Faculty of Engineering & Technology

P.K. University Shivpuri

(MP)

Department Of Textile Technology

Evaluation Scheme & Syllabus
for

Diploma – Textile Technology
2ND Semester

(Effective from session 2025-26)

DIPLOMA –TEXTILE TECHNOLOGY

STUDY AND EVALUATION SCHEME FOR DIPLOMA TEXTILE TECHNOLOGY

YEAR-1st /SEMESTER -2nd

SUBJECTCODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
DAPPLTT201	Applied Mathematics -II	3	1	0	4	30	-	30	70	-	70	100
DAPPLTT202	Applied Physics -II	2	1	0	3	30	-	30	70	-	70	100
DGENETT203	General Mechanical Engg.	2	1	0	3	30	-	30	70	-	70	100
DTEXTTT204	Textile Fibres	2	1	0	3	30	-	30	70	-	70	100
DTEXTTT205	Textile Chemical Processing	3	0	0	3	30	-	30	70	-	70	100
DAPPLTT206	Applied Physics -II Lab	0	0	2	1	-	25	25	-	25	25	50
DGENETT207	General Mechanical Engg. Lab	0	0	2	1	-	25	25	-	25	25	50
DWORKTT208	Workshop Practice Lab	0	0	2	1	-	25	25	-	25	25	50
DTEXTTT209	Textile Fibres Lab	0	0	2	1	-	25	25	-	25	25	50
Total		12	4	8	20	150	100	250	350	100	450	700

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DAPPLTT201

APPLIED MATHEMATICS -II

(Common to all branch of Diploma engineering)

L	T	P
3	1	0

1. **INTEGRAL CALCULUS - I :** 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 :**
   2.1 Meaning and properties of definite integrals, Evaluation 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):

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

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

4. CO-ORDINATE GEOMETRY (3 DIMENSION):

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

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

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DAPPLTT202

APPLIED PHYSICS-II

(Common to all branch of Diploma engineering)

L	T	P
2	1	0

1. Optics :

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

2. Introduction To Fibre Optics :

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

3. Lasers and its Applications :

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 :

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

5. D.C. Circuits :

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:

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

7. Semiconductor Physics :

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

8. Junction Diode and Transister :

Majority and Minority charge carriers P-N junction reverse biasing of a junction diode, P-N junction transistor, transistor-action, Base, emitter and collector currents and their relationship LED's.

formation, barrier voltage, Forward and device characteristics, Formation of

9. Introduction To Digital Electronics :

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

10. Non-conventional energy sources:

(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.

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DGENETT203: GENERAL MECHANICAL ENGG.

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 TRANSMISSTION & 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 calorifics values. Claculation of air required for complete combustion of unitmass/volume. Concept of excess air in bioler furnace combustion. Heat carried away by flew gases. Flew 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 adeabatic 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 efficency 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 0oC. Pressure and temperature curve of steam generation. Idea of wet, dry saturated and super heated steam. Saturation pressure, temperature, degree of super heat, Enthalpy, Entrophy 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. Lancashre, Babcock Wilcoxs, Cochran and Simple vertical boilers. Boilers mountings and accessories. Steam traps, Reducers, Expansion bends. Boilers specification. Equivalent evaporation, Boiler efficiancy, Draught, Chimeney height, Conditions for maximum draught through chimeney. 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. Volumatric 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. Bellcoleman 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, Fe-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. Humadification. Dehumadification 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.

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DTEXTTT204: TEXTILE FIBERS

1. INTRODUCTION:

(i) Definition of the Terms: Textile, Fibre, Textile fibre, Staple, Filament, Yarn and thread.
(ii) Characteristics of a good Testile 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: (i) Cotton: Verities of cottons, Harvesting and Ginning
(ii) Wool: Classification of wool fibres. The major animal fibres - Mohair, Camel hair,
(iii) Bast Fibres: Jute, Hemp, Ramie, Sisal and Flax. Plant harvesting, Retting, Breaking and Scutching.
(iv) 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: Meaning of the term, Introduction to man made fibres such as Viscose Rayon, Acetate Rayon, Cuprammonium Rayon, Nylons (6 and 66), Terelene, 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 improtance in their uses.
3.2 Introduction to mechanical properties of fibres: Stress- strain characteristics of various textile fibres. Concept of modulus of 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 mehtod of identification. Chemical methods of their identification - Staining test and Solubility Test.

4. MOLECULAR STRUCTURAL POLYMERIZATION:

1.Molecular structure, Structure of textile fiber (Wool, Silk, Cotton, Polyester, Viscon Nylon).
3. Method of polymerisation, Criteria of fiber forming polymer such as Polyesters, Polyamides, Aerylic.

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 Amorphus regin. Viscoelastic behaviour of textile fibres

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DTEXTTT205: TEXTILE CHEMICAL PROCESSING

(A) PREPARATORY PROCESS General Introduction of following :

1. Impurities in raw cotton,jute, wool and silk, thier removal.,
2. Cropping, Shearing, Cropping and Gas Singeing
3. Desizing.,
4. Scouring of cotton.,
5. Bleaching of cotton with Sodium Hypochlorite and Hydrogen peroxide.,
6. Scouring of wool.,
7. Carbonisation of wool.,
8. Milling.,
9. Crabbing of wool.,
10. Decatising.,
11. Degumming of silk.,
12. Jute retting.,
13. Heat setting of synthetic and synthetic blends

(B) MERCERISATION

1. Object.
2. Mercerisation process for yarn and cloth.
3. Physical changes in fibres after mercerisation.

(C) DYEING:

1. Classification of dyes according to their mode of application.
2. Dyeing of cotton with direct, sulphur, vat, solubilised vat, reactive.
3. Dyeing of wool and silk.
4. Dyeing of Nylon,acetate and terrylene with diperse dyes.
5. Dyeing of acrylics with modified basic dyes.
6. Basic idea about dope dyeing.
7. Introduction of natural dyes- vegetables, minirals and animal dyes, dying of wool, silk & cotton with these dyes.

(D) PRINTING

1. Methods of printing: Block, screen, spray and roller printing techniques, limitations of each method and brief study of auxilaries.
2. Styles of printing : Elementry knowledge of direct. resists, discharge styles of printing.

(E) FINISHING:

1. Object.
2. Ingredients used in brief : Study of duranle and water repellent, waterprofing, anticrease, Fireproof.
3. Calnders (Plain, friction, felt) Paper press, shrink proofing (sanforsing and London shrink finish) K-D machine.

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DAPPLTT206

APPLIED PHYSICS-II LAB

(Common to all branch of Diploma engineering)

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LIST OF EXPRIMENTS:-

1. Determination of coefficient of friction on a horizontal plane.
2. Determination of 'g' by plotting a graph T2 verses l and using the formula g=4n2/Slope of the graph line
3. Determine the force constant of combination of springs incase of -1. Series 2. Parallel.
4. To verify the series and parallel combination of Resistances with the help of meter bridge.
5. To determine the velocity of sound with the help of resonance tube.
6. Determination of viscosity coefficient of a lubricant by Stoke's law.
7. Determination of E1/E2 of cells by potentiometer.
8. Determination of specific resistance by Carry Foster Bridge.
9. Determination of resistivity by P.O.Box.
10. Verification of Kirchhoff'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.

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DGENETT207: GENERAL MECHANICAL ENGG. LAB

A. Demonstration 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 clutch, Plate clutch (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 Practical's:
10. Determination of velocity ratio of a spur gear train.
11. Velocity diagram of a four bar chain mechanism.
12. Performance evaluation of solar cooker.

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DWORKTT208: WORKSHOP PRACTICE LAB

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, Advantange 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) Abrassive cutting by leather wheel.
ii) Pollishing with hard cotton wheel and with polishing material.
iii) Buffing with cotton wheel or buff wheel.

1. ***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.

2. *Fitting Shop, Plumbing Shop & Fastening Shop:*

EX-1 Study of materials, limits, fits and toterances.

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 taping the same to creat 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

3. *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 ferous (lead or aluminium) as per exercise 3.

4. *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.

5. *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.

6. *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 Rectangle of cast iron.

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DTEXTTT209: Textile Fibers Lab

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)Polyesters from other fibres.
   (iv) viscose rayan, Cuprammonium rayan 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, Polyster, 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 stappling 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. Stappling apparatus.
14. To do qualitative and quantitative estimation of fibres in a blend.