6.3	Assist in selection of site; layout and construction of f/w and leather goods units.	Estimation of space required for erection of machine in factory and their layout. Construction details (brief) of f/w factories and leather goods units. Power requirements.	Practice in layout of machine for small units.
6.4	Demonstrates correct procedure	Study of technical literature for	Practice in operation and simple adjustments

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	for opearting various machines.	operating various machinery.	to avoid defective functioning.
7.1	To assist in research and development.		
7.2	Product and process deve-lopment.	SAME AS ABOVE.	
7.3	Refer technical literature such as books, journals etc.		
7.4	Work study	Method of study and works measurement. Use of stop watch various allowances. Analytical estimating Flow process chart, etc. String diagrams.	Determination of time required for important operations connected with footwear and leather goods manufacture. Layout exercises.

VIII.COURSE OBJECTIVES

At the end of the course, the student should be able to :

1. Understand the physical and chemical principles involved in the materials and processes used in the manufacture of footwear and leather goods;

2. Select the materials used in the manufacture of footwear and leather goods on scientific, technological and aesthetic consideration;

3. Understand the basic engineering principles involved the machinery used in footwear and leather goods manufacture;

4. Develop designs for different types of footwear and leather goods;

5. Demonstrate the use of correct processes and operations in footwear and leather goods manufacture.

6. Undertake the preventive maintenance and minor repairs of plant and machinery involved in footwear and leather goods manufacture;

7. Make various items of footwear and leather goods by hand and machine;

8. Plan, direct, and control production processes in footwear and leather goods industries including quality control;

9. Estimate the cost of manufacture of footwear and leather goods;

10. Understand the principles of industrial management for functioning as an effective superviser;

11. Suggest measures for improving productivity in the industry;

12. Assist in conducting techno-economic surveys and preparing project reports for the setting up of footwear and leather goods units;

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13. Acquire necessary knowledge to market footwear and leather goods.

IX. CURRICULUM ANALYSIS FOR IDENTIFYING SUBJECTS OF STUDY :

Curriculum Area	Subjects of study
Language	Communication Technique
Basic Sciences	Physics, Chemistry and Mathematics.
Basic Engineering	General Engineering (Mechanical and Electrical) DRawing and workshop practice.
Footwear and Leather goods Technology	Elementary Leather technology Materials for footwear Manufacture Footwear technology Leather goods manufacture Leather sports goods manufacture Leather garments manufacture Footwear and allied trades engg. Maintenance of machinery Testing and quality control.
Management	Estimating and costing Industrial management and Entrepreneurship development.
Project Work	Project connected with leather goods and footwear technology.

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I Semester

1.1 FOUNDATIONAL COMMUNICATION
SECTION "A" (ENGLISH)

L	T	P
4	-	-

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Units	Coverage Time L	T	P
Section A English				
1.	PARTS OF SPEECH	12	-	-
2.	VOCABULARY BUILDING	05	-	-
3.	Grammar	15	-	-
4.	DEVELOPMENT OF EXPRESSION (Composition)	12	-	-
Section B Hindi				
5.	Topic 5	2	-	-
6.	Topic 6	5	-	-
7.	Topic 7	5	-	-
		56	-	-

DETAILED CONTENTS

1. **PARTS OF SPEECH :**

   a. Noun
   b. The pronoun : Kinds and Usage
   c. The adjective : Kinds and Degree
   d. Determiner : Articles
   e. The verb : Kinds
   f. The Adverb : Kinds, Degree and Usage
   g. Prepositions
   h. Conjunctions
   i. The Interjections
   j. Subject: Verb Agreement (Concord)

2. **VOCABULARY BUILDING :**

   a. Antonyms and Synonyms
   b. Homophones
   c. One word substitutions
   d. Idioms and Phrases
   e. Abbreviations

3. **Grammar**

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a. Sentence & its types
a. Tenses
b. Punctuations
c. Active and Passive voice
d. Transformation of Sentences
e Synthesis of Sentences
f. Direct and Indirect Narrations

4. **DEVELOPMENT OF EXPRESSION (Composition) :**

a. Paragraph Writing
b. Essay Writing
c. Proposal Writing
d. Letter Writing (Formal,Informal,Business,official etc.)
f. Report Writing
g. Note Making
h. News Making
i. Application Writing
j. Minute Writing
k. Invitation Letter Writing

SECTION "B" (Hindi)

5– संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, वर्ण समास, संधि, अलंकार, रस, उपसर्ग प्रत्यय।

6– पत्र लेखन, निविदा संविदा, दर आमंत्रण (कोटेशन) अपील, स्वतन्त्र अभिव्यक्ति, प्रतिवेदन लेखन, प्रेस विज्ञप्ति।

7– वाक्य/वाक्यांश के लिए शब्द, पर्यायवाची या समानार्थी शब्द, विलोम शब्द, अनेकार्थी शब्द, शब्दयुग्म या समुच्चारित शब्द समूह, वाक्य शुद्धि (शुद्ध अशुद्ध वाक्य), मुहावरे एवं लोकोक्तियॉं।

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1.2 APPLIED MATHEMATICS I(A)

[Common to All Engineering Courses]

L	T	P
3	2/2	-

Rationale:

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

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

DETAILED CONTENTS:

1. ALGEBRA-I : (10 Marks)

1.1 Series : AP and GP; Sum, nth term, Mean

1.2 Binomial theorem for positive, negative and fractional index (without proof). Application of Binomial theorem.

1.3 Determinants : Elementary properties of determinant of order 2 and 3, Multiplication system of algebraic equation, Consistency of equation, Crammer's rule

2. ALGEBRA-II:(10 Marks)

2.1 Vector algebra : Dot and Cross product, Scaler and vector triple product.

2.2 Complex number.

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

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3. TRIGONOMETRY :(8 Marks)

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

3.2 Inverse circular functions : Simple case only

4. DIFFERENTIAL CALCULUS - I : (12 Marks)

4.1 Functions, limits, continuity, - functions and their graphs, range and domain, elementary methods of finding limits (right and left), elementary test for continuity and differentiability.

4.2 Methods of finding derivative, - Function of a function, Logaritimic differentiation, Differentiation of implicit functions.

5. DIFFERENTIAL CALCULUS -II :(10 Marks)

5.1 Higher order derivatives, Leibnitz theorem.

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

5.3 Application - Finding Tangants, Normal, Points of Maxima/Minima, Increasing/Decreasing functions, Rate, Measure, velocity, Acceleration, Errors and approximation.

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1.3 APPLIED PHYSICS-I

[Common to All Engineering Courses]

L	T	P
3	2/2	-

Rationale:

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

DETAILED CONTENTS:

1. Units and Dimensions (4 Marks)

S.I. Units & Dimensions of physical quantities, Dimensional formula and dimensional equation. Principle of 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.

2. ERRORS AND MEASUREMENT (4 Marks)

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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,

3. Circular Motion (5 Marks)

Central forces. Uniform Circular motion (Horizental and Vertical cases),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.

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

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

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

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

6. Fluid Mechanics :(5 Marks)

Surface tension, Capillary action and determination of surface tension from capilary rise method, Equation of continuity (A1V1=A2V2), Bernoulli's theorem, and its application stream line and Turbulent flow, Reynold's number.

7. Friction :(4 Marks)

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

8. Harmonic Motion (6 Marks)

Periodic Motion , characterstics of simple harmonic motion;

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

9. Heat & Thermodynamics: (6 Marks)

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

10. Acoustics (5 Marks)
Definition of pitch, loudness, quality and intensity of sound waves. Echo, reverberation and reverberation time. Sabine's formula without Derivation. Control of reverberation time (problems on reverberation time). Accoustics of building defects and remedy.

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1.4 APPLIED CHEMISTRY

[Common to All Engineering Courses]

L	T	P
6	-	4

Rationale:

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

DETAILED CONTENTS:

1. ATOMIC STRUCTURE :(3 MARKS)

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

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2. CHEMICAL BONDING :(4 MARKS)

Covalent bond, Ionic & Co-ordinate, Hydrogen bonding, Valence bond theory, Hybridisation, VSEPR theory, Molecular orbital theory.

3. CLASSIFICATION OF ELEMENTS :(3 MARKS)

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

4. ELECTRO CHEMISTRY-I:(3 MARKS)

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

5. ELECTRO CHEMISTRY-II:(3 MARKS)

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

6. CHEMICAL KINETICS :(3 MARKS)

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

7. CATALYSIS :(2 MARKS)

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

8. SOLID STATE :(2 MARKS)

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

9. FUELS :(3 MARKS)

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

Liquid fuel - Petroleum and its refining, distillate of petroleum (Kerosene oil, 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 and CNG.

Numerical Problems based on topics

10. WATER TREATMENT :(3 MARKS)

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

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

11. COLLOIDAL STATE OF MATTER :(3 MARKS)

Concept of 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.

12. LUBRICANTS :(3 MARKS)

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

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cutting fluids. Industrial application, its function in bearing.

13. HYDROCARBONS:(4 MARKS)

A. Classification and IUPAC nomeuclature of organic compounds hamologous series (Functional Group)

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

14. ORGANIC REACTIONS & MECHANISM:(4 MARKS)

1. Fundamental auspects -

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

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.

15. POLYMERS :(3 MARKS)

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

2. Thermosetting and Thermoplastic resen -

   A. Addition polymers and their industrial application- Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon.

   B. Condensation polymer and their industrial application : Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Decron, Polyurethanes.

3. General concept of Bio polymers, Biodegradable polymers and inorganic polymers(Silicon)

16. SYNETHETIC MATERIALS :(4 MARKS)

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A. Introduction - Fats and Oils
B. Saponification of fats and oils , Manufacturing of soap.
C. Synthetic detergents, types of detergents and its manufacturing.
3. EXPLOSIVES: TNT, RDX, Dynamite.
4. Paint and Varnish

LIST OF PRACTICALS

1. To analyse inorganic mixture for two acid and basic radicals from following radicals

A. Basic Radicals :

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

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

Ni++, Ba++, Sr++, Ca++, Mg++

B. Acid Radicals :

CO3--, S--, SO3--, CH3COO-, NO2-,

No3- , Cl-, Br_ , I- , So4--

2. To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.

3. To determine the total hardness of water sample in terms of CaCo3 by EDTA titration method using Eriochroma black-T indicator.

4. To determine the strength of given HCl solution by titration against NaOH solution using Phenolphthalium as indicator.

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

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

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

L	D	P
-	10	10

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	-	-	18
2.	Principles of projection	-	-	17
3.	Missing surfaces	-	-	18
4.	Sketching of pictorial views	-	-	17
5.	Three views of given objects	-	-	18
6.	Shapes of inclined surface	-	-	17
7.	Plan, Clevation, side views and Isometric views	-	-	18
8.	Dimensioning technique	-	-	18
		-	-	140

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

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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

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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.

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II Semester

2.1 APPLIED MATHEMATICS I (B)

[Common to All Engineering Courses]

L	T	P
3	2/2	-

Rationale:

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

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

DETAILED CONTENTS:

1. INTEGRAL CALCULUS - I : (14 Marks)

Methods of Indefinite Integration :-

1.1 Integration by substitution.

1.2 Integration by rational function.

1.3 Integration by partial fraction.

1.4 Integration by parts.

2. INTEGRAL CALCULUS -II :(14 Marks)

2.1 Meaning and properties of definite integrals, Evaluation of definite integrals. Integration of special function.

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

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2.3 Simposns 1/3rd and Simposns3/8th rule and Trapezoidal Rule : their application in simple cases.

3. CO-ORDINATE GEOMETRY (2 DIMENSION):(14 Marks)

3.1 CIRCLE :

Equation of circle in standard form. Centre - Radius form, Diameter form, Two intercept form.

3.2 Standard form and simple properties

Parabola x2=4ay, y2=4ax,

Ellipse $\frac{x2}{a2} + \frac{y2}{b2} = 1$

Hyperbola $\frac{x2}{a2} - \frac{y2}{b2} = 1$

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

4.1 Straight lines and planes in space -

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

4.2 Sphere x2 + y2 + z2 + 2gx + 2fy + 2wz=d (Radius, Centre and General Equation)

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2.2 APPLIED PHYSICS-II

[Common to All Engineering Courses]

L	T	P
3	2/2	4

Rationale:

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

1. Optics (4 Marks)

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

2. Introduction To Fibre Optics :(5 Marks)

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

3. Lasers and its Applications (4 Marks)

Absorbtion and Emission of energy by atom, Spontaneous and Stimulated Emission, Poluation inversion, Main component of

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laser and types of laser- Ruby Laser, He-Ne laser and their applications. Introduction to MASER.

4. Electrostatics :(4 Marks)

Coutomb's Law, Electric field, Electric potential, Potential energy, Capacator, Energy of a charged capacitor, Effect of dielectric on capacators.

5. D.C. Circuits (5 Marks)

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

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

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

7. Semiconductor Physics (4 Marks)

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

8. Junction Diode and Transister : (6 Marks)

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

9. Introduction To Digital Electronics : (6 Marks)

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

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

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

(b) Solar energy: Solar radiation and potentiality of

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solar radiation in India, uses of solar energy: Solar Cooker, solar water heater, solar photovoltaic cells, solar energy collector.

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PHYSICS LAB

Note: Any 4 experiments are to be performed.

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

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

3. Determine the force connstant of combinationof springs incase of 1. Series 2. Parallel.

4. To verify the series and parallel combination of Resistances with the help of meter bridge.

5. To determine the velocity of sound with the help of resonance tube.

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

7. Determination of E1/E2 of cells by potentio meter.

8. Determination of specific resistance by Carry Foster bridge.

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

10. Verification of Kirchoff's Law.

11. To draw Characteristics of p-n Junction diode.

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

NOTE :

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

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2.3 GENERAL ENGINEERING -I

(Common with Leather Technology (Tanning)

L	T	P
6	2	-

Rationale:

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

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

DETAILED CONTENTS:

1. ENGINEERING MATERIALS:-

An introduction to mechanical properties of materials. Types of wood and their uses in leather machinery. Ferrous and nonferrous metals; CI types and properties; carbon steel and alloy steel, stainless steel; Non-ferrous metals brass, bronze, copper, aluminium and magnisium alloys.

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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

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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.

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2.4 MATERIALS FOR FOOTWEAR MANUFACTURE

L	T	P
4	22	-

Rationale:

Materials used in foot wear manufacture is fundamental requirement for footwear industry. A diploma holder in footwear and leather goods technology having adequate knowledge of footwear materials will prove useful to the footwear industry. He can maintain better quality control and suggest sutaible steps to ne taken in the competitive market.Knowledge of finishing materials further strengthins the knowldege and improves of products for better marketability.

Sr. No.	Units	Coverage Time L	T	P
1.	Leather	4	3	
2.	Fabric	6	3	-
3.	Rubber	8	3	-
4.	Fibre Board	4	2	-
5.	Synthetic Material	6	3	
6.	Wood & Metal	4	2	-
7.	Adhesives	8	4	-
8.	Grinderies	8	4	-
9.	Finishing Materials	8	4	-
		56	28	-

DETAILED CONTENTS:

1. LEATHER : Upper material(Natural and Man made)

   Different types of leather, used in shoe manufacturing, their characteristics and properties.

2. FABRIC:

   Classification, fabrics used for upper lining, side lining, backer, taping, Socking,toe puff and their characteristics, use of elastic in footwear.

3. RUBBER: (Soling Material/Sole)

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Utility of rubber in shoe industry and types of rubber used in footwear and their identification, characteristics, rubber sole, crepe sole, moulded rubber sole microcelluor rubber sole, synthetic and resin rubber soles, Rubber compounding, mixing and vulcanization. Polymers.

4. FIBRE BOARD:

Different types of fibre board, Classification of leather board, characteristics of different types of leather boards for insole, stiffner toe puff and heel. Utility and use of paper board; different types of paper board. Insole and types of materials.

5. SYNTHETIC MATERIAL :

PVC,PU,TPR poromerics, EVA and Filon materials, their properties and uses.

6. WOOD AND METAL:

Wooden and metallic heels, platform logs and shanks : Types of wood and metal used and their characteristics.

7. ADHESIVES:

Types of adhesives, basic materials used in formulation of adhesives like starch glue, latex, rubber solution, chloroprene based adhesive polyurethene, reoprere etc. Bonding strengh of adhesives, time of setting comparative study of adhesives available in the market. Selection of adhesives for cemented construction.

8. GRINDERIES, SOLE AND SOLING MATERIALS:

Eyelets, rivets, hob nails of different heads, pinel pins, tingles made of different metals like iron, brass and their suitability and longevity. Special type of rivets used in selective type of footwear, brass screw, brass and steel staple and their use in footwear spikes used in sport shoes, shank, stll toe cap and their use in special type of footwear, bottom - filling, materials like cement, elastics laces, EVA, Cork sheet, Saw Dust leather waste. Padding materials decorative fittings for footwear, different types of threads used in footwear manufacturing, Types of Niddles.

9. FINISHING MATERIALS:

Creams and waxes of different varieties and their use in formulation of finishing materials like sole polish, heel

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hand ball, upper dressings, polishes and creams of different colours. Glazing materials, lacquers, binders, resines, plasticizors etc. Material used in the formulation of glazing material such as rosin, sundras, shellac and the solvents required for their preparation.

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2.5 FOOTWEAR TECHNOLOGY -I

L	T	P
4	2	16

Rationale:

A diploma holder in footwear and leather goods manufacture is supposed to possess knowledge of various manufacturing step envolved in the manufacture of footwear. IN the absebce if manufacturing technique and proper design and planning wastage will be increased with regulling increase in the price upper chicking, bottem checking and making of footwear envolves various steps which when taken care of in sequencial order will yield good result.

Sr. No.	Units	Coverage Time L	T	P
1.	Historical Review	2	1	-
2.	Machine & Tools	8	4	-
3.	Operation of Shoe Manufacturing	8	4	-
4.	Footwear Construction	8	4	-
5.	Bottom Cutting & Preparation of Bottom Stock	8	4	-
6.	Stamping & Marking	6	3	-
7.	Economical Methods of Clicking	8	4	-
8.	Estimating & Costing	8	4	-
		75	28	224

DETAILED CONTENTS:

1. A historical review of the footwear industry and its impact and importance in modern life particularly in relation to all type of gents, ladies and children shoes of every day use. Modern trends and development in foreign countries.Purpose of shoes in every day life.

2. Machines and tools employed in the upper and bottom clicking departments.

3. Various stages of footwear manufacture as:
Upper clicking : Principles of clicking, marking and cutting of paper patterns and leather components of shapes, design tightness strength, uniformity, economy and control of material consumption. Condition of knife, way of cutting, planning of cutting arrangements, inter-locking locking continuity when cutting, over cutting, identification,

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marking and correct pairing. Cutting of fabrics by different system i.e. wrap system, welt system and bias system of cutting and lining marking. Advantages and disadvantages of Hand and press clicking. Qualities of a good clicker.

4. Introduction to constructions such as Good year welted, silhou welt Lock stitch through sewn welt, fair-stitched, moccasion machine sewn (Black or Mekay) cemented riveted screwd and stitched, turnshoe, veldshoeon,sliplasted, direct moulded construction, injection moulding; DVP, DMS. Stroble construction, Machine strobel construction, Stitch down constant.

5. Bottom cutting and preparation of bottom stock

   Correct placing of cutting knives in accordance with their requirements, quality and thickness of the components for maximum economy, characteristics of different bottom components used.
   Important point to be considered while cutting the bottom components, systematic cutting of different components from the appropriate portions of sole leather sides.
   Preparation of bottom stock and the importance of correct preparation of bottom components. Sorting, splitting, stapping, insole preparation for welted shoes. Preparation of the toe puffs/stiffeners, tampering of bottom compoents and its effect on manufacturing processes. Leather unit soles (PVC coated)

6. Stamping and marking of cut components.

7. Economical methods of clicking and reduction in wastage.

8. Methods of estimating quantity of raw material required for upper lining and bottom component and calculation of upper cost.

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FOOTWEAR TECHNOLOGY LAB

Group 1: PRACTICAL (Upper Clicking)

The following processes should be covered.

1. Preparation of clicking tools such as clicking knife and pricking awl etc.
2. Examination of defects in leather.
3. Practice in layout, marking and cutting of leather and fabric for upper and lining components.
4. Practice in hand/clicking with clicking knife.
5. Practice in setting and operating of clicking press and splitting machine.
6. Practice in splitting, sorting, pairing and marking of identification marks on cut components.
7. Practice in measuring leather by various methods.
8. Exercise on calculation of storing of leather.
9. Exercise on calcualtion of material consumption and reduction of wastage.
10. Preparing cost sheet with control on consumption.

Group 2: PRACTICAL (Bottom Clicking)

The following processes should be covered.

1. Preparing hand tools required for bottom clicking.
2. Examination of defects in leather.
3. Practice in layout, marking and cutting of bottom leather components.
4. Practice in hand clicking.
5. Practice in skiving, splitting, sorting, pairing and marking of identifications.
6. Use of patterns and gauges for checking thickness and correct preparation of components.
7. Exercise on calculation of material consumption and reduction of wastage.
8. Preparing cost sheet with control on consumption in clicking department.

Group 3: PRACTICAL (Making)

Design, fabrication and making of chappals or new cut for Ladies and Gents.

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III Semester

3.1 GENERAL ENGINEERING II

(Common with Leather Technology (Tanning))

L	T	P
6	-	4

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.	Basic qualities of electricity	15	-	-
3.	Electrical tariffs	15	-	-
4.	Motor's and Transformer	15	-	-
5.	Measuring Instruments	15	-	-
6.	Electrical Heating	12	-	-
7.	Electrical Safety	06	-	-
		84	-	56

DETAILED CONTENTS:

1. Application and advantages of electricity :
   Various applications of electricity, advantages of electrical energy over other forms of energy.

2. Basic qualities of electricity :
   Idea of voltage, current, power, energy - their units; conversion of mechanical units into corresponding electrical units and vice versa : difference between A.C. and D.C., frequency time period, maximum and RMS value, concept of phase and phase difference, power factor, practical importance of power factor.

3. Electrical Tariff System :

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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.

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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.

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3.2 FOOTWEAR DESIGN - I

L	T	P
4	2	4

Rationale:

The final product takes the required schope through many intemediate processes. The manufacturing of an object is finalised when its design is approved. Therefore knowledge of footwear design is very much essential for a diploma student in footwear technology. The knowledge of some basic things like Anatomy of human foot, Muscular system, Skin, Footwear Diseases and Abnormalities is very mush essential for a designer. Designing a suitable last is also very important to achive required shoe structure.

Sr. No.	Units	Coverage Time L	T	P
1.	Anatomy of Human Foot	10	5	-
2.	Muscular System	10	5	-
3.	Skin	10	5	-
4.	Foot Diseases & Abnormalities	10	5	-
5.	Foot Measurement & Internal Size System	10	4	-
6.	Last	6	4	-
		56	28	56

DETAILED CONTENTS:

ANATOMY OF HUMAN FOOT :

Bones : Types of bones in human feet, structure of bones, their position and significance and defect of bones.

Joints : Types of joints in human feet their function, principles, no of joints in human feet and joint defects.

Arches : Types of arches, function of arches in human feet, merits and demerits arches.

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Ligaments : Types of ligaments, their function merits and demerits of ligaments.

Muscular system :

Function of muscles, their origin and insertion balance of power, normal and abnormal balance b/w muscles, muscles of leg and foot.

Skin :
Structure of skin, function of epidermis dermis and hypodermis, nerves system of skin and muscles (Sweat glands etc.) structural anomalies skin direase and disarder of human feet (such as corn, callus, blister, etc.)

FOOT DISEASES AND ABNORMALITIES :

Human foot absormalities and direaes such as halux valgux, halux rigidus, hummer toe, clawed toe, mallet toe and their causes, other defects such as (Flat foot, humped foot, etc and their causes)

Foot Measurement and International Size System :
Methods of feet measurement size stickzesdigraph etc. (Incorporation of doctors services for study of above topics is required.) Different methods of foot measurement lime size stick or pantograph. International size system such as English, French(Paris Point), American, German, Japanes, Mundo point size system. Conversion of one size system into another size system.

LAST

Classification and types of last, importance of last, brief description of last making and tools used for it. Allownaces and deduction for last such as - scoop last, hinge last, solid last, telescopic last. Preparation of last such as toe spring and pitch heel, etc. different types of measurement on last such as SL, Girth, IP, GP, etc.

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PRACTICALS :

1. Foot measurement – Size of foot- Minor parts of foot as

   Tarsal Group, Meta Tarsal Gropus and Phelenges Group measurements

2. Last measurement- Standard length, Instep measurement, Joint, Long Heel, C.P., Heel Hight, Tab point, Heel Pitch, Toe Spring, etc.

3. Identification of materaials used in LAST making

4. Demonstration of LAST making

5. Reshaping of last

6. Making of foot models using plaster of Paris preparing insole patterns from the foot prints and contour patterns from the lasts.

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3.3 FOOTWEAR DESIGN - II

L	T	P
4	2	8

Rationale:

The final product takes the required schope through many intemediate processes. The manufacturing of an object is finalised when its design is approved. Therefore knowledge of footwear design is very much essential for a diploma student in footwear technology. The knowledge of some basic things like Anatomy of human foot, Muscular system, Skin, Footwear Diseases and Abnormalities is very mush essential for a designer. Designing a suitable last is also very important to achive required shoe structure.

Sr. No.	Units	Coverage Time L	T	P
1.	Definition of Fashion Trends, Style, Look Etc.	1	1	-
2.	Factors influencing Choice of Footwear	4	2	-
3.	Effect of climate	4	2	-
4.	Footwear materials	4	2	-
5.	Component study	4	2	-
6.	Design survey	4	3	-
7.	Construction study	4	3	-
8.	Selection of last	4	3	-
9.	Tools equipment	4	2	-
10.	Special designs	4	2	-
11.	Grading	4	2	-
12.	Pattern making	4	2	-
13.	Plannimeter	4	2	-
		56	28	112

DETAILED CONTENTS:

Definition of fashion, trends, style, look, motif, flair rhythm.

History of fashion cycle, and its periodical evolution.

Factors influencing choice of footwear by consumers such as age, sex, comfort, aesthetics, profession/occupation.

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Influence of climate in selection of footwear ; study of colours and chromatic cycle.

Study of material (natural and man made), feels and texture.

Study of components i.e. heels, platform, unit sole, clog etc.

Survey of designs in catalouges, periodicals, shop windows and boutiques.

Technological factors to be considered in designing footwear such as processes and machinery.

Study of construction and knowledge of its look and feel.

Selection of last depending upon smartness, comfort and elegance.Designing of Last- Basic point of last for designing purpose. Last Model Making - Last modeling points- Standard length, Sheet point, Counter Point, Tip and Toe, Breast of Heal, Trade time of Last, Types of Bottom plate, Quality of Last Materials, Proper Last Fitting, Last Profile.

Location of points on the last (counter, instep, joints and vamp point)

Tools and equipment required for designing.

Making on last (centre line, front, back, tread line)
Chappal and sandal patterns

Preparation of insole and sole pattern of shoes.

Preparation of standards and linning standards for various design.

Preparation of section patterns for uppers and lining for various design-
Oxford, Derby, Monk, casuals with and without elastic, Grescion, Ankle boots.

Long boots, Courts shoes.

Range building systems.

Principles of grading. Granding methods i.e. by hand, pantograph, geometrical, comperative and radial tools system. Grinding with the help of computer.

Patterns making ; tools and machinery; shear cutting and

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binding machine: materials on which the patterns are cut; storage of patterns, Mean Forne.

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PRACTICALS :

1. Visits to exhibitions, fashion centres, footwear show rooms, grindery markets, last making units for collecting information required for design work.

2. Mean Forme, Free hand sketching of footwear designs.

3. Colour combination exercises.

4. Preparation of leather materials and grindries chart.

5. Preparation of design specifications chart.

6. Construction of standard for lining, standard, cutting of section patterns and preparation of pullovers for the following designs :
   Oxford Derby Monk
   Capsuals with and without elastic.
   Grescion Ankle boots Long boots Court shoes

7. Exercise on hand grading and granding using pantograph.

8. Demonstration of Plannimeter to find out production pattern area.

9. Demonstration of graph system to find out correct area of patterm.

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3.4 FOOTWEAR TECHNOLOGY - II

L	T	P
4	2	8

Rationale:

The knowledge and practice of footwear technology envolves several steps like Upper Closing, Skiving, Edge treatment, Ornamentation and Its Purpose, Reinforcements, Jointing of Upper and Lining Section For Upper Closing and Finishing Operation. A diploma student equiped with afore said steps will be able to handle responsibelities successfully in the world of work.

Sr. No.	Units	Coverage Time L	T	P
1.	Upper Closing	6	3	-
2.	Reinforcements	6	3	-
3.	Lining Attatchment	8	3	-
4.	Cleaning & Finishing Operation	8	3	-
5.	Punching	10	7	-
6.	Skiving	6	3	-
7.	Edge Treatment	6	3	-
8.	Ornamentation & Its Purpose	6	3	-
		56	28	112

DETAILED CONTENTS:

Upper closing :

Checking of pairs and identification marks before commencing major operation in closing department.

Punching :

To start the closing of components, decoration and punching.

Skiving :

Close seam skive, under lay skive and turning in skive. Purpose and importance of skiving by hand and machine, their merits and demerits.

Edge treatment :

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Purpose and affects of edge treatment. Types of edge treatment. Raw-edge, burnished edge, folded edge, bound edge, gimped edge, slipbeaded edge and bagged edge.

Ornamentation and its purpose :

Kinds of ornamentation - Fancy seam, multi seam, Braiding, corded seam. Ornamental lacing, stitching along edges. Embroidering and performing.

Reinforcements :

Taping, backing, staying and stay stitching.
Their purpose, importance and effects.

Jointing of upper and lining section for upper closing :

Different kinds of seam plain close seam, silked or open stirched seam, lapped seam use and importance in shoe upper closing. Types of stitches-lock, chain, and zig-zag stitch. Difference in seam and stitch. Threads used in closing room.

Finishing operations :

Cleaning, Edge beating, trimming, eyeleting and checking the quality of closed uppers, description and sequence of operatons of upper closing of court shoe, Mocassion shoe. Durby shoe and Oxford shoe. Machines and tools and devices employed in the upper closing department.

PRACTICAL :

Designing & Fabrication of Shoe Uppers By Hand / Machine Process of the Following :-

(1) Derby

(2) Oxford

(3) Casual Shoe

(4) Monk shoe and Brogue shoe

The following processes should be covered.

1. Preparation & Pre-operation Before Upper Clicking :

(a) Preparation of clicking tools such as clicking knife, board, Cutting knife (Ranpi) Stitching and picking etc.
(b) Examination and Marking of defects in all types of

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Leathers.

(c) Preparation of layout, Marking on leather and fabrics for upper and lining components.

2. Clicking :

(i) Upper components cutting - Vamp, quarten, Toe cap, Back strep, and Mud Gaurd and Apron, Tongue, Saddle and counter.
(ii) Lining components cutting - Vamp and Quarte of Leather and Fabrics.
(iii) Colouring, Marking - Such as upper components for sketching, Beading, Stitching, Seam, underlay, overlaping, size, Lot and code numbers.

3. Upper operation :

(i) Upper components spliting and grading.
(ii) Upper skiving of different components - Vamp, Quaten, Toe, Cap, Back strep, Mud Gaurd and Apprin, Tongue Saddle and counter.
(iii) Ornamental treatment before skining - Edge Burnishing, Different types of Punching and Knitting.

4. Edge Folding :

(i) Edge treatment - Types of edge treatment - Raw edge, Folded edge, gimped edge slip wet - Begged edge and bugget edge.
(ii) Ornamental treatment often Beaded edge - Different types of edge Punching, Fancy Seams, Stitching and Fitting devices.

5. Components Assembling :

(a) Lining Assembling

(1) Quarten lining attachment with plane seams by Machine.
(2) Vamp lining attachment
(3) Quarter and vamp lining attachment with tongue (Varion method/Fitted up method)

(b) Upper Components Assembling

(1) Quarter attachment with reinforcement function susc as - Taping, Backing, Staying and stay stitching.
(2) Quarter and Beading by Hammaer.
(3) Quarten and vamp attachment by plan and fancy seam.

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6. Upper Closing/Sewing :

(1) Preparation of Quarten with lining (Fitted Method) By Machen (Fitted and Varian method)

(2) Preparation of upper with vamp, Quarten etc. components by Machine (Fitted and Variian method)

(3) Punching and eyeletting such as Required sizes.

7. Upper Finishing :

(1) Threads Cutting

(ii) Upper Cleaning and Seams Beading

(iii) Antifunges treatment.

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IV SEMESTER

4.1 Functional Communication

L	T	P
4	-	-

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Units	Coverage Time L	T	P
Section A English				
1.	On Communication	04	-	-
2.	Exploring Space	04	-	-
3.	Sir C.V. Raman	04	-	-
4.	Professional Development	04	-	-
5.	Buying a Second Hand Bicycle	04	-	-
6.	Leadership and Supervision	04	-	-
7.	First Aid	03	-	-
8.	The Romanance of Reading	03	-	-
9.	No Escape from Computers	03	-	-
10.	Bureau of Indian Standards	03	-	-
Section B Hindi				
1.	Topic 1	02	-	-
2.	Topic 2	02	-	-
3.	Topic 3	02	-	-
4.	Topic 4	02	-	-
5.	Topic 5	02	-	-
6.	Topic 6	02	-	-
7.	Topic 7	02	-	-
8.	Topic 8	01	-	-
9.	Topic 9	02	-	-
10.	Topic 10	02	-	-
11.	Topic 11	01	-	-
		56	-	-

Section “A” (English)

Text Lessons

Unit I.	On Communication
Unit.II	Exploring Space
Unit.III	Sir C.V. Raman
Unit.IV	Professional Development of Technicians
Unit.V	Buying a Second Hand Bicycle
Unit.VI	Leadership and Supervision
Unit.VII	First Aid

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Unit.VIII The Romanance of Reading
Unit.IX No Escape from Computers
Unit.X Bureau of Indian Standards

Section "B" Hindi

1– स्वरोजगार
2– भारतीय वैज्ञानिकों एवं तकनीकियों का भारत के विकास में योगदान
3– ग्राम्य विकास
4– परिवार नियोजन
5– सामाजिक संस्थायें
6– नियोजन और जन कल्याण
7– भारत में प्रौद्यौगिकी के विकास का इतिहास
8– हरित कांन्ति
9– पर्यावरण एवं मानव प्रदूषण
10–श्रमिक कल्याण
11–भारत में श्रमिक आन्दोलन

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4.2 FOOTWEAR ENGINEERING

L	T	P
4	1	8

Rationale:

Footwear engineering envolves knowledge and skill of footwear and leather goods machinery. The diploma holder in footwear technology must have sufficient exposure to these machines so that he may independently operate and maintain these machines. Minor maintenance and repair is frequently needed in day to day working. Establishment of footwear plant at suitable place results in economical manufacture of end products. Hence some elementary knowledge about selection of site for footwear plant should also be provided to the student.

Sr. No.	Units	Coverage Time L	T	P
1.	Selection of Site	8	2	-
2.	Footwear & Leather Goods Machinery	20	5	-
3.	Footwear Plant Maintenance	20	5	-
4.	Selection of Machinery	8	2	-
		56	14	112

DETAILED CONTENTS:

1. Selection of Site :

Location of footwear and leather goods manufacturing units. Factors influencing site selection such as availity of power, transport, market, labour, raw materials.

2. Footwear and Leather Goods Machinery :

General construction, descriptive idea of various footwear and leather goods machinery such as
(1) Pattern making machine
(2) Hand press
(3) Upper and bottom cliking press(Hydraulic/Pneumatic)

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(4) Belt cutting machine
(5) Upper and bottom spiliting machine
(6) Skiving machine
(7) Folding machine
(8) Industrial sewing machine (flat bed, cylinder bed, post bed, heavy duty, zig-zag)
(9) Punching and eyeletting machine
(10) Trade mark ambossing machine
(11) Fore part lasting m/c
(12) Side lasting machine
(13) Seat lasting veldeschoen
(14) Upper roughing machine
(15) Bottom roughing machine
(16) Cementing press
(17) Pounding machine
(18) Sole screwing machine
(19) Sole & heel trimming machine
(20) Combined finishing machine
(21) Spray booth with compressor
(22) Heel ataching machine
(23) Double operating Press (D.O.P. machine)
(24) Double needle stitching machine
(25) Lasting machine (To & side lasting machine)
(26) Sole Press M/c (Hydraulic/Pneumatic)
(27) Heat Setter and Chiller

3. Footwear Plant Maintenance:

(1) Functions of maintenance department
(2) Maintenance procedures - preventive maintenance, Routine maintenance and breakdown maintenance of footwear and Leather goods machineries and accessories.
(3) Lubrication and oiling procedures in routine maintenance and development lubrication charts.
(4) Fabrication and repair of components for breakdown maintenance.
(5) Estimating the repair and maintenance cost.
(6) Safety - Definition, importance, causes of accident, accident prevention rules, general safety devices.

4. Selection of machinery for different capacities of production, conveyor system of working in upper making and assembly.

PRACTICALS

1. Study of footwear machinery, their make and functions.

2. Alignment of machinery and rectifying defects.

3. Dismantling, assembly and skiving and industrial sewing machine.

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4. Replacement of worn out parts and knives for splitting machines, trimming machines, edge setting and finishing machines.

5. General check up of all the electrical equipment such as motors, starters, switches, fuses, etc.

6. Study of spray guns and drying chambers.

7. Demonstration of correct methods of operating machines.
8. Blue print reading of factory layouts and instalation drawing.

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4.3 LEATHER GOODS MANUFACTURE-I

L	T	P
4	2	8

Rationale:

Besides footwear many goods of leather are used in every day life. Manufacturing process of these things also envolve sufficient knowledge of specific nature. Broaduly speaking we can classify these items into industrial and consumer type. Different articles need different types of leather. Hence appropriate knowledge about the quality of raw material needed for different items should be known to the diploma student. Besides leather some fittings are also required in leather goods. Hence knowledge of these fittings must be given to the diploma student in leather goods manufacture for durability and economy.

Sr. No.	Units	Coverage Time L	T	P
1.	Classification of Leather Goods	8	4	-
2.	Fashion Items.	8	4	-
3.	Selection of Leathers	8	4	-
4.	Fittings	8	4	-
5.	Treatment of Leather Goods	8	4	-
6.	Method of manufacturing leather goods of operations	8	4	-
7.	Costing of Leather Goods	8	4	-
		56	28	112

DETAILED CONTENTS:

Types of leather goods for various uses, classification of leather goods; industrial and consumer type; consumer leather goods such as key case, cigarette case, camera and transistor case, coin purse, wallets, foils, ladies and jent's handbags, Lether Stationery, document case, passport covers, attche case, jewel box, Lether Jewellary watch strap, goods such as leather belting, washers, oilseals, laces, moulded leather goods, pickers, combers and other leather accessories. Factors influencing design such as fashion, utility material cost, colour, texture and combinations trends in design for fashion items. Detailing

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motif, artistic leather works. Embossing. Stitching and thorging leather goods. Detailed designing of 5 items of leather goods including Doctor's bag.

Selection of leather for various leather articles. Types of leather used for different articles and their characteristics. Chrome leather, suitcase leather, embossed leather, belting leather, lace leather, leather for industrial leather goods and moulded articles, silk and textile linings. Types of thread used for machine and hand stitching, grindries and fittings used in leather goods such as buttons, rivets, D-rings, buckles, locks, metal fittings, hinges, handles, zips and other fastners. USe of card board and other boards in leather goods. Adhesives used in leather goods; polishes, lacquer and lacquer emulsions. Antifungus treatment for leather goods and their specifications. Pattern cutting and making of card board and tin patterns. Standard size range for the articles. USe of other synthetic materials like regzine, foam, leather etc. and their judicial combination for low cast items.
Sequence of operations for manufacture of selected items of leather goods. Estimation of labour content and productivity under given set of conditions. To make estimate and prepare a scheme for setting up a production unit for selected items of product mix.

PRACTICALS :

Free sketching of basic design of leather goods. To develop design for 5 items of leather goods. Preparation of patterns. Manufacture of selected items of leather goods. Making 3 items of leather of daily use such as key case, optical case, coin purse, cell phone cover, camera case, ladies purse, Lether Stationery, Lether Jewllery, etc..
Factory visit and market study of products, raw materials and grinderies, Sample collection.

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4.4 ELEMENTARY LEATHER TECHNOLOGY

L	T	P
4	2	-

Rationale:

Although a middle level man power in footwear industry deals with the finished leather for different manufacture yet some situation many arise when he is required to work in leather procesing unit. Moreover if a diploma student has some basic knowledge about the raw hides, skins structure, defects, curing, various tanning processes and material efficiently. The identification and selection of leather for specific items is very useful in leather trade industry

Sr. No.	Units	Coverage Time L	T	P
1.	General Information	4	2	-
2.	Raw Hides & Skins	6	3	-
3.	Pretaning Process	6	3	-
4.	Tanning	6	3	-
5.	Post Tanning	6	3	-
6.	Types of Finished Leather	4	2	-
7.	Characteristics of Leather For Footwear Manufacture	6	3	-
8.	Fibre Structure	6	3	-
9.	Physical Properties	6	3	-
10.	Purchase Procedure	6	3	-
		56	28	-

DETAILED CONTENTS:

1. General information about leather manufacture.

2. Raw hides and skins structure, defects, flaying, and curing.

3. Brief description of pretaining processes.

4. Vegetable and chrome tanning.

5. Post tanning and finishing operations.

6. Types of finished leathers, common defect in finished leathers.

7. Characteristics of leather required for the manufacture of footwear.

8. Inherent difference in fibre structure in different parts of side, hide and its influence in the cutting of footwear

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components.

9. Physical properties : Tensile strength, plasticity, Elasticity, Thermo static property and their bearing on foot and body comfort.
10. Conventional methods of purchase of different types of leather.

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4.5 COMPUTER PRINCIPLE & APPLICATION

L	T	P
2	-	4

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.	Components of Computer	4	-	-
2.	Data Presentation	8	-	-
3.	Operating System	8	-	-
4.	Programming Langauge	12	-	-
5.	Graphics	12	-	-
6.	Introduction to Internet	9	-	-
		28	-	56

DETAILED CONTENTS

1. COMPONENTS OF THE COMPUTER :

Block diagram of computer, Input and Output devices, Types of software, System software, Application software.

2. DATA PRESENTATION :

Binary Number System, Conversion from Decimal to Binary, Conversion from Binary to Decimal, Octal, Hexa decimal, Memory Addressing, ASCII, EBCDIC coding system

3. OPERATING SYSTEM :

i. What is operating system, Multiprogramming, Time Sharing and Multi tasking.

ii. Command of DOS, UNIX, LINUX, Windows environment menus of dialogue boxes, Concept of ICON, Function of Programming, Documnet

4. PROGRAMMING LANGUAGES :

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Concept of programming languages and its classification, Exercise on C/C++ language.

5. GRAPHICS :

Page Maker, Coral Draw, CAD.

6. INTRODUCTION TO INTERNET :

What is Internet, How to send and receive E-Mail and see different types of web sides.

LIST OF PRACTICALS

1. Programming Implementation in C/C++

2. Programming simulation for control operations

3. Graphics

   A. Page Maker
   B. Coral Draw

4. Practice on Auto-Cad.

5. Practice on DOS/UNIX/LINUX/Windows.

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4.6 ENERGY CONSERVATION

L	T	P
3	-	2

RATIONALE

The requirement of energy has increased manifolds in last two decades due to rapid urbanization and growth in industrial/service sector. It has become challenging task to meet ever increasing energy demands with limited conventional fuels and natural resources. Due to fast depletion of fossil fuels and a tremendous gap between supply and demand of energy, it is essential to adopt energy conservation techniques in almost every field like industries, commercial and residential sectors etc. Energy conservation has attained priority as it is regarded as additional energy resource. Energy saved is energy produced. This course covers the concepts of energy management and its conservation. It gives the insight to energy conservation opportunities in general industry and details out energy audit methodology and energy audit instruments.

DETAILED CONTENTS

1. **Basics of Energy**

   1.1 Classification of energy- primary and secondary energy, commercial and non-commercial energy, non-renewable and renewable energy with special reference to solar energy, Capacity factor of solar and wind power generators.
   1.2 Global fuel reserve
   1.3 Energy scenario in India and state of U.P. Sector-wise energy consumption (domestic, industrial, agricultural and other sectors)
   1.4 Impact of energy usage on climate

2. **Energy Conservation and EC Act 2001**

   2.1 Introduction to energy management, energy conservation, energy efficiency and its need
   2.2 Salient features of Energy Conservation Act 2001 & The Energy Conservation (Amendment) Act, 2010 and its importance. Prominent organizations at centre and state level responsible for its implementation.
   2.3 Standards and Labeling
      2.3.1 Concept of star rating and its importance
      2.3.2 Types of product available for star rating

3. **Electrical Supply System and Motors**

   3.1 Types of electrical supply system
   3.2 Single line diagram
   3.3 Losses in electrical power distribution system
   3.4 Understanding Electricity Bill
      3.4.1 Transformers Tariff structure
      3.4.2 Components of power (kW, kVA and kVAR) and power factor, improvement of power factor

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3.4.3 Concept of sanctioned load, maximum demand, contract demand and monthly minimum charges (MMC)

3.5 Transformers

3.5.1 Introduction

3.5.2 Losses in transformer

3.5.3 Transformer Loading

3.5.4 Tips for energy savings in transformers

3.6 Electric Motors

3.6.1 Types of motors

3.6.2 Losses in induction motors

3.6.3 Features and characteristics of energy efficient motors

3.6.4 Estimation of motor loading

3.6.5 Variation in efficiency and power factor with loading

3.6.6 Tips for energy savings in motors

4. Energy Efficiency in Electrical Utilities

4.1 Pumps

4.1.1 Introduction to pump and its applications

4.1.2 Efficient pumping system operation

4.1.3 Energy efficiency in agriculture pumps

4.1.4 Tips for energy saving in pumps

4.2 Compressed Air System

4.2.1 Types of air compressor and its applications

4.2.2 Leakage test

4.2.3 Energy saving opportunities in compressors.

4.3 Energy Conservation in HVAC and Refrigeration System

4.3.1 Introduction

4.3.2 Concept of Energy Efficiency Ratio (EER)

4.3.3 Energy saving opportunities in Heating, Ventilation and Air Conditioning (HVAC) and Refrigeration Systems.

5 Lighting and DG Systems

5.1 Lighting Systems

5.1.1 Basic definitions- Lux, lumen and efficacy

5.1.2 Types of different lamps and their features

5.1.3 Energy efficient practices in lighting

5.2 DG Systems

5.2.1 Introduction

5.2.2 Energy efficiency opportunities in DG systems

5.2.3 Loading estimation

6 Energy Efficiency in Thermal Utilities

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6.1 Thermal Basics

6.1.1 Types of fuels

6.1.2 Thermal energy

6.1.3 Energy content in fuels

6.1.4 Energy Units and its conversions in terms of Metric Tonne of Oil Equivalent (MTOE)

6.2 Energy Conservation in boilers and furnaces

6.2.1 Introduction and types of boilers

6.2.2 Energy performance assessment of boilers

6.2.3 Concept of stoichiometric air and excess air for combustion

6.2.4 Energy conservation in boilers and furnaces

6.2.5 Do's and Don'ts for efficient use of boilers and furnaces

6.3 Cooling Towers

6.3.1 Basic concept of cooling towers

6.3.2 Tips for energy savings in cooling towers

6.4 Efficient Steam Utilization

7 Energy Conservation Building Code (ECBC)

7.1 ECBC and its salient features

7.2 Tips for energy savings in buildings

7.2.1 New Buildings

7.2.2 Existing Buildings

8 Waste Heat Recovery and Co-Generation

8.1 Concept, classification and benefits of waste heat recovery

8.2 Concept and types of co-generation system

9 General Energy Saving Tips

Energy saving tips in:

9.1 Lighting

9.2 Room Air Conditioner

9.3 Refrigerator

9.4 Water Heater

9.5 Computer

9.6 Fan, Heater, Blower and Washing Machine

9.7 Colour Television

9.8 Water Pump

9.9 Cooking

9.10 Transport

10 Energy Audit

10.1 Types and methodology

10.2 Energy audit instruments

10.3 Energy auditing reporting format

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PRACTICAL EXERCISES

1. To conduct load survey and power consumption calculations of small building.
2. To check efficacy of different lamps by measuring power consumption and lumens using lux meter.
3. To measure energy efficiency ratio (EER) of an air conditioner.
4. To measure effect of valve throttling and variable frequency drive (VFD) on energy consumption by centrifugal pump.
5. To measure and calculate energy saving by arresting air leakages in compressor.
6. To measure the effect of blower speed on energy consumed by it.

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V SEMESTER

5.1 INTEGRATIVE COMMUNICATION

L	T	P
-	-	4

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Units	Coverage Time L	T	P
1.	Introduction to Personality Development	-	-	02
2.	Factors Influencing / Shaping Personality	-	-	02
3.	Self Awareness – 1	-	-	03
4.	Self Awareness – 2	-	-	02
5.	Self Awareness – 3	-	-	02
6.	Change Your Mind Set	-	-	02
7.	Interpersonal Relationship and Communication	-	-	03
8.	Non-Verbal communication Communication Skills	-	-	02
9 .	Communication Skills ACTIVITIES	-	-	06
10.	Body Language skills	-	-	03
11.	Leadership Traits & Skills	-	-	03
12.	Attitude	-	-	03
13.	Analyzing & Solving a Problem skills	-	-	02
14.	Time Management skills	-	-	03
15.	Stress Management Skills	-	-	02
16.	Interview Skills	-	-	04
17.	Conflict Motives	-	-	02
18.	Negotiation / Influencing Skills	-	-	02
19.	Sociability	-	-	03
20.	Importance of Group	-	-	03
21.	Values / Code of Ethics	-	-	02
		-	-	56

PERSONALITY DEVELOPMENT

1 Introduction to Personality Development

AIM, Skills, Types of Skills, LIFE SKILLS VS OTHER SKILLS, Concept of Life Skills. Ten core Life Skills identified by WHO

2. **Factors Influencing / Shaping Personality :**

Introduction, Physical and Social Factors Influencing / Shaping Personality (Hereditary, Self-Development, Environment, Education, Life-situations) Psychological AND Philosophical

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Factors Influencing / Shaping Personality (Past Experiences, Dreams and Ambitions, Self-Image, Values)

3. **Self Awareness – 1**

DIMENSIONS OF SELF AWARENESS (Self Realization, Self Knowledge or Self Exploration, Self Confidence, Self Talk, Self Motivation, Self Esteem, Self Image, Self Control, Self Purpose, Individuality and Uniqueness, Personality, Values, Attitude, Character), SELF REALIZATION AND SELF EXPLORATION THROUGH SWOT ANALYSIS AND JOHARI WINDOW,

4. **Self Awareness – 2**

SYMPATHY VS EMPATHY AND ALTRUISM,
Importance ofEmpathizing with Others,

5. **Self Awareness – 3**

Self-Awareness through Activity, Body Image (What is Body Image, What Decides our Body Image, What is Poor Body Image, What are the Harmful Effects of Poor Body Image), Tackling Poor Body Image(Enhance Self-Esteem, Build Up Critical Thinking, Build up Positive Qualities, Understand Cultural Variation, Dispel Myths, Utilize Life Skills)

6. **Change Your Mind Set**

What is Mindset, HOW TO CHANGE YOUR MINDSET (Get the Best Information Only, Make the best people your Role Model, Examine Your Current Beliefs, Shape Your Mindset with Vision and Goals, Find Your Voice, Protect Your Mindset, Let Go of Comparisons, Put An End To Perfectionism, Look At The Evidence, Redefine What Failure Means, Stop Worrying About What “People” Think)

INTERPERSONAL SKILLS

7. **Interpersonal Relationship and Communication**

INTERPERSONAL RELATIONSHIP , Forms of Interpersonal Relationship, Must Have in an Interpersonal Relationship, Interpersonal Relationship between a Man and a Woman (Passion, Intimacy, Commitment), Relationship Between Friends, ROLE OF COMMUNICATION IN INTERPERSONAL RELATIONSHIP (Take Care Of Your Tone And Pitch, Choice of Words is Important in Relationships, Interact Regularly, Be Polite, Try To Understand The Other Person’s Point Of View As Well, Individuals Can Also Communicate Through Emails,

8. **NON-VERBAL COMMUNICATION Communication Skills**

Non-Verbal Communication,
We Communicate with Our Eyes, Communication with Facial Expression, A Good Gesture, Appearance, Posture and Gait, Proximity and Touch), IMPORTANCE OF LISTENING, Characteristics of Good and Effective Listener(Is Attentive, Do Not Assume, Listen for Feelings and Facts, Concentrate on the Other Speakers Kindly and Generously, Opportunities)

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9. **Communication Skills ACTIVITIES –**

Activities in Making Collages, Making Advertisements, PPT Preparation &
Presentation, Speaking -Seminars, Group Discussions, Debates,
Extempore Speeches, Listening to an audio clip and telling its
gist, Answering a telephone call, Making enquiries, General tips-
Pronunciation, Tone, Pitch, Pace, Volume, relevance, brief,
simple Reading Newspaper, Magazines (Current Affairs,
Economic magazines, Technical magazines), How to read a
report, article, Writing- Resume Writing, Writing joining report,
Notice writing, Report making, Proposal writing, Advertisement,
Notice for tender, Minutes writing, E-Mail writing,
Listening News, Listening to audio clips.(Lecture, poetry, speech, songs),

10. Body Language skills

Introduction, What is Body Language , Body Language Parts,
Personal Space Distances (Intimate Distance, Personal Distance,
Social Distance, Public Distance), IMPORTANT BODY
LANGUAGE SIGNS AND THEIR MEANING

UNDERSTANDING OTHERS

11. **Leadership Traits & Skills :**

Introduction, Important Leadership Traits (Alertness, Bearing,
Courage, Decisiveness, Dependability, Endurance, Enthusiasm,
Initiative, Integrity, Judgment, Justice, Knowledge, Loyalty, Sense
of Humour), Other Useful traits (Truthfulness, Esprit-de-corps,
Unselfishness, Humility and sympathy, Tact without loss of moral
courage, Patience and a sense of urgency as appropriate, Selfconfidence,
Maturity, Mental including emotional stability)

12. **Attitude**

Types of Attitude, Components of Attitudes (Cognitive
Component, Affective Component, Behavioral Component),
Types of Attitudes (Positive Attitude, Negative Attitude, Neutral
Attitude, Rebellious Attitude, Rational and Irrational Attitudes,
Individual and Social Attitudes), Kinds of Attitude,
ASSERTIVENESS, How to Develop Assertiveness (Experiment
and Try New Things, Extend Your Social Circle, Learn to Make

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Decisions for Yourself, Indulge in Knowledge, Admire Yourself &
Others), Negotiation (Be Sensitive to The Needs Others, Be Willing To Compromise, Develop Your Problem-Solving Skills, Learn to Welcome Conflict, Practice Patience, Increase Your Tolerance For Stress, Improve Your Listening Skills, Learn To Identify Bottom-Line Issues Quickly, Be Assertive, Not Aggressive)

PROBLEM SOLVING

13. **Analyzing & Solving a Problem skills**

Critical Thinking, Creative Thinking, Decision Making, Goal Setting & Planning, Problem Solving

14. **Time Management skills**

Need of Time Management, TIME WASTERS (Telephone, Visitors , Paper work, Lack of Planning & Fire Fighting , Socializing , Indecision , TV , Procrastination), PRINCIPLES OF TIME MANAGEMENT - Develop a Personal Sense of Time (Time Log , value of other people's time), Identify Long-Term Goals , Concentrate on High Return Activities , Weekly & Daily Planning (The Mechanics of Weekly Planning , Daily Planning), Make the Best Use of Your Best Time , Organize Office Work (Controlling Interruptions , Organizing Paper Work), Manage Meetings, Delegate Effectively, Make Use of Committed Time, Manage Your Health,

15. **Stress Management Skills**

INTRODUCTION, Understanding Stress and its Impact, Expected Responses (Physical, Emotional, Behavioral), stress signals(thoughts, feelings, behaviors and physical), STRESS MANAGEMENT TECHNIQUES (Take Deep Breath, Talk It Out, Take A Break, Create a Quite Place in Your Mind, Pay Attention to Physical Comfort, Move, Take Care of Your Body, Laugh, Mange Your Time, Know Your Limits, Do You Have To Be Right Always, Have A Good Cry, Look for the Good Things Around You, Talk Less, Listen More), UNDERSTANDING EMOTIONS AND FEELINGS-through Activity

16. **Interview Skills (2 sessions from Industry Expert is Compulsory)**

Curriculum Vitae (When Should a CV be Used, What Information Should a CV Include, personal profile, Covering Letter, What Makes a Good CV, How Long Should a CV Be, Tips on Presentation), Different Types of CV (Chronological, Skills-Based), BEFORE THE INTERVIEW , CONDUCTING

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YOURSELF DURING THE INTERVIEW , FOLLOWING THROUGH AFTER THE INTERVIEW , Interview Questions To Think About , MOCK INTERVIEW – Activity (MOCK INTERVIEW EVALUATION - NON-VERBAL BEHAVIORS, VERBAL BEHAVIORS, General Etiquettes to face the Board , Telephonic interview

17. **Conflict Motives –Resolution**

Motives of Conflict(Competition for Limited Resources, The Generation Gap and Personality Clashes, Aggressive Personalities, Culturally Diverse Teams, Competing Work and Family Demands, Gender Based Harassment), Merits and Demerits of Conflict , Levels of Conflict (Interpersonal Conflict, Role Conflict, Inter-group Conflict, Multi-Party Conflict, International Conflict), Methods of Conflict Resolution (The Win-Lose Approach, The Lose-Lose Strategy, The Win-Win Approach), Techniques for Resolving Conflicts (Confrontation and Problem Solving Leading to Win-Win, Disarm the Opposition, Cognitive Restructuring, Appeal to Third Party, The Grievance Procedure)

18. **Negotiation / Influencing Skills**

Why Influencing, What Is Influencing, TYPES OF INFLUENCING SKILLS (Probing And Listening, Building Rapport, Sign Posting, Pacing, Selling, Assertiveness), LAWS AND PRINCIPLES OF INFLUENCE, The Six Laws of Influence (The Law of Scarcity, The Law of Reciprocity, The Law of Authority, The Law of Liking, The Law of Social Proof, The Law of Commitment and Consistency), Influencing Principles (Making a Start, Buy Yourself Thinking Time, Dealing With Disagreement, Difficult And Sensitive Situations)

19. **Sociability : Etiquettes And Mannerism & Social Skills**

Need for Etiquette , Types of Etiquettes (Social Etiquette, Bathroom Etiquette, Corporate Etiquette, Wedding Etiquette, Meeting Etiquette, Telephone Etiquette, Eating Etiquette, Business Etiquette, E-Mail Etiquettes,), MANNERISMS, HOW TO IMPROVE YOUR SOCIAL SKILLS (Be Yourself, Be Responsible, Be Open & Approachable, Be Attentive, Be Polite, Be Aware, Be Cautious)

20. Importance of Group / Cross Cultural Teams / Team Work skills

Introduction, Types and Characteristics of Groups (Definition of a Group, Classification / Types of Groups, Friendship Group, Task Group, Formal Groups, Informal Group, Effective Group),

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Importance of a Group, Characteristics of a Mature Group, TYPES AND CHARACTERISTICS OF A TEAM (Definition of a Team, Types of Teams, Functional Teams, Problem Solving Teams, Cross - Functional Teams, Self - Managed Teams), Importance of a Team, Characteristics of a Team

21. VALUES / CODE OF ETHICS

Meaning, A FEW IMPORTANT VALUES (Honesty, Integrity, Purity, Discipline, Selflessness, Loyalty, Fairness, Equality, Trust, Support, Respect, etc)

Note : One Orientation module for the faculty is must. Involvement of Industry Experts is necessary for Interview Skills

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5.2 INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

L	T	P
6	2	-

RATIONALE

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

DETAILED CONTENTS

1. **Principles of Management**
   - 1.1 Management, Different Functions: Planning, Organising, Leading, Controlling.
   - 1.2 Organizational Structure, Types, Functions of different departments.
   - 1.3 Motivation: Factors, characteristics, methods of improving motivation, incentives, pay, promotion, rewards, job satisfaction, job enrichment.
   - 1.4 Need for leadership, Functions of a leader, Factors for accomplishing effective leadership, Manager as a leader, promoting team work.
2. **Human Resource Development**

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2.1 Introduction, objectives and functions of human resource development (HRD) department.
2.2 Recruitment, methods of selection, training strategies and career development.
2.3 Responsibilities of human resource management – policies and functions, selection – Mode of selection – Procedure – training of workers, Job evaluation and Merit rating.

3. **Wages and Incentives**

3.1 Definition and factors affecting wages, methods of wage payment.
3.2 Wage incentive – type of incentive, difference in wage, incentive and bonus; incentives of supervisor.
3.3 Job evaluation and merit rating.

4. **Human and Industrial Relations**

4.1 Industrial relations and disputes.
4.2 Relations with subordinates, peers and superiors.
4.3 Characteristics of group behaviour and trade unionism.
4.4 Mob psychology.
4.5 Grievance, Handling of grievances.
4.6 Agitations, strikes, Lockouts, Picketing and Gherao.
4.7 Labour welfare schemes.
4.8 Workers' participation in management.

5. **Professional Ethics**

5.1 Concept of professional ethics.
5.2 Need for code of professional ethics.
5.3 Professional bodies and their role.

6. **Sales and Marketing management**

6.1 Functions and duties of sales department.
6.2 Sales forecasting, sales promotion, advertisement and after sale services.
6.3 Concept of marketing.
6.4 Problems of marketing.
6.5 Pricing policy, break even analysis.
6.6 Distribution channels and methods of marketing.

7. **Labour Legislation Act (as amended on date)**

7.1 Factory Act 1948.
7.2 Workmen's Compensation Act 1923.
7.3 Apprentices Act 1961.
7.4 PF Act, ESI Act.
7.5 Industrial Dispute Act 1947.
7.6 Employers State Insurance Act 1948.
7.7 Payment of Wages Act, 1936.
7.8 Intellectual Property Rights Act

8. **Material Management**

8.1 Inventory control models.
8.2 ABC Analysis, Safety stock, Economic ordering quantity.
8.3 Stores equipment, Stores records, purchasing procedures, Bin card, Cardex.
8.4 Material handling techniques.

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9. **Financial Management**
   9.1 Importance of ledger and cash book.
   9.2 Profit and loss Account, Balance sheet.
   9.3 Interpretation of Statements, Project financing, Project appraisal, return on investments.
10. **Entrepreneurship Development**
   10.1 Concept of entrepreneur and need of entrepreneurship in the context of prevailing employment conditions.
   10.2 Distinction between an entrepreneur and a manager.
   10.3 Project identification and selection.
   10.4 Project formulation.
   10.5 Project appraisal.
   10.6 Facilities and incentives to an entrepreneur.
11. **Fundamental of Economics**
   11.1 Micro economics.
   11.2 Macro economics.
12. **Accidents and Safety**
   12.1 Classification of accidents based on nature of injuries, event and place.
   12.2 Causes and effects of accidents.
   12.3 Accident-prone workers.
   12.4 Action to be taken in case of accidents with machines, electric shock, fires and erection and construction accidents.
   12.5 Safety consciousness and publicity.
   12.6 Safety procedures.
   12.7 Safety measures – Do’s and Don’ts and god housing keeping.

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5.3 LEATHER GARMENTS MANUFACTURE

L	T	P
6	-	6

Rationale

Besides footwear and leather goods, leather is also used for preparation of garments. A diploma student should also be aware alnet the type of the letter used for manufacture of different types of garments. Garment designing is a specialised jali, the equipment and machinery used in garment manufacture, cutting, stitching, crossing and finishing operations should also be knon to a diploma student.

Sr. No.	Units	Coverage Time L	T	P
1.	Classification of leather garments.	9	-	-
2.	Types of leathers for garment Manufacture	9	-	-
3.	Properties and special characteristics of garment leathers	9	-	-
4.	Garment designing & Costing	15	-	-
5.	Equipment and Machinery	15	-	-
6.	Sequence of operation	15	-	-
7.	Ironings and finishing	12	-	-
		84	-	84

DETAILED CONTENTS:

Classification of leather garments based on material, design, usage, fashion. Principles of tailoring with emphasis on sizes. Measurements and fittings; Types of leather used for leather garments such as grain garments, suedes, fur leather from sheep, goat, cow and cowcalf, buff calf. Full-chrome, semichrome and combination tanned leather. Properties and special characteristic of garment leathers in general such as draping, feel, texture, wet rub resistance, uniformity of shades, other non leather material used as subsitute or in combination with leather. Lining and padding materials, fastners and grinderies, thread and decorative fittings.

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Designing of garments and preparation of sectional patterns. Arrangements of patterns to minimise wastage of leather. Recovery of waste and its utilisation. Designing and fabrication of hand gloves, ties and headwear.

Equipment and machinery used in garment manufacturing such as industrial sewing machine including needle feed type.

Cloth cutting machines, button hole and button stitching machines, ironing press. Tools used in leather garment manufacture such as gimping, scissors, wooden and iron hammers, stone slabs, measuring tapes, crayons etc. Special furniture and layout required for garment unit. Dummies for checking fittings.

Principles of cutting components, colour matching, texture, feel. Types of stitching and attachments used, Sequence of operations for assembly of components for garments.

Ironing and finishing :

Inprocess checking and final checking of measurements.
Get up and overall quality.
Freehand sketching, drafting and preparation of patterns

PRACTICALS :

Freehand sketching of jacket, safari, ladies coat, skirts and half pants.

Taking measurements for sizes and fitings.

Designing a few items of garment listed above, gloves, ties and cap.

Practice in cutting and stitching of three items of garments and one item each of gloves, ties and headwear.

Preparation of sectional patterns

Fabrication

Note :- If leather is not available , practice may be done on raxine or foam.

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5.4 TESTING AND QUALITY CONTROL

L	T	P
6	2	6

Rationale

Quality control is an essential part to be maintained by an industry for its products to have continuous demand by users. It is therefore important to have set listing procedure for the maintenance of quality which may envolve physical as well as chemical listing. A diploma student equipped with listing techniques will certainly be useful for the industries.

Sr. No.	Units	Coverage Time L	T	P
1.	Machines and Equipment for physical & chemical testing	20	6	-
2.	Analysis of different materials	19	6	-
3.	Analysis of tanned leather	15	5	-
4.	Physical testing	15	6	-
5.	Principles of inspection	15	5	-
		84	28	84

DETAILED CONTENTS:

Machines and apparatus used for carrying out physical and chemical tests on leathers, chemicals materials, synthetic products, rubber and fabric such as Analytical/ Electronics balance, shrinkage tester, tensometer, abrassion resistance tester, flexometer, lastometer, rub fastness tester, stiffness tester, apparent density apparatus, thickness measuring gauge, soxhlet extractor, kjeldalh's distillation unit, Scuff Resistance, Crockmeter, etc.

Analysis of different materials used in the manufacture of leather, footwear, leather goods and leather sports goods such as water, sodium, bichromate chrome powder, extracts, basicity of chrome, liquors etc.

Analysis of chrome and other mineral tanned leathers for chrome and other mineral content, total oil and fats, hide substance, moisture etc.

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Analysis of vegetable tanned leathers for fixed tannis, hide substance, total ash, water solubles, fat content, degree of tennage etc.

Physical Testing :

Measurement of thickness, water absorption, apparent density, tensile strength, elongation and break at specified load, stitch tear resistance, abrasion, shrinkage permeability dry and wet rub fastness, grain crack index, adhession test, shape retention test, oil test, edurance test, fatigue test etc.

Visual examination of thread used, neatness and straightness of stitching, number of stitches in an inch, proper fixing of zip fastners, correct sizes and measurements. Interpretation of the results of analysis and physical tests in comparison with the specifications. Official methods of sampling and analysis. Indian standard specifications for leather, synthetics, rubber, foam, grinderies, fittings, etc.

Principles of inspection - improcess inspection and builtai quality control system in factories - Functions of inspection agencies such as quality marking centres, Indian standard Institution. Export Inspection, shrinkage, grain crackness, flex resistance, dry and wet rub fastness.

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Practical

Physical Testing

(1) Measurement and thickness of the leather sample. (V.T. or C.T.)

(2) Determination of the appearent density of the cylindrical leather sample.

(3) Find out the percentage of water absorption in V.T. sole leather.

(4) Find out the tensile strength of leather sample by tensil M/C

(5) Find out the stitch tear resistance of leather sample sample by T.M.

(6) Determination of the abrasion & resistance of the sole leather.

(7) Find out the shrinkag temperature by shrinkage testing.

(8) Find out the tongue tear strength by tensile M/C.

(9) Find out the grains crackness circulatious.

(10) Flexing resistance by Flexometer.

(11) Wet and dry rub fastness testing by colour fastness tester.

(12) Determination of Scruff resistance and Crockmeter Test

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5.5 LEATHER GOODS MANUFACTURE II

L	T	P
6	2	6

Rationale:

The knowledge and skill about some special type of leather goods such as sports goods and harness and saddlery items should also be provided to the diploma student to make him fit specialised jali situation, the quality of material and manufacturing and for better finished goods makes students more suitable to the industries.

Sr. No.	Units	Coverage Time L	T	P
1.	General information about sports goods, harness and sadddlery	12	4	-
2.	Sports shoes	15	5	-
3.	Sports gloves	15	5	-
4.	Influence of games in designing	15	5	-
5.	Machinery and Equipment required for cricket and hockey balls	15	5	-
6.	Process of manufacture	12	4	-
		84	28	84

DETAILED CONTENTS:

1. General informations about sports goods, Harness & Saddlery Industry, international demand for various types of sports goods, harness & saddlery. Classification of leather based sports goods such as (a) footballs and other leather balls, hockey and cricket balls, sports shoes, sports gloves and other soft leather goods such as wicket keeping gloves, ice batting gloves, footballs gloves, ski gloves, hockey gloves, golf equipment kits and other sports goods bags.

2. Harness and saddlery such as jumping, riding, troting, racing and reins, halters, briddles, stirrups, girth, brow-band, nose band, Martingies, Cruppar, Box-Muzzle, Head Bumper, bits, Ankle-split tools, knee pads, Horse blankets & saddlery. National & International Trade in games, influence

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of games on designing.

3. Special type of leathers manufactured for sports goods, harness & saddlery and their characteristics. Importance of strechlessness and water proffness for football and other leather balls, leather shape retention and moulting properties of Hockey, Cricket ball, Harness & Saddlery leather, run and elasticity required for them.
4. Machinery and equipments required for manufacture of cricket & Hockey balls, Sports, Gloves, Harness & Saddlery. Types of sports shoes and their method of construction. Materials required for manufacture of Harness and Saddlery. Tools and fixtures used in sports goods, Harness & Saddlery manufacture,. Process of manufacture of various types of sports goods, harness & saddlery and their application.

PRACTICALS

1. Exercise in cutting pattern for hockey and cricket ball, sports gloves and Industrial glove (3 types) and Volley ball, Foot ball.

2. Making of any two balls.

3. Making of batting glove ,inner glove and wicket keeping glove.

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VI Semester

6.1 ENVIRONMENTAL EDUCATION & DISASTER MANAGEMENT

L	T	P
4	-	-

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	4		
2.1	Water Pollution	8		
2.2	Air Pollution	8		
2.3	Noise Pollution	4		
2.4	Radio Active Pollution	6		
2.5	Solid Waste Management	6		
3.	Legislations	4		
4.	Environmental Impact Assessment	4		
5.	Disaster Management	6		
	TOTAL	56	-	-

DETAILED CONTENTS

1. INTRODUCTION :

- Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. 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

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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.

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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

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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.

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6.2 FOOTWEAR TECHNOLOGY - III

L	T	P
8	-	8

Rationale:

A diploma holder in footwear and leather goods manufacture is supposed to possess knowledge of various manufacturing step envolved in the manufacture of footwear. IN the absebce if manufacturing technique and proper design and planning wastage will be increased with regulling increase in the price upper chicking, bottem checking and making of footwear envolves various steps which when taken care of in sequencial order will yield good result.

Sr. No.	Units	Coverage Time L	T	P
1.	Tool equipment & machinery	12	-	-
2.	Stitching	8	-	-
3.	Drafting	8	-	-
4.	Sole attaching	8	-	-
5.	Modern methods of footwear construction	12	-	-
6.	Conditioning	12	-	-
7.	Cemented sole construction	12	-	-
8.	Finishing	12	-	-
9.	Trimmings	12	-	-
10	Packing	8	-	-
11.	Inspection & Quality Control	8	-	-
		112	-	112

DETAILED CONTENTS:

Lasting and Making :

Preparation of awl. Types of stitches required for various purposes. Relation of awl stitches and threads to material and size of stitches.

Principles of drafting and its importance in lasting of shoes of different constructions (Welted, veldt shoes) welt attaching by hand and machine (staples shank fitting, bottom filling, sole attaching by hand and machine, bottom levelling, sole nailing.)

Modern methods of footwear construction including direct moulded, injection moulded and cemented unit sole : purpose

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and relative merits of the various methods of footwear construction in relation to their use. Importance of conditioning, damping, mulling, heat setting and drying.

Detailed study of cemented shoe construction. Adhesives and machines used in cemented construction.

Finishing :

Upper leather dressing, cleaning and shoe lacing, Heel attaching and top piece attaching by hand and machine.

Different types of edge trimming, fore part and waiste trimming, heel scouring, heel front buffing, inking, edge setting by hand and machine, bottom buffing, bottom finishing, upper leather cleaning and dressing, fitting and sock, shoe lacing, checking and packing for different types of footwear.

The aims and objects of finishing, their utility. The relation between heel pairing and heel scouring, edge trimming and setting, common faults in finishing.
Inspection recognition and elimination of faults. The use of heat and heat effects in shoe processes.

Various tools, equipments and machinery employed for finishing. There use and general maintenance. The vital parts of machines and their minor adjustments

Material used for packing, individual and trendship packing. Export packing, use of fungicides for export packing.

Defect removing methods- such as wrinkles on lining twisted back strap, High and low quarters, Soft toe and back, soft stifner etc.

PRACTICALS

1. Preparation of hand tools required in finishing departments.

2. Practice in setting and operating heel attaching trimming and finishing machine.

3. Practice in heel attachments by hand and machine.

4. Practice in trimming sole and heel by hand and machine.

5. Practice in heel scouring, heel front buffing, edge setting, heel colouring, waxing and setting by hand and machine, bottom buffing, bottom finishing of different methods, upper

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leather, cleaning and dressing; fitting of socks, shoe lacing, checking and boxing.

6. Exercise in rectifying finishing defects.
7. Preparation of colours, shades for various types of leathers.
8. Practice on different types of fancy finishings.
9. Exercise on calculation of material consumption, reduction of wastage.
10. Preparing cost sheet for finished footwear.

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6.3 COSTING ANALYSIS AND ACCOUNTING

L	T	P
6	2	-

Rationale

Estimating and Costing of engineering goods is an important activity of an industry. Record keeping, book keeping and marketing of the finished product are associated with estimating and costing. The student should also be equipped with the knowledge of exchange instruments such as cheque, hundi, bill of exchange, cash memo, invoice etc.

Sr. No.	Units	Coverage Time L	T	P
A.	COSTING ANALYSIS			
1.	Introduction To Costing Analysis	3	1	-
2.	Elements of Cost & Production Expenses	6	2	-
3.	Direct & Indirect Expenses	6	2	-
4.	Material & Material Control	3	1	-
5.	Standard of Cost, Cost sheet and Tender Statement	6	2	-
6.	Standard Costing & Variance Analysis	6	2	-
7.	Marginal Costing & Break-even Analysis	6	2	-
8.	Budget and Bedgetary Control	6	2	-
B.	ACCOUNTING			
1.	Meaning & Definition of Accounting	3	1	-
2.	Concept and Convention of Accounting	9	3	-
3.	Journal, Ledger and Trial Balance	9	3	-
4.	Cash Book & Other Books	9	3	-
5.	Fianl Accounts with Adjustment	6	2	-
6.	Banking Transactions	6	2	-
		84	28	-

DETAILED CONTENTS:

1. INDTRODUCTION OF COSTING ANALYSIS :

Meaning, need and function of costing, Advantages of casting, Different methods of cost finding.

2. ELEMENTS OF COST AND PRODUCTION EXPENSES :

Production expenses and their classification, Direct and

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indirect expenses, Direct and indirect materials, Direct and indirect labour, Classification of indirect expenses, Conponents of total cost.

3. DIRECT AND INDIRECT EXPENSES :

Direct and indirect expenses and their kinds, Classificaiton of overheads, Difference between oncost and overheads.

4. MATERIALS AND MATERIAL CONTROL :

Meaning, importance, objects of materials and material control, Kinds of materials, Purchasing, Storing of materials, Receipt of materials, Issue and returns/transfer of materials, Methods of pricing of materials, LIFO and FIFO methods, Inventory system, Inventory control, Stock levels, Economic order quantity, ABC techniques of inventory control, Bin Cards.

5. STATEMENT OF COST, COST SHEET AND TENDER STATEMENT :

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

6. STANDARD COSTING AND VARIANCE ANALYSIS :

Standard cost and costing, Essentials for success of standard costing system, Objects, Advantages, Disadvantages of standard costing, Difference between standard costing and budgetary control, Variances and overhead variance.

7. MARGINAL COSTING AND BREAK-EVEN ANALYSIS :

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

8. BUDGET AND BUDGETARY CONTROL :

Budget and budgetary contol, Essential of effective budgeting, Type of budgets, Preparation of production budget, Material budget, Sales budget, Distribution budget, Master budget, Flexible budget, Computation of semi-variable expenses.

B. ACCOUNTING

1. MEANING AND DEFINITION OF ACCOUNTING :

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Meaning, Characteristics, Difference, Advantages of book-keeping and accoutancy, Meaning characteristics and advantages of double entry system.

2. CONCEPT AND CONVENTIONS OF ACCOUNTING :

Concepts of accounting, Conventions of accounting.

3. JOURNAL, LEDGER AND TRIAL BALANCE :

Journal, Rules for jouralising, Ledger, Need of ledger, Rules of posting, Trail balance, Methods of preparing trial balance, Disclosed and undisclosed errors in trail 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, Bill receivable book, Bill payable book.

5. FIANL ACCOUNTS WITH ADJUSTMENTS :

Trading A/c, Manufacturing A/c, Profit and loos A/c, Balance sheet with all adjustments.

6. BANKING TRANSACTIONS :

Meaning and functions of bank, Bank A/c opening, Methods, Chaques, Kind of dheques, Crossing, Endoresement and dishonoured of cheque..pa

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6.4 INDUSTRIAL PROMOTION, MARKETING AND EXPORT

L	T	P
6	2	-

Rationale:

The success of an industry depends upon the continuous demand of finished product in national and international market. It becomes are important function on the part of industry to communication the users special leather of the finished goods. Marketing, Advertising, Training of sales personnel, Export marketing. The designed responsibilities it he is equiped with knowledge and shell of industrial promotion and export marketing.

Sr. No.	Units	Coverage Time L	T	P
A.	INDUSTRIAL PROMOTION			
1.	Growth and contributionof lether goods industry	2	-	-
2.	National Policy on the development of footwear and leather goods industry	3	1	-
3.	Facilities offered for setting up of footwear and leather goods industries	3	1	-
B.	MARKETING			
1.	Marketing Concept	2	1	-
2.	Marketing Strategy & Market Segmentatio	3	1	-
3.	Marketing Research	3	1	-
4.	Sales Forecasting	3	1	-
5.	Product Tem, Product Line & Product Mix	3	1	-
6.	Product Planning & Development	3	1	-
7.	Product Identificaiton	3	1	-
8.	Management of Sales Force	3	1	-
9.	Advertising Management & Decisions	3	1	-
10.	Sales Promotion	3	1	-
C.	EXPORT			
1.	Exports : An Engine of Growth	2	1	-
2.	Golden Rules for Successful Exporting	3	1	-
3.	Preliminaries for Starting Export Business	3	1	-
4.	Registration of Exporters	3	1	-
5.	Appointing Overseas Agents	3	1	-
6.	Obtaining Export Licence	3	1	-
7.	Obtaining Export Credit Insurance	6	2	-
8.	Arranging Finance For Exports	6	2	-

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9.	Understanding Foreign Exchange Rates	6	2	-
10.	Lebelling, Packaging, Packing and Marketing Goods For Exports	3	1	-
11.	Excise Procedure	3	1	-
12.	Insurance Goods Againts Marine Risk (C.I.F/F.B.O.)	3	1	-
13.	Preparing Exports Documents	3	1	-
		84	28	-

DETAILED CONTENTS:

A. INDUSTRIAL PROMOTION :

1. GROWTH AND CONTRIBUTION OF LEATHER GOODS INDUSTRY :

Growth and contribution of footwear and leather goods industry towards socio-economic development in India.

2. NATIONAL POLICY ON THE DEVEOPMENT OF FOOTWAR AND LEATHER GOODS INDISTRY :

National policy on the development of footwar and leather quods industry. Sizes of units - Iny cottage, small, medium and large scale industry.

3. FACILITIES OFFERED FOR SETTING UP OF FOOTWEAR AND LEATHER QUODS INDUSTRY :

Facilities offered for setting up of footwar and leather quode industries by the following agencies -

A. Khadi adn Village Industry Commission Board
B. District Industies Centres
C Financial Institutions
D. Co-operatives
E. Small Industries Development Organisation
F. Bharat Leather Corporation
G. CLRI

B. MARKETING :

1. MARKETING CONCEPT :

Meaning, social marketing, integrated marketing, role or importance, function.

2. MARKETING STRAGEGY AND MARKET SEGMENTATION :

Meaning, Purpose, Methods of marketing segmentation,

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Marketing strategy - Meaning, Types of marketing strategy.

3. MARKETING RESEARCH :

Meaning, advantages of marketing research, marketing research procedure, Marketing research in India.

4. SALES FORECASTING :

Meaning, sales forecasting periods, factors effecting sales forecast, sales forecast procedure. Methods or techniques of sales forecasting, importance.

5. PRODUCT ITEM, PRODUCT LINE AND PRODUCT MIX :

Product mix, The optimal product mix, Influence of manufactures objectives on the product mix, Reasons of changes in product mix, Meaning and origin of fashion, Fashion adoption process, Marketing and fashion.

6. PROCUCT PLANNING AND DEVELOPMENT :

Product planning, Product modification, Product innovation and Product elimination.

7. PRODUCT IDENTIFICATION :

Product branding, Packaging, Labelling and warranty/guarantee series.

8. MANAGEMENT OF DALES FORCE :

Sales Force - Slection, Training, Remuneration supervision and control, Evaluation of sales man's performance.

9. ADVERTISING MANAGEMENT AND DECISION :

Meaning, objectives, Types of advertising; Control of the advertising programme, Means or Media of advertising promotional advertising, Essentials of a good advertising copy, Advertising in India.

10. SALES PROMOTION :

Meaning of sales promotion, Objects, Functions and Importance of sales promotion, Types and methods of sales promotion.

C. EXPORT :

1. EXPORTS :An Engine of Growth :

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Meaning of export, Indian Export. Growth potential and perpective Foreign Trade Policy.

2. GOLDEN RULES :

Golden rules for sucessful exporting.

3. PRELIMINATRIES FOR STARTING EXPORT BUSINESS :

Setting up and appropriate business organization, Choosing appropriate mode of operation, Naming the business, Selecting product, Selecting overseas market, Selecting channels of distribution, Export pricing and costing.

4. REGISTRATION OF EXPORTERS :

Registration with RBI, Registration with Regionla authorities of Director General of Foreign Trade for obtaining Exporter Code Number, Registration with Export Promotion Councils.

5. APPOINTING OVERSEAS AGENTS :

Meaning and check list for careful selection of overseas agent, speciman agency agreement.

6. ONTAINING EXPORT LICENCE :

Application for an export licence/certificate/permission.

7. OBTAINING EXPORT CREDIT INSURANCE :

Obtaining export credit insurance.

8. ARRANGING FINANCE FOR EXPORTS :

Preshipment finance, Post shipment finance in Indian Rupees, Gold Card Scheme, Fortaiting Finance; External Commercial Borrowing, EXIM Bank Finance.

9. UNDERSTANDING FOREIGN EXCHANGE RATES :

Exchange rates, System of exchange rate, Direct and Indirect quotation, Forward contracts, Procuring/Manufacturing goods for export and their inspection IS/ISO 9000 and ISO 14000.

10. Lebelling, Packaging, Packing and Marketing goods for export.

11. EXCISE PROCEDURES :

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Procedure for registration, assesment duty.

12. Insurance goods againt, Marine risks - CIF and FBO.

13. PREPARING EXPORTS DOCUMENTS :

Documents for declaration of goods, Documents for transportation of goods, Documents for customers clearance of goods, other documents.

NOTE : Market survey and industrial visit should be done for practical experience of above topic.

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6.5 CAD/CAM FOR FOOTWEAR

L	T	P
2	-	4

:RATIONALE :

Application of CAD in footwear design is the theme of this curriculum

Sr. No.	Units	Coverage Time L	T	P
1.	Principle and scope of CAD	6	-	-
2.	Hardware & Peripherals	6	-	-
3.	Software in CAD & Designing With Software	6	-	-
4.	Pattern Generation, Grading & Costing	6	-	-
5.	Image Processing	4	-	-
		28	-	56

1. PRINCIPLES AND SCOPE OF CAD

Definition and advantages of CAD/CAM. Types of CAD/CAM systems available. Different types of CAD/CAM systems. Digital to analog conversion (DAC) and analog to digital conversion (ADC). Real coordinates and screen coordinates. Resolution of screen - Video Graphics Adapter (VGA), SVGA. 2D and 3D coordinates and coordinate extraction. Graphic file formats. Colour and fill patterns formats. Primary objects. Shell digitisation Standard length and width for a shell. Different size system increments. Pattern area and Rubberband area. Different wastage calculation.

2. HARDWARE AND PERIPHERALS

Computer systems requirements. Basic understanding of the following : Digitizer (2D and 3D), 3D encoder, Scanner, Mouse, Plotter (pen), Cutter (Laser), water and knife and printer (dot matrix, inkjet, laser and bubble jet). Fax modem card and modem. Local area network (LAN) and Wide Area Network (WAN). CNC and its implementation in Last modelling.

3. SOFTWARE IN CAD :

Choice of operating system, Structured and non-structured programmes, System Software and utilities, Application software like debugging aids, Compliers and other utility

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programming technique and languages, Shoe Designing with CAD Software.

4. PATTERN GENERATION/GRADING/COSTING

Mean forme digitization for 2D, last digitisation for 3D. Shell modification. Pattern extraction. Pattern marking and allowances. Pattern matching. Grading the shell. Pattern plot out/cut out. Pattern testing. Pattern nesting. Wastage calculation for first wastage, second wastage and third wastage.

5. IMAGE PROCESSING :

Principles and Strategies for Collection of data for imaging, Data reduction and processing techniques with specialreferances to footwear designs.

NOTE :

A good number of visits of the units having CAD/CAM facilities be arranged.

CAD PRACTICES

1. Digitisation of mean forme.

2. Digitisation of last.

3. Shell modification.

4. Extraction of patterns from shell

5. Pattern testing

6. Grading pattern

7. Costing of patterns.

A visit to FDDI or CLRI will be a good experience for the students. Emphasis should be given towards use of window based application use for preparing design forecasts and presentation. If MS-Office is properly used then the specification sheet preparation will be very easy for a designer. In fact using a little skill of basic programming one can get the costing sheet also.

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6.6 PROJECT

The purpose of introducing project is to enable the student to apply the knowledge, skills and attitude acquired during the entire course to the solution of real life problems. Each student will be assigned a specific problem. Some suggested problems are listed below.

1. Preparation of a project profile for setting up factory/sports goods leather garments/leather goods factory.

2. Work study in footwear industry and suggesting measures for increasing productivity.

3. Problems connected with the development and marketing of footwear.

4. Conduct market study and forecast fashion profile in selected regions.

5. Problems related to raw material substitution, cost and waste reduction.

6. Evolve designs and make product range for footwear/leather goods.

Problems suggested by industry may also be considered for project work.

The student will have to go through all the steps in problems solving such as defining the problem, analysis of the problem, collection of required information and material formulation of alternative solution to the problems, selecting and best solution and reduction into practice. The student will be assessed on the basis of the project report and viva voce examination.

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THREE YEAR(Six Semester) DIPLOMA COURSE IN LEATHER TECHNOLOGY, FOOTWEAR (COMPUTER AIDED SHOE DESIGN)

XII. STAFF STRUCTURE

	Intake of the course	60	
	Pattern of the course	3yrs (Six Semester)	
1.	Principal	1	
2.	H.O.D.	1	
3.	Lecturer Footwear Technology	3	
4.	Lecturer Maths/Physics	1	
5.	Lecturer Chemistry	1	
6.	Lecturer Language	1	Part time
7.	Lecturer in Mechanical Engg. cum Workshop Incharge	1	Common With Leather Tech.
8.	Lecturer in Commerce/Accountancy	1	Common With Leather Tech.
9.	Computer Programmer	1	Common With Leather Tech.
10	Instructor in Electrical Engg.	1	
11.	Foreman (Footwear & Leather Goods)	1	
14.	Instructor Footwear Technology	5	
15.	Instructor (Fitting Shop)	1	
16.	Instructor (Welding Shop)	1	Common With Lether Tech.
17.	Instructor (Machine Shop)	1	Common With Lether Tech.
18.	Instructor (Carpentry Shop)	1	Common With Lether Tech.
19.	Drawing Instructor	1	Common With Lether Tech.
20.	Steno typist	1	Common With Lether Tech.
21.	Accountant/Cashier	1	Common With Lether Tech.
22.	Student/Library Clerk	1	Common With Lether Tech.
22.	Store Keeper	1	Common With Lether Tech.
24.	Class IV	6	
25.	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.

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XIII- SPACE REQUIREMENT

		No	M2
	A. Batch Size 15		
	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	3	240
7.	Class rooms	2	150
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 Lab @ 5 Sq.m. per student	1X2	75
3.	Footwear Technology Lab @ 8 Sq.m. per student control.	1X2	120
4.	Leather Goods Manufacture Lab @ 5 Sq. m. per student.	1X2	75
5.	Footwear Design Lab @ 5 Sq.M. per student	1X2	75
6.	Footwear Engineering Lab @ 5 Sq.M. per student	1X2	75
7.	Computer room	1X2	60
8.	Testing & Quality Control Lab	1X2	60
	D. Common Facilities		
1.	Dispensary	1	40
2.	Canteen & tuck shop	1	50
3.	Parking space/cycle stand with garrage	1	50% student
4.	N.C.C. block	1	70
5.	Guest room (With attached bath), Kitchen & Store	1	45
	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	_____

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LIST OF EQUIPMENTS

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

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

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

I. APPLIED PHYSICS LAB

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

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with complete accessories

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

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S.No.	Name of Equipment	No.	@ Rs. Aprox.	Amt.in Rs. Aprox.
	Complete			
46.	Lab stools	30		
47.	Lab tables	8		
48.	Plug Keys One Way	5	50	250
49.	Plug Keys Two Way	5	100	500
50	Helical Springs - Soft, 10 cm each	6	100	600

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II. APPLIED CHEMISTRY LAB

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

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S.No.	Name of Equipment	No.	@ Rs. Aprox.	Amt.in Rs. Aprox.
28.	Tripod stand (Steel/Iron) Large/Medium	30	30	900
29.	Wire gauge 15 X 15 cm. with asbestos	30	15	450
30.	Test tube holder wodden	50	10	500
31.	Porcelain plates Ceramic	30	20	600
32.	Funnel 15 cm. Glass Borosil Corning/Plastic	60	16	960
33.	Spatula hard & nickel/steel	2 each	50	100
34.	Distilled water units (electrical)	1	10000	10000
35.	Distilled water units (solar)	1	5000	5000
36.	Open balance 1000 gms./10 mg.	1	600	600
37.	Brush for cleaning Hydro Fiber Acid & Alkali Resistant	100	10	1000
38.	Jars 20 Lit. for keeping destilled water	5	100	500
39.	Lab table 2 m. x 1.2 m. x 1 m. hight with central sink and cup boards (Teak wood) with drawers and two built in almirah on each side with reagent racks, better tile top	4	8000	32000
40.	Exhaust fans 18" (GEC make/Crompton)	4	2000	8000
41.	Side racks and selves for bench reagents made of teak wood for 24 bottels each set	4	2000	8000
42.	Digital balance electronic Electronics upto 2 decimal places	1	10000	10000
43.	Hot plates 7-1/2", 3" dia controled 2000 watts	1	1000	1000
44.	Hot air oven thermostatically controled with selves and rotary switches 350 x 350 x 25 high	1	8000	8000
45	pH Meter (Digital)	1	1000	1000
46	Glass Electrode	2	850	1700
47.	Reference Electro	2	850	1700
48.	Weight Box 1gm,2gmX2, 5gm,10 gm 20gmX2, 50gm, 100gm with for cep Miscellaneous	LS		15000

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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
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 (Testing & Quality Control Lab)				
A.	Chemical Testing:				
1.	Single Pan Balance		5	--	50000

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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	2	10000	20000
8.	Soxlet Apparatus	2	8000	20000
9.	pH Meter	2	5000	20000
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
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 (Computerised)	2	--	--

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VI- FOOTWEAR WORKSHOP :

(Fig.in Lakhs Rs.)

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

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	Dimensions : 1200X550X110mm Power : 550W, 220V			
6.	Glamping hand drive M/C	1	1.20	
7.	Binding M/C Stitches per minute 2500 S.P.M. Maximum Stitch Length : 5.5 mm Lift of pressure foot : 100 mm (by knee) Needle System : DP X 17 Niddle bar stroke : 34 mm Alternating Movement : 2-6 mm Feed Type : Unison Feed Diameter of cylinder Bed : 46mm	1	0.90	
8.	Pull over M/C	1	0.50	
9.	Heel lasting M/C	1	1.00	
10.	Pounding M/C Dimensions : 650X500X1300mm Power : 550W,220V Voltage : 440 V Production : 3000 pairs/8 hour	1	0.80	
11.	Roughing M/C	1	0.60	
12.	A. Edge trimming M/C (For Lining) Power : 0937 KW Net Weight : 64 Kg. Dimensions : 1100 X 530 X 1165 mm	1	1.50	
	B. Edge trimming M/c (For Sole) Suitable for Flush Trimming for Sole Made of PU,TPR, EVA and Rubber Power : 0.37 KW Net Weight : 64 KG Dimensions : 1100 X 530 X 1165 mm	1	1.00	
	C. Hell Attaching Machine (For Lining)	1	0.40	
13.	Heel trimming M/C	1	0.40	
14.	Ironing Machine	1	2.00	
15.	Working tables with stoob	60	1.00	(Total)
16.	Decorative punching M/C	1	0.15	
17.	Dies, toobs, moulds, lasts etc.	L.S.	1.00	(Total)
18.	Tools boxes for students	60	0.20	(Total)
19.	Thickness measuring gauge	2	0.03	
20.	Pattern Shear	2	1.50	
21.	Pattern Binding M/c	1	0.03	
22.	Pattern Vaccum Forming M/C	1	1.50	

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

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41.	Thickness Measuring Machine Capacity : 1mm-35mm For Thickness of raw hide Operated : Electronic Power : 3 Phase Induction Motor 1.5 HP	1	0.50
42.	Compressor For Pneumatic machine Motor : 2HP Tank Capacity : 115 Lit. Air Delivery : 340L/min. Pressure : 10 Bar	1	1.00
43.	Punching Machine Punching Width : 36 mm Feed : 0-60 mm Speed : 250-350/min. Motor : 200W Net Weight : 45 Kg. Dimension 365 X 370 X 360 mm OR Standard	1	0.60
44.	Simplex Matie 33 mts. conveyor with 1 Mech. tier	1	3.50
45.	Two colour hrizontal injection moulding M/C with moulds etc.	1	20.00
46.	D.M.S. M/C 4 bed with moulds etc.	1	8.00

DESIGNING SHOP

1.	Pattern Binding Machine Hydraulic Pattern Binding Machine. Binding precision is 0.1-1 mm, Electrically operated, 440 volts supply, Weight less than 150 kg, Power 1.5 Kg.	1	1.00
2.	Shoe Last (Fiber, PVC) Hing Last - Derby Oxford Sporty 41/42 size male, 37/38 Female Medimum Fitting Scoop Last - Derby Oxford Sporty 41/42 size male, 37/38 Female Medimum Fitting Boot Last 41/42 size male, 37/38 Female Medimum Fitting	1	1.00
3.	Designing Tools	30 Sets	0.20 (Total)
4.	Designing Table	30 Sets	0.20 (Total)

Garment Shop |-

1.	Needle feed M/C	5	1.00(Total)
2.	Swing Machine Power Operated Stitches per monute 2200-2600 Maximum Stitch Length 6mm Lift of pressure foot 11mm (by knee)	5	1.50(Total)

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	Needle System DP X 5 Needle bar stroke 36mm Hook Type - Vertical Rotating Hook Link Take up Lever		
3.	Button hole M/C For punching cloths, hats, umbrella, work system, pneumatically or automatic Punching Width 36mm Max. Feed 0-60mm Speed 250-350/min. Motor 200 W	1	0.80
4.	Button sewing M/C	1	0.35

Leather Goods Shop |-

1.	Football panel cutting M/C Machine should be able to cut the size given below - Pentagon Panel Size 4.5 cm. (Each Core) Hexagon Panel Size 4.5 cm. (Each Core) Combing punch in each core 9 No. Punching width up to maxi. 8 mm.	1	0.30
2.	Footbal shaping M/C Machine is design for shaping the Football/Volleyball Sphere of panel circumference 60-70 cm Air pressure min. 1Kgf/cm2	1	0.30
3.	Planni meter	1	0.30
4.	Belt cutting Machine Width Half Inch To 2 Inch Cutting Thickness 10mm Max. No. of Belt Cutting at a time 6 No. Motor 1 HP. Speed 200-250 RPM	1	0.15
5.	Belt Spliting Machine Power	1	0.13
6.	Belt Edge Skiving M/c	1	0.24
7.	Belt Adhesive Coating M/c	1	0.20
8.	Belt Pressing M/c	1	0.20
9.	Belt Side Decorating M/c Machine mechanical and electrical Power operated single phase on 220 V	1	0.18
10.	Belt Punching M/c (Mannual)	1	0.10
11.	Belt Colouring M/c	1	0.20
12.	Belt Eyelet Fixing M/c	1	0.10
13.	Belt Finishing M/c	1	0.15
14.	Belt Creasing M/c	1	0.14

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15.	Belt Edge Making M/c	1	0.20
16.	Leather Round Belt Making M/c (Circular Strip Cutting M/c)	1	0.25
17.	Spacer For Round Belt	1	0.18
18.	Strap Cutting M/c	1	--
19.	Belt Punching & Fixing M/c Punching Width 36 mm Feed 0-60 mm Speed 250-350/min. Motor 200W Dimension 365X370X360 mm Or Standard	1	0.90
20.	Spray Gun Capacity 500ml, Made of Stainless Steel.	1	0.10

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CAD LAB

S.No.	DESCRIPTION	QTY.	APPROX. COST (in Rs.)
1.	Latest Shoe Designing software with Licensed Latest Shoe Designing Software 2D or 3D with full pattern and pieces engineering, Complete solution for developing and grading shoe, lasts, 2D/3D last digitizing ability to import image files, pattern tracing, Interface for cutting and ploting systems, Automatic stitches,special functions for Boots adn Moccasin, ability to transfer data to database/ able to make last for modeling.	L.S.	200000.00
	OR		
	Computer of latest specification		
2	Latest Core to Duo based computer system and Latest Operating System Software with Licensed Intel Core i5-2410M/i7 Processor (3 MB L3 Cache,2.90 GHz,DDR3 1333 MHz) 2 GB Graphic Card, Window 7 Premium 18.5" TFT LED Display, 6 GB RAM DDR3, 1 TB HDD, DVD Writer, Wi-Fi, Bluetooth, Optical Mouse, Key Board, Preloaded Antyvirus Or Latest Version	62	20,000,00=00 (60+2Server)
3.	Software : i WINDOWS - XP/2000/VISTA ii ORACLE 9i or Latest Windows based 20 USERS) & Development (Latest) iii. VISUAL STUDIO (professional) iv. MS OFFICE 2010 (Professional) v. COMPILER - 'C',C++, JAVA vi. Auto Cad Latest Version vii. Front Pange, Internet Explorer,Page Maker Corel Draw, Dream Weaver viii. Tally ix. * Specials Packages For Shoe Design (*->Only For Footwear Tech.)	L.S.	200000.00
4.	3 D Digitizer Active Area 12"* 18" (305*457* MM) Plateform Support PC Software Driver Microsoft Windows 95,98 ME, NT, 200, XP, Vista, 7 & 8 Hardware Interface USB Resolution Up to 12700 lines per inches/500 lines per mm real resolution Self Diagnostic Automatic testing RAM, ROM And Technology Microprocessor	01	100000.00

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	Certification	UL 1950, EN60950,FCC, VCCI, CE, EN55022, EN55024		
5.	Flat Bed Scanner 4200 dpi Flat Bed A3 Size, 4200 dpi ADF with Network			
6.	MFP Colored Laser Printer Laser Jet, B/W, A4 Size, all in one print, Scan, Copy and Fax, ADF, Scan, Resolution 1200 dpi or greater, print resolution 600X600X2 dpi, USB, LAN Connectivity		01	50000.00
7.	44" Plotter Paper Cutting, Speed 800mm/s or Greater, Effective cutting area Leather 900 X 600 mm or greater, HPGL.		01	50000.00
8.	UPS 5 KVA 5 KVA line interactive with rated KVA Single phase AC, Online Sine wave, Minium VAH1600, 160V To 280 V input		01	175000.00
9.	Window Air Conditioner 1.5 tones capacity with ISI Mark along with electronic voltage stablizer withover voltage and time delay circuit.		04	30000.00(Each)
10.	Room preparation and furniture		LS	

INTRODUCTION TO COMPUTER (Common to all Trades)

COMPUTER CENTRE

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

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

LIST OF LABORATORY EQUIPMENT(Energy Conservation)

Sr. No	Particulars	Qty	Estimated Cost (Rs)
1.	Multimeter	1	17,000
2.	Power Analyzer	1	20,000
3.	Luxmeter	1	5,000
4.	Black Box (for checking lamp efficacy including stand and luxmeter)	1	25,000
5.	Centrifugal pump, 1 kW	1	15,000
6.	Variable Frequency drive	2	50,000
7.	Water Flow meter	1	10,000
8.	Pressure Gauge	1	2,000
9.	Experimental Set up for Valve Throttling vs VFD	1	50,000
10.	Compressor, 20 cfm, single-stage	1	50,000
11.	Air leakage meter	1	18,000
12.	Blower (2 HP)	1	8,000

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LEARNING RESOURCE MATERIALS

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

ote :

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

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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 Footwear and Leather Goods Technology.

PURPOSE: To design and develop diploma curriculum in Leather Technology, Footwear Computer Aided Shoe Design.

NOTE: 1.Please answer the questions to the points given in the questionnaire.

2.Any other point or suggestion not covered in this questionnaire may be written on a separate paper and enclosed with the questionnaire.

1.Name of the organisation:_____
_____

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

3.Name of the department/section/ shop _____

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

5.Number of diploma holder employees under your charge in the area of Leather Technology, Footwear (Computer Aided Shoe Design) _____

6.Please give names of modern equipments/machines handled by a diploma holder in Footwear and Leather Goods technology in your organisation.

1. 2. 3.

4. 5. 6.

7.What proficiencies are expected from a diploma holder in Leather Technology, Footwear Computer Aided Shoe Design.

1. 2. 3.

4. 5. 6.

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

1. Theoretical knowledge ----------%

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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, Footwear Computer Aided Shoe Design.
(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 Footwear design of different countries/States. Yes/No

13. Does your organisation conducts field survey to know users views regarding. Yes/No
1. Selection of Footwear for different age groups and sex.
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, Footwear Computer Aided Shoe Design.

15. In which types of organisations can a diploma holder in Leather Technology, Footwear Computer Aided Shoe Design get employement.

1 2 3

4 5 6

16. Job procepects for the diploma holder in Leather Technology, Footwear Computer Aided Shoe Design the next ten years in the state / country.

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17. In your opinion what should be the subjects to be taught to a diploma student in Leather Technology, Footwear Computer Aided Shoe Design.

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, Footwear Computer Aided Shoe Design.

(Signature)

Kindly mail the above questionnaire duly filled to:-

Dr. Kshama Mishra
Assistant 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)

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ANNEXURE- II SUMMER TRAINING SCHEDULE

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

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

1. Procurement of footwear material and other grinderies used for Footwear and Leather Goods Manufacture and also procurement of different synthetic materials other than leather in common use for footwear manufacture.

2. The student will gather full details regarding different sections of a footwear factory including its layout, machines used with specifications, sources of supply of spare parts, maintenance schedule etc.

3. Last manufacture, machines and different materials used namely wodden, metalic, synthetic for last manufacture.

4. Footwear manufacture operations namely component clicking, closing, bottming/making and finishing.

5. Manufacture techniques of leather goods, (industrial/domestic/sports) including leather garments.

6. Testing and qulaity control of footwear and leather goods,marketing/sales and production.

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

1. Name & Address of the unit

2. Date of
   i. Joining.
   ii. Leaving.

3. Nature of Industry

   i. Product.
   ii. Services.
   iii. Working Hrs.

4. Sections of the unit visited and activities there in.

5. Details of machines/Tools & instruments used in working in the section of the unit visited.

6. Work procedure in the section visited.

7. Specifications of the product of the section and materials used.

8. Work of repair and maintenance cell.

9. Details of the shops

10. Name of checking and Inspecting Instruments and their details. Quality controls measures taken.

11. Details of hadraulics/pneumatic/ thermal units or appliances used if any.

12. 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.

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STUDENT ACTIVITIES ON ENERGY CONSERVATION/ENERGY EFFICIENCY

1. Presentations of Case Studies
2. Debate competitions
3. Poster competitions
4. Industrial visits
5. Visual Aids

COURSE OUTCOMES

After studying this course, a student will be able to co-relate and apply fundamental key concepts of energy conservation and energy management in industry, commercial and residential areas. A student will be able to:

- Define principles and objectives of energy management and energy audit.
- Understand Energy Conservation Act 2001 and its features.
- Understand various forms & elements of energy.
- Identify electrical and thermal utilities. Understand their basic principle of operation and assess performance of various equipments.
- Identify areas of energy conservation and adopt conservation methods in various systems.
- Evaluate the techno economic feasibility of the energy conservation technique adopted.

INSTRUCTIONAL STRATEGY

Teachers are expected to lay considerable stress on understanding the basic concepts in energy conservation, principles and their applications. For this purpose, teachers are expected to give simple problems in the class room so as to develop necessary knowledge for comprehending the basic concepts and principles. As far as possible, the teaching of the subject must be supplemented by demonstrations and practical work in the laboratory. Visits to industries must be carried out. Expert from industry must be invited to deliver talks on energy conservation to students and faculty.

REFERENCE BOOKS

1. Guide book on General Aspects of Energy Management and Energy Audit by Bureau of Energy Efficiency, Government of India. Edition 2015
2. Guide book on Energy Efficiency in Electrical Utilities, by Bureau of Energy Efficiency, Government of India. Edition 2015
3. Guide book on Energy Efficiency in Thermal Utilities, by Bureau of Energy Efficiency, Government of India. Edition 2015
4. Handbook on Energy Audit & Environmental Management by Y P Abbi&Shashank Jain published by TERI. Latest Edition
5. **Important Links:**
   (i) Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India. www.beeindia.gov.in.
   (ii) Ministry of New and Renewable Energy (MNRE), Government of India. www.mnre.gov.in.
   (iii) Uttar Pradesh New and Renewable Energy Agency (UPNEDA), Government of Uttar Pradesh. www.upneda.org.in.
   (iv) **Central Pollution Control Board (CPCB),** Ministry of Environment, Forest and Climate Change, Government of India. www.cpcb.nic.in.
   (v) Energy Efficiency Sevices Limited (EESL). www.eeslindia.org.
   (vi) Electrical India, Magazine on power and electrical products industry. www.electricalindia.in.

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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

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						SARAK, DELHI

1. DISCIPLINE : LEATHER TECHNOLOGY,FOOTWEAR (CASD)

Sl.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
1.	EXPORTS OPPORTUNITIES IN LEATHER SHOE AND SHOE UPPER INDUSTRY	I. T. C. O. T.	ENGLISH	1994	900.00	I. T. C. O. T., 50 A GREAMS ROAD, MADRAS
2.	EXPORTS OPPORTUNITIES IN LEATHER SHOE AND SHOE UPPER LEATHER	I. T. C. O. T.	ENGLISH	1994	600.00	I. T. C. O. T., 50 A GREAMS ROAD, MADRAS
3.	INDIAN LEATHER-2010 A TECHNOLOGY INDUSTRU TRADE FORECAST	COMPLIED BY C.L.R.I,MADRAS	ENGLISH	1994	1800.00+ POSTAGE	C. L. R. I., MADRAS
4.	RAW MATERIAL FOR INDIAN LEATHER INDUSTRY	N D P PUB.	ENGLISH	1994	250.00	C. L. R. I., MADRAS
5.	CHEMICAL FOR LEATHER INDUSTRY	N D P PUB.	ENGLISH	1994	200.00	C. L. R. I., MADRAS
6.	MODERNISATION OF LEATHER INDUS-TRY AND DEV. OF LEATHER COMPLEX IN INDIA	N D P PUB.	ENGLISH	1994	200.00	C. L. R. I., MADRAS
7.	LEATHER CLOTHING & ITS MANF. & MAINTENANCE	COMPILED	ENGLISH	1985	L13.5	BRITISH LEATHER CONFE.
8.	MANNUAL OF SHOE MAKING	COMPILED	ENGLISH	1966	L21.10	CLARK'S TRG. DEPTT.
9.	COMPLETE HAND BOOK OF LEATHER CRAFTING	J. E. GARNES	ENGLISH	1986	L37.50	KRIEGER PUBLISHING CO.,U.S.A
10.	MODERN PATTERN CUTTING & DESIGN	H. J. PATRICK	ENGLISH	1962	L21.70	MRBBS MILLER LTD
11.	COMPLETE FOOTWEAR DIECTIONERY	W. A. ROSSI	ENGLISH	1994	L20.00	FOOTWEAR OPEN TECH. UNIT
12.	PATTERN CUTTING HAND BOOK	M. H. SHARP	ENGLISH	1991	L12.95	SHOE TRADES PUB. Co., U.S.A.
13.	AMERICAL LAST MAKING	KARIC ADRIAN	ENGLISH	LATEST	L45.00	SHOE TRADES PUB. Co., U.S.A.
14.	PROFESSIONAL SHOE FITTING MANNUAL	WILLAMINS ROSSI & ROSE TERANT	ENGLISH	LATEST	L30.95	SHOE TRADES PUB. Co., U.S.A.
15.	CPMPLETE JAMD BOOK OF AIHETIC FOOTWEAR	P. C. MELVYN	ENGLISH	LATEST	L35.00	SHOE TRADES PUB. Co., U.S.A.
16.	BIOMECHINES OF RUNNING SHOE	BINNO NIGG	ENGLISH	LATEST	L43.00	SHOE TRADES PUB. Co., U.S.A.
17.	TAPS TO SHOE PRODUCTION VOL. I DESIGN	ENGLISH		SHOE TRADES PUBLISHING CO. U.S.A		$33.00
18.	TAPS TO SHOE PRODUCTION VOL. II PATTERN CUTTING	ENGLISH		--- DO ---		$33.00
19.	TAPS TO SHOE PRODUCTION VOL. III MAKING	ENGLISH		--- DO ---		$50.00
20.	INFORMATION SYSTEMS FOR F/W MANUFACTURING	ENGLISH	NICHOLAS BROWN	--- DO ---		$25.00
21.	PRODUCTION PLANNING FOR F/W MANUFACTURING DEMOUSTRATION OF CONCEPT	ENGLISH	- DO -	--- DO ---		$58.00
22.	FOOTWEAR MATERIAL & PROCESS TECHNOLOGY	ENGLISH	-	--- DO ---		$65.00
23.	SIX LANGUAGE TECH. GLOSSARY OF SHOE AND LEATHER	ENGLISH	-	--- DO ---		$65.00
24.	THE DICTIONARY OF SHOE INDUSTRY TERMINOLOGY	ENGLISH	-	--- DO ---		$41.00
25.	INTERNATIONAL GLOSSARY OF LEATHER TERMS	ENGLISH	-	--- DO ---		
26.	PRODUCT KNOWLEDGE	ENGLISH	COMPLIED	F.D.D.I. NOIDA		650.00
27.	ESSENTIALS OF SERVING	ENGLISH	- DO -	--- DO ---		800.00
28.	SINGLE NEEDLE POST BED SERVING M/C	ENGLISH	- DO -	--- DO ---		700.00
29.	TWIN NEEDLE FLAT BED SERVING M/C	ENGLISH	- DO -	--- DO ---		350.00

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Sl.No.	TEXT BOOK	AUTHOR	MEDIUM	EDITION YR	COST	FULL ADDRESS OF PUBLICATION
30.	TWIN MIDDLE POSTBED SWING M/c	COMPILED	ENGLISH	1993	350.00	F. D. D. I. PUB.,NOIDA .
31.	SKILL OF SKIVINGBED SWING M/c	COMPILED	ENGLISH	1993	550.00	F. D. D. I. PUB.,NOIDA .
32.	THE ART OF HAND TURNOVER BINDING (FRENCH BINDING)	COMPILED	ENGLISH	1993	300.00	F. D. D. I. PUB.,NOIDA
33.	THE ART OF HAND FOLDING	COMPILED	ENGLISH	1993	350.00	F. D. D. I. PUB.,NOIDA
34.	SKILL OF OPERATING CYLINDER ARM	COMPILED	ENGLISH	1993	400.00	F. D. D. I. PUB.,NOIDA
35.	THE SKILL OF SEAM REDUCING	COMPILED	ENGLISH	1993	200.00	F. D. D. I. PUB.,NOIDA
36.	POLUYMERIC MATERIALS OF F/W	G. RADHAKISHORI & P. RAJALINGEN	ENGLISH	1993	300.00	C. L. R. I., MADRAS

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