

CURRICULUM FOR THREE YEAR
DIPLOMA COURSE IN

=====
: CARPET TECHNOLOGY :
: 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 16.06.2017:
=====

STUDY AND EVALUATION SCHEME FOR
THREE YEARS (SIX SEMESTER) DIPLOMA COURSE IN CARPET TECHNOLOGY
(To Be Effective From)

I Semester (Common With Textile Technology)

Curriculum						S U B J E C T	Scheme of Examination								
Periods Per Week							Theory				Practical			Grand Total	
Le	Tut	Dr	Lab	Work	Tot		Examination	Sess.	Total	Examination	Sess.	Total			
c.	ori	aw	Shop	Shop	al		Dur.	Marks	Marks	Dur.	Marks	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 General Mechanical Engg.	2.5	50	20	70	3	40	20	60	130
-	-	-	14	-	14	1.5 Engineering Drawing	3.0	50	20	70	-	-	-	-	70
16	2	14	4	-	36	<-----TOTAL----->	--	250	100	350		40	20	60	410
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)													25		
TOTAL													435		

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	-	-	4	-	10	2.3 Applied Chemistry	2.5	50	20	70	3	40	20	60	130
3	-	-	3	-	6	2.4 Textile Fibres	2.5	50	20	70	3	60	30	90	160
6	-	-	-	-	6	2.5 Introduction To Carpet	2.5	50	20	70	-	-	-	-	70
-	-	-	-	14	14	2.6 Workshop Practice	--	--	--	--	4	60	30	90	90
21	2	-	11	14	48	<-----TOTAL----->	--	250	100	350		200	100	300	650
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)													25		
TOTAL													675		

- NOTE:-
- (1) Each period will be 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.

STUDY AND EVALUATION SCHEME FOR
THREE YEARS (SIX SEMESTER) DIPLOMA COURSE IN CARPET TECHNOLOGY
(To Be Effective From)

III Semester

Curriculum						S U B J E C T	Scheme of Examination							
Periods Per Week							Theory				Practical			Grand Total
Le c.	Tut or ial	Dr aw al	Lab	Work Shop	Tot al		Examination Dur.	Sess. Marks	Total Marks	Examination Dur.	Sess. Marks	Total Marks		
4	-	-	-	-	4	3.1 Industrial Safety	2.5	50	20	70	--	--	--	70
5	-	-	2	-	7	3.2 Electrical Technology & Electronics	2.5	50	20	70	3	40	20	130
2	-	-	5	-	7	3.3 Introduction To Computer	--	--	--	--	3	60	30	90
4	2	-	-	-	6	3.4 Yarn Manufacturing Process	2.5	50	20	70	-	-	-	70
6	2	-	8	-	16	3.5 Carpet Yarn Manufacturing	2.5	50	20	70	3	40	20	130
21	4	-	15	-	40	<-----TOTAL----->	--	200	80	280	--	140	70	490
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)													25	
TOTAL													515	

IV Semester

4	-	-	-	-	4	4.1 Functional Communicaton	2.5	50	20	70	-	--	--	70
6	1	-	6	-	13	4.2 Carpet Design-I	2.5	50	20	70	3	40	20	130
4	2	-	6	-	12	4.3 Textile Testing	2.5	50	20	70	6	40	20	130
4	1	-	-	-	5	4.4 Fabric Manufacturing System	2.5	50	20	70	-	-	-	70
6	1	-	6	-	13	4.5 Carpet Manufacturing	2.5	50	20	70	3	40	20	130
24	5	-	18	-	47	<-----TOTAL----->	--	250	100	350	--	120	60	530
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)													25	
TOTAL													555	

NOTE:-

- (1) Each session will be of 16 weeks.
- (2) Effective teaching will be at least 14 weeks.
- (3) Remaining periods will be utilised for revision etc.
- (4) 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 150 marks for this exposure. These marks will be awarded by project examiner in the final year. (Examination marks :100, Sess. marks : 50). See Annexure - II.
- (5) Field visit and extension lectures are to be organised and managed well in advance at institute level as per need.

STUDY AND EVALUATION SCHEME FOR
THREE YEARS (SIX SEMESTER) DIPLOMA COURSE IN CARPET TECHNOLOGY
(To Be Effective From)

V Semester

Curriculum						Scheme of Examination								
Periods Per Week						S U B J E C T	Theory				Practical			Grand Total
Le c.	Tut ori al	Dr aw	Lab	Work Shop	Tot al		Examination Dur.	Sess. Marks	Total Marks	Examination Dur.	Sess. Marks	Total Marks		
													Marks	
-	-	-	4	-	4	5.1 Integrative Communicaton	--	--	--	3	40	20	60	
6	2	-	-	-	8	5.2 Industrial Management & Entrepreneurship Development	2.5	50	20	70	--	--	70	
4	2	-	-	-	6	5.3 Carpet Chemical Prrocessing	2.5	50	20	70	-	--	70	
6	2	-	8	-	16	5.4 Carpet Design-II	2.5	50	20	70	6	100	150	
6	2	-	-	-	8	5.5 Carpet Finishing And Maintenance	2.5	50	20	70	--	--	70	
22	8	-	12	-	42	<-----TOTAL----->	--	200	80	280	--	140	210	
Games/NCC/Social and Cultural Activities + Discipline (15 + 10)												25		
TOTAL												515		

VI Semester

4	-	-	-	-	4	6.1 Environmental Education(*) & Disaster Management	2.5	50	--	--	--	--	--
4	2	-	-	-	6	6.2 Non Woven	2.5	50	20	70	--	--	70
6	2	-	8	-	16	6.3 Carpet Testing	2.5	50	20	70	4	80	120
6	-	-	-	-	6	6.4 Modern Carpet Technology	2.5	50	20	70	--	--	70
-	-	-	8	-	8	6.5 Project	--	--	--	--	VIVA	100	150
-	-	-	-	-	-	6.6 Industrial Training-6 Week	--	--	--	--	VIVA	80	120
20	4	-	8	8	40	<-----TOTAL----->	--	150	60	210	--	260	390
Games/NCC/Social and Cultural Activity/Community Development+Discipline (15+10)												25	
Aggregate												625	
30% Carry Over of I & II.												333	
70% Carry Over of III & IV												749	
100% Carry Over of V & VI												1140	
Grand Total												2222	

NOTE:-

- (1) Each period will of be 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) Each group of 2 to 3 students may choose one problem from the project paper.
- (6) Field visits and Extension lectures at institute level as per need be arranged.
- (7) *-After the examination of IV Semester each student will go for Industrial Training of 4 weeks and will submit report duely forwarded by the supervising officer of the concerned industry for assesment by a pannel consisting of one internal examiner and one external.
- (8) (*) It is compulsory to appear & to pass in examination, But marks will not be included for division and percentage of obtained marks.

C O N T E N T S

S.NO.	PARTICULARS	PAGE NO.
I.	Study and Evaluation Scheme	
II.	Main Features of the Curriculum	1
III.	List of Experts	2
1	I Semester	
1.1.	Foundational Communication	4 - 8
1.2.	Applied Mathematics-I(A)	9 -10
1.3.	Applied Physics-I	11-12
1.4	General Mechanical Engg.	26-29
1.5	Engineering Drawing	18-20
2	II Semester	
2.1.	Applied Mathematics-I(B)	21-22
2.2.	Applied Physics-II	23-25
2.3.	Applied Chemistry	13-17
2.4	Textile Fibres	30-32
2.5	Textile Manufacturing Processes	33-35
2.6	Workshop Practice	36-38
3.	III Semester	
3.1	Industrial Safety	38 - 39
3.2	Electrical Technology & Electronics	40 - 44
3.3	Introduction To Computer	45 - 48
3.4	Yarn Manufacturing Process	49 - 51
3.5	Carpet Yarn Manufacturing	49 - 51
4.	IV Semester	
4.1.	Functional Communication	4 - 8
4.2	Carpet Design-I	52 - 53
4.3	Textile Testing	52 - 53
4.4	Fabric Manufacturing System	52 - 53
4.5	Carpet Manufacturing	52 - 53
5.	V Semester	
5.1	Integrative Communication	4 - 8
5.2	Industrial Management & Entrepreneurship Development	64 - 65
5.3	Carpet Chemical Processing	52 - 53
5.4	Carpet Design-II	52 - 53
5.5	Carpet Finishing & Maintenance	52 - 53
6.	VI Semester	
6.1	Environment Education & Disaster Management	79 - 81
6.2	Non Woven	66
6.3	Carpet Testing	60-61
6.4	Modern Carpet Technology	62

IX.	Staff structure & Staff qualifications	70
X.	Space requirement	71-72
XI.	List of Equipment	73-92
XII.	Learning Resource Materials	93
XIII.	Annexure - I	94
XIV.	Annexure - II	95
	Industrial Training.	96
XV.	Annexure - III Questionnaire	97-99

II.

MAIN FEATURES OF THE CURRICULUM

TITLE OF THE COURSE		DIPLOMA IN CARPET TECHNOLOGY
DURATION OF THE COURSE		THREE YEAR
TYPE OF THE COURSE		FULL TIME
PATTERN OF THE COURSE		SEMESTER SYSTEM
INTAKE		60
ENTRY QUALIFICATION		PASSED HIGH SCHOOL WITH 35% MARKS
MODE OF ADMISSION		THROUGH JOINT ENTRANCE EXAMINATION

III.LIST OF EXPERTS

List of experts who contributed in the Development of the curriculum for the Three Year Diploma in Carpet Technology on dated 15.03.2015 at I.R.D.T.,U.P., Kanpur

1. Shri Liyakat Ali N.H.D.C. Ltd., Lucknow
2. Shri D. K. Verma H.O.D.(T.D.)
Govt. Girls Poly.,Varanasi
3. Smt. Alka Ali Associate Professor
U.P.T.T.I., Kanpur
4. Shri Mukesh Uttam Associate Professor
U.P.T.T.I., Kanpur
5. Dr. Mukesh Singh Associate Professor
U.P.T.T.I., Kanpur
6. Shri Himanshu Mauriya Lecturer
Govt. Poly., Furrukhabad
7. Shri Brajesh Misra Lecturer
Govt. Poly., Mau
8. Shri Pankaj Yadav Asstt. Prof.
I.R.D.T., Kanpur

List of experts who contributed in the Semester of the curriculum for the Three Year(Six Semester) Diploma in Carpet Technology on dated 27.03.2017 at I.R.D.T.,U.P., Kanpur

1. Shri Neeraj Joshi Deputy Director
DTE Kanpur
2. Shri D. K. Verma Deputy Director
DTE Kanpur
3. Shri Pankaj Yadav Asstt. Director
DTE Kanpur
4. Dr. Mukesh Kumar Singh Professor and HOD-MMFT
U.P.T.T.I., Kanpur
5. Shri R. K. Gupta H.O.D./Principal, Govt. Poly.,Furrakhabad
6. Shri Rahul Singh Lecturer(TT), Govt. Poly., Kanpur
7. Shri Yogesh Singh Professor, I.R.D.T.U.P., Kanpur

**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**

- 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& I k] l oLke] fo'ksk.k] fdz; k fo'ksk.k] o.kz l ekl] l f/k] vydkj] j l] mi l xz i R; ; A
- 6& i= ys[ku] fufonk l fonk] nj vka=.k %dk/s ku% vihy] LorU= vfHkO; fDr] ifronu ys[ku] id
foKflrA
- 7& okD; @okD; ka k ds fy, 'kCn] i; kz okph ; k l ekukFkhz 'kCn] foyke 'kCn] vusdkFkhz 'kCn] 'kCn; e ; k
l e p p k f j r 'kCn l e g] okD; 'k(f) % k q v' k q okD; % e g k o j s , o a y k s d k f D r ; k A

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

L T P
3 2/2 -

Rationale:

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

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

DETAILED CONTENTS:

1. ALGEBRA-I : (10 Marks)
 - 1.1 Series : AP and GP; Sum, nth term, Mean
 - 1.2 Binomial theorem for positive, negative and fractional index (without proof). Application of Binomial theorem.
 - 1.3 Determinants : Elementary properties of determinant of order 2 and 3, Multiplication system of algebraic equation, Consistency of equation, 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..
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, Logarithmic differentiation, Differentiation of implicit functions.
- 5. DIFFERENTIAL CALCULUS -II :(10 Marks)
 - 5.1 Higher order derivatives, Leibnitz theorem.
 - 5.2 Special functions (Exponential, Logarithmic, Inverse circular and function), Definition, Graphs, range and Domain and Derivations of each of these functions.
 - 5.3 Application - Finding Tangents, Normal, Points of Maxima/Minima, Increasing/Decreasing functions, Rate, Measure, velocity, Acceleration, Errors and approximation.

1.3 APPLIED PHYSICS-I

[Common to All Engineering Courses]

L T P
3 2/2 -

Rationale:

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

DETAILED CONTENTS:

1. Units and Dimensions (4 Marks)

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

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

2. ERRORS AND MEASUREMENT (4 Marks)

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

3. Circular Motion (5 Marks)

Central forces. Uniform Circular motion (Horizontal and Vertical cases), angular velocity, angular acceleration and centripetal acceleration. Relationship between linear and angular velocity and acceleration. Centripetal and centrifugal forces. Practical applications of centripetal forces. Principle of centrifuge.

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

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

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

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

6. Fluid Mechanics :(5 Marks)

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

7. Friction :(4 Marks)

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

8. Harmonic Motion (6 Marks)

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

9. Heat & Thermodynamics: (6 Marks)

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

10. Acoustics (5 Marks)

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

1.4 GENERAL MECHANICAL ENGINEERING

L T P
6 - 4

Rationale

For every practising engineer some knowledge of Mechanical Engineering relevant to his discipline is a must. This paper is meant to provide the would be textile technologists elements of mechanical engineering relevant to their work.

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Foundations and Installation	8	-	-
2.	Pipe and Pipe Fittings	8	-	-
3.	Bearings and Lubrications	8	-	-
4.	Power Transmission and Material Handling	8	-	-
5.	Couplings, Clutches, Eccentrics and Camps	8	-	-
6.	Fules and Combustion	9	-	-
7.	Thermodynamics	8	-	-
8.	Steam Generation and Steam Generators	8	-	-
9.	Pumps and Air Compressors	8	-	-
10.	Refrigeration and Air-Conditioning	8	-	-
		84	-	56

DETAILED CONTENTS

1. FOUNDATIONS AND INSTALLATIONS:

General principles and considerations for machine foundations, vibrations in machine foundations. Layout of foundation bolts, alignment of machines care and precautions to be used in installation of machines, introduction to Indian Standards on machine foundations. Practice in blue printreading for installtions.

2. PIPE AND PIPE FITTINGS:

Classification of pipes according to materials used, field of application, IS specifications of water, air and steam pipes, various types of pipe fittings and their applications, laying of pipes, cuttings threading and jointing of pipes.

3. BEARINGS AND LUBRICATION:

Various kinds of bearings, bush bearing, ball and roller bearing, thrust bearing and their application in textile machineries. Principle of film lubrication. Various methods of lubrication, lunricants and their properties. Selection of lubricants for various textile machineries.

4. POWER TRANSMISSION & MATERIAL HANDLING:

- (a) Different types of Trolleys used in process house.
- (b) Belt and gear drive.

Types of gears, spur gear, bevel gear, helical gear, worm and worm wheel, rack and pinion.

Power transmission by belt, chain and gears. Gear drive, application of various kinds of gears and drives in textile machinery. Variable speed drives.

5. COUPLINGS, CLUTCHES, ECCENTRICS AND CAMS:

Necessity of coupling, types of couplings, rigid and flexible couplings, universal coupling, fluid coupling. Introduction to common types of clutches, eccentrics and cams, their function and use.

6. FUELS AND COMBUSTION :

Common solid, liquid and gas fuels. Their composition, higher and lower calorific values. Calculation of air required for complete combustion of unit mass/volume. Concept of excess air in boiler furnace combustion. Heat carried away by flue gases. Flue gas analysis by Orsat apparatus. (Simple Numerical Problems)

Idea of specific properties of liquid fuels such as knock resistance (Cetane and Octane numbers). Flash point, Flame point, Solidification point.

7. THERMODYNAMICS:

Concept of thermodynamic systems and surroundings, Work and its relation to heat. First law of thermodynamics and its application to Constant volume, Constant pressure, Constant temperature and adiabatic processes in dealing with gases and vapours. Representation of these processes in P. V. diagram, calculation of work done.

Second law of thermodynamics. Concept of enthalpy, entropy of thermodynamic system. Concept of Heat engine, Heat pump and refrigerator. Carnot cycle efficiency of heat engine, coefficient of performance of refrigerator and heat pump. Steady state flow process. Its equation and application.

8. STEAM GENERATION AND STEAM GENERATORS:

Idea of steam generation from water at 0°C. Pressure and temperature curve of steam generation. Idea of wet, dry

saturated and super heated steam. Saturation pressure, temperature, degree of super heat, Enthalpy, Entropy and specific volume of wet, dry saturated and super heated steam. Use of steam tables for simple calculations. Introduction to water tube, fire tube boilers e. g. Lancashire, Babcock Wilcox, Cochran and Simple vertical boilers. Boilers mountings and accessories. Steam traps, Reducers, Expansion bends. Boilers specification. Equivalent evaporation, Boiler efficiency, Draught, Chimney height, Conditions for maximum draught through chimney. Measurement of steam consumption. Simple numerical problems.

9. PUMPS & AIR COMPRESSORS:

Elementary knowledge of working of reciprocating, Centrifugal and Vacuum pumps, Blowers and Compressors, Fans and Exhausts.

Difference between reciprocating and rotary compressors. Their types and working, Single stage and Multi stage compressors. Power required to drive single stage compressor. Volumetric efficiency and effect of temperature on it. Use of compressed in textile industry.

10. REFRIGERATION AND AIR CONDITIONING:

Meaning of the term refrigeration. Its application, Unit. Refrigeration methods. Bell Coleman air cycle, air refrigerator, Vapour compression refrigeration. Analysis of simple saturated cycle for vapour compression refrigerator.

Characteristics of good refrigerants. Properties of common refrigerants such as NH₃, CO₂, SO₂, Freon-12.

Air Conditioning:

Meaning of the term and its application. Gas and vapour mixture. Dry and wet bulb temperature, Dew-point, Depression of wet bulb temperature and Depression of Dew-point. Saturated air, specific humidity, relative humidity, Absolute humidity. Humid specific volume, Heat enthalpy of moist air. Use of psychrometric charts and tables. Sensible heating and cooling. Humidification. Dehumidification and their methods.

Air conditioning for human comfort. Air conditioning, for summer and winter. Air conditioning round the year, Psychrometric air conditioning. Industrial air conditioning.

GENERAL MECHNICAL ENGINEERING-LAB

- A. Domonstration of the following for study and sketch.
1. (a) Bio Gas Plant.
(b) Wind Mill.
(c) Solar Cooker.
(d) Voltaic Cell Type Soalr Energy Converter.
 2. Key's, Key ways and Splined shaft e.g. Jib head key, Flat key, Saddle key, Woodruff key, Feather key, Pin key, Splined shaft.
 3. Pins- Split pin, Taper cotter type split pin, Cottor pin, Cottor bolts. Foundations Bolts- Lewis rag bolt, Fish tail bolt and Square head bolt.
 4. Friction clutch and Coupling- Cone cluch, Plate cluch (Single Pair); Muffcoupling, Flange coupling, Universal or Hook's joint coupling. Flexible coupling- Belt and Pin Type, Coil spring type.
 5. Bearings- Plane, Bush, Split step bearings, Ball Roller bearings, Thrust bearings.
 6. Gears- Spur gear, Single and Double herical gears, Bevel gears.
 7. Gear Trains- Simple spur gear train, Compound gear train, Epicyclic gear train.
 8. Compressor and Tension helical springs.
 9. Slider Crank Mechanism and Quick Return Mechanism.

Performance Practicals:

10. Deterimination of velocity ratio of a spur gear train.
11. Velocity diagram of a four bar chain mechanism.
12. Performance evaluation of solar cooker.

NOTE:-

Field visits are recomended for equipments not available in the institution such as biogas plant, wind mill, Boilers. No need to purchase them. Models of Boilers may be procured for study purpose.

1.5 ENGINEERING DRAWING

[Common to Three years Diploma Course in Civil Engg., Electrical Engg., Chemical Engg., Dairy, Ceramic, Textile Technology, Textile Chemistry]

[Also Common to Four year Part-time Diploma Course in Electrical Engineering, Mechanical Engineering (Specilization in Production Engineering)]

[Also common to First year Diploma Course in Chemical Technology : (1) Fertilizer Technology, (2) Rubber and Plastic Technology]

L T P
4 - 10

Rationale

Drawing, which is known as the language of engineers, is a widely used means of communication among the designers, engineers, technicians, draftmen and craftsmen in the industry. The translation of ideas into practice without the use of this graphic language is really beyond imagination. Thus, for the effective and efficient communication among all those involved in an industrial system, it becomes necessary that the perosonnel working in different capacities acquire appropriate skills in the use of this graphic language in varying degrees of proficiency in accordance with their job requirements.

Generally speaking, an engineering technician working at the middle level of the threetier technical manpower spectrum, is required to read and interpret the designs and drawings, provided to him by technologists and subsequently to translate them to the craftsmen for actual execution of the job.

This course in Engineering Drawing has been designed, keeping in view, the above refered job functions of a technician in the industry. This preliminary course aims at building a foundation for the further courses in drawing and other allied subjects. The contents of the course have been selected as to form a core for the various deversified fields of engineering. It is expected that at the end of this session, the students acquires sufficient skill drafting and some ability in spetial visualization of simple objects.

Sl.N.	Units	Coverage Time		
		L	T	P
1.	Drawing Instruents and their use	5	-	4
2.	A. Lettering techniques	3	-	16
	B. Introduction to scales	2	-	8
3.	Conventional Presentation	5	-	8
4.	A. Principles of projections	3	-	12
	B. Point Line, Plane	2	-	28
5.	Orthographic projection of simple geometrical solids	5	-	12
6.	Section of Solids	5	-	20
7.	Isometric Projection	5	-	20
8.	Free Hand Sketching	5	-	8
9.	Development of surfaces	5	-	24
10.	Orthographics Projection of Machine Parts	5	-	12
11.	Practice on Auto Cad	6	-	24
		56	-	140

C O N T E N T S

- NOTE : Latest Indian Standards Code of Practice to be followed.
1. Drawing, instruments and their uses. 1 Sheet
 - 1.1 Introduction to various drawing, instruments.
1
 - 1.2 Correct use and care of Instruments.
 - 1.3 Sizes of drawing sheets and their layouts.
 2. (a) Lettering Techniques 2 Sheet
Printing of vertical and inclined, normal single stroke capital letters.
Printing of vertical and inclined normal single stroke numbers.
Stencils and their use.
(b) Introduction to Scales 2 Sheet
Necesssity and use, R F
Types of scales used in general engineering drawing.
Plane, diagonal and chord scales.
 3. Conventional Presentaion : 1 Sheet
Thread (Internal and External), Welded joint, Types of lines, Conventional representation of materials, Conventional representation of machine parts.
 4. (a) Principles of Projection 1 Sheet
Orthographic, Pictorial and perspective.
Concept of horizontal and vertical planes.
Difference between I and III angle projections.
Dimensconing techniques.
(b) Projections of points, lines and planes. 1 Sheet
 - 5 (a) Orthographic Projections of Simple 2 Sheet
Geometrical Solids
Edge and axis making given angles with the reference planes. Face making given angles with reference planes. Face and its edge making given angles with referance planes.
(b) Orthographic views of simple composite solids from their isometric views.

- (c) Exercises on missing surfaces and views
6. Section of Solids 2 Sheet
- Concept of sectioning
- Cases involving cutting plane parallel to one of the reference planes and perpendicular to the others.
- Cases involving cutting plane perpendicular to one of the reference planes and inclined to the others plane, true shape of the section
7. Isometric Projection. 2 Sheet
- Isometric scale
- Isometric projection of solids.
8. Free hand sketching 1 Sheet
- Use of squared paper
- Orthographic views of simple solids
- Isometric views of simple job like carpentary joints
9. Development of Surfaces 2 Sheet
- Parallel line and radial line methods of developments.
- Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid).
10. ORTHOGRAPHIC PROJECTION OF MACHINE PARTS: 2 Sheet
- Nut and Bolt, Locking device, Wall bracket
11. PRACTICE ON AUTO CAD : 2 Sheet
- Concept of AutoCAD, Tool bars in AutoCAD, Coordinate System, Snap, Grid and Ortho mode. Drawing Command - Point, Line, Arc, Circle, Ellipse. Editing Commands - Scale, Erase, Copy, Stretch, Lengthen and Explode. Dimensioning and Placing text in drawing area. Sectioning and hatching. Inquiry for different parameters of drawing.
- NOTE :
- A. The drawing should include dimension with tolerance wherever necessary, material list according to I.S. code. 25% of the drawing sheet should be drawn in first angle projection and rest 75% drawing sheet should be in third angle figure
- B. Practice on AutoCAD latest software is to be done in AutoCAD lab of Mechanical Engineering Department of the Institute.

II Semester

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

L T P
3 2/2 -

Rationale:

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

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

DETAILED CONTENTS:

1. INTEGRAL CALCULUS - I : (14 Marks)

Methods of Indefinite Integration :-

- 1.1 Integration by substitution.
- 1.2 Integration by rational function.
- 1.3 Integration by partial fraction.
- 1.4 Integration by parts.

2. INTEGRAL CALCULUS -II :(14 Marks)

- 2.1 Meaning and properties of definite integrals, Evaluation of definite integrals. Integration of special function.
- 2.2 Application : Finding areas bounded by simple curves, Length of simple curves, Volume of solids of revolution, centre of mean of plane areas.
- 2.3 Simposns 1/3rd and Simposns3/8th rule and Trapezoidal Rule : their application in simple cases.

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

- 3.1 CIRCLE :

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

3.2 Standard form and simple properties

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

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

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

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

4.1 Straight lines and planes in space -

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

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

2.2 APPLIED PHYSICS-II

[Common to All Engineering Courses]

L T P
3 2/2 4

Rationale:

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

1. Optics (4 Marks)

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

2. Introduction To Fibre Optics :(5 Marks)

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

3. Lasers and its Applications (4 Marks)

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

4. Electrostatics :(4 Marks)

Coulomb's Law, Electric field, Electric potential, Potential

energy, Capacitor, Energy of a charged capacitor, Effect of dielectric on capacitors.

5. D.C. Circuits (5 Marks)

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, Magnetic Hysteresis Curve and its utility. Basic idea of super conductivity, Meissner's effect.

7. Semiconductor Physics (4 Marks)

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

8. Junction Diode and Transistor : (6 Marks)

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

9. Introduction To Digital Electronics : (6 Marks)

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

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

- (a) Wind energy : Introduction, scope and significance, measurement of wind velocity by anemometer, general principle of wind mill.
- (b) Solar energy: Solar radiation and potentiality of solar radiation in India, uses of solar energy: Solar Cooker, solar water heater, solar photovoltaic cells, solar energy collector.

PHYSICS LAB

Note: Any 4 experiments are to be performed.

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

NOTE :

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

2.3 APPLIED CHEMISTRY

[Common to All Engineering Courses]

L T P
6 - 4

Rationale:

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

DETAILED CONTENTS:

1. ATOMIC STRUCTURE :(3 MARKS)

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

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 block elements), Periodic properties : Ionisation potential, electronegativity, 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, Galvanic Series. Prevention of corrosion by various method.

6. CHEMICAL KINETICS :(3 MARKS)

Law of mass action, order and molecularity of reaction. Activation energy, rate constants, 1st order reactions and 2nd order reactions.

7. CATALYSIS :(2 MARKS)

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

8. SOLID STATE :(2 MARKS)

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

9. FUELS :(3 MARKS)

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

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

Cetane number.

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

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

Numerical Problems based on topics

10. WATER TREATMENT :(3 MARKS)

Hardness of water, Its limits and determination of hardness of water by EDTA method. Softening methods (Only Sods lime, Zeolote and Ion exchange resin process). Disadvantage of hard water in different industries, scale and sludge formation, Corrosion, Caustic embrittlement, primming and 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 electro dialysis. 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 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 aspects -
- A. Electrophiles and nucleophiles, Reaction Intermediates, Free radical, Carbocation, Carbanion
- B. Inductive effect, Mesomeric effect, Electromeric effect.
- 2.A. Mechanism of addition reaction (Markonikov's Rule, Cyanohydrin and Peroxide effect),
- B. Mechanism of Substitution reactions; (Nucleophilic) hydrolysis of alkyl halide, electrophilic substitution halogenation, Sulphonation, Nitration and Friedel-Craft reaction.
- C. Mechanism of Elimination reaction - Dehydration of primary alcohol, Dehydrohalogenation of primary alkyl halide.
15. POLYMERS :(3 MARKS)
1. Polymers and their classification. Average degree of polymerisation, Average molecular weight, Free radical polymerisation (Mechanisms)
2. Thermosetting and Thermoplastic resin -
- A. Addition polymers and their industrial application- Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon.
- B. Condensation polymer and their industrial application : Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Decron, Polyurethanes.
3. General concept of Bio polymers, Biodegradable polymers and inorganic polymers(Silicon)
16. SYNTHETIC MATERIALS :(4 MARKS)
- A. Introduction - Fats and Oils
- B. Saponification of fats and oils , Manufacturing of soap.
- C. Synthetic detergents, types of detergents and its manufacturing.
3. EXPLOSIVES: TNT, RDX, Dynamite.
4. Paint and Varnish

LIST OF PRACTICALS

1. To analyse inorganic mixture for two acid and basic radicals from following radicals
 - A. Basic Radicals :
NH₄⁺, Pb⁺⁺, Cu⁺⁺, Bi⁺⁺⁺, Cd⁺⁺, As⁺⁺⁺, Sb⁺⁺⁺,
Sn⁺⁺, Al⁺⁺⁺, Fe⁺⁺⁺, Cr⁺⁺⁺, Mn⁺⁺, Zn⁺⁺, Co⁺⁺
Ni⁺⁺, Ba⁺⁺, Sr⁺⁺, Ca⁺⁺, Mg⁺⁺
 - B. Acid Radicals :
CO₃⁻⁻, S⁻⁻, SO₃⁻⁻, CH₃COO⁻, NO₂⁻,
No₃⁻ , Cl⁻, Br⁻ , I⁻ , So₄⁻⁻
2. To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.
3. To determine the total hardness of water sample in terms of CaCo₃ by EDTA titration method using Eriochroma black-T indicator.
4. To determine the strength of given HCl solution by titration against NaOH solution using Phenolphthaleum as indicator.
5. To determine the Chloride content in supplied water sample by using Mohr's methods.
6. Determination of temporary hardness of water sample by O-Hener's method.

2.4 TEXTILE FIBRES
(Common with Textile Technology)

L T P
3 - 3

Rationale

Textile Fibre being the primary input to textile industry, any education in the field of textiles remains incomplete with some knowledge of textile fibres, so whether it is textile technologist or textile chemist knowledge of textile fibres is inevitable. The paper aims to expose the vital aspect of subject to the reader.

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Introduction	8	-	-
2.	Classification & Sources of Textile Fibres	8	-	-
3.	General Properties of Fibres	8	-	-
4.	Molecular Structural Polymerization	8	-	-
5.	Utilization of Fibres	10	-	-
		42	-	42

DETAILED CONTENTS

1. INTRODUCTION:

(i) Definition of the Terms:

Textile, Fibre, Textile fibre, Staple, Filament, Yarn and thread.

(ii) Characteristics of a good Textile Fibre:

(a) Essential Properties:

Length, Strength, Flexibility, Cohesiveness

(b) Desirable Properties:

Fineness, Resiliancy, Uniformity, Porosity, Lusture, Durability and Commerical availability.

Importance and usefulness of these properties for textile use. Examples of fibres considerably in these properties

2. CLASSIFICATION AND SOURCES OF TEXTILE FIBRES:

2.1 Definition and Classification of textile fibres.

(a) Natural Fibres:

(1) Cellulosic fibres :

(i) Cotton: Verities of cottons, Harvesting and Ginning

(ii) Bast Fibres: Jute, Hemp, Ramie, Sisal and Flax.
Plant harvesting, Retting, Breaking and Scutching.

(2) Protein/Animal Fibre :

(i) Wool: Classification of wool fibres. The major animal fibres - Mohair, Camel hair, Cashmere, Reclaimed fibres.

(ii) Silk: Production of Raw silk, Its physical, chemical and electrical properties and methods of identification, different varieties of silk.

(v) Grading of Natural Fibres.

(b) Man Made Fibres:

Introduction to man made fibres such as Viscose Rayon, Acetate Rayon, Cuprammonium Rayon, Nylons (6 and 66), PET, Polypropylene. Acrylic, Metallic Fibres. General methods of manufacturing man made fibres viz. Wet, Dry and Melt processes in brief.

3. GENERAL PROPERTIES OF FIBRES:(Natural & Man Made)

3.1 Physical properties of fibres length, fineness, crimp, specific gravity, cross sectional shapes, maturity and their importance in their uses.

3.2 Introduction to mechanical properties of fibres: Stress-strain characteristics of various textile fibres. Concept of modulus and Tenacity, Extensibility, Toughness, Work of rupture and Frictional properties.

3.3 Brief introduction to optical and electrical properties of fibres.

3.4 Comparison of natural and man-made fibres

3.5 Use of optical microscope for fibre identification. Other physical method of identification. Chemical methods of their identification - Staining test and Solubility Test.

4. MOLECULAR STRUCTURAL POLYMERIZATION:

I. Molecular structure, Structure of textile fiber (Wool, Silk, Cotton, Polyester, Viscon Nylon).

II. Method of polymerisation, Criteria of fiber forming polymer.

5. UTILISATIONS OF FIBRES:

According to their properties Influence of physical and chemical properties of fibres on their usefulness. Chemical and Physical properties of textile fibres. Introduction to degree of polymerisation, Crystalline and Amorphous region.

TEXTILE FIBRES
List of Experiments

1. To distinguish animal fibres from vegetable fibres
 - (i) with an alkali.
 - (ii) with an acid.
2. To distinguish
 - (i) Silk from wool fibres.
 - (ii) Nylon from other fibres.
 - (iii) Polysters from other fibres.
 - (iv) viscose rayon, Cuprammonium rayon and Acetate fibres.
3. To distinguish linen from cotton.
4. To distinguish Orlon Acrylic Fibres from other fibres.
5. To identify textile fibres such as Cotton, Wool, Silk, Jute, Viscos rayon, Polyester, Nylon and Acrylic fibres under microscope and to draw their longitudinal and cross-sectional views.
6. Checking moisture gain of different textile fibres by Shirley moisture meter and by good brand conditioning oven.
7. To check the maturity ratio of cotton fibres by 10% caustic soda solution.
8. To check staple length of textile fibres by hand stapling method.
9. To check trash contents of cotton fibre by Shirley Trash analyser.
10. To identify of textile fibres by
 - (i) Staining Test
 - (ii) Solubility Test.
11. To determine the relative humidity and temperature of room with the aid thermo-hydrograph, whirling hydrometer and dry and wet bulb thermometers.
12. Find out fibre length by Uster stapler.
13. To find out fibre fineness of cotton by A.N. Stapling apparatus.
14. To do qualitative and quantitative estimation of fibres in a blend.

2.5 INTRODUCTION TO CARPET

L T P
6 - -

Rationale

The fabrics prepared go under variety of chemical processing before it reaches the hands of consumer. The processes have different objectives but they are important for quality and asthetic sense added to the fabric so is this paper here.

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	15	-	-
2.	Topic 2	30	-	-
3.	Topic 3	20	-	-
4.	Topic 4	19	-	-
		84	-	-

DETAILED CONTENTS

1. Definition and History of carpet
2. World History : Afghan carpets, Armenian carpets, Chinese carpets, Indian carpets, Pakistani carpets, Persian carpets, Scandinavian carpets, Turkish carpets, Turkmen (Bukhara) carpets, Azerbaijani rug, Oriental carpets in Europe, Spanish carpets, Bulgarian carpets, French carpets, English carpets, Modern carpets.
3. Fibres and yarns used in carpet : Nylon, Polypropylene, Wool and wool-blends, Polyster, Acrylic, etc. Esessential and desirable properties for carpet.
4. Types of Carpet : Woven, Needle felt, Knotted, Tufted and Others.

2.6 WORKSHOP PRACTICE

[Common with Civil Engg., Civil Engg. (sp. in Rural Engg.), Electrical, Ceramic, Dairy, Agriculture, Chemical Technology (Rubber & Plastic), Chemical Technology (fertilizer), Four year chemical Engg.]

[Four year Past time Mechanical Engg. (sp. in Production Engg.)]

L T P
- - 14

Rationale

A diploma holder in any branch of engineering has to work in between a skilled workman and an Engineer. In order to have effective control over skilled workmen it is necessary that the supervisory staff must have adequate knowledge and skill. For development of skills workshop practice is very essential.

Sl.No.	Units	Coverage Time		
		L	T	P
1.	Carpentry shop	-	-	20
2.	Painting & polishing shop	-	-	16
3.	Sheet metal and soldering shop	-	-	56
4.	Fitting shop, Plumbing & Fastening Shop	-	-	24
5.	Foundry shop			20
6.	Smithy shop	-	-	24
7.	Welding shop	-	-	20
8.	Machine shop	-	-	16
		-	-	196

DETAILED CONTENTS

1. Carpentry Shop :
 - EX-1 Introduction & demonstration of tools used in carpentry shop and different types of joints, types of wood, seasoning and preservation of wood
 - EX-2 Planing and sawing practice
 - EX-3 Making of lap joint
 - EX-4 Making of mortise and tenon joint
 - EX-5 Making of any one utility article such as wooden-picture frame, hanger, peg, name plate, etc.

2. Painting and Polishing Shop:
 - EX-1 Introduction of paints, varnishes, Reason for surface preparation, Advantage of painting, other method of surface coating i.e. electroplating etc.
 - EX-2 To prepare a wooden surface for painting apply primer on one side and to paint the same side. To prepare french polish for wooden surface and polish the other side.

- Ex-3 To prepare metal surface for painting, apply primer and paint the same.
- EX-4 To prepare a metal surface for spray painting, first spray primer and paint the same by spray painting gun and compressor system.

* The sequence of polishing will be as below:

- i) Abrasive cutting by leather wheel.
- ii) Polishing with hard cotton wheel and with polishing material.
- iii) Buffing with cotton wheel or buff wheel.

3. Sheet Metal and Soldering Shop :

- EX-1 Introduction and Types of sheets, measuring of sheets
- EX-2 Study and sketch of various types of stakes/anvil.
- EX-3 Introduction & demonstration of tools used in Sheet metal working shop.
- EX-4 Cutting, shearing and bending of sheet.
- EX-5 To prepare a soap case by the metal sheet.
- EX-6 To make a funnel with thin sheet and to solder the seam of the same.
- EX-7 To make a cylinder and to solder the same.
- EX-8 Preparation of different type of joints such as Lap joint-single seam, double seam. Hemp and wired joints.
- EX-9 To braze small tube/conduit joints.

4. Fitting Shop, Plumbing Shop & Fastening Shop:

- EX-1 Study of materials, limits, fits and tolerances.
- EX-2 Introduction & demonstration of tools used in Fitting Shop.
- EX-3 Hacksawing and chipping of M.S. flat. Filing and squaring of chipped M.S. job. Filing on square or rectangular M.S. piece.
- EX-4 Making bolt & nut by tap and die set and make its joints
- EX-5 To drill a hole in M.S. Plate and tapping the same to create threads as per need.
- EX-6 Utility article-to prepare double open mouth spanner for 18" hexagonal head of a bolt.
- EX-7 Cutting and threading practice for using socket, elbow and tee etc. and to fit it on wooden practice board.
- EX-8 Study of-bib cock, cistern or stop cock, wheel valve and gate valve etc.
- EX-9 Practice of bolted joints
- EX-10 To prepare a rivetted joint
- EX-11 To make a pipe joint
- EX-12 To make a threaded joint

EX-13 Practice of sleeve joint

5. Foundry Work

- Ex-1 Study of metal and non metals
- Ex-2 Study & sketch of the foundry tools.
- Ex-3 Study & sketch of cupula & pit furnace.
- Ex-4 To prepare the green moulding sand and to prepare moulds (single piece and double piece pattern sweep mould)
- Ex-5 Casting of non ferrous (lead or aluminium) as per exercise 3.

6. Smithy Shop :

- EX-1 Study & Sketch of Tools used in smithy shop.
- EX-2 To prepare square or rectangular piece by the M.S. rod.
- EX-3 To make a ring with hook for wooden doors.
- EX-4 Utility article-to preapre a ceiling fan hook.

7. Welding Shop :

- EX-1 Introduction to welding, classification of welding, types of weld joints.
- EX-2 Welding practice-gas and electric.
- EX-3 Welding for lap joint after preparing the edge.
- EX-4 Welding of Butt joint after preparation of the edge.
- EX-5 'T' joint welding after preparation of edge.
- EX-6 Spot welding, by spot welding machine.

8. Machine Shop

- EX-1 Study & sketch of lathe machine.
- EX-1 Study & sketch of grinders, milling M/c, Drilling M/c and CNC Machines
- Ex-2 Plain and step turning & knurling practice.
- Ex-3 Study and sketch of planning/Shaping machine and to plane a Ractangle of cast iron.

3.1 INDUSTRIAL SAFETY

(Common To Textile Chemistry, Textile Technology, Textile Design)

	L	T	P
Rationale	4	-	-

Textile industry is one of the major industries of the country. Its safety problems are much more different than those of others. So it is vital to give youngsters willing to enter into this field, knowledge of general principles of industrial safety focussing on problems in textile industry.

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Introduction	8	-	-
2.	Principles of Accident Prevention	8	-	-
3.	Safety Engineering	18	-	-
4.	Sizing Process & Loom Shed Safety, Precaution In Chemical Processes	10	-	-
5	Safety Statutes	12	-	-
		56	-	-

DETAILED CONTENTS

1. INTRODUCTION:

Need for Industrial Safety - Legal Humanitarain, Economic and Social consideration. Safe working conditions and productivity, Unsafe conditions and Hazards. Cost of accidents- Direct or Indirect social cost, financial cost. Role of mangement and workers participation in Industrial Safety. Safety management principles and practices.

2. PRINCIPLES OF ACCIDENT PREVENTION:

Definitions - Accident, Injury, Dangereous occurances, Unsafe acts, Unsafe conditions and hazards. Theories of accidents prevention, Principles and methods of accidents preventions.

3. SAFETY ENGINEERING:

Safe guarding of machines- Statutory provisions related to safe guarding of machinery and working near unguarded machines. Principle of machine guarding. Ergonomics of

machine guarding. Types of guards and guarding machines in textile industry. Incidental safety devices. Accidents and hazards. Guarding of machines and safety precautions in Opening, Cleaning, Carding, Drawing, Combing, Fly frame, Ring frames, Rotors (spinning), Winding, Doubling, Warping, Sizing and Weaving operations.

Material Handling:

Ergonomics of material handling, Principles of correct method of lifting objects of different size, shape and weight with safe use of accessories for manual handling.

Safety aspects of design and construction and use of material handling machinery use in textile industry- Lifts, Forks, Motor Trolleys, Over head cranes and Chain Pullies.

Principle of good illumination at work place and its recommended minimum standard. Lighting and Colour.

Danger From Electricity:

Safe limits of amperage and voltages. Means for cutting over loads and short circuit protection. earth fault protection. Protection of joints and conductors.

Fire explosion, Common cause for industrial fire detection and alarm. Knowledge of water system, Carbon Dioxide System, Foam Extinguishers system and Dry Chemical Extinguishing Systems for extinguishing fire, Sprinklers.

4. SAFETY PRECAUTION IN CHEMICAL PROCESSES:

Bleaching, Dyeing, Printing, Finishing and Accidental hazards. Chemical hazards in wet processing. Effluent in textile processing.

Health and Welfare:

Health hazards in Textile industry. Dust and Fly. Noise generated and control measures. Occupational hazards, Occupational diseases. Personal production equipments. Health and welfare measures e.g First Aid Facilities and other welfare measures Hospital, Clinics. Special precautions for specific work environment.

5. SAFETY STATUTES:

Employees welfare and legislation. Indian Boiler Act and Regulation. The Water (Control of Pollution) Act and Rules. The Air (Pollution) Act and Rules.

3.2 ELECTRICAL TECHNOLOGY & ELECTRONICS

(Common To Dairy Engineering, Mechanical Engineering, Textile Chemistry)

L T P
5 - 2

Rationale :

The superiority of electricity as power over other means in use in home or industry can not be denied. So it is imperative to introduce the mechanical engineering students with electrical machines and their various uses.

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Units	Coverage Time		
		L	T	P
1.	Electric Induction	4	-	-
2.	A. C. Theory	6	-	-
3.	Three Phase Circuits	6	-	-
4.	Measurement & Measuring Instruments	10	-	-
5.	Electronics	10	-	-
6.	D. C. Machines	8	-	-
7.	Transformers	6	-	-
8.	Synchronous Machines	6	-	-
9.	Induction Motors	6	-	-
10.	Electro Heating	4	-	-
11.	Electro Plating	4	-	-
		70	-	28

DETAILED CONTENTS

1. ELECTRIC INDUCTION:

Faraday's Laws of electromagnetic induction. Self and mutual induction. Statically and Dynamically induced e.m.f., Lenz's law. Fleming's left hand and right hand rule.

2. A. C. THEORY:

Production of alternating e.m.f. Definition of cycle, Frequency, Amplitude, Time period, Instantaneous, Average, R.M.S. maximum values of sinusoidal wave. Form factor, peak factor.

Representation of a sinusoidal quantity by a mathematical expression and phasor, phase and phase difference, Relationship of voltage and current for pure resistance, pure inductance and pure capacitive reactance, impedance.

Solution and phasor diagrams of simple R.L.C. series and parallel circuits. Active and reactive power. Significance of P.F.

3. THREE PHASE CIRCUITS:

Production of Three phase voltage, advantages of three phase supply. Concept of star and delta connections. Relationship between phase and line values of currents and voltages, Power in three phase circuits, simple numerical problems.

4. MEASUREMENT & MEASURING INSTRUMENTS:

(i) Primary and secondary instruments-Indicating, Recording and Integrated instruments.

(ii) Working principle and construction of the following instruments.

(a) Ammeter & Voltmeter (Moving coil & Moving Iron).
Extension of their ranges.

(b) Dynamometer type wattmeter.

(c) Single Phase A. C. Energy Meter.

(iii) Measurement of power in a single phase and three phase circuits by wattmeter, Use of digital multimeter for measurement of voltage, Current and testing of devices.

5. ELECTRONICS:

Basic idea of semi conductors P & N type. Semi conductor diodes, Zener diodes and their applications in rectifiers. Transistors-PNP and NPN-their characteristics and uses at an amplifier (Brief description only). Principle characteristics and application of SCR. Devices like UJT,

- FET, DIAC, TRIAC (Brief introduction, Introduction to operational amplifier, Introduction to basic logic gates and microprocessors.
6. D. C. MACHINES:
- D. C. Generator:
- Working principle, Constructional details, e.m.f. equation, Types of generators and their applications.
- D. C. Motor:
- Working principle, Back e.m.f., Types of D. C. motor and elementary idea of their characteristics. Torque equation, Methods of speed control (Description Only).
7. TRANSFORMERS:
- Working principle and constructional details of a single phase and 3 phase transformers, e.m.f. equation, Losses and efficiency, Cooling of transformers, Elementary idea of auto transformers and welding transformers.
8. SYNCHRONOUS MACHINES:
- (a) Alternators:
- Working principle, Types of alternators, Constructional details, E.M.F. equation, Condition for parallel operation.
- (b) Synchronous Motors:
- Working principle, Constructional details, Vector diagram, Effect of excitation on armature current and power factor, Synchronous condenser.
9. INDUCTION MOTORS:
- (a) Three Phase Induction Motors:

Working principle and constructional details-Types of induction motors-Slipring and Squirrel cage. Slip in induction motors. Speed torque characteristic, Starting and speed control. Application of induction motors in industry. General faults and their remedies.

(b) Single Phase Induction Motors:

Working principle and constructional details and application of single phase motors (Split phase, Capacitor start and Run Motor). A. C. series motors, General faults and their remedies.

10. ELECTRO HEATING:

Types of electro heating. Brief description of resistance ovens and induction furnace and core furnaces.

11. ELECTROPLATING:

Importance of electroplating, Principle of electroplating and equipment used. Processes used in electroplating, Anodising.

ELECTRICAL TECHNOLOGY & ELECTRONICS LAB

1. To change the speed and direction of rotation of d.c. shunt motor by
 - (a) Armature control method.
 - (b) Field control method.
2. To change the speed and direction of rotation of d.c. compound motor by
 - (a) Armature control method.
 - (b) Field control method.
3. To measure the terminal voltage with variation of load current of
 - (a) D.C. shunt generator.
 - (b) D.C. compound generator.
4. To perform load test on a single phase transformer and determine its efficiency.
5. To start and run a induction motor by
 - (a) Star Delta Starter.
 - (b) Auto Transformer Starter.
6. To measure slip of an induction motor by direct loading.
7. To start and change the direction of rotation of an induction motor.
8. To measure transformation ratio of a single phase transformer.
9. To measure power and P.F. in a single phase circuit by Ammeter, Voltmeter and Wattmeter.
10. To measure power and P.F. in a 3 phase/A.C. circuit by two wattmeter method.
11. To calibrate a single phase energy meter at different P.F.'s and different loads.
12. To locate the faults in an electrical machine by a megger.
13. To connect a fluorescent tube and note its starting and running current.
14. To draw characteristics of Silicon Controlled Rectifier

(SCR).

15. Testing of electrical devices - Zenor, Diode, Transistor, FET, UJT, SCR.
16. Use of operational amplifier as adder, subtractor, comparator, differentiator and integrators.

3.3 INTRODUCTION TO COMPUTER

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

L	T	P
2	-	5

Rationale:

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

TOPIC WISE DISTRIBUTION OF PERIODS

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

DETAILED CONTENTS

1. Introduction to Computer:

- A. Block Diagram of Computer.
- B. Types Of Computer
- C. Types of Input and Output devices
- D. Memories Devices (Its Types and Basic).

2. INTRODUCTION TO OPERATING SYSTEMS (MS-DOS/MS-WINDOWS:)

What is operating system, its significance, Commands of DOS, Features/Application of window.

3. WORD PROCESSING:

- File : Open, Close, Save, Save as, Search, Send to, Print Preview, Print and Page Setup
- Edit : Cut, Copy, Paste, Office Clipboard, Select All,

Find, replace, Goto, etc.
View : Normal/Web Layout/Print Layout; Tool Bars;
Header/Footer; Zoom, etc.
Insert: Break, Page Number, Date & Time, Symbol, Comment,
Reference, etc.
Format: Font, Paragraph, Bullets & Numbering, Borders &
Shading, Column, Change case, Back ground, etc.
Tools : Spelling & Grammer, Language, Word Count, Letters &
Mailing, Options, Customize, etc.
Table : Draw, Insert, Delete, Select, Auto Format, AutoFit,
Convert, Sort, Formula, etc.
Mail Merge

4. WORKSHEET:

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

5. PRESENTATION :

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

6. DATABASE OPERATION :

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

7. Introduction to Internet:

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

8. INTRODUCTION TO ADVANCE TOOLS :

I. Steps requires to solving problems.

A. Flow Chart

B. Algroithm

C. Programming

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

INTRODUCTION TO COMPUTER LAB

List Of Practicals

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

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

3.4 YARN MANUFACTURING PROCESS

(Common to Three year Diploma course in Textile Design (Printing))

L T P
4 2 -

TOPICWISE DISTRIBUTION OF PERIODS :

Sl.No.	TOPIC	LECTURE	TUTORIAL
1.	TOPIC-I	10	5
2.	TOPIC-II	10	5
3.	TOPIC-III	12	6
4.	TOPIC-IV	12	6
5.	TOPIC-V	12	6
T O T A L		56	28

DETAILED CONTENTS

- I. Flow chart of the processes involved in the Conversion of fibres into Yarn and objective of different processes.
- II. Brief study and working principles of blow room and carding.
- III. Brief description and working of draw frame, combing and speed frame
- IV. Brief description and working of ring frame, dubling frame and reeling.
- V. Types of yarn and their uses along with brief idea of manufacturing, Numbering system and characteristics such as strength, twist and evenness of yearn. (No numerical question should be asked in the examination).

3.5 CARPET YARN MANUFACTURING

	L	T	P
Rationale	6	2	8

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	6	2	
2.	Topic 2	12	4	
3.	Topic 3	12	4	
4.	Topic 4	12	4	
5.	Topic 5	12	4	
6.	Topic 6	9	3	
7.	Topic 7	21	7	
		84	28	112

DETAILED CONTENTS

1. Wool-shearing, clipping and categorization, Impurities present in wool and their removal.
2. Wool fibre spinning system - Woolen, semi worsted and worsted system, Flow chart and their description for all the system

Woolen- Blending, opening, carding and spinning.

Semi Worsted and Worsted - Blending, opening, carding, gilling, combing, roving and worsted spinning.

Difference among all these system and their utilities.
3. Requirement of carpet yarn with regards to count, twist, bulk, Faults in carpet yarn and their remedies, other properties of carpet yarn required in handmade and machine made carpet.
4. Specification of cotton yarn commonly used in carpet manufacturing.
5. Spinning of longer staple natural fibres like flax, jute, silk, etc. Concept of Mule, Flyer, Slip Draft, etc.
6. Objective and operations of doubling and twisting, Basic principles involved in assembly winding, Ring twisting, T.F. O., etc.
7. Limitation of Ring Spinning Process : Evaluation and possibilities of new spinning process.

Brief idea of spinning and friction spinning and properties of these yarns.

LIST OF PRACTICALS

1. To study the various parts of willow machine and their function.
2. To study the waste percentage extracted in willow machine.
3. To study the various parts and the settings of a woolen cum semi worsted card and passage of material.
4. To study the various setting of a woollen card.
5. To study the noil percentage extracted in combing.
6. To determine the production/hr of a woolen cum semi worsted carding machine.
7. To study the various parts of mule spinning frame, their function and passage of material.
8. To study the twist constant of woolen ring frame and calculation of twist per inch in yarn.
9. To determine the production per spindle/hour in a mule spinning frame.
10. To study the various parts of a gilling machine and their function and passage of material. To determine the draft constant, total draft and distribution of draft in a gilling machine.
11. To determine the production/hour of a gilling machine.
12. To study the various parts of roving frame and their function.
13. To study the transmission of drive and production/hr of a roving frame.
14. To study various parts of semi worsted R/F (with drafting and their functions).

15. To study the production per spindle hour of a semi worsted ring frame (with drafting).

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

Section "B" Hindi

1& Lojkt xkj

2& Hkkjrh; oKkfudka , oa rduhfd; ka dk Hkkjr ds fodkl ea ; ksxnku
3& xkE; fodkl
4& ifjokj fu; kstu
5& l kekftd l l Fkk; a
6& fu; kstu vkj tu dY; k.k
7& Hkkjr ea i kSj fxdh ds fodkl dk bfrgkl
8& gfjr dkkUr
9& i ; kbj.k , oa ekuo i nWk.k
10& Jfed dY; k.k
11& Hkkjr ea Jfed vkUnksyu

4.2 CARPET DESIGN - I

L T P
6 1 -

RATIONALE :

The importance of the paper lies in the fact that it introduces the reader with different varieties of the fabric and designs and related technical terminology. Knowledge of these things very base of textile designer's working.

TOPICWISE DISTRIBUTION OF PERIODS :

Sl.No.	TOPIC	LECTURE	TUTORIAL
1.	TOPIC-I	14	5
2.	TOPIC-II	14	5
3.	TOPIC-III	14	4
4.	TOPIC-IV	14	5
5.	TOPIC-V	14	4
6.	TOPIC-VI	14	5
T O T A L		84	28

DETAILED CONTENTS :

- I. Classification of woven fabrics. Introduction to technical terms used in cloth construction. Warp, weft, ends, picks, weave, design, repeat of design draft, pegplan and denting plan
- II. Plain weave and its derivatives ie, warp rib, weft rib, and matt or hopsack or basket.
- III. Regular twill weaves and their derivatives such Pointed, Herring bone, Zigzag-wavy, Curved, Broken, Re-arranged, Fancy twill, Combined twill and Diamonds.
- IV. Satin and sateen weaves.
- V. Basic of design, Introduction of Drawing. Study of different Geometrical structures i.e Lime, Triangle, Circle, Curve, Forms, Shapes, etc. and its impact on visulization and perception. Basic carpet designs; material and emthod used in carpet designing and colouration. Motif of design and drawing (Historical, Aesthetical), Indian Motif (Indiya collection). Drawing from out door sources i.e parks, meseum and architectural buildings, Utilization of Drawing techniques and other media and idea to develop design and drawing.
- VI. Difference between desgn and development, Aspects of home textile design, Source of design ideas/inputs, Design requirements pertaining to different countries. Product life

cycle, Characteristics of industry during various phases of product of life cycle.

4.3 - TEXTILE TESTING

(Common To Textile Chemistry)

L T P
4 2 6

Rationale

As the name implies this paper aims to develop in the incumbent the capability of testing the products and its components for desired results. Without it a product can never be claimed for any standard.

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Importance of Textile Testing	8	4	-
2.	Sampling and quality control	8	4	-
3.	Fibre Dimensions	8	4	-
4.	Yarn Dimensions	8	4	-
5.	Fabric Dimensions	8	4	-
6.	Tensile Testing of Textiles	8	4	-
7.	Evenness Testing:	8	4	-
		56	28	84

DETAILED CONTENTS

1. IMPORTANCE OF TEXTILE TESTING:

Introduction to textile testing, properties of fibres, yarns and fabrics and their relevance in assessing the performance, of textiles during and after manufacture.

2. Sampling and Quality Control : Definition of sample, sample size, sampling Technique, Introduction to quality control, Accuracy of measurement, presentation and analysis of data, SQC charts analysis of defects, difference between average and correlation. Standard deviation and coefficient of variation.

3. FIBRE DIMENSIONS:

i. Fibre Length Measurement - Use of Baer sorter, Fibrograph, Uster-stapler, their principles of operation.

ii. Fibre Fineness Measurement - By cutting and weighing method, Sheffield micronair, Aerlometer, Maturity of cotton by caustic soda method and by airflow methods.

iii. Role of Humidity - Absolute Humidity, Relative

Humidity, moisture Regain, Moisture content.

iv. Introduction to H.V.I. (High Volume Instruments)

4. YARN DIMENSIONS:

i. Measurement of yarn twist by Rock bank twist tester, continuous twist tester and by twist and untwist methods.

ii. Measurement of yarn diameter by microscope.

5. FABRIC DIMENSIONS:

i. Measurement of fabric thickness. Measurement of crimp by crimp tester.

ii. Air permeability of fabrics, its measurement by air permeability tester.

iii. Crease recovery of fabrics, factors effecting crease recovery, measurements of crease recovery by crease recovery tester.

iv. Water repellancy tests.

v. Abrasion resistance test on fabric by Mortindale, Abrasion Tester.

6. TENSILE TESTING OF TEXTILES:

i. Fibre strength testing by Pressely strength tester, stelometer.

ii. Yarn strength testing, types of testing machines, single yarn strength testing and Lea strength testing.

iii. Fabric strength testing by cut strip, grab strip and revealed strip methods.

iv. Fabric tear testing by tongue tear, trapezoid tear test.

v. Bursting strength testing by hydraulic strength tester.

7. EVENNESS TESTING

i. Nature of irregularities - short term, medium term and long term variations, periodic and non periodic irregularities.

- ii. Evenness testing by uster evenness tester and fielden and walker evenness tester.
- iii. Classmate faults and classifaults.

TEXTILE TESTING
LIST OF EXPERIMENT

1. To find the count of yarn
(i) by physical balance
(ii) by yarn quadrants balance.
(iii) by Bessley yarn balance.
and to calculate Coefficient of variation (CV).
2. To calculate yarn count by wrap reel and to calculate C.V..
3. Determine the twist of yarn per inch/per meter in double yarn and its individual components by continuous twist tester and twist and untwist tester.
4. Find out the hank of sliver and roving with the aid of wrap block machine.
5. Find the staple length of fibre by Bare Sorter.
6. Measure fibre fineness by flowing air through a sample of fibre by micronaire.
7. Find out fibre length by analytical digital fibrograph.
8. Find out lea strength of cotton yarn by lea strength tester (Power driven) and CSP.
9. Find the breaking strength of cotton yarn by Ballistic strength testing machine.
10. To find the breaking strength and elongation of single thread of cotton by single thread testing machine (Hand or power driven).
11. Examine the bursting strength of a fabric by bursting strength tester.
12. Find out the relative abrasion properties of fabrics by Martindale abrasion tester.
13. Find the breaking strength of different textile fabrics by means of cloth strength tester (power driven).
14. Measure crimp by shirley crimp meter.
15. Find out air permeability of fabric by air permeability tester.
16. Measure crease recovery of fabric by crease recovery tester.

17. Find out fibre strength by stelometer.
18. Test of pilling of fabrics by computerzed pilling texter.
19. Estimation of final pH value of finished fabric.
20. Test evenness of the yarn by evenness tester.

4.4 FABRIC MANUFACTURING SYSTEM

L T P
4 1 -

RATIONALE :

From the title of the paper, it is evident that the knowledge of manufacturing process is matter of imparitive importance to textile designer. So is the importance of the paper.

TOPICWISE DISTRIBUTION OF PERIODS

Sl.No.	TOPIC	LECTURE	TUTORIAL
1.	TOPIC-I	12	3
2.	TOPIC-II	12	3
3.	TOPIC-III	12	3
4.	TOPIC-IV	10	3
5.	TOPIC-V	10	2
T O T A L		56	14

DETAILED CONTENTS

- I. Brief introduction to sequence of different processes involved in the conversion of yarns into fabrics. Brief study and working principles of cheese winding, warp winding, weft winding, warping and sizing.
- II. Introduction to various primary, secondary and auxiliary motions of a loom.
- III. Classification of various types of weaving machines. Brief Study of handloom, power loom and elementary knowledge of automatic looms and shutterless looms.
- IV. Brief study of dobby and jacquard.
- V. Introduction to knitted fabrics and various types of knitting concepts (Warp knits and weft knits).

4.5 CARPET MANUFACTURING

	L	T	P
Rationale	6	1	6

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	20	3	
2.	Topic 2	22	4	
3.	Topic 3	22	4	
4.	Topic 4	20	3	
		84	14	84

DETAILED CONTENTS

1. FUNDAMENTALS OF CARPETS 1

Classification of carpets, textures and other relevant features, Introduction to various terms used in carpet industry locally and inter nationally.

2. HAND KNOTTED CARPET :

Preparatory process, Construction, types of knots used, brief description of equipments used manufacturing process in various types hand knotted carpets including Tibetan type. Defect arising in hand knotted carpets and their remedial measures.

3. HAND WOVEN CARPETS :

Preparatory process, construction, types of looms used in hand woven carpet, brief description of various types of looms and tools used in hand woven carpets. Various types of defects arising in hand woven carpets and their remedial measures. Flat woven carpets manufacturing and finishing process including Broad Looms.

4. TUFTED CARPETS :

Preparatory process, constructions, basic principles, process sequences, tufting equipments used e.g (tufting, frame, tufting gun, etc.) Schortz hand tufted machine, Construction of various, backing cloth used in tufted carpet.

LIST OF PRACTICALS

A. Hand Knotted Carpets

1. Preparation of warp
2. Mounting and setting of warp
3. Preparation of weft (pile material, lachchi and tharry)
4. Practice of knots.
5. To study and identify the various types of knots used in hand knotted carpet and also to determine knots/square inch in a carpet.
6. Preparation of a small sample.
7. Study of various parts of a vertical carpet loom and their functions.

B. Tibetan Carpets

1. Practice of knots
2. Preparation of small sample

C. Hand Tufted Carpet

1. Farming of primary backing including tracing of design
2. Practice of tufting using hand and electric gun
3. Preparation of small sample

D. Loom Made Carpets

1. Study of the features of the loom
2. Study of various parts of handloom and their function.
3. Installation of handloom for durry and vertical carpet loom.
4. Preparation of small sample (Broad loom/durry)
5. To study various parts of a vertical arpet loom and their functions.

E. Practical demonstration on handling of equipments used in manufacturing of a Hand knotted and hand tufted carpet.

F. Practical demonstration on handling of equipments used in manufacturing of Indo-Tibetan and Board Loom.

- G. Acquaintance of KUBBY Carpet sampling machine and prototype development of handmade carpet (Preferably protraits.)

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 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 of Empathizing 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)

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 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 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), 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

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**
 - 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.
- 9. **Financial Management**
 - 9.1 Importance of ledger and cash book.
 - 9.2 Profit and loss Account, Balance sheet.
 - 9.3 Interpretation of Statements, Project financing, Project appraisal, return on investments.
- 10. **Entrepreneurship Development**
 - 10.1 Concept of entrepreneur and need of entrepreneurship in the context of prevailing employment conditions.
 - 10.2 Distinction between an entrepreneur and a manager.
 - 10.3 Project identification and selection.
 - 10.4 Project formulation.
 - 10.5 Project appraisal.
 - 10.6 Facilities and incentives to an entrepreneur.
- 11. **Fundamental of Economics**
 - 11.1 Micro economics.
 - 11.2 Macro economics.
- 12. **Accidents and Safety**
 - 12.1 Classification of accidents based on nature of injuries, event and place.
 - 12.2 Causes and effects of accidents.

- 12.3 Accident-prone workers.
- 12.4 Action to be taken in case of accidents with machines, electric shock, fires and erection and construction accidents.
- 12.5 Safety consciousness and publicity.
- 12.6 Safety procedures.
- 12.7 Safety measures - Do's and Don'ts and god housing keeping.

5.3 CARPET CHEMICAL PROCESSING

	L	T	P
Rationale	4	2	-

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	12	4	-
2.	Topic 2	9	3	-
3.	Topic 3	9	3	-
4.	Topic 4	9	3	-
5.	Topic 5	9	3	-
6.	Topic 6	9	3	-
7.	Topic 7	9	3	-
8.	Topic 8	9	3	-
9.	Topic 9	9	3	-
		84	28	-

DETAILED CONTENTS

1. Preparatory process for different fibres used in carpets (Scouring bleaching).
2. Classification of dyes and various dyes used for dyeing of various fibres (Cotton, wool, acrylic, polyester).
3. Introduction to various terms used in chemical processing of carpets- M:L ratio, Shade %age, Mass colouration, Dope dyeing exhaustion percentage. Introduction to various dyeing machinery - Fibre dyeing machine, Hank dyeing machine, Winch, Jigger, HTHP dyeing machine.
4. Principle and application of dyes - Acid dyes, Metal complex dyes, Basic dyes, Disperse dyes.
5. Introduction to method and style of printing various ingredients used in printing paste yarn printing, Flock printing and latest developments in carpet printing.
6. CHEMICAL PROCESSING RELATED TO CARPET :

Impurities present in wool like suint, wool grese and surface soiling. Process for the removal emulsion souring process in relation to detergents and wool grease removal. Principles of the tests carried out on grease. Introduction to wool grease recovery. Wool drying, pressing and packing.
7. ACID DYES :

Generalized formula and classification of acid dyes. Procedure for application of various types of acid dyes to wool and other fibres (e.g. Nylon and Silk), Nylon: Mechanism of acid dyeing and dye fibre bound, effect of different process parameters and role of additives in acid dyeing, Fastness properties of acid dyes.

CHROME DYES :

Concepts of mordants; formation of chromium complexes; Method of application of chrome dyes - Chrome mordant process, After Chrome Process, Meta chrome process. Brief idea on fastness properties of chrome dyes, Chromosol.

METAL COMPLEX DYES :

General formula and structure, Classification of metal complex dyes - 1:1 metal complex dyes and 1:2 metal complex dyes; Procedure of application of metal complex dyes and mechanism of dyeing fastness; Properties of metal complex dyes.

8. CHEMICAL COATING AND FINISHING :

Objectives of Latexing, Merit of Latex, Application of latex, Formulation of latex compound and role of auxiliaries; Quality assessment of latex, Problems and remedial measures of latexing synthetic latex and its advantages.

Shearing, Third Backing, Edge Binding, Taping, Fringe and Knotting - Finishing, Modern backing technique substituting latexing.

9. CHEMICAL PROCESS ON WOOL :

Bleaching, Prevention of dyebath yellowing, Insect resist treatments, Shrink proofing, Anti static properties, plane retardant wool, photo stabilizers, stain blicking, polymer grafting setting. Wool Scour Effluent Treatment- Process control and quality assurance, Energy conservation.

5.4 CARPET DESIGN-II

	L	T	P
Rationale	6	2	8

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	15	5	-
2.	Topic 2	15	5	-
3.	Topic 3	15	5	-
4.	Topic 4	12	4	-
5.	Topic 5	12	4	-
6.	Topic 6	15	5	-
		84	28	112

DETAILED CONTENTS

1. Introduction of Computer Aided Desinging - Importance and advantage of CAD, Features of CAD sytem, Interface elements, Transfer of designs to print paper : Various steps in transferring designs form sketch to Point Paper.
2. Customizable setting, view, new designing creations, scanned photographs editing, File utilities, freehand tools, geometric tool group, selection group, zoom group, selection utilities, general group.
3. Creating motifs in computer : drawing tools, motif scanning parameters-editing imagr for graph making- scaling rotating, reversing, convert to full methods of different style and forms of design using computer i.e. resize group, irregular scale normal scale, covert to full, drop repeat, exchnge horizontally, vertical exchange adjustment repeat.
4. Importance of colour application in motif, colour utilities, colour protection colour separation, transparent colour,change colours, colour reduction, colour reduction based on similarity tracing a graph/design plate print out, wool consumption print out, colour library- overview creating new colour library DPI calculation.
5. Preparation of computerized graph design from edited motif with suitable weaves, vector and raster images, x and y in designs, flot control and flat checking, pixel resolution and its relation with thread and thread per inch. Weave creation, creation of weaves and saving, Jacquard designing, Principle of creating motifs in computer- drawing tools,

motif scanning, scanning parameters, colours and attributes.

6. Printing Designs- Usage of CAD in Textile Printing; Editing of scanned Image by using different CAD tools. Creation of design direct on computer screen by using CAD tools (Mouse/Digitiser). Creation of different textures with the helps of CAD. Incorporation of different Textures etc. Arrangement and layout of Motif to form Print Design. Design Calculaiton as per given parameters for print i.e. Size of screen, Number of screen etc. Colour seperatio to make screen, Block etc.

5.5 CARPET FINISHING AND MAINTENANCE

	L	T	P
Rationale	6	2	-

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	28	9	-
2.	Topic 2	28	9	-
3.	Topic 3	28	10	-
		84	28	-

DETAILED CONTENTS

1. CHEMICAL COATING :

Various types of latex and syntetic resin used in carpet backing, chemicals used for coating and their role, Equipments used for application of coating (e.g. Mixing vessel, balcking pan, oven chemical pot milling machine, latex spray gun, etc.), Curing process, Problems arising in Latexing and their remedial measures.

2. Description and functions of various equipments used in finishing of carpet e.g. Thokai Tools : Bakani, Beroni, Shearing machine, Hand shearing machine, Finishing, Scissors, Embossing, Scissor, Fibric scissor, Pile separator, Steel teeth comb, Embossing hand tools.

3. CHEMICAL WASHING OF CARPETS :

Traditional system. Mechanised system including pre and post washing sequence. Detailed idea on various type of washing like antique wash, herbal wash etc. (Chemicals used and process parameters, equipments are to be studied), Sheen and glaze characteristics of woollen and silk carpets.

VI Semester

6.1 ENVIRONMENTAL EDUCATION & DISASTER MANAGEMENT

L T P
4 - -

RATIONALE:

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

TOPIC WISE DISTRIBUTION OF PERIODS:

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

DETAILED CONTENTS

1. INTRODUCTION :

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

2. POLLUTION :

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

2.1 WATER POLLUTION :

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

2.2 AIR POLLUTION :

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

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

2.3 NOISE POLLUTION :

Sources of noise pollution, its effect and control.

2.4 RADISACTIVE POLLUTION :

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

2.5 SOLID WASTE MANAGEMENT :

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

3. LEGISLATION :

Preliminary knowledge of the following Acts and rules made thereunder-

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

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

4. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) :

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

5. DISASTER MANAGEMENT :

Definition of disaster - Natural and Manmade, Type of disaster management, How disaster forms, Destructive power,

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

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

6.2 NON WOVEN

L T P
4 2 -

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	10	5	-
2.	Topic 2	10	5	-
3.	Topic 3	10	5	-
4.	Topic 4	8	4	-
5.	Topic 5	8	4	-
6.	Topic 6	10	5	-
		56	28	-

DETAILED CONTENTS

1. Introduction to Non woven, Raw materials: Fibrous matters description, Properties of fabrics made from different fibrous matters, Bounding agents used in non woven.
2. Classification non woven, Production steps for different methods : General production steps for manufacturing non woven fabrics. Dry bounded fabric production steps, Spun bounded fabric production.
3. Types of webs and their forming techniques: Staple fibre webs, wet-laid webs, Dry-laid webs, Fibre preparation.
4. Non woven fabric bounding techniques : Mechanical bounding, Needle punching technology, Stitched bounding technology, Hydro entanglement Adhesive bounding or chemical bounding; Spray adhesive bounding, Foam bounding, Thermal bounding, Hot calendaring, Area bounding, Point bounding, Embossing, Belt calendaring, Through- air bounding.
5. Finishing of Non Woven Fabrics : Introduction, classification of finish applied to non woven fabrics, Shrinkage, Wrenching and Creping, Creeping : The Micrex-Microcreepe process. Process carbbing, Calendaring. Roller Presses, Perforating and Slitting Performing, Slitting Splitting, Grading, Velouring.
6. Antistatic Finish, Antimicrobials, Water repalent finish, Lubricants, UV absorbers and Polymer stabilizers, Flame retardent Soil release, Optical brightners.

6.3 CARPET TESTING

	L	T	P
Rationale	6	2	8

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	22	8	-
2.	Topic 2	22	8	-
3.	Topic 3	20	6	-
4.	Topic 4	20	6	-
		84	28	-

DETAILED CONTENTS

1. Performance evaluation of carpets and other floor coverings- classification of floor covering according to use and structure. Need for carpet texting. Different aspects of quality testing and performance assessment of carpets. Norms for various performance parameters of carpet
2. Testing of functional properties of carpet and floor covering (a) Apperance retention (b) Carpet durability including soilability, carpet abrasion resistance (c) Resilience (d) Tendency of pilling and fuzzing (e) Other properties like insulation properties, acoustic properties electrostatic properties, etc.
3. Brief description and principle operation of following carpet testing equipments; Dynamic loading machine, Tuft Withdrawal tensometer, Pilfuz Carpet Tester, Usometer, Hexapod Tumble Tester, Courtaulds Tetrapod Walker.
4. Brief description and principle operation of following Carpet Testing Equipments : Digital Thickness Gauge, Portable Carpet Thickness Guage, Drum Testing Device, Roller Chair Testing Device, Carpet Static Loading Device, Carpet Wear and Abrasion Tester, Types of Carpet Flammability Tester.

LIST OF PRACTICALS

1. Determination of dimensional stability of carpet.
2. Determination of carpet thickness using digital thickness tester.
3. Measurement of pile height of carpet using leave guage.
4. Determination of thickness of carpet under a given load vis-a-vis compressibility and % recovery by Digital thickness guage.
5. Determination of thickness of carpet and carpet backing using portable thickness gauge.
6. Determination of abrosion resistance and weight loss in carpet.
7. Determination of degree of appearance retention of a carpet.
8. Determination of blend composition of carpet.
9. Determination of knots/sq" of a hand knotted carpet.
10. Determination of tuft withdrawal force using tuft withdrawal tensometer.

6.4 MODERN CARPET TECHNOLOGY

	L	T	P
Rationale	6	-	-

Topic Wise Distribution of Periods

Sl.No.	Topics	Coverage Time		
		L	T	P
1.	Topic 1	20	-	-
2.	Topic 2	22	-	-
3.	Topic 3	22	-	-
4.	Topic 4	20	-	-
		84	-	-

DETAILED CONTENTS

1. Introduction to machine made carpets - Wilton, Axminster, Face to Face weaving, Machine tufting
2. CLASSIFICATION OF MACHINE MADE CARPETS :

Rang of yarn count used in machine made carpets for warp, weft and pile yarn, Properties of carpet yarn and their impact of functional properties of carpet. Brief description on characteristic features and manufacturing process of machine made tufted carpet. Study of various steps involved in the machine tufting.
3. Classification of woven carpets, brief description on characteristic features and manufacturing processes of various types of woven carpets with special reference to Wilton and Axminster looms.
4. Non woven carpet : Types of non woven carpet, their construction and end use. Brief description of process and machineries involved in manufacturing of Needle punched, adhesive bonded, Electrostatically flocked carpet.

6.5 PROJECT

L T P
- - 4

Two periods per week are allotted for project work in the final year of the course. In classroom students (i) be encouraged and helped for developing new designs in weave/carpet (ii) be given clear idea of establishing a carpet unit of given size beginning from selection of site, deciding type of building construction/shed, units of machinery required, their layout. Fundamental requirements of carpet mill organisation. Deciding number of workers and their type. Process control in carpet departments, elements of costing and costing procedures in various sections, Factors affecting productivity and efficiency of men and machines, sources of finance and development of resources.

For general awareness students be introduced to organisations involved in certification, standardisation, research and development of textile products Viz. BIS, Centre Silk Board, Textile Committee, Textile Commission, Jute Commission, ATIRA, NITRA, BTRA, etc.

The project paper will be of two parts. Part-A will contain the problems to evaluate students learning. The Part-B will be regarding students awareness of the plans and programmes running for rural development, ecological balance and environmental pollution control, entrepreneurship development and agencies involved in these works.

PART-A:

Part-A will contain two types of problems (i) relating to development of designs in yarn/weave and preparing their samples. (ii) relating to establishment of a spinning/weaving unit of given size. The student will be allowed to choose one either kind of the problem to solve.

PART-B:

The student Will survey a village and prepare a report giving details of population, means of lively hood, Health and hygenic conditions, Education facilities and various programmes/projects running for the development and the personnels and agencies involved in the work. He will also make observation on environmental pollution and ecological disturbunces and will make a mention of these in his report with their reasons, suggesting remedies. Without it the project will not be taken as complete. The student will also do some constructive work for pollution control as advised by the guiding teacher

Student will choose any one of the problems from Part(A) and Part(B) is compulsory for all students. The students can be divided into groups of threes to do one problem. The students will be examined for 100 marks by an examiner appointed by B.T.E, U.P.

1. Examination Marks 100

Part A:-

Project Work	50
Viva Voce	25

Part B:-

Project Work	15
Viva Voce	10

Sessional Marks	50	50
	-----	-----
Total	150	150
	-----	-----

6.6 INDUSTRIAL TRAINING (6 Week)

Viva Voce	100
Sessional Marks	40

Total	140

DIPLOMA IN CARPET TECHNOLOGY
STAFF STRUCTURE

Intake of the Course 60
Pattern of the Course Semester System

S.No.	Name of Post	No.
1.	Principal	1
2.	HOD	1
3.	Lecturer(*)	7
4.	Lecturer in Communication Tech.	1 (Part-time)
5.	Instructor	2
6.	Computer Programmer	1
7.	Steno Typist	1
8.	Accountant/Cashier	1
9.	Student/Library Clerk	1
10.	Store Keeper	1
11.	Class IV	6
12.	Sweeper	Part time as per requirement
13.	Chaukidar & Mali	As per need with justification

NOTE :

1. The number of staff required for individual institution shall be worked out in accordance with the norms laid down in G.O.No. 2281/Pra. Shi. -3-1989-60 (B)/85 dated June 27, 1989.
2. Services of the staff of other disciplines of the Institute may be utilised.
3. The post of "Computer Programmer" is not needed in the institutions where diploma in "Electronics Engineering" is running.
4. QUALIFICATIONS OF STAFF : As per Service Rules.

SPACE STRUCTURE

No. M2

[A]. Administrative Block

1.	Prinicipal's room	1	30
2.	Steno room	1	6
3.	Confidential room	1	10
4.	Reception Lounge	1	25
5.	Main Office	1(.25 Sqm./Student)	
6.	Library (common with other disciplines)	1	150
7.	Common room	3	150
	A. Boys Common Room	1	50
	B. Girls Common Room	1	50
	C. Staff Common Room	1	50
8.	Class rooms	2	120
9.	Store (100+0.1xStudent Population)	1	109
10.	Confrence Room	1	75
11.	Head of Department Room	1	15
12.	Lecturer Room	(10 Sqm./Lecturer)	
13.	Confidential Office for Examination work	1	25
14.	Estate Office (Security,Campus,Services)	1	25

[B] Acedemic Block

Sl.No.	Detail of Space	No.	@ Sq.m	Floor Area Sq.m.
1.	Class Room	2	60	120
2.	Drawing Hall	1	120	120
3.	Physics Lab			90
4.	Chemistry Lab			120
5.	General Mechanical Engineering Lab			120
6.	Textile Testing Lab.			
	A Fibre			11470x4800mm
	B Yarn			11470x4800mm
	C Fabric			11000x7500mm
7.	Carpet Technology Lab			39830x15230mm
8.	Electrical Technology & Electronics Lab or Common with Electrical Engineering.			
9	Computer Lab (Air Cond.Glass Partition			

and Special type pvc flooring and
false ceiling) 60

[C] Work shop

I	Workshop Supdt. Room	12
II	Store	20
III	Shops	
(a)	Carpentry Shop	50
(b)	Smithy Shop	70
(c)	Fitting Shop	50
(d)	Welding Shop	50
(e)	Painting Shop	50
(f)	Sheet Metal ,Soldering & Brazing shop	50
(g)	Plumbing shop	50
(h)	Machine Shop	150
(i)	Foundry	75

[D]. Common Facilities

1.	Dispensary	1	75
2.	Canteen, Cooperative Store,Bank Extension Centre, Postal Services etc.	1	150
3.	Parking space		
	A. Cycle Stand (1 Sqm./Cycle For 25% Students)		
	B. Scooter Stand (3 Sqm./Scooter For 25% Students)		
	C. Car Garage (15 Sqm./ Car)		
	D. Bus Garage (55 Sqm./ Bus)		
4.	N.C.C. block	1	(2 Sqm/Student)
5.	Guest room (with 2 guest rooms and service facility)	1	100

[D]. Residential Facilities

1.	Hostel for students	1	for 50% boys & 100% girls students to be provided in seperate block)
2.	Staff quarters		
	Principal	1	Type IV
	HOD/Warden	2	Type IV
	Sr. Lect./Lect.	2	Type IV
	Technical/Ministerial staff	4	Type II
	Class IV	6	Type I
3.	Play ground (common)	1	1500-2500 Sqm depending upon availability of land

Priorty to be given in following order

- (1)
 - a. Administrative Building
 - b. Labs
 - c. Workshop
 - d. Over head Tank
 - e. Boundary Wall
 - f. Principal Residence
 - g. Fourth Class Quarters (2/3)
- (2)
 - a. Hostel
 - b. Students Aminities
- 3) Residences of employee

LIST OF EQUIPMENT

1. Equipment essentially required for performing the practicals mentioned in the curriculum are only to be procured.
2. Experimental model/Prototype/Lab Model be purchased in place of costly machines/equipments.
3. "Machine/Equipment/Instruments of old BTE list which are not included in the list given below are to be retained in the Lab/Shop for Demonstration purpose but not to be purchased fresh."

I. APPLIED PHYSICS LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt. in Rs.
1.	Brass ball with hook 2 cm. dia	2	20	40
2.	Stop clock least count 0.1 Sec	2	500	1000
3.	Wall bracket with clamping arrangement	2	50	100
4.	Meter scale	5	20	100
5.	Convex lenses of focal length 10 cm., 20 cm., 50 cm. and 100 cm. 2 nos. of each	8	10	80
6.	Optical bench steel with pin and lens holders	2	500	1000
7.	Astronomical telescope	1	500	500
8.	Searl's conductivity apparatus with copper & steel rods 25 X 4 cm. diameter with all accessories	1 set	1000	1000
9.	Lea's conductivity app. complete with all accessories	1 set	1000	1000
10.	Constant water flow arrangement	2	400	800
11.	Boiler made of copper 2 lt. cap.	4	200	800
12.	Platinum resistance thermometer	2	800	1600
13.	Potentiometer - 10 wires with jockey	1	500	500
14.	Meter bridge complete	1	250	250
15.	Lead accumulator 2.2 V. and 20 amp. hour capacity	2	250	500
16.	Moving coil galvanometer	3	200	600
17.	Moving coil ammeter 0-1 amp., 0-5 amp., 0-10 amp., 1 no of each	3	250	750
18.	Moving coil voltmeter 0-1 V. 0-5 V., 0-10 V. 1 No of each	3	250	750
19.	Leclanchi cell complete	3	100	300
20.	Resonance col. of steel tube with tuning forks and other accessories	1	500	500
21.	Tuning forks set of different frequencies	1 set	1000	1000
22.	App. for determining coefficient of friction on a horizontal plane	1 set	1000	1000
23.	Appratus for determining characteristics of P-N junction diode complete with all accessories	1 set	1500	1500
24.	Post office box dial type	1	1200	1200
25.	Resistance box 0-10 ohm., 0-100 ohm. 2 nos. each	4	400	1600

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
26.	Rheostat of different ohm.capacity	8	250	2000
27.	Physical balance with weight box	2	800	1600
28.	Set of fractional weights	10	20	200
29.	Fortin's barometer with mercury	1	2500	2500
30.	Battery eleminator 6 V. & 3 amp.	1	250	250
31.	Lab tables	3	8000	24000
32.	Lab stools	10	100	1000
33.	Anemometer cup type	1	1000	1000
34.	Anemometer hand held	1	1000	1000
35.	Suryamapi	1	1500	1500
36.	Insolation meter	1	1500	1500
	Misc.	LS		5000

II. APPLIED CHEMISTRY LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt. in Rs.
1.	Test tube stand	15	10	150
2.	Funnel stand	15	10	150
3.	Burette stand	15	30	450
4.	Pipette stand	15	10	150
5.	Chemical balances with analytical weights 1gm -200gms	5	1500	7500
6.	Fractional weights set with rider	5sets	25	125
7.	Kipp's apparatus 1000 ml. polythen	2	500	1000
8.	Reagents bottles			
	250ml	120	10	1200
	500ml	5	15	75
	1000ml	5	25	125
9.	Wide mouth bottle 250 ml	15	15	225
10.	Winchester bottle 2.5 litre	15	30	450
11.	Test tubes 1/4" x 6"	75	1	75
12.	Boiling tube 1" x 6" hard glass	24	10	240
13.	Pestle and mortar 10 cms	2	30	60
14.	Watch glass 7.5 cms	15	5	75
15.	Beakers			
	100 ml.	10	15	150
	250 ml.	24	20	480
	400 ml.	12	25	300
	1000 ml.	5	30	150
16.	Weighing bottle 10 ml with lid	15	10	150
17.	Wash bottles	15	15	225
18.	Conical flask 250 ml.	15	30	450
19.	Flat bottom flask 500 ml.	6	40	240
20.	Flat bottom flask 250 ml.	15	25	375
21.	Burette 50 ml.	15	60	900
22.	Pipette 25 ml.	15	20	300
23.	Measuring flask 250 ml. with stopper	15	50	750
24.	Measuring cylinder of various sizes (250 ml, 500 ml, 1000 ml) 3 no. of each	9	LS	250
25.	Bunsen's burner of brass	15	50	750
26.	Gas plant petrol 10 to 20 burners automatic	1	5000	5000
27.	Spirit lamp	15	30	450
28.	Tripod stand	15	10	150
29.	Wire gauge 15 X 15 cm. with asbestos	15	15	225
30.	Test tube holder	15	10	150
31.	Porcelain plates	15	20	300
32.	Funnel 15 cm.	15	16	240
33.	Blow pipe & work tools with electric blower for glass blowing	1 set	10000	10000
34.	Cork borers with sharpn	2 set	100	200
35.	Cork pressure	1 set	250	250
36.	Glass cutting knife	1	75	75
37.	Spatula hard & nickel/steel	2 each	50	100
38.	Water tapes with gooseneek	6	200	1200

39. Gas taps two way	10	150	1500
----------------------	----	-----	------

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
40.	Pinch cock & screw	15	20	300
41.	Distilled water units (electrical)	1	5000	5000
42.	Distilled water units (solar)	1	5000	5000
43.	Open balance 1000 gms./10 mg.	1	600	600
44.	Platinum wire	5	25	125
45.	Brush for cleaning various type	40	10	400
46.	Jars 20 Lit. for keeping destilled water	5	100	500
47.	Lab table 2 m. x 1.2 m. x 1 m. hight with central sink and cup boards (Teak wood) with drawers and two built in almirah on each side with reagent racks, better tile top	4	8000	32000
48.	Exhaust fans 18"	4	2000	8000
49.	Side racks and selves for bench reagents made of teak wood for 24 bottels each set	4	2000	8000
50.	Digital balance electronic	1	10000	10000
51.	Hot plates 7-1/2", 3" dia controled 2000 watts	1	1000	1000
52.	Hot air oven thermostatically controled with selves and rotary switches 350 x 350 x 25 high	1	8000	8000
53.	pH Meter	1	1000	1000
54.	Glass Electrode	2		
55.	Reference Electro	2		
	Miscellaneous	LS		10000

III. WORKSHOP PRACTICE

CARPENTRY SHOP

S.No.	Name of Equipment	No.	@ Rs.	Amt. in Rs.
1.	60 cm. rule	10	15	150
2.	Flexible steel rule 2 metre	2	20	40
3.	T square 23 cm. steel	10	20	200
4.	Bevel square 23 cm. steel	2	30	60
5.	Marking knife 25 cm. steel	10	30	300
6.	Marking gauge wooden & brass 25 cm.	10	30	300
7.	Mortise gauge wooden & brass 25 cm.	10	50	500
8.	Caliper inside, steel 20 cm.	2	50	100
9.	Caliper outside, steel 20 cm.	2	50	100
10.	Compass steel 20cm.	2	40	80
11.	Devicer steel 20 cm.	2	40	80
12.	Plumb	2	20	40
13.	Wooden bench vice steel 20 cm.	10	200	2000
14.	Bench hold fast steel 30 cm.	10	40	400
15.	Bar clamp 2 m.	2	300	600
16.	G clamp of flat spring steel 20x30 cm.	4	60	240
17.	Rip saw 40-45 cm.	10	80	800
18.	Cross cut saw 40-45 cm.	2	80	160
19.	Tennon saw 30-35 cm.	10	50	500
20.	Dovetail saw 30-35 cm.	2	60	120
21.	Compass saw 35 cm.	4	60	240
22.	Key hole saw or pad saw 30-35 cm.	2	25	50
23.	Bow saw	2	25	50
24.	Frame saw	2	25	50
25.	Chisel fish brand 1" to 1/8"			
	firmer	3 set	100	300
	Dovetail	3 set	100	300
	Mortise	3 set	100	300
26.	Gauge or Golchi 1" to 1/8"	3 set	150	450
27.	Wooden jack plane complete	10	100	1000
28.	Wooden smoothing plane	10	80	800
29.	Iron jack plane complete	10	200	2000
30.	Iron rebate plane complete	3	80	240
31.	Iron grooving plane complete	3	120	360
32.	Iron compass plane complete	3	200	600
33.	Wooden moulding plane complete	3	200	600
34.	Bradawl	3	150	450
35.	Gimlet drills set	1 set	150	150
36.	Center bit	2	120	240
37.	Twist bit	2	80	160
38.	Auger bit	2	40	80
39.	Dovetail bit	2	15	30
40.	Counter shank bit	2	20	40
41.	Ratchet brace machine	2	175	350

42.	Grand drill machine 1/4" burmi	2	200	400
43.	Wooden hand drill	5	200	1000
44.	Wooden mallet	10	25	250
45.	Claw hammer	3	30	90
46.	Carpenters hammer	10	30	300
47.	Turning tool set for lathe	3 set	800	2400
48.	Screw driver 18" & 15"	6	50	300

S.No.	Name of Equipment	No.	@ Rs.	Amt. in Rs.
49.	Adze 500 gm.	10	50	500
50.	Pincer 175 mm.	6	75	750
51.	Plier 150 mm.	4	90	360
52.	Oil stone 8"	4	75	300
53.	Rasp file 12"	4	100	400
54.	Half round file 12"	4	80	320
55.	Round file 12"	4	80	320
56.	Triangular file 5", 4"	8	60	480
57.	Water stone	4	20	80
58.	Carpentry work benches	4	2000	8000
59.	Band saw machine complete	1	30000	30000
60.	Circular saw machine	1	15000	15000
61.	Grinding machine with motor	1	6000	6000
62.	Universal wood working machine	1	15000	15000
	misc. for foundation of machines	LS		10000

SMITHY SHOP

1.	Anvil 150 Kg. with stand	5	2500	12500
2.	Swage block 50x30x8cm.&45x45x10cm.	2	1250	2500
3.	Hammers			
	Ball peen 8 Kg.	10	150	1500
	Cross peen 8 Kg.	10	150	1500
4.	Beak iron 25 Kg.	1	500	500
5.	Swages different types	6	40	240
6.	Fullers different types	6	30	180
7.	Leg vice 15 cms. opening	1	150	150
8.	Electric blower with motor	1	5000	5000
9.	Furnace chimney with exhaust pipe	5	5000	25000
10.	Sledge Hammer 5Kg	2	200	400
	Misc. tools		LS	2500

SHEET METAL, SOLDERING & BRAZING

1.	Dividers - 15cm.	5	60	300
2.	Trammel 1 m.	1		
3.	Angle protector	5	60	300
4.	Try square 30 cm.	5	40	200
5.	Centre punch	5	20	100
6.	Steel rule 30 cm. , 60 cm.,	5	25	125
7.	Sheet metal gauge	1	120	120
8.	Straight snips 30 cm.	2	250	500
9.	Curved snips 30 cm.	2	300	600
10.	Bench shear cutter 40 cm.	1	5000	5000
11.	Chisel 10 cm.	5	100	500
12.	Hammer	5	150	750
13.	Bench vice 13 cm.	5	1000	5000
14.	Plier	5	50	250
15.	Nose plier	5	60	300

16.	Sheet metal anvil/stakes	5	2000	10000
17.	Shearing machine 120 cm.	1	2500	2500
18.	Solder electric	2	500	1000
19.	Solder furnace type	2	250	500
20.	Brazing equipments and accessories	1	5000	5000
21.	Blow lamp	2	250	500
22.	Sheet bending machine	1	10000	10000
	Misc.		LS	5000

FITTING SHOP

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
1.	Bench vice jaw 10 cm.	10	300	3600
2.	Surface plate 45x45 cm.	2	2000	4000
3.	V. Block 10x7x4 cm.	5	350	1650
4.	Try square	10	40	400
5.	Bevel protractor 30 cm.	1	2100	2100
6.	Combination set	1	2500	2500
7.	Divider	5	60	300
8.	Centre punch	5	20	100
9.	Calipers (Different sizes)	12	20	240
10.	Vernier calipers 30 cm.	2	600	1200
11.	Micrometer 0-25, 25-50 m.m.	4	500	2000
12.	Vernier depth gauge	1	350	350
13.	Feeler gauge--15 blades	1	30	30
14.	Radius gauge	1	100	100
15.	Angle gauge	1	100	100
16.	Thread gauge	1	100	100
17.	Bench drilling machine 13 mm.	1	5000	5000
18.	Double ended electric grinder	1	4000	4000
19.	Drill set	1set	1000	1000
20.	Reamer set	1set	2000	2000
21.	Tap set	1set	2000	2000
22.	Adjustable wrenches	1set	2000	2000
23.	Allen key set	1set	350	350
24.	Spanners	6	60	360
25.	Work benches	6	2000	12000
26.	Power hacksaw	1	4000	4000
	Misc. Files, Dieset, Hexa frames etc.		LS	10000

WELDING SHOP

1.	Ellectric welding set oil cooled	1	10000	10000
2.	Industrial regulator type oil cooled arc welder	1	12000	12000
3.	Air cooled spot welder 7.5 KVA	1	15000	15000
4.	General accssories for air cooled spot welder of 7.5 KVA			8000
5.	Gas welding set with gas cutting torch and complete with all accessories	1	15000	15000
6.	Misc. work benches		LS	20000

PAINTING & POLISHING SHOP

1. Air compressor complete with 2 HP motor	1set	12000	12000
2. Spray gun with hose pipe	1	1000	1000
3. Stoving oven	1	3000	3000
4. Buffing machine with leather and cotton wheels	1	4000	4000
5. Electroplating Equipment for cromium Nikle plating.	1	10000	10000
Misc.	LS		2000

PLUMBING SHOP

S.No.	Name of Equipment	No.	@ Rs.	Amt. in Rs.
1.	Pipe vice 5 cm.	4	250	1000
2.	Chain wrenches	5	250	1250
3.	Ring spanner Set	5	125	625
4.	Wheel pipe cutter	2	300	600
5.	Water pump plier	4	50	200
6.	Pipe die set 2" set	2 set	600	1200
7.	Pipe bending device	1	5000	5000
8.	Work benches	4	4000	16000
9.	Set of various types of plumbing fittings e.g. Bib cock, Cistern, Stop cock, Wheel volve, Gat volve etc.		LS	2000
10.	Misc. Hacksaw frame and others		LS	2000

FOUNDRY SHOP

1.	Moulding boxes	50		12000
2.	Laddles	5		1000
3.	Tool kits	10 sets		2500
4.	Quenching tanks water or oil	2		1000
5.	Permiability tester	1		1000
6.	Mould hardness tester	1		6000
7.	Sand tensile testing equipment	1		7500
8.	Portable grinders	1		3000
9.	Temperature recorders/controllers	LS		5000
10.	Pit furnace with Blower	1		5000

MACHINE SHOP

1.	Lathe machine 4.5 feet "V" bed. Height of centres 8.5 inch. Dog chuck 8 inch complete 1 H.P. motor 440v, push button starter with coolent pump, tray and with standard accessories.	2	25000	50000
2.	Shaper machine 12 inch stroke with 2 H.P. motor	1	20000	200000

440 volts push button
starter with vice 6 inch
(Swivel base)

NOTE:-

The institutes running mechanical engg. course need not purchase these two items separately because they will have one complete machine shop for the course

GENERAL MECHANICAL ENGINEERING LAB

(Common to elements of Mechanical Engineering Lab In Mechanical Engineering)

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
1.	Biogas Plant	1	By Out door visit	
2.	Windmill	1	By Out door visit	
3.	Experimental Solar Cooker Box Type- Instrumented To Measure Temperature its Performance & Temperature At Various Location.	1	500	500
4.	Photo Voltage Solar Cell	1	10000	10000
5.	Throttling & Separating Colorimeter. (Thermal Engg. Lab)	1	10000	10000
6.	Jib Head Key, Flat Key, Saddle Key, Wood Ruff Key, Feather Key Pinkey & A piece of splined shaft.	1 Set	L.S.	500
7.	Pins- Split Pin, Taper Cottor Type Split Pin, Cottor or Cottor Pin, Cottor Bolts; Lewis or Rag Foundation Bolt, Fish Tail & Square Head Foundation Bolts.	1 Set	L.S.	500
8.	Friction Clutches & Couplings -Cone Clutch, Single Plate Muff Coupling, Flange Coupling Universal Coupling or Hooks Joint. Flexible Coupling- Belt & Pin Type, Coil Spring Type.	1 Set	L.S.	2500
9.	Bearings- Plane, Bushed, Split Step, Ball, Rollar Bearings, Thrust Bearings.	1 Set	L.S.	1000
10.	Spur gear Single & Double Helical Gears, Bevel Gears.	1 Set	L.S.	1000
11.	Simple Spur Gear train	1	1500	1500
12.	Compound Gear Train	1	1500	1500
13.	Epicyclic Gear Train	1	2000	2000
14.	Compression & Tension Helical Springs.	1 Each	200	200
15.	Four Bar Mechanism Fitted on a board.	1	1000	1000
16.	Slider Crank Mechanism	1	1000	1000
17.	Whitworth Quick Return Mechanism Fitted on a board.	1	1000	1000

ELECTRICAL TECHNOLOGY & ELCETRONICS LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
1.	D.C. Shunt Motor 3 Kw. 1500 RPM with 3 Point Starter.	2	10000	20000
2.	D.C. Compound Motor 3 Kw. 1500 RPM	2	10000	20000
3.	Single Phase Transformer 1 KVA 50 Hz. Primary Voltage 230 with tapping at 50%, 86.6 % Facility	2	6000	12000
4.	3 Phase Induction Motor 415 V., 50 Hz, 440 RPM, 3 KVA Star/Delta/Autotransformer Starter.	2	5000	10000
5.	Loading Drum Spring Balance & Belt Arrangement.	2 Set	1000	2000
6.	Tachometer (Analog/Digital)	1	2000	2000
7.	3 Phase Inductive Loading of Variable Nature	1	8000	8000
8.	Single Phase Inductive Loading Variable 0-10 Amp., 50 Hz.	1	8000	8000
9.	Moving Coil Ammeter 0-10 Amp.	8	1000	1000
10.	Moving Coil Voltmeter 0-300 V.	8	1000	8000
11.	Moving Iron Ammeter 0-10 Amp.	8	1000	8000
12.	Moving Iron Voltmeter 0-300 V.	8	1000	8000
13.	Wattmeter Single Phase Dynamo Type 75/300/600 V. 2.5/5 Amp.	4	2500	10000
14.	Three Phase Variable Inductive Loading.	1	8000	8000
15.	Single Phase Variable Inductive Loading with Rheostat.	1	8000	8000
16.	Megger 0-20 Mega Ohm, 500 RPM .			
17.	Flouroscent Tube With Choke.	1	100	100
18.	SCR Bread Board	1	1000	1000
19.	Power Supply 230 V.	1	1000	1000
20.	Moving Coil Ammeter 0-500 M.A.	1	1000	1000

S.No.	Name of Equipment	No.	@ Rs.	Amt. in Rs.
21.	Moving Coil Voltmeter 0-250 V.	1	1000	1000
22.	Energy Meter Single Phase 230 V., 5 Amp	1	2000	2000
	Misc.		LS	1500

TEXTILE TESTING LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
1.	Baer Sorter (For Fibre Length) Acrylic Transparent Sheet - 6"X8"X2 pices, 3"X8"X2 pcs Fibre Mounting Templest 6"X8"X2 pices, 3"X8"X2 pcs with tweezers, velvet pad, scales, planchass with all complete accessories or Latest Configuration	2	20000	40000
2.	Microscope Digital Mocroscope - Microscope & Ends Counting Equipments- Magnifying Power 5X,10X,20X, 40X,100X lenses Trinocular biological microscope with fibre cross section kit, high resolution CCD camera and imaging software with measurement facilities, Scope of use section of fibre or yarn, analysis of any fibre, yarn and fibre Range : 5X,10X,20X,450X,100X / as per requirements, Focus : Adjustable, Lights - White, Blue, Yellow, Uppper & Lower, Supply - 220 V AC supply Single Phase, with all complete accessories Or Latest Configuration	2	65000	130000
3.	Moisture Meter	1	16000	16000
4.	Wrapreel	2	30000	60000
5.	Wrap Block	2	6000	12000
6.	Beesley Balance	4	7000	28000
7.	Quadrant Balance	2	4000	8000
8.	Lea Strength Tester	1	50000	50000
9.	Single Thread Tester (Digital)	1	100000	100000
10.	R. B. Twist Tester	2	25000	50000
11.	One Inch Twist Tester	2	8000	16000
12.	Take Up Twist Tester Yarn test length : 25 mm to 500 mm adjustable (Metric unit) Or 1" to 20" Maximum adjustable (imperial unit), The test length is automatically taken into account for calculation and final reading is displayed directly in TPM/TPL Range :Upto 60TPL Resolution :1 TPM or 0.01 TPI Motor Speed: Upto 1500 RPM Clamps : Spring loaded clamps	2	28500	57000

at motor end for easy clamping of Yarn

Averaging : Reading of at least 10 samples can be stored and average TPM/TPI value is calculated and digital display with pre set device.

Supply : 220 V AC, single phase Suitable for S/Z type of twisted yarn with reset device. Tension weight upto 100 gm adjustable. Yarn spool mounting arrangement at one end of the twist tester with all complete accessories or Latest Configuration

13.	Fabric Strength Tester (Tensile Strength)	1	50000	50000
14.	Tearing Strength Tester	1	20000	20000
15.	Bursting Strength Tester	1	35000	35000
16.	Abrasion Resistance Tester (Martindale Type)	1	50000	50000
17.	Laundrometer (For washing fastness testing)	1	50000	50000
18.	Crocko Meter	1	10000	10000
19.	Digital Fibrograph Measuring Principle-Optical Measuring Range-12.0 to 45.0 mm Measuring Accuracy - +/- 0.1 mm Result Output-2.5% SL,50% SL & UR % Front End Language-English Applicable Standard-ASTM D5332,ISO2648 & IS233 Power Supply-Single Phase 220V AC	1	320000	320000
20.	Uster Evenness Tester	1	2000000	2000000
21.	Trash Analyser	1	150000	150000
22.	Conditioning Oven 220 V With capability of maintaining temperature up to 100oC and facility for smoth variation of temperature inside 27 liter.	1	98500	98500
23.	Stelometer (For bundle Strength)	2	70000	140000
24.	Crease Recovery Tester Size of the Test Specimen - 40mm X 15mm, Crease Load : 1Kg. (Stainless Steel), Angle measurement : On an Engraved circular scale graduated in 1 deg., Scale measurement : 0-180 with all complete accessories Or Latest Configuration	2	15000	30000
25.	Water Repellancy Tester	1	80000	80000
26.	Pilling Tester	1	30000	30000
27.	Crimp Rigidity Tester Minor Load - 2 Gr. to 10Gr. in a step of one grams Major Load - 100 Gr. to 500 Gr. in step of 50 Grams Digital display 220 V, with all complete accessories or Latest Configuration	1	20000	20000
28.	Air Permeability Tester	1	35000	35000

29.	Sheffield Micronair (For Fibre Fineness)	1		
30.	Uster Stapler for fibre length	1		
31.	A.N. stapling apparatus for fibre fineness Tester	1		
32.	Miscellaneous Items-Thermometers, Heating Devices, Thermohydrograph, Whirling Hydrometer, Dry & Wet bulb thermometer, Physical Balance, etc.			
33.	Classimate (Yarn faults finding equipments)	1		900000
33.	H.V.I. (High Volume Instrument) for various parameter of fibre	1		3500000
34.	Sublimation fastness tester	1		15000
35.	Round Sample of GSM with Electronic balance	1	35000	35000
36.	Stiffness Tester	1	15000	15000
37.	Drapemeter	1	25000	25000
38.	Fabric Thickness Tester	1	8000	8000
39.	A.S.T.M. Cards For Threads/Inch	1		

NOTE:

1. Item No. 17,18,25 and 26 are not required for Textile Technology course.
2. Indian make working laboratory models for costly equipment be purchased if available.

CARPET TECHNOLOGY LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
1.	Blow Room Line With Six Beating Points (Lab Model) Latest Lab Model of blaow room line of 10 inch width or more complete with hopper feeder, Scutcher, beaters with adjustment grid bars, lattic, Krischner neater, Feed regulatory system, calendar rollers, lap rollers, lap tray with electric control pannel, beating point= 4.5 to 6 with complete accessories or Latest Configuration	1	4200000	4200000
2.	Model of mini carding plant 250 mm working width 250 mm cylinder, doffer, feed roller, opening roller, striping roller, crush roller stainless undercasing, takeup drum suitable for feeding, miniature draw frame with gear and pulleys to drive feed roller, cyliner and doffer and other accessories, Mechanical type possibility of processing 50 gms. per batch 10 "width, metallic wire clothing with complete accessories, Microprocessor based individual drive or Latest Configuration	1 No.	6,50,000=00	
3.	Draw Frame : Having 3 over 3 drafting arrangement to process the silver from miniature carding machine with individual AC variable speed motors with change grars to vary the speeds of front roller, middle and back roller for different Total Draft and break Draft inclusive of motor, rpm indicators control system and other accessories Mechanical type single delivery, 3 over 3 drafting arrangement, range 5-15 draft Microprocessor based or Latest Configuration	1 No.	8,00,000=00	
4.	High Speed Simplex (Lab Model) Latest Lab Model Range :6-12 Spindle	1	480000	480000

Suitable for 110 mm dia package
 Draft Range=6-18, 3 roller apron
 drafting arrangement SKF PK 1500,
 individual AC variable speed motors
 with control system with automatic
 stop motion, Inching mechanism,
 100 empty PP bobbins with complete
 accessories and pinion according
 to draft change with all complete
 accessories or Latest Configuration

5.	Ring Frame	1	850000	850000
	Ring Spinning Frame : No. of Spindle 6-12, mechanical speed 25000 rpm, ring dia - 38 mm, 70mm gauge, 180 mm lift, SKF PK 2025/2035, 3 over 3 drafting arrangement with short cradles, for gearing arrangement to change the total draft, Break draft and TPI with change gears and other accessories. Mechanical draft 10-50 Microprocessor based or Latest Configuration			
6.	Sliver Lap Machine	1	250000	250000
7.	Ribbon Lap Machine	1	250000	250000
8.	Comber 6/8 Heads	1	800000	800000
9.	Parallel Winding Machine (24 Drums) (Lab Model)	1	250000	250000
	Cheese winding :Range 4-8 or more drum, Speed Range- 600-800 y.p.m., Optical cleaner on individual spindle, Steel drum/ Bakelite drum as per parallel winding, 220V, Single phase motor, 100pp cheeses with all complete accessories or latest configuration			
10.	Yarn Doubling Machine (Lab Model)	1	275000	275000
11.	Hank Reeling Machine	1	15000	15000
12.	Two For One Twister(T.F.O.)	1	800000	800000
	TFO type, No. of spindle= range 4-8, 230 mm gauge, 150 mm pot dia, suitable for cheese of 170 mm traverse, twist range=3.0 to 45.0, count range 2/8's to 2/80's Ne, Tangential belt drive for S & Z twist both, with automatic shop motor and other complete accessories, 100 PP empty package with all complete accessories or Latest Configuration			
13.	Stripping Roller (For Card)	1	5000	5000
14.	Grinding Roller (Transverse wheel Grinder)	1	5000	5000
15.	Metallic Wire Mounting Equipment (With Butt Welder)	1	10000	10000
17.	Assembly Winder	1	250000	250000

18.	Open end spinning M/c of Twelve rotors(Lab Model) Having Range 4-8 head rotor guage-230 mm having 48 mm rotor with OK39/40 opening rollers, automatic stop motion R4/10 navels, built in automatic indicators and quick response sensors to monitor yarn continuity and sliver, trash separator and discharge tunel for better cleaning, Feeding can size of 14" X 42" and take up package cone and cheese both with individual motors with pully to change draft and twist with motors. Electrical PLC system, Computer, UPS, Control system, Dreft range suitable for 2' to 24's and other all complete accessories, draft range-50-200 user friendly menu driven software or Latest Configuration	1	750000	750000
19.	Laboratory model of melt Spinning Process	1	300000	300000
20.	Laboratory model of wet Spinning Process	1	100000	100000
21.	Draw Texturising Machine (Indian Model)	1	300000	300000

NOTE:-

1. Indian make working laboratory models for the costly equipment mentioned above be purchased if available.

S.No.	Name of Equipment	No.	@ Rs.	Amt. in Rs.
1.	Warp Winding Machines			
	A. Ordinary Machine with 10 Heads	1	50000	50000
	B. Automatic Winding Machine with 10 Heads	1	800000	800000
2.	Pirn Winding Machine with 4 Heads	1	40000	40000
3.	Warping Machines			
	A. Beam Warping Machine (High Speed)	1	300000	300000
	B. Sectional Warping Machine	1	175000	175000
4.	Working Model of Sizing Plant	1	300000	300000
5.	Drawing and Denting Frames (cap. 200e nds) Stainless Screen Frame, Capacity 3200 ends with all Complete Accessories or Latest Configuration	2	10000	20000
6.	Beam Knotting Machine	1	80000	80000
7.	Plane Looms			
	A. Plain Loom For Plain Tappet	1	40000	40000
	B. Plain Loom For Other Weave Tappets	1	45000	45000
8.	Dobby Looms			
	A. Single (Acting) Dobby Loom	1	150000	150000
	B. Double Acting (Double Lift) Dobby Loom	1	150000	150000
9.	Jacquard Looms			
	A. Loom with Single Lift Single Cylinder Jacquard	1	150000	150000
	B. Loom With Single Lift Double Cylinder Jacquard	1	160000	160000
	C. Loom With Double Lift Double Cylinder Jacquard	1	175000	175000
10.	Automatic Weaving Machines			
	A. Automatic Pirn Changing Loom	1	200000	200000
	B. Automatic Shuttle Changing Loom	1	200000	200000
11.	Shuttleless Weaving Machines			
	A. Gripper Type Shuttleless Loom	1	3500000	3500000
	B. Air Jet Weaving Machine	1	1200000	1200000
	C. Water Jet Weaving Machine	1	1200000	1200000
12.	Other Weaving Machines			

A. Hand Looms	2	15000	30000
B. Loom With Circular Multiple Box Motion.	1	100000	100000
C. Loom With Drop Box Multiple Box	1	100000	100000
D. Loom With Terry Motion	1	150000	150000
E. Loom With Pick At Will Motion	1	150000	150000
13. Card Cutting Machine	1	25000	25000
14. Knitting Machines			
A. Flat Knitting Machine	1	75000	75000
B. Circular Knitting Machine	1	75000	75000
15. Sewing Machine	6	8000	40000
16. Model of Rapier Looms 20" with winding and warping unit complete set	1	3800000	3800000

NOTE:

1. Indian make working laboratory models for costly equipment be purchased if available.
- COMPUTER APPLICATION FOR ENGINEERING (Common to all Trades)

INTRODUCTION TO COMPUTER (Common to all Trades)

COMPUTER CENTRE

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

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

7. 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

Note :

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

ANNEXURE - I

PROPOSED GUIDE
FOR
STUDENTS TO PREPARE THEIR INDUSTRIAL VISIT REPORT

1. Name & Address of the unit
2. Date of
 - i. Joining.
 - ii. Leaving.
3. Nature of Industry
 - i. Product & Capacity.
 - 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 and its layout.
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 (welding, Foundary, Machines shop etc) related to repair and maintenance work.
10. Name of checking and Inspecting Instruments and their details. Quality controls measures taken.
11. Details of hadraulics/pneumatic/thermal units or appliances used. Material Handling Equipments.
12. Discription of any breakdown and its restoring.
13. Use of computer - if any.
14. Visit of units store, Manner of keeping store items, Their receiving & distribution.
15. Safety measures on work place &

working conditions in general -
comfortable, convenient & hygeinic.

ANNEXURE - II

TRAINEES ASSESSMENT

The Institute invites the comments on the work & behaviour of student during his stay in the industry from his immediate supervisors on the following points.

1. Name of the trainee
2. Date of
 - i. Joining.
 - ii. Leaving.
3.
 - i. Regularity & Punctuality
 - ii. Sense of responsibility
 - iii. Readiness to work/learn
 - iv. Obedience
 - v. Skill aquired
4. Name of the sections of the unit he attended during his stay.
His activities/worth of being there.
5. Any thing specific

Sinnature of the Assessor

Date :-

Designation

ANNEXURE III

For Community Development work two 15 days camps will be organised during the session in identified villages. The students shall stay in the camps and under the supervision of concerned faculty members shall undertake/execute the assigned works in the following fields.

1. To launch and sustain functional literacy programmes.
2. To train the rural youth in different trades/skills.
3. Training by innovating and improving the efficiency of household gadgets.
4. To control and reduce pollution affecting the social fabric of rural life i.e.
 - Construction of Soak Pits and Sanitary Latrines, Tree Plantation, Social Forestry, Installation of Smokeless Chulhas.
5. To disseminate information on sources of non conventional energy. Installation and maintenance of Solar Street Lights, Solar Photovoltaic Pumps, Wind Mills, Bio Gas Plants etc shall be undertaken.
6. Transfer of appropriate Technology/Demonstration of cheap houses by use of locally available material, treatment of mud walls innovation of mud floor, treatment of thatch roofs etc shall be taken with provisions for training to the villagers.
7. Training and demonstration of new agricultural implements, household gadgets and appliances of non conventional energy.
8. To help the rural youth in preparing project reports to set up industrial units and entrepreneurial development.
9. All community polytechnics shall render repair and maintenance of agricultural implements, appliances of non conventional energy, household gadgets etc and train the rural youth in such skills.

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

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

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

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

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

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

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

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

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

12. Does your organisation have any system for the survey of Home articles of different countries/States. Yes/No

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

1. Home Articles for different age groups and sex.
 2. Effect of climatic conditions
 3. Any other
- If yes ; Please give brief account of each.

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

15. In which types of organisations can a diploma holder in Carpet Technology can work or serve.

- | | | |
|---|---|---|
| 1 | 2 | 3 |
|---|---|---|

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

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

Theory

Practical

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

Theory

Practical

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

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

21. What changes in technologies are to be incorporated in the development of curriculum in Carpet Technology.

(Signature)

Kindly mail the above questionnaire duly filled to:-

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

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