BANGLADESH TECHNICAL EDUCATION BOARD

4- YEAR

DIPLOMA IN TEXTILE ENGINEERING PROGRAM

GARMENTS DESIGN AND PATTERN MAKING TECHNOLOGY

SYLLABUS

1ST & 2ND SEMESTER

BANGLADESH TECHNICAL EDUCATION BOARD

BANGLADESH TECHNICAL EDUCATION BOARD

4-YEAR

DIPLOMA IN TEXTILE ENGINEERING PROGRAM

GARMENTS DESIGN AND PATTERN MAKING TECHNOLOGY

SYLLABUS

FIRST & SECOND SEMESTER

Garments Design and Pattern Making

FIRST SEMESTER

Sl. No	Subject code	Name of the subject	T	P	C	MARKS				
						Theory		Practical		Total
						Cont. assess.	Final exam.	Cont. assess.	Final exam.	
1	4911	Introduction to Textile Science	3	0	3	30	120	-	-	150
2	1011	Engineering Drawing	0	6	2	-	-	50	50	100
3	6711	Basic Electricity	3	3	4	30	120	25	25	200
4	5911	Mathematics-I	3	3	4	30	120	50	-	200
5	5913	Chemistry	3	3	4	30	120	25	25	200
6	5711	Bangla	2	2	3	20	80	25	25	150
7	5712	English-I	2	0	2	20	80	-	-	100
TOTAL			**16**	**17**	**22**	**160**	**640**	**175**	**125**	**1100**

SECOND SEMESTER

Sl No	Subject code	Name of the subject	T	P	C	MARKS				
						Theory		Practical		Total
						Cont. assesses.	Final exam.	Cont. assesses.	Final exam.	
1	1911	Textile Raw Materials – I	2	0	2	20	80	-	-	100
2	5022	Sewing Practice –I	2	6	4	20	80	50	50	200
3	7011	Basic Workshop Practice	0	6	2	-	-	50	50	100
4	5921	Mathematics – II	3	3	4	30	120	50	-	200
5	5912	Physics-I	3	3	4	30	120	25	25	200
6	5722	English – II	2	2	3	20	80	25	25	150
7	5812	Physical Education , Life Skill Development	0	2	1	-	-	25	25	50
	TOTAL		**12**	**22**	**20**	**120**	**480**	**225**	**175**	**1000**

4911	INTRODUCTION TO TEXTILE SCIENCE	T	P	C
		3	0	3

AIMS

- To be able to acquire knowledge of clothing.
- To be able to understand ginning, mixing and blending.
- To be able to develop knowledge of weaving, knitting, singeing and dyeing.
- To be able to acquire knowledge of scouring and bleaching.
- To be able to understand garments manufacturing process

SHORT DESCRIPTION

Clothing; Ginning; Mixing; Blending; Batching and emulsion; Yarn manufacturing; Weaving; Knitting; Singeing and desizing; Scouring and bleaching; Dyeing, printing and finishing; Garments manufacturing process; Spreading and cutting of garments; Garments finishing.

DETAIL DESCRIPTION

1 Understand the clothing.

1.1 Mention the sequences of cloth processing from fiber to garments.
1.2 Name the sources of textile fibers.
1.3 Describe different types of woven & knit fabrics.
1.4 Discuss the historical development of textile and clothing process.
1.5 Describe hand loom products.

2 Understand the ginning.

2.1 Define ginning.
2.2 Mention the purposes of ginning.
2.3 Name the types of ginning.
2.4 Describe working principle of different ginning machines.
2.5 Describe different types of ginning machines.
2.6 Describe the faults of ginning with their remedies.

3 Understand the mixing of spin able fibers.

3.1 Define the term of mixing.
3.2 Mention the purposes of mixing.
3.3 Mention the classification of mixing.
3.4 Describe the process of mixing.
3.5 Describe the economic process of mixing.

4 Understand the blending of different fibers.

4.1 Define blending.
4.2 Mention the purpose of blending.
4.3 Mention the blending ratio of different fibers.
4.4 Mention the classification of blending.
4.5 Describe the process of blending.
4.6 Describe the economic process of blending.

5 Understand batching and emulsion.

5.1 Define batch and batching.

5.2 Describe the procedure of batching.
5.3 Define emulsion.
5.4 Mention the properties of emulsion.
5.5 Describe the procedure of emulsion.

6 Understand the yarn manufacturing (spinning).

6.1 Mention the purpose of carding (jute and cotton).
6.2 List different categories of cotton spinning machinery.
6.3 Describe the working principles of each machinery for carding.
6.4 Mention the purposes of drawing and doubling.
6.5 Describe drawing process in jute spinning.
6.6 Describe drawing process in cotton spinning.
6.7 Mention the purposes of lap forming.
6.8 Mention the purpose of combing.
6.9 Mention the purpose of simplex.
6.10 Mention the purposes of spinning.

7 Understand the weaving.

7.1 Mention the purpose of sizing.
7.2 Mention different types of sizing.
7.3 Describe the process of sizing.
7.4 Differentiate between drafting and denting.
7.5 Mention the purposes of drafting .
7.6 List different types of drafting and denting.
7.7 Describe drafting and denting process.
7.8 State basic principles of weaving.
7.9 List different types of machinery used in weaving.

8 Understand the knitting.

8.1 Define knitting.
8.2 Describe different types of knitting machine.
8.3 Describe different types of knitted fabrics.
8.4 Mention the properties of knitted fabrics.
8.5 Discuss the defects of knitted fabrics.

9 Understand the singeing and desizing.

9.1 Define singeing.
9.2 Mention the purpose of singeing.
9.3 List different types of singeing.
9.4 Describe the process of singeing.
9.5 Mention the purpose of desizing.
9.6 List different types of desizing.
9.7 Describe the process of desizing.

10 Understand scouring and bleaching.

10.1 Define scouring.
10.2 Mention the purpose of scouring.
10.3 List different types of scouring.
10.4 Define bleaching.
10.5 Mention the purpose of bleaching.
10.6 List different types of bleaching.

11 Understand the dyeing, printing & finishing.

11.1 Define dyeing.
11.2 Mention the purpose of dyeing.

11.3 Define printing.
11.4 Mention different types of printing.
11.5 List different types of printing machines.
11.6 Describe different types of mechanical finishing.
11.7 Describe different types of chemical finishing.

12 Understand the garments manufacturing process.

12.1 Mention the purpose of design/sketch.
12.2 Mention different types of design/sketch.
12.3 Describe the procedure of design/sketch.
12.4 Mention the purpose of production pattern design.
12.5 List different types of production pattern design.
12.6 Describe the procedure production of pattern design.
12.7 Mention the purpose of sample making.
12.8 Identify different types of sample making.
12.9 Describe sample making procedure.

13 Understand the spreading and cutting of garments.

13.1 Mention the purpose of spreading.
13.2 Describe spreading procedure.
13.3 Mention the purpose of cutting.
13.4 Describe the purpose of cutting.
13.5 Describe the purpose of sewing.
13.6 Describe the sewing procedure.

14 Understand the garments finishing.

14.1 Define garments finishing.
14.2 Describe pressing, folding and packing.
14.3 Mention the purposes of garments finishing.
14.4 Classify the finishing of garments.
14.5 Describe different types of garments finishing.

REFERENCE BOOKS

1. Cotton Spinning, - willian taggart
2. Spun Tarn Technology vol-I, - A venkata
3. Cotton Spinning Hand Book, - R. jagannathan
4. Technology of Tex Processing Vol-I - Dr. V. A. shenai
5. Dyeing and Chemical Technology of Textile Fibre. TK Pattabhiram

৬. ইয়ার্ন ম্যানুফ্যাকচারিং ১, - মোঃ মহিবুল ইসলাম
৭. ফ্রেবিক ম্যানুফ্যাকচার-১, - মোঃ আব্দুল খালেক
৮. টেক্সটাইল কেমিষ্ট্রি- ১, - মোঃ মজিবুর রহমান
৯. ক্লদিং টেকনোলজি-১, - মোঃ শাহজাহান ফিরোজ

1011	ENGINEERING DRAWING	T	P	C
		0	6	2

OBJECTIVES

- To develop the ability to use various drawing instruments and materials.
- To enable in constructing and using various types of scales in drawing.
- To provide the ability to construct various geometrical figures.
- To enable to adopt various symbols used in drawing.
- To provide the skill of freehand sketching with shades and shadows.
- To provide the basic skill of drawing orthographic views.

SHORT DESCRIPTION

Drawing instruments and their uses; Lettering, numbering and constructing title strip; Adopting alphabet of lines and dimensioning; Constructing scales; Constructing geometrical figures; Constructing conic sections; Adopting symbols; Freehand sketching (with shades and shadows), Drawing orthographic views.

DETAIL DESCRIPTION

DRAWING INSTRUMENTS AND MATERIALS

1 Practice with drawing instruments and materials for basic drawing technique.

1.1 Identify the different types of drawing instruments.
1.2 Use different types of drafting equipment.
1.3 Use different types of drafting software.
1.4 Identify the standard sizes of drawing board and sheets.
1.5 Draw the border lines in drawing sheets following standard rule.
1.6 Draw horizontal, vertical and inclined lines with the help of set squares and T-square.
1.7 Draw 15 degree, 75 degree, 105 degree and 120 degree angles with the help of set squares.
1.8 Use lettering guide, template, scale pantograph and French curve.

LETTERING NUMBERING AND TITLE STRIP

2 Letter and number freehand and with instruments.

2.1 Identify the necessity of good lettering in engineering drawing.
2.2 Draw freehand single stroke vertical letters from A to Z (upper and lower case) and numbers 0 to 9.
2.3 Draw freehand inclined (65 degree to 75 degree) single stroke letters from A to Z (upper and lower case) and numbers from 0 to 9.

2.4 Draw block letters (Gothic) using 5 : 4 and 7 : 5 proportions and height.
2.5 Select a suitable size of letters and write a few sentences using all the letters selecting suitable scale.
2.6 Draw title strip with proper placement using suitable size of letters and measurements.

ALPHABET OF LINES AND DIMENSIONING

3 Adopt the alphabet of lines.

3.1 Select different lines in drawing.
3.2 Use center line, hidden line, phantom line, break line, dimension line, extension line, section line and cutting plane line.
3.3 Use different thickness of line to emphasize a part of drawing.
3.4 Select recommended grades of pencils for various types of lines for engineering drawing.

4 Adopt the elements and theory of dimensioning.

4.1 Put dimensions in engineering drawing according to an accepted standard.
4.2 Identify the elements of dimensions from a given dimensioned drawing.
4.3 Apply aligned and unidirectional system of dimensioning.
4.4 Draw size and location of dimension, continuous dimension, staggered dimension and dimensioning in limited space.
4.5 Add necessary dimension to a given drawing with suitable arrows.

CONSTRUCTION OF SCALE

5 Prepare scale for drawing application.

5.1 Calculate representative fraction and interpret a scale reading.
5.2 Use different types of scale to find full size dimension.
5.3 Draw a plain scale to show meters, centimeters and millimeters of a given distance on object.
5.4 Draw a diagonal scale to show three units having given RF.
5.5 Read particular distance on plain and diagonal scale.
5.6 Use scale of chord.
5.7 Draw angle of 49 degree, 78 degree and 95 degree with the help of scale of chord.

GEOMETRICAL CONSTRUCTIONS

6 Construct geometric figures (lines, triangles & squares).

6.1 Divide given straight line into any number of equal parts.
6.2 Draw perpendicular when the given point is at or near the end of the line.
6.3 Bisect a given angle.
6.4 Trisect a given angle.
6.5 Draw a straight line parallel to given straight line at some given distance.
6.6 Draw a square on a given straight line.

7 Construct geometric figures (circles and regular polygons).

7.1 Draw regular polygons i.e. pentagon, hexagon and octagon having given one side.
7.2 Locate the center of circle and arc.
7.3 Inscribe circle in triangles.
7.4 Inscribe a circle about a triangle.
7.5 Divide a triangle into any number of equal parts.
7.6 Draw an equilateral triangle equal in area of a square.
7.7 Determine the length of the circumference of circle.

CONIC SECTIONS

8 Construct conic sections.

8.1 Draw an ellipse by concentric circle method.
8.2 Draw an ellipse by parallelogram method.
8.3 Draw an ellipse by four center method.

8.4 Draw a parabola having given foci and directrix.
8.5 Draw a parabola from given abscissa and ordinate.

SYMBOLS

9 Adopt standard symbols in drawing.

9.1 Identify symbols used in drawing.
9.2 Draw a legend using symbols of different engineering materials.
9.3 Draw the symbols of different plumbing fittings and fixtures used in drawing.
9.4 Draw the symbols of different electrical fittings and fixtures used in drawing.
9.5 Interpret information from drawing containing standard symbols.

FREEHAND SKETCHING (WITH SHADES AND SHADOWS)

10 Sketch freehand with shades and shadows.

10.1 Produce freehand sketches of the following with shade and shadow technique:

a. Book
b. Brick
c. Step
d. Cylinder
e. Hand
f. tubewell
Spade with handle
Pipe wrench
g Bib-cock
Bench vice
h Open box
i Electric lamps
j Electric switches
k Electric fan
l Nuts and bolts

10.2 Use different materials and methods of shading and shadowing freehand sketches.

ORTHOGRAPHIC PROJECTION

Translate pictorial views of simple objects into orthographic views.

Identify different planes.
Draw third angle orthographic views of simple objects.
Draw first and third angle views of a simple object and add proper dimensions.
Solve missing Luis problems of different objective.

REFERENCE BOOKS

1 Geometrical Drawing
— I H Morris
2 Prathamic Engineering Drawing
— Hemanta Kumar Bhattacharia

6711 **BASIC ELECTRICITY**

T	P	C
3	3	4

OBJECTIVES

- To familiarize the basic electrical quantities & laws and to apply them in solving problems of electrical circuits.
- To acquaint with electro-chemistry, electro-magnetism, electro-magnetic induction and electrostatic.
- To develop skill in electrical wiring.
- To appreciate the safety measures to be taken for electrical wiring.

SHORT DESCRIPTION

Electric current and ohm's law; Conductors and insulators; Basic electrical circuits; Power and energy; Basic electro-chemistry; Electro-magnetism; Electro-magnetic induction; Electrostatics; Wires and cables; Hand tools used in wiring; House wiring; Controlling devices; Protective devices; Earthing.

DETAIL DESCRIPTION

Theory :

ELECTRIC CURRENT

1 Understand electricity and its nature.

1.1 State the meaning of electricity.
1.2 Describe the structure of atom.
1.3 Define current, voltage and resistance.
1.4 State the units of current, voltage and resistance.

CONDUCTOR & INSULATOR

2 Understand conductor and insulator.

2.1 Define conductor and insulator.
2.2 Explain the conductor and insulator according to electron theory .
2.3 List at least 5 conductors and 5 insulators.
2.4 Describe the factors upon which the resistance of a conductor depends.
2.5 State laws of resistance.
2.6 Prove the relation $R= \rho \frac{L}{A}$
2.7 Explain the meaning of resistivity and name the unit of resistivity.
2.8 Solve problems relating to laws of resistance.

OHM'S LAW

3 Understand Ohm's Law

3.1 State Ohm's law.
3.2 Deduce the relation between current, voltage and resistance.
3.3 Solve problems relating to Ohm's law.

BASIC ELECTRIC CIRCUITS

4 Understand electric circuit.

4.1 Define electric circuit.

4.2 Name the different types of electric circuits.
4.3 Define series circuit, parallel circuit and Mixed ckt.
4.4 Describe the characteristic of series circuit and parallel circuit.
4.5 Calculate the equivalent resistance of series circuit, parallel circuit and Mixed circuit.
4.6 Solve problems relating to series circuit parallel circuit. mixed ckt .

POWER AND ENERGY

5 Apply the concept of electrical power and energy.

5.1 Define electrical power and energy.
5.2 State the unit of electrical power and energy.
5.3 Show the relation between electrical power and energy.
5.4 List the name of instruments for measuring of electrical power and energy.
5.5 Draw the connection diagram of wattmeter and energy meter in an electrical circuit.
5.6 Solve problems relating to electrical power and energy Calculation.

6 Understand the principles of Joule's law.

6.1 Describe the heating effect of electricity when current flows through a conductor.
6.1 Explain Joule's law regarding the development of heat in electrical circuit.
6.2 Describe meaning of "J".
6.3 Solve problems relating to Joule’s law.
6.4 Solve problems relating to Joule’s law

BASIC ELECTRO-CHEMISTRY

7 Understand the concept of cells.

7.1 Describe the meaning of potential difference.
7.2 Define the meaning of cell.
7.3 Classify the Cell
7.4 Difine Primary Cell
7.5 List the different types of primary Cell
7.6 Describe the construction and principle of action of a simple Voltaic cell.
7.7 List the defects of a simple Voltaic cell.
7.8 Describe the causes of defects of a simple Voltaic cell.
7.9 Describe the methods of removing the defects of a simple Voltaic cell.

8. Understand the construction and principle of action of secondary cell.

8.1 Define secondary cell.
8.2 Describe the construction and principle of action of a lead acid cell.
8.3 List the uses of lead acid cell.
8.4 List the advantages of secondary cell.
8.5 Distinguish between a cell and a battery.
8.6 Describe the series and parallel grouping of cells.
8.7 Distinguish bets Primary & Secondary Cell

9 Understand the concept of capacitors and capacitance.

9.1 Define capacitor and capacitance.
9.2 Name the unit of capacitance.
9.3 Name the different types of capacitor.
9.4 Write the uses of capacitor.
9.5 Determine the equivalent capacitance of a number of capacitors connected in series.
9.6 Determine the equivalent capacitance of a number capacitors connected in parallel.
9.7 Explain the energy stored in a capacitor.
9.8 Solve problems relating to capacitor connected in series and in parallel.

ELECTRO - MAGNETISM

10 Understand Electro - magnetism.

10.1 Describe magnetic field, magnetic lines of force and its properties.
10.2 Describe field intensity and magnetic flux density.
10.3 Distinguish between absolute permeability and relative permeability.
10.4 Describe the concept of magnetic effect of electrical current.
10.5 States Maxwell's cork screw rule and Fleming's right hand rule for determining the direction of magnetic field and current.
10.6 Explain the force experienced in a current carrying conductor placed in a magnetic field.
10.7 State Fleming's left hand rule.
10.8 Explain the work done by a moving conductor in a magnetic field.
10.9 Explain the force between two parallel current carrying conductor.

11 Understand magnetic circuit.

11.1 Define a magnetic circuit.
11.2 Define the terms magnetizing force, magnetomotive force, ampere –turns, reluctance, permeance, permeability, magnetic linkage and leakage.
11.3 Show the relation between magnetomotive force, reluctance and magnetic field intensity or magnetizing force.
11.4 Compare a magnetic circuit with an electrical circuit.

ELECTRO MAGNETIC INDUCTION

12 Understand electro- magnetic induction.

12.1 Define Faraday's laws of electro-magnetic induction.
12.2 Describe the magnitude of dynamically induced emf and statically induced emf
12.3 Solve problems relating to emf generation.
12.4 Define Lenz's law and Fleming's right hand rule for determining the direction of induced emf and current.
12.5 Define self induced emf and self inductance.
12.6 Explain inductance of a iron cored inductor.
12.7 Define mutual inductance and co-efficient of coupling.

WIRES AND CABLES

13 Understand the uses of wires and cables.

13.1 Define electrical wires and cables.
13.2 Distinguish between wires and cables.
13.3 Describe the construction and uses of PVC, VIR, TRS or CTS and flexible wires
13.4 Describe the procedure of measuring the size of wires and cables by wire gauge.
13.5 Describe the current carrying capacity of a wire.

JOINTS AND SPLICES

14 Understand the usefulness of joints and splices.

14.1 Define the meaning of joints and splices.
14.2 State the five steps of making a joint.
14.3 Describe the procedure to make a pig tail joint, western union joint, Britannia joint, duplex joint, tap joint, simple splice.
14.4 Give example of uses of above mentioned joints.

HOUSE WIRING

15 Understand the different methods of house wiring.

15.1 State the meaning of wiring.
15.2 List the types of wiring.
15.3 State the procedure for Channel wiring, surface conduit wring and concealed wiring.
15.4 State the types of wiring used in :
a) Residential building.
b) Workshop
c) Cinema hall/Auditorium
d) Temporary shed
15.5 List the name of fittings used in different types of electrical wiring.

CONTROLLING DEVICES

16 Understand the construction and uses of controlling devices.

16.1 Define controlling device.
16.2 Name the different types of controlling devices.
16.3 Describe the constructional features and uses of tumbler switch, iron clad switch, push button switch and gang switch.

PROTECTIVE DEVICES

17 Understand the construction and uses of protective devices.

17.1 Define protective devices.
17.2 Name the different types of protective devices.
17.3 Name the different types of fuses used in house wiring.
17.4 Describe the construction and uses of renewable fuse.
17.5 Name the different types of circuit breaker used in house wiring.

EARTHING

18 Understand the necessity of ear thing.

18.1 Define ear thing
18.2 Explain necessity of ear thing
18.3 Name different types of ear thing

WIRING CIRCUITS

19 Apply the principle of controlling electrical circuit by switch.

19.1 Sketch the wiring diagram of one lamp controlled by one SPST switch and describe its uses.
19.2 Sketch the wiring diagram of one lamp controlled by two SPDT switch and describe its uses.
19.3 Draw the wiring diagram of one calling bell with a lamp controlled from one point.
19.4 Draw the wiring diagram of a fluorescent tube light circuit.
19.5 Describe the working principle of fluorescent tube light.

ELECTRICITY ACT

20 Understand electricity act/rule of Bangladesh and safety practices.

20.1 State electricity act/rule of Bangladesh to be followed in electrical wiring.
20.2 Describe the importance of electricity act/rule.
20.3 Describe safety procedure against electrical hazards.
20.4 List the performance of safety practices for electrical equipment, machines and accessories.

<u>Practical</u> :

1 Identify and use electrical measuring instruments.

1.1 Identify Voltmeters, Ammeters, Ohm Meter, Wattmeter, Energy meter and AVO meter.

1.2 Select & read the scale of given meters.
1.3 Connect correctly voltmeter, ammeter, wattmeter and energy meter to a given circuit.

2 Show skill in verification of Ohm's Law.

2.1 Sketch the circuit diagram for the verification of Ohm's Law.
2.2 List tools, equipment and material required for the experiment.
2.3 Prepare the circuit according to the circuit diagram using proper equipment.

3 Verify the characteristics of series and parallel circuits.

3.1 Draw the working circuit diagram.
3.2 List tools, equipment and materials required for the experiment.
3.3 Prepare the circuit according to the circuit diagram using proper equipment.
3.4 Check all connections before the circuit is energized.
3.5 Record data and verify that in a series circuit total voltage and resistance is equal to the summation of individual voltage and resistance respectively but total current is equal to the individual current.
3.6 Record data and verify that for a parallel circuit supply voltage is equal to the branch voltage, supply current is equal to summation of branch currents and total conductance is equal to the summation of branch conductance.

4 Show skill in measuring the power of an electric circuit.

4.1 Sketch the necessary circuit diagram of an electrical circuit w electrical load, ammeter, voltmeter and wattmeter.
4.2 Prepare the circuit according to the circuit diagram using ammet voltmeter and wattmeter.
4.3 Record the power, measured by the wattmeter and verify t reading with that of calculated from ammeter and voltmeter.
4.4 Compare the measured data with that of calculated and rat power.

5 Show skill in measuring the energy consumed in an electrical circuit.

5.1 Sketch the necessary diagram of an electric circuit wattmeter, energy meter and electrical load.
5.2 Prepare the circuit according to the circuit diagram usir wattmeter and energy meter.
5.3 Record the energy measured by the energy meter and verify with that of calculated from wattmeter for a fixed time.

6 Show skill in grouping a number of cell to form a battery.

6.1 Sketch the connection diagram of 4 cells (1.5 V each) in series.
6.2 List the materials and equipment required for the experiment.
6.3 Connect the terminals of the cells according to the diagram.
6.4 Determine the terminal voltage of the group and verify it with the calculated result.

7 Make a simple Cell.

7.1 List the materials for constructing a simple cell.
7.2 Prepare electrolyted by diluting H^2SO_4 with distilled water on proper ratio.
7.3 Assemble the cell using required electrolyte and electrodes along with necessary materials.
7.4 Measure the emf of the cell.

8 Show skill in making artificial magnets.

8.1 Make an artificial magnet by rubbing method (Single touch)
8.2 Make an artificial magnet by divided touch method.
8.3 Make an artificial magnet by passing electrical current.
8.4 Detect the polarity of the produced artificial magnet with the help of a compass needle.

9. Show skill in uses of hand tools, wires and cables.

9.1 List the hand tools used in electrical wiring.
9.2 Identify the hand tools used in electrical wiring.
9.3 Draw neat sketches of hand tools used in electrical wiring.

9.4 Identify different types of wires and cables.
9.5 Measure the diameter of the identified wire and cables using standard wire gauge.

10. Show skill in making a duplex joint and a T-joint.

10.1 Sketch a duplex joint and a T-joint
10.2 Perform skinning and scraping of two pieces of PVC duplex cal and two pieces of simplex PVC cables.
10.3 Make the joints according to sketches.
10.4 Write a report.

11 Show skill in preparing wring circuit of two lamps controlled from the points separately.

11.1 Sketch a working circuit of two lamps controlled from two poin separately.
11.2 Make the wiring circuit using required materials and equipment a wiring board.
11.3 Test the connection of circuit by providing proper supply.

12. Show skill in preparing wiring circuit of one lamp controlled from the points.

12.1 Sketch a working diagram of one lamp controlled by two SPD tumbler switches.
12.2 Complete the wiring circuit using required materials and equipment on wiring board.
12.3 Test the connection of circuit by providing proper supply.

13 Show skill in preparing wiring circuit of one bell with two indicating lamp controlled from two points .

13.1 Sketch a working diagram of one bell with two indicating lamps controlled by two push button switch.
13.2 Make the wiring circuit using required materials and equipment in wiring board.
13.3 Test the connection of circuit by providing proper supply.

14 Show skill in preparing wiring circuit of a fluorescent tube light.

14.1 Sketch a working diagram of a fluorescent tube light circuit.
14.2 Make the connection of a fluorescent tube light circuit using required materials and equipment.
14.3 Test the connection of the circuit by providing supply.

REFERENCE BOOKS

1 A text book of Electrical Technology — B. L. Theraja
2 Basic Electricity — Charles W Ryan
3 Basic Electrical theory and Practice — E. B. Babler

5911 **MATHEMATICS – I**

T	P	C
3	3	4

OBJECTIVES

- To acquaint the students with the basic terminology of Algebra.
- To be able to understand the complex numbers (J-operator) which are being used in electrical engineering
- To be able to understand the binomial expansion.
- To be able to use the knowledge of trigonometry in solving problems of engineering importance.

SHORT DESCRIPTION

Algebra: Set, Indices, Logarithms, AP & GP, Polynomials & polynomial equations, Complex number, Permutation & Combination, Binomial theorem for positive integral Index and negative & fractional index.

Trigonometry: Ratio of associated angles, Compound angles, Transformation formulae, multiple angles and Sub-multiple angles.

DETAIL DESCRIPTION

Algebra:

1 Apply the concept of set in solving problem.

1.1 Define set, sub-set and universal set.

1.2 Define the different types of number set.

1.3 Define union of set, intersection of set, complement of set, power set, disjoint set.

1.4 Prove (using Venn diagram) the relation of following types where A, B and C are any set.

i) $AU (BUC) = (AUB) \cap (AUC)$

ii) $(AUB)^c = A^c \cap B^c$

iii) $(A \cap B)^c = A^c UB^c$

1.5 Find the number of elements in the union of two sets.

1.6 Solve the problems using above.

2 Apply the laws of indices in solving mathematical problem.

2.1 State the laws of indices.

2.2 Apply the laws of indices to solve the problem.

2.3 Perform algebraic operation on surd.

2.4 Use the scientific calculator in solving the problems of indices.

LOGARITHIMS

3 Apply the concept of logarithms.

3.1 Define logarithm.

3.2 Prove the following laws of logarithm.

a) $\text{Log}_a (m \times n) = \text{Log}_a m + \text{Log}_a n$

b) $\text{Log}_a \left(\frac{m}{n}\right) = \text{Log}_a\ m - \text{Log}_a\ n$

c) $\text{Log}_a\ (m)^n = n\ \text{Log}_a\ m$

d) $\text{Log}_b\ a \times \text{Log}_a\ b = 1$

e) $\text{Log}_a\ 1 = O$

3.3 Solve problems using 3.2.
3.4 State the difference between Naperion and common logarithms.

4 Understand the concept of AP & GP.

4.1 Define AP and common difference.

4.2 Find last term and sum of n terms, given first term and common difference.

4.3 Define GP and common ratio.

4.4 Find the sum of n terms given first and common ratio.

5 Apply the concept of polynomial in solving the problems.

5.1 Define polynomials and polynomial equation.
5.2 Explain the roots and co-efficient of polynomial equations.
5.3 Find the relation between roots and co-efficient of the polynomial equations.
5.4 Determine the roots and their nature of quadratic polynomial equations.
5.5 Form the equation when the roots of the quadratic polynomial equations are given.
5.6 Find the condition of the common roots of quadratic polynomial equations.
5.7 Solve the problems related to the above.

6 Understand the concept of complex numbers.

6.1 Define complex numbers.
6.2 Perform algebraic operation (addition, subtraction, multiplication, division, square root) with complex number of the form a+jb.
6.3 Find the cube roots of unity.
6.4 Apply the properties of cube root of unity in solving problems.

7 Apply the concept of permutation & Combination.

7.1 Explain permutation.
7.2 Find the number of permutation of n things taken r at a time when,
i) things are all different.
ii) things are not all different.
7.3 Solve problems of the related to permutation :
i) be arranged so that the vowels may never be separated.
From 10 man and 6 women a committee of 7 is to be formed. In how many ways can this be done so as to include at least two women in the committee.

7.4 Explain combination.
7.5 Find the number of combination of n different things taken r at a time.
7.6 Explain ${}^nC_r$, ${}^nC_n$, ${}^nC_0$
7.7 Find the number of combination of n things taken r at a time in which p particular things
i) Always occur ii) never occur.

7.8 Establish i) ${}^nC_r = {}^nC_{n-r}$

ii) ${}^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$

7.9 Solve problems related to combination.

8 **Apply the concept of binomial theorem.**

8.1 State binomial expression.

8.2 Find the general term, middle term, equidistant term and term independent of x.

8.3 Use binomial theorem to find the value of

i) $(0.9998)^{2}$, correct to six places of decimal .

ii) $(1+\sqrt{2})^{5} - (1-\sqrt{2})^{5}$

8.4 Express the binomial theorem for negative and fractional index.

8.5 Solve problems of the following types:

Expand i) $(1-nx)^{-\frac{1}{n}}$ ii) $\frac{1}{4.08}$

9 **Apply the concept of associated angles.**

9.1 Define associated angles.

9.2 Find the sign of trigonometrical function in different quadrants.

9.3 Calculate trigonometrical ratios of associated angle.

9.4 Solve the problems using above.

10 **Apply the principle of trigonometrical ratios of compound angles.**

10.1 Define compound angles.

10.2 Establish the following relation geometrically for acute angles.

i) $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$.

ii) $\cos(A \pm B) = \cos A \cos B \pm \sin A \sin B$.

10.3 Deduce formula for $\tan(A \pm B)$, $\cot(A \pm B)$.

10.4 Apply the identities to work out the problems:

i) find the value of $\sin 75^{0}$, $\tan 75^{0}$.

ii) show that $\frac{\sin 75^{0} + \sin 15^{0}}{\sin 75^{0} - \sin 15^{0}} = \sqrt{3}$

iii) if $\alpha + \beta = \theta$, $\tan\alpha + \tan\beta = b$, $\cot\alpha + \cot\beta = a$,

show that $(a - b) = ab \cot\theta$.

11 **Apply sum and product formula of trigonometrical ratios.**

11.1 Express sum or difference of two sines and cosines as a product and vice-versa.

11.2 Solve problems of the followings types:

i) show that, $\sin 55^{\circ} + \cos 55^{\circ} = \sqrt{2}\cos 10^{0}$

ii) prove that, $\cos 80^{0} \cos 60^{0} \cos 40^{0} \cos 20^{0} = \frac{1}{16}$

12 Apply the concept of ratios of multiple angles.

12.1 State the identities for sin 2A, cos 2A and tan 2A.

12.2 Deduce formula for sin 3A, cos 3A and tan 3A.

12.3 Solve the problems of the followings types.

i) express cos 5θ in terms of cos θ .

ii) if tan α = 2 tan β, show that, tan $(\alpha + \beta) = \dfrac{3 \sin 2\alpha}{1+3 \cos 2\alpha}$

13 Apply the concept of ratios of sub-multiple angles.

13.1 Find mathematically the identities for sin α , cos α and tan α in terms of $\frac{\alpha}{2}$ and $\frac{\alpha}{3}$

13.2 Solve the problems of the type :

find the value of cos 3^0 , cos 6^0 , cos 9^0 , cos 18^0, cos 36^0, etc.

5913 **CHEMISTRY**

T	P	C
3	3	4

OBJECTIVES

- To provide the students a background of basic science required for understanding technology subjects.
- To develop a working knowledge of common engineering and industrial materials including physical and chemical properties and to enable to determine through experiments the properties of such materials.
- To develop a basic knowledge and concept of chemical reactions of common engineering and industrial materials.
- To develop through experiments the understanding of fundamental scientific concept which will provide a common base for further studies in science and technology?

SHORT DESCRIPTION

Role of Chemistry in the field of engineering and technology; Matter and its changes; Symbol, valence and chemical equations; Different types of chemical reactions; Catalyst and Catalysis; Acid, Base and Salt; Properties of gases; Dalton atomic theory; Avogadro's hypothesis; Laws of chemical equivalent; Atomic Mass and molecular mass; Atomic structure; Quantum numbers; Periodic table; Oxidation & Reduction; Chemical bond; Electrolytic conductance and electrolysis; Acid base equilibrium; Water; Metals; Concept of Organic Chemistry; Aliphatic Hydrocarbon and Alcohols.

DETAIL DESCRIPTION

Theory: MATTER AND ITS CHANGES

1 Symbol, Valency & Chemical Equation

1.1 Define matter, element, compound, mixtures, solutions and suspensions.
1.2 Distinguish between, "atoms and molecules", "physical change and chemical change", "exothermic and endothermic changes and reactions".
1.3 Identify exothermic and endothermic reactions from a given list of reactions.
1.4 Define symbol and formula, valence of elements and radicals.
1.5 Discuss the variations of valence with examples.
1.6 Define active and latent valence.
1.7 Define chemical equation.
1.8 Explain the full meaning of a given chemical equation.

DIFFERENT TYPES OF CHEMICAL REACTIONS, CATALIST & CATALYSIS

2 Understand the concept of chemical reactions.

2.1 Define chemical reaction.
2.2 Name the methods of bringing about chemical reaction.
2.3 Give examples of different types of chemical reactions with suitable examples.
2.4 Define catalysis and catalyst.
2.5 Mention different types of catalyst with examples.
2.6 List five uses of catalysts in industries.

ACID, BASE & SALT

3 Understand acid, base and salt.

3.1 Define acid, base and salt.
3.2 List five properties of acid, base and salt.
3.3 Classify salts according to their chemical properties.
3.4 Explain basicity of an acid and acidity of a base.

STATES OF MATTER

4 Understand properties of gases.

4.1 Identify the basic properties of gases.
4.2 Define Boyls law & Charls law, absolute temperature S.T. P /N.T.P
4.3 Deduse the relationship between pressure, volume and temperature of a gas to establish Boyle's Law, Charle's law and the law of pressure.
4.4 Combine the gas laws to establish the gas equation.
4.5 Establish the partial pressure of mixed gases using Dalton's law of partial pressure.
4.6 Solve problems in relation to pressure, volume, temperature and partial pressure of a mixture of gases.

DALTON'S ATOMIC THEORY & AVOGADRO'S HYPOTHESIS

5 Understand Dalton's atomic theory & Avogadro's hypothesis

5.1 List the four postulates of Dalton's atomic theory.
5.2 Explain at least five limitations of Dalton's atomic theory.
5.3 State Avogadro's hypothesis.
5.4 Explain Avogadro's constant.
5.5 Explain five applications of Avogadro's hypothesis in Chemistry.
5.6 Solve problems using the knowledge of Avogadro's hypothesis.

6 Understand chemical equivalent, Atomic & molecular Mass.

6.1 Define the chemical equivalent of an element, a compound, a radical, an acid an alkali and a salt.
6.2 Explain the variations in chemical equivalent of an element.
6.3 Define atomic mass and molecular Mass.
6.4 Establish a relationship among chemical equivalent, valence and atomic Mass.
6.5 Solve problems to find out atomic Mass, chemical equivalent and valency.

7 Understand the modern concept of atomic structure.

7.1 State the fundamental particles of atom.
7.2 Explain the following terms:
i) Atomic number ii) Isotopes iii) Isobar iv) Gram-atom
v) Mass Number and vi) Gram molecular Mass, vii) Mole viii) ISO tone.
7.3 Describe Rutherford's and Bohr's atomic model.

8 Understand the quantum numbers.

8.1 Define quantum numbers.
8.2 Explain the significance of the following quantum numbers:
i) Principal quantum number
ii) Subsidiary quantum number
iii) Magnetic quantum number
iv) Spin quantum number
8.3 Explain the Paula's exclusion principle.
8.4 Explain the probability distribution of electrons round the nucleus.
8.5 Define orbit and orbital.

9 Understand the modern periodic table.

9.1 State the periodic law of elements.
9.2 Describe the modern long periodic table.

9.3 Explain the limitations of periodic table.
9.4 Give the Name of IA, VII-A and Zero group elements.

10 Understand oxidation and reduction.

10.1 Explain the modern concepts of oxidation and reduction with examples.
10.2 Explain "oxidizing agent" and "reducing agents " with examples.
10.3 Explain the oxidation and reduction takes place simultaneously.
10.4 Explain the oxidation number and oxidation state.
10.5 Write the oxidation number of an element from its compounds.

11 Understand the modern concept of chemical bonds.

11.1 Define chemical bond.
11.2 List the different types of bonds.
11.3 Explain the modern concept of ionic bonds.
11.4 Explain the co-valet bonds, co-ordinate bond, Sigma bond, Pie bond.

12 Understand the fundamentals of electrolysis.

12.1 Define electrolysis.
12.2 Differentiate between electrical conductor and electrolyte.
12.3 Explain the process of electrolysis.
12.4 Explain Faraday's laws of electrolysis.
12.5 List at least four Industrial applications of electrolysis.

13 Understand pH value, Acidimetry and Alkalimetry.

13.1 Define pH, acidimetric and alkalimetry.
13.2 Explain pH scale and its uses.
13.3 Explain acid base titration.
13.4 Explain the method of preparation of normal solutions.
13.5 Define of indicators and their uses.
13.6 Explain buffer solutions and their working mechanism.

14 Understand oxides and hydroxides.

14.1 Define oxide and hydroxide.
14.2 Describe the classification of oxides and hydroxides.
14.3 Explain different types of oxides and hydroxides with examples.

15 Understand the chemical process involved in water treatment.

15.1 Distinguish between hard water and soft water.
15.2 Differentiate between temporary and permanent hardness of water.
15.3 List at least three disadvantages and three advantages of using hard water.
15.4 Describe the Permuted process of softening hard water by explaining the reactions that take place.
15.5 Explain the ion exchange resin process of softening water.
15.6 Describe chemical tests of water.

16 Understand the extraction and refining process for Iron, Copper, Zinc and Aluminum.

16.1 Compare the properties of metal and non-metal.
16.2 Define (i) ores (ii) roasting (iii) calcinations (iv) smelting (v) alloy (vi) slag, (vii) Flux.
16.3 Give names and formulae of important ores of Iron, Copper, Aluminum and Zinc.
16.4 Describe the manufacturing process of iron and copper from its ore.
16.5 Compare the properties of (i) Cast Iron (ii) iron (iii) Steel (iv) Wrought Iron.

17 Understand the concept of Organic Chemistry and organic compounds.

17.1 Define Organic Chemistry.
17.2 Distinguish between organic and inorganic compounds.
17.3 Explain homologous series of organic compounds.
17.4 List the molecular and structural formulae of methane, ethane, propane and butane.
17.5 Explain functional groups of organic compounds.

18 Understand the aliphatic hydrocarbons and the alcohols.

18.1 Define hydrocarbon, saturated and unsaturated hydrocarbons.
18.2 Define alkenes, alkene's and alkynes.
18.3 Explain commons system, derived system and IUPAC system of nomenclature of organic compounds.
18.4 Define Alcohols.
18.5 Explain the classification of alcohol.
18.6 Define the term Enzyme, Fermentation, De-carbonization, Power Alcohol, Absolute Alcohol .

PRACTICAL ;

OBSERVATION AND MEASUREMENT

1. Measure the pH value of unknown solutions to classify them as neutral, acidic or alkalis.
2. Prepare a decinormal solution of sodium carbonate.
3. Determine the unknown strength of an acid. Solve by a standard alkalis solution with a suitable indicator.

QUALITATIVE ANALYSIS OF KNOWN SALTS

4. Perform test tube tests for the known salt samples Copper salt, Iron salt, Lead salt, Aluminum salt, Ammonium salt, etc.
5. Perform charcoal oxidation and reduction test for the different salt e.g. such as Lead salt, Copper salt, Iron salt, Calcium salt, etc.
6. Perform tests to detect unknown basic radicals e.g. Lead, Copper, Iron Calcium, Zinc, Aluminium, Ammonium and Sodium.
7. Perform tests to detect unknown acid radicals e.g. chloride, nitrate, carbonate and sulphate.

5711	BANGLA	T	P	C
		2	2	3

উদ্দেশ্য

১। ভাষা দক্ষতা সমূহের (Language skills) প্রায়োগিক যোগ্যতা অর্জন ।

২। বাংলা সহিত্য পঠন- পাঠনের মাধ্যমে বাঙালী জাতীয়তাবোধ, দেশ প্রেম, নৈতিকতা, মুক্তচিন্তা ও মূল্য রোধের উন্মেষ ঘটানো।

সংক্ষিপ্ত বিবরণী

বাংলা ভাষা ঃ মাতৃভাষা ও সৃজনশীলতা ; গল্প, কবিতা, প্রবনধ , নাটক ও উপন্যাস সংকলন এবং বাংলা ভাষা রীতির বিভিন্নতা বানান ঘটিত সমস্যা ও উচ্চারণ কীর্তি বিরচন ও পত্র রচনা।

<u>তাত্ত্বিক অংশ</u>

বিশদ বিবরণী

১ বাংলা ভাষার নির্ভুল প্রয়োগ ঃ

ক) বাংলঅ ভাষা ঃ ভাষার সংঙ্গা, বাংলা ভাষার উৎপাত্তি ও ক্রম বিকাশ, বাংলা ভাষা রীতি- সাধু, চলিত রীতি ও আঞ্চলিক বা উপভাষা (সংঙ্গা, বৈশিষ্ট, পার্থক্য ও উদাহরণ)

খ) বাংলা বানান ও উচ্চারণ বিধি ঃ স্বরবর্ণ, ব্যঞ্জনবর্ণ ও যুক্ত বর্ণের গঠন কৌশল , নাম,উচ্চারণরণ ও উদাহরণ; বাংলা একাডেমীর প্রমিত বানান রীতি জাতীয় শিক্সাক্রম ও পাঠ্য পুস্তক বোর্ডেও বানান রীতি,উচ্চারণ রীতি ও উচ্চারণ সূত্র বাংলঅউচ্চারণরণের রীতি সমূহ, বহুল প্রচলিত কিছু শব্দের বানান ওউচ্চারণরণ বানানের অশুদ্ধি, বাক্যে পদেও পদ-প্রয়োগ ও পদ বিন্যাসে ভূল , সাধু ও চলিত রীতির মিশ্রণজনিত ভুল।

গ) বিরচন ঃ ভাবসম্প্রসারন, সারাংম ও সারমর্ম; প্রতিবেদন রচনা।

ঘ) পত্র রচনা ঃ ব্যক্তিগত, সামাজিক, দাপ্তরিক, সংবাদপত্র প্রকাশ উপযোগী, স্মারক লিপি, মান পত্র আবেদন পত্র- প্রাতিষ্ঠানিক, চাকুরির আবেদন, জীবন বৃত্তান্ত ইত্যাদি।

২ বাংলা সাহিত্য ঃ

ক) কবিতা

বঙ্গ ভাষা- মাইকেল মধুসুধন দত্ত
সোনার তরী রবীন্দ্রনাথ ঠাকুর
মানুষ- কাজী নজরুল ইসলাম
বাংলার মুখ আমি দেখিয়াছি- জীবনানন্দ দাশ

খ) ছোট গল্প ঃ

খোকাবাবুর প্রত্যাবর্তন -রবীন্দ্র ঠাকুর
মহেশ - শরৎ চন্দ্র চট্টোপাধ্যায়
একুশের গল্প - জহির রায়হান

গ) প্রবন্ধ ঃ

অধাঙ্গী - বেগম রোকেয়া সাখাওয়াত হোসেন
জীবন ও বৃক্ষ - মোতাহের হোসেন চৌধুরী
সংস্কৃতি - আবুল ফজল

ঘ) একান্ধিকা ঃ

মানুষ - মুনীর চৌধুরী

ঙ) মুক্তিযুদ্ধের উপন্যাস ঃ (যে কোন একটি)

১.আগুনের পরশমনি- হুমায়ূন আহমেদ

২.জননী সাহসিনী - ১৯৭১ -আনিসুল হক

<u>ব্যবহারিক অংশ</u>

১. নির্ধারিত বক্তৃতা ঃ বিভিন্ন জাতীয় দিবস বিষয়ক - বিজয় দিবস একুশে ফেব্রুয়ারি আন্তর্জাতিক মাতৃভাষা দিবস, স্বাধীনতা দিবস, ১৫ আগস্ট-জাতীয় শোক দিবস, মে দিবস।
প্রাতিষ্ঠানিক বক্তৃতা – নবাগত শিক্ষকের বরণ, বিদায়ী ছাত্রদেও উদ্দেশ্যে বক্তৃতা, শিক্ষা মন্ত্রী/ মহাপরিচালক/ চেয়ারম্যান এর আগমন উপলক্ষে বক্তৃতা।

২. **আবৃত্তি ঃ**
বাঁশী - রবীন্দ্রনাথ ঠাকুর
কান্ডারী হুশিয়ার - কাজী নজরুল ইসলাম
হায় চিল- জীবনানন্দ দাশ
প্রতিদান - জসীম উদ্দিন
সিঁড়ি - সুকান্ত ভট্টাচার্য
তোমাকে পাওয়ার জন্য হে স্বাধীনতা - শামসুল রহমান
বর্ণমালা আমার দুঃখিনী বর্ণমালা -শামসুর রহমান
চিঠি দত্ত - মহাদেব সাহা।

৩. বিতর্ক ঃ
বিজ্ঞান আশীবাদ না অভিশাপ।
ছাত্র রাজনীতি নিয়ন্ত্রই প্রকৃত গণতন্ত্র প্রতিষ্ঠার পথ। ইংরেজি মাধ্যম শিক্ষা পদ্ধতি জাতীয়তাবোধ ও দেশপ্রেম সৃষ্টির প্রধান অন্তরায়।
প্রযুক্তির বিকাশই প্রকৃতি বিনাশের একমাত্র কারন। সংস্কৃতিই আধুনিক মানুষের ধর্ম। মুক্তিযুদ্ধেও চেতনাই অসাম্প্রদায়িক বাংলাদেশ প্রতিষ্ঠার মূলমন্ত্র। আকাশ সংস্কৃতি যুব সমাজের নৈতিক অবক্ষয়ের মূল কারণ। চালকের অসর্তকতাই সড়ক দুর্ঘটনার প্রধানতম কারণ।

৪. **উপস্থিতি বক্তৃতা ঃ**
বিষয়বস্তু উন্মুক্ত।

৫. **প্রতিবেদন উপস্থাপন ঃ**
উদ্ধতন কতৃপক্ষের কাছে উপস্থাপণ
সংবাদপত্রে প্রকাশের জন্য প্রেরণ

5712 **ENGLISH – I**

T	P	C
2	0	2

Objectives:
After the completion of the course, learners will be able to develop-

- Listening with understanding
- The fluency of speech
- Reading with understanding
- Grammatical accuracy with emphasis on spelling & punctuation
- Creative writing
- Transferring information
- Communicating effectively

CONTENTS

Seen comprehension

Unit	Lesson	Title
Three: Learning English	1	Learning a language
	2	Why learn English
	3	How to learn English
Six: Our Environment	1	The environment and the ecosystem
	2	How the environment is polluted
	7	How to manage waste
Seven: Disasters we live with	5	The shake and the quake
Thirteen: We and our rights	2	Women have rights too.

N.B: The Unit mentioned refers to the Text Book (1st Paper) English for Today for class 11 – 12 by National Curriculum & Text Book Board, Dhaka.

GRAMMAR

1. (a) Use of Articles.
(b) Use of Tense *(Right forms of verbs with indicators)
(c) Classify verbs: (Auxiliary, Principle, transitive, intransitive, finite, non-finite, causative, quasi-passive)
(d) Uses of voice.

2. Sentence:
(a) Sentence structure: (Assertive, Interrogative, Optative, Imperative, Exclamatory, Simple, Complex and Compound)
(b) Question making: WH, Yes/No, Tag question

3. **Enrich vocabulary:** synonyms, Antonyms
4. Change Parts of speech and uses of suffix and prefix.

Communication
1. Style of letters: (full blocked, blocked, semi- blocked)

2. Parts of writing official letters: Techniques of writing (Heading, reference, date, inside, address, topic, greetings, complementary closing, signature, supplements.)

3. Write dialogues: (with teacher, principle, shopkeeper, hotel manager, station master, OC, DC, new corner, buyers, doctor, friend, colleges etc).

4. Write a guided paragraph with questions.

SYLLABUS

SECOND SEMESTER

1911	TEXTILE RAW MATERIALS - I	T	P	C
		2	0	2

AIMS

- To be able to acquire comprehensive knowledge of textile raw materials such as textile fiber, cotton fiber, jute fiber, linex fiber, hemp fiber, sisal fiber, coir fiber and manila fiber.
- To be able to develop knowledge of wool fiber and silk fiber.
- To be able to identify and classify different types of vegetable fibers and animal fibers.

SHORT DESCRIPTION

Vegetable fiber: Textile fiber; Cotton fiber; Jute fiber; Linen fiber; Hemp fiber; Sisal fiber; Coir fiber; Manila fiber.
Animal fiber: Wool fiber; Silk fiber.

DETAIL DESCRIPTION

VEGETABLE FIBERS

1 Understand the textile fibers.

1.1 Define textile fibers.
1.2 Describe the characteristics of textile fibers.
1.3 Mention the classification of textile fibers with example.
1.4 Identify the sources of textile fibers.
1.5 Mention different products of textile fibers.
1.6 Distinguish between natural and man-made fibers.

2 Understand the cotton fiber.

2.1 Describe the procedure of cultivation of cotton.
2.2 Describe growth and harvesting of cotton.
2.3 Mention the classification of cotton fiber.
2.4 Describe grading of cotton fiber.
2.5 Describe the structure of cotton fiber.
2.6 List chemical compositions of cotton fiber.
2.7 Mention end uses of cotton fiber.
2.8 Describe fiber identification test.

3 Understand the jute fibers.

3.1 Describe the cultivation of jute.
3.2 Describe the harvesting of jute.
3.3 Mention the classification of raw jute.
3.4 Describe jute grading.
3.5 Identify the defects of jute fiber.
3.6 Discuss the structures of jute.
3.7 List the chemical compositions of jute fiber.

3.8 Mention the properties (chemical, physical) of jute fiber.
3.9 Describe identification test (microscopy, burning & tearing) of fiber.
3.10 Mention end uses and diversified uses of jute.

4 Understand the linen fiber.

4.1 Describe the history of linen fiber.
4.2 Describe the cultivation of the linen fiber.
4.3 Mention the classification of linen fiber.
4.4 Describe linen sorting and grading.
4.5 Describe the structure of linen.
4.6 List the chemical compositions of linen.
4.7 Mention physical properties of linen fiber.
4.8 Mention chemical properties of linen fiber.
4.9 List the end uses of linen fiber.

5 Understand the hemp fiber.

5.1 Describe the history of hemp fiber.
5.2 Describe the cultivation of the hemp fiber.
5.3 Mention the classification of hemp fiber.
5.4 Describe hemp sorting and grading.
5.5 Describe the structure of hemp fiber.
5.6 List the chemical compositions of hemp fiber.
5.7 Mention the properties (chemical and physical) of hemp fiber.
5.8 Mention the end uses of hemp fiber.

6 Understand the sisal fiber.

6.1 Describe the history of sisal fiber.
6.2 Describe the cultivation of sisal.
6.3 Identify the sources of sisal.
6.4 List the chemical compositions of sisal fiber.
6.5 Mention the uses of sisal.

7 Understand the coir fiber.

7.1 Describe the history of coir fiber.
7.2 Describe the cultivation of coir fiber.
7.3 Identify the sources of coir fiber.
7.4 List the chemical compositions of coir fiber.
7.5 Mention the end uses of coir.

8 Understand the manila fiber.

8.1 Describe the history of manila fiber.
8.2 Describe the cultivation of manila fiber.
8.3 Identify the sources of manila fiber.
8.4 List the chemical compositions of manila fiber.
8.5 Mention end uses of manilation.

ANIMAL FIBERS

9 Understand the wool fiber.

9.1 Describe wool fiber.
9.2 Describe sources of wool fiber.
9.3 Mention the classification of wool.
9.4 Describe the grading of wool.
9.5 Describe the wool production process.
9.6 Describe the physical construction of wool.

9.7 Describe the chemical compositions of wool.
9.8 Mention the properties (chemical & physical) of wool.
9.9 Define clothing comport of wool.
9.10 Describe the fabric identification of wool.
9.11 Describe different applications and uses of wool fiber.
9.12 Mention the types of wool fiber.

10 Understand the silk fiber.

10.1 Describe the history of silk fiber.
10.2 Describe the growth and sources of silk.
10.3 Mention the classification of silk fiber.
10.4 Describe sericulture process of silk fiber.
10.5 Identify chemical compositions of silk fiber.
10.6 Mention the properties of silk fiber.
10.7 Describe different applications and end uses of silk.

REFERENCE BOOKS

1. Textile Fiber of Fabric - Bernard P. Corbman
2. Fiber Science - R. Gopalakrishman, V. Kasinaltan K. Bagyam
3. Textile Fibers - Dr. V. A. Shenai
4. The Woolen Industry - Alam Brearley
5. Manual of Textile Technology - W. Klein

৬. টেক্সটাইল ফাইবার - মোঃ মহিবুল ইসলাম
৭. টেক্সটাইল ফাইবার - এম. এ. সাইম

5022	SEWING PRACTICE – I	T	P	C
		2	6	4

AIMS

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of sewing practice with special emphasis on:

- sewing needles and machines
- stitch and seam
- feed mechanism of sewing.

SHORT DESCRIPTION

Sewing needles; Sewing machines; Stitch; Seam and Feed mechanism of sewing.

DETAIL DESCRIPTION

Theory:

1 Understand the sewing needles.

1.1 Identify sewing needle indicating their different points.
1.2 Identify needle sizes.
1.3 Describe the features of needle.
1.4 Describe the uses of sewing needle.
1.5 Describe embroidery needle.
1.6 Describe darning needle.
1.7 Describe different cutting points.

2 Understand the sewing machines.

2.1 Describe different parts of sewing machines.
2.2 Name the types of sewing machine.
2.3 Describe the features of flat bed machines.
2.4 Describe the features of raised bed machines.
2.5 Describe the features of post bed machines.
2.6 Describe the features of cylinder bed of sewing machines.
2.7 Mention the functions of plain sewing machine.
2.8 Describe the feed mechanism of plain sewing machine.
2.9 Describe the problems of sewing.

3 Understand the stitch type.

3.1 Describe the features of stitch class 100.
3.2 Describe uses of stitch class 100.
3.3 Describe the features of stitch class 209.
3.4 Describe the uses of stitch class 209.
3.5 Describe the features of stitch class 301.
3.6 Mention the uses of stitch class 301.
3.7 Describe the features of stitch class 401.
3.8 Describe the uses of stitch class 401.
3.9 Describe the features of stitch class 503.
3.10 Describe the uses of stitch class 503.
3.11 Describe the features of stitch class 602.
3.12 Mention the uses of stitch class 602.

4 **Understand the seam.**

4.1 Define seam.

4.2 Mention the classification of seam.
4.3 Mention the properties of seam.
4.4 Describe different types of seam.
4.5 Describe end uses of different seam.

5 Understand the feed mechanism of sewing.

5.1 Mention the necessity of feed mechanism of sewing machine.
5.2 List different types of feed mechanisms.
5.3 Describe different types of feed mechanisms.

Practical:

1. Draw the diagram of lockstitch sewing machine and label the important parts.
2. Practice on sewing with the lockstitch machine using normal rules.
3. Draw straight & parallel lines on the fabric.
4. Draw parallel curve line on the fabric.
5. Draw square on the fabric.
6. Draw triangle on the fabric.
7. Draw circle on the fabric.
8. Draw threading in the lockstitch machine.
9. Draw threading in the overlock machine.
10. Sew fabric with stitch density 10 SPI/12SPI/14SPI.
11. Sew stitch type 100, 209, 301.
12. Sew stitch type 401, 503, 602.
13. Practice on needle changing in different sewing machines.
14. Practice on pressure adjustment in the sewing machines.

7011 BASIC WORKSHOP PRACTICE

T	P	C
0	6	2

AIMS

To provide the students with an opportunity to acquire knowledge and skills to

- perform different metal & fitting works.
- perform basic welding works.
- Use and take care of fitting and welding tools & equipment.

SHORT DESCRIPTION

Fitting : Safety Precautions, Common hand tools; Measuring instruments; Laying out; Sawing, chipping, filing, grinding and finishing, drilling and thread cutting;
Welding: Arc welding; Gas welding; Welding with non-ferrous metal; Resistance welding.

Practical:

1 Understand the safely productions in Fitting & welding shop:

1.1. State general safety precaution in Fitting shop.
1.2. State general safety precaution in welding shop.
1.3. State the importance of good house keeping.

2 Demonstrate the application of basic metal working hand tools.

2.1 Identify common hand tools used for metal and fitting works.
2.2 Check hand tools for sharpness.
2.3 Carryout minor maintenance and sharpening of tools used for fitting works.
2.4 Follow safety procedure during working in the fitting shop.

3 Demonstrate the application of measuring instruments and gages for bench work.

3.1 Identify the measuring and layout tools.
3.2 Take measurement with vernier caliper and micrometer.
3.3 Measure and layout a fitting job.
3.4 Check/measure with gages (sheet and wire gage, drill gage, etc).

4 Demonstrate the application of machines and equipment for fitting works.

4.1 Identify machines and equipment for specific use.
4.2 Take care and maintenance of machines and equipment used in the fitting shop.

5 Show skill in sawing, chipping, filing, drilling and reaming.

5.1 Identify the operations of sawing, chipping, filing, drilling and reaming.
5.2 Perform sawing, chipping, filing, drilling and reaming operations.
5.3 Make a job involving sawing, chipping, filing, drilling and reaming operations (Hinge, Angle gage, etc).
5.4 Follow safety procedures during sawing, chipping, filing, drilling and reaming.

6 Show skill in cutting threads.

6.1 Identify the taps and dies.
6.2 Cut internal and external threads with tap and die.
6.3 Follow safety procedures during working with taps and dies.

7 Show skill in making sheet metal jobs.

7.1 Select appropriate sheet metal.
7.2 Select tools and equipment for sheet metal works.
7.3 Layout the sheet for jobs.(Development Drawing)
7.4 Make wire edge.
7.5 Make seam joint.
7.6 Make mug/measuring can/sugar scoup, etc.

8 Show skill in making pipe and duct.

8.1 Estimate the sheets required for pipe and duct.
8.2 Layout a sheet for pipe and duct.
8.3 Make pipe and duct.
8.4 Take care during making pipe and duct.

9 Show skill in soldering and brazing.

9.1 Select tools and equipment for soldering and brazing.
9.2 Make soldering and brazing joint.
9.3 Take care during soldering and brazing.

10 Show skill in arc welding.

10.1 Select welding tools and equipment.
10.2 Prepare work piece for welding joint.
10.3 Select proper current and voltage for arc welding.
10.4 Select appropriate electrodes.
10.5 Make arc welding joints (Lap, Butt, Tee, Corner, etc.)
10.6 Follow safe working procedures during arc welding.

11 Show skill in welding by gas.

11.1 Select tools and equipment for gas welding and gas cutting.
11.2 Select appropriate filler rod and flux.
11.3 Select appropriate flame for welding and cutting.
11.4 Make gas welding joints (Lap, Butt, Tee, Corner, etc.)
11.5 Follow safe working procedures during arc welding.

12 Show skill in resistance welding.

12.1 Identify the resistance welding machines.
12.2 Identify accessories and tools for resistance welding.
12.3 Make spot welding joints.
12.4 Follow safe working procedures during working with spot welding machine.

REFERENCE BOOKS

1 Basic Sheet Metal Practice
— J. W. Giachino
2 Prathomic Fitting Sikkha

— Hemanta Kumar Bhattacharia

3 Welding Principles for Engineers

— Morris

4 Metal Fabrication

— Robert L. O’con

5 Sheet Metal Work

— Blackburn & Cassidy

5921 **MATHEMATICS – II**

T	P	C
3	3	4

OBJECTIVES

- To enable in solving the simultaneous equations with the help of determinant and matrix.
- To make understand the exponential series.
- To enable to calculate the areas of regular polygons, hexagons, octagon, hydraulic mean depth (HMD) of a channel, area occupied by water of circular culvert. Excavation work.
- To provide the ability to calculate volume of regular solids like pyramid frustum of pyramid, prismoid, wedge and area of curved surfaces.

SHORT DESCRIPTION

Algebra: Determinants, Matrix, Partial Fractions, Exponential Series.

Trigonometry: Inverse circular functions, Properties of triangle and solution of triangles.

Menstruation: Area of rectangles, squares, triangles, quadrilaterals, parallelograms, rhombus, trapezium, circle, sector, segment; Volume of rectangular solids, prism, parallelepiped , pyramids, cones , spheres, frustum of pyramid and cone; Area of curved surface of prism. Cylinder cone, pyramid and frustum of cone.

DETAIL DESCRIPTION

ALGEBRA:

1 Apply determinants to solve simultaneous equations.

1.1 Expand a third order determinant.
1.2 Define minor and co-factors.
1.3 State the properties of determinants.
1.4 Solve the problems of determinants.
1.5 Apply Cramer's rule to solve the linear equation.

2 Apply partial fraction to break the numerator and denominator.

2.1 Define matrix, null matrix, unit matrix, square matrix. column matrix, row matrix, inverse matrix, transpose matrix, adjoin matrix, rank of a matrix, singular matrix.
2.2 Explain equality, addition and multiplication of matrix.
2.3 Find the rank of a matrix.
2.4 solve the problems of the following types:
  i) Solve the given set of linear equations with the help of matrix.
  ii) Find the transpose and adjoin matrix of a given matrix.

3 Solve problems using binomial theorem

3.1 Define proper and improper fractions.
3.2 Resolve in to partial fraction of the followings types :
  a) Denominator having a non-repeated linear factor.
  b) Denominator having a repeated linear factor.
  c) Denominator having a quadratic factors.
  d) Denominator having a combination of repeated, non-repeated and quadratic factors.

4 Understand exponential series.

4.1 Define e.
4.2 Prove that e is finite and lies between 2 and 3.

4.3 Prove that $e^x = 1 + \frac{x}{L^1} + \frac{x^2}{L^2} + \frac{x^3}{L^3} + \frac{x^4}{L^4}$ ..... to $\propto$

4.4 Solve problems of the followings types :

i) $1 + \frac{1}{L^2} + \frac{1}{L^4} + \frac{1}{L^6}$ + ... to $\propto$

ii) $\frac{1}{L^2} + \frac{1+2}{L^3} + \frac{1+2+3}{L^4} + \frac{1+2+3+4}{L^5}$ + ... to $\propto$

TRIGONOMETRY

5 Apply the concept of inverse circular function.

5.1 Explain the term inverse circular function and principal value of a trigonometrical ratio.

5.2 Deduce mathematically the fundamental relations of different circular functions.

5.3 Convert a given inverse circular function in terms of other functions.

5.4 Prove mathematically

i) $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \frac{x+y}{1-xy}$.

ii) $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \frac{x+y+z-xyz}{1-xy-yz-zx}$

iii) $\sin^{-1} x + \sin^{-1} y = \sin^{-1} \left(x\sqrt{1-y^2} + y\sqrt{1-x^2}\right)$

iv) $2 \tan^{-1} x = \sin^{-1} \frac{2x}{1+x^2} = \cos^{-1} \frac{1-x^2}{1+x^2} = \tan^{-1} \frac{2x}{1-x^2}$

5.5 Solve problems of the following types.

a) $2 \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{4} = \frac{\pi}{4}$

b) $\cos \tan^{-1} \cot \sin^{-1} x = x$.

c) Prove that the area of the segment cut from a circle of radius r by a chord at a distance d from the centre is given by $K = r^2 \cos^{-1} \frac{d}{r} - d\sqrt{r^2 - d^2}$

6 Apply the principle of properties of triangles.

6.1 Prove the followings identities :

i) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$.

ii) $a^2 = b^2 + c^2 - 2bc \cos A$

iii) $a = b \cos C - c \cos B$.

v) $\Delta = \frac{1}{2} bc \sin A$.

6.2 Establish the followings.

a) $\tan \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$

b) $\tan \frac{B-C}{2} = \frac{b-c}{b+c} \cot \frac{A}{2}$

c) $\Delta = \frac{abc}{4R}$

6.3 Solve the problems of the following types:

i) Prove $\cos (B - C) + \cos A = \frac{bc}{2R}$

ii) An object experiences two forces F_1 and F_2 of magnitude 9 and 13 Newton's with an angle 100^0 between their directions. Find the magnitude of the resultant R.

7 Apply the concept of area of triangle.

7.1 Find the area of triangle in the form,

i) $A=\frac{\sqrt{3}}{4}a^2$, a = length of a side of equilateral triangle.

ii) $A=\frac{c}{4}\sqrt{4a^2-c^2}$, where a= length of equal sides,

c= third side.

iii) $A=\sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c = length of the sides of a triangle and 2s is the perimeter of the triangle.

7.2 Use formula in 7.1 to solve problems.

8 Apply the concept of finding areas of quadrilateral & Parallelogram.

8.1 Define quadrilateral & Parallelogram.

8.2 Find the areas of quadrilateral when off sets are given.

8.3 Find the areas of a parallelogram.

8.4 Solve problems using above formulae.

9 Apply the concept of finding areas of rhombus & trapezium.

9.1 Define rhombus & trapezium.

9.2 Find the areas of rhombus when the diagonals are given.

9.3 Find the areas of trapezium in terms of its parallel sides and the perpendicular distance between them.

9.4 Solve problems related to rhombus & trapezium.

10 Apply the concept of finding areas of regular polygon.

10.1 Define a regular polygon.

10.2 Find the area of a regular polygon of n sides, when

i) the length of one side and the radius of inscribed circle are given.

ii) the length of one side and the radius of circumscribed circle are given.

10.3 Find the area of a regular.

a) hexagon

b) octagon

when length of side is given.

10.4 Solve problems of the followings types:

A hexagonal polygon 6 m length of each side has a 20 cm width road surrounded the polygon. Find the area of the road.

11 Understand areas of circle, sector and segment.

11.1 Define circle, circumference, sector and segment.

11.2 Find the circumference and area of a circle when its radius is given.

11.3 Find the area of sector and segment of a circle.

11.4 Solve problems related to the above formulae.

12 Apply the concept of volume of a rectangular solid.

12.1 Define rectangular solid and a cube.

12.2 Find geometrically the volume of a rectangular solid when its length, breadth and height are given.

12.3 Find the volume and diagonal of a cube when side is given.

12.4 Solve problems with the help of 12.2 & 12.3.

13 Apply the concept of the volume of a prism and a parallelepiped.

13.1 Define a prism, parallelepiped and a cylinder.

13.2 Find the volume of prism, parallelepiped and cylinder when base and height are given.

13.3 Solve problems related to 13.2.

14 Apply the concept of the volume of pyramid, cone and sphere.

14.1 Define pyramid, cone and sphere.

14.2 Explain the formula for volume of pyramid, cone and sphere.

14.3 Solve problems related to 14.2.

15 Apply the concept of surface area of prism, cylinder and cone.

15.1 Explain the formulae for areas of curved surfaces of prism cylinder and cone.

15.2 Solve problems related to15.1.

5912 **PHYSICS-I**

T	P	C
3	3	4

OBJECTIVES

- To provide the students a background of basic science i.e. Physics required for understan ding technological subjects.
- To develop a working knowledge of common engineering and industrial materials and to enable to determine through experiments the properties of such materials.
- To develop through experiments an understanding of fundamental scientific concept.
- To develop a basic knowledge and concept of physical properties of common engineering and industrial materials.

SHORT DESCRIPTION

Units; Vector and Scalar quantities; Motion and Equations of motion; Force and Newton's Laws of motion; Gravity and Gravitation; Simple Harmonic motion; Hydrostatics; Surface tension and viscosity ; Pressure, Density and Specific gravity; Sound : Concepts and nature of sound, Velocity of sound, Ultrasonic.

DETAIL DESCRIPTION

Theory :

1. UNITS VECTOR AND SCALAR QUANTITIES

Understand vector and scalar quantities.

1.1 List and Identify the symbols of fundamental SI Unit and some derived SI Unit.
1.2 Define vector quantities with examples.
1.3 Define scalar quantities with examples.
1.4 Show the various presentations of the vector quantities; two & three dimensional position and unit vector.
1.5 Distinguish between vector and scalar quantities.
1.6 Find and explain the resultant of two vectors in different directions.
1.7 Resolve a vector into horizontal & vertical component.
1.8 Explain the dot and cross product of two vectors.
1.9 Define laws of triangle of vector.

2. MOTION AND EQUATIONS OF MOTION

Understand motion and equations of motion.

2.1 Define rest and motion.
2.2 Classify motion.
2.3 Define and explain displacement, speed, velocity, acceleration and retardation.
2.4 Deduce the relationship between displacement, velocity, acceleration and retardation from these definitions.
2.5 Distinguish between (i) speed and velocity (ii) velocity and acceleration.

3. Understand circular motion

3.1 Define circular motion.
3.2 Define angular velocity and linear velocity with their units.
3.3 Deduce the relation between angular velocity and linear velocity.
3.4 Define centripetal and centrifugal force with examples.
3.5 Prove centrifugal force = $\frac{mv^2}{r}$
3.6 Define and explain angular momentum, torque and moment of inertia.
3.7 Calculate the torque and moment of inertia of a revolving body.

4. FORCE AND NEWTON'S LAWS OF MOTION

Understand force.

4.1 Define force.
4.2 Define different units of force and their correlation and also mention the dimension of force.
4.3 Define parallel force and a couple.
4.4 Find out the resultant of parallel forces.
4.5 Define inertia and momentum.
4.6 State the simple units and dimension of momentum.
4.7 State and prove the principles of conservation of momentum.
4.8 State Newton's laws of motion.
4.9 Prove P=mf, from Newton's 2nd law of motion.

5. GRAVITY AND GRAVITATION

Understand gravity and gravitation.

5.1 Define and explain the Kepler's Law.
5.2 Define gravity and gravitation.
5.3 State the laws of gravity and gravitation.
5.4 Define and determine the gravitational constant (G) and also mention its units and dimension.
5.5 Define acceleration due to gravity 'g' and also mention its units and dimension.
5.6 Discuss the variation of 'g' at different places.
5.7 Define mass and weight with their units and dimension.
5.8 Distinguish between mass and weight.
5.9 Define and explain gravitational potential and escape velocity
5.10 State and explain the laws of falling bodies and mention the equation of motion of a body when it is projected vertically upwards or downwards

6. SIMPLE HARMONIC MOTION (SHM)

Understand simple harmonic motion.

6.1. Define simple harmonic motion (SHM).
6.2. State the characteristics of SHM.
6.3. Describe a simple pendulum and a second pendulum.
6.4. Define effective length, amplitude, phase, complete oscillation, period of oscillation, frequency.
6.5. State and explain the laws of simple pendulum.
6.6. Describe a compound pendulum.
6.7. Discuss the conditions under which a pendulum clock will go slow or fast.

7. WORK, POWER AND ENERGY

Understand work, power and energy.

7.1 Define work, power and energy.

7.2 State the units and dimensions of work, power and energy.
7.3 State and prove the principle of the conservation of energy.
7.4 Define potential energy (PE) and kinetic energy (KE).
7.5 Derive the equation of potential and kinetic energy.
7.6 Show that the K.E. gained by a falling body is equal to the P.E. lost by the body.
7.7 Describe transformation of energy and mention the mass-energy relation.
7.8 Recognize that the useful work can be found from:

$$\text{efficiency} = \frac{\text{output work}}{\text{input work}} \times 100.$$

8. ELASTICITY

Understand the concept of elasticity.

8.1 Name some of the general and special properties of matter.
8.2 Define Elasticity and Elastic limit.
8.3 Define perfectly elastic body and perfectly rigid body.
8.4 Define stress and strain with their units and dimensions.
8.5 State and explain the Hook's law.
8.6 Describe various kinds of modulus of elasticity.
8.7 Mention the units and dimensions of modulus of elasticity.
8.8 Define Poisson's ratio and calculate the work done of a elastic body by using young's modulus.

FRICTION

9. Understand Friction

9.1 Define friction.
9.2 Describe the different kinds of friction.
9.3 Define the laws of static friction.
9.4 Define the co-efficient of static friction.
9.5 Describe the angle of static friction and angle of repose.
9.6 Describe the laws of kinetic friction.
9.7 State the co-efficient and angle of kinetic friction.
9.8 Show that the co-efficient of static friction is equal to the tangent of angle of repose.
9.9 Describe an experiment to determine the co-efficient of static friction.
9.10 State the merits and demerits of friction.

10. HYDROSTATICS

Understand behavior of fluids.

10.1 Define pressure as force per unit area and state that it is measured in N/m^2 or Pa (Pascal).
10.2 State characteristics of liquid pressure.
10.2.1 Establish that pressure at a point in a fluid is dependent upon the density of the fluid, the depths in the fluid and acceleration due to gravity.
10.3 Define and explain surface tension and viscosity.
10.4 Calculate the surface tension of a fluid by using capillary tube.

11. DENSITY AND SPECIFIC GRAVITY

Understand density and specific gravity

11.1 State and prove Archimede's Principle.
11.2 Define density and specific gravity.

11.3 State the units of density and specific gravity.
11.4 Distinguish between specific gravity and density.
11.5 Establish the density of water at different temperatures.
11.6 Find out specific gravity of solids and liquids.
11.7

12. SOUND

Understand nature and behavior of sound.

12.1 Identify that sound is produced by vibration and travels through a medium as a longitudinal wave.
12.2 Distinguish between the production and behavior of longitudinal and transverse waves.
12.3 Recognize that sound can be produced of different pitches (frequencies) & that the human ear has an audible frequency range covering approximately 20 Hz to 20 KHz.
12.4 State the approximate frequency range for
   a. infrasonic sound
   b. ultrasonic (supersonic) sound.
12.5 Explain how sound is absorbed, reflected & refracted by different types of surface.
12.6 Describe the practical uses of echo sounding devices.
12.7 Define velocity of sound.
12.8 State the velocity of sound at NTP in still air.
12.9 Compare the effects of pressure, temperature & humidity on the velocity of sound in air.

PRACTICAL

Observations and Measurements

1. Determine accurate diameter/side of an object using vernier calipers.
2. Measure the area of cross section of a wire by micrometer screw gage.
3. Measure the thickness of a glass plate by spherometer.
4. Verify the law of parallelogram of forces by a force board.
5. Draw L-T2 graph and destine the value of “g” by using a simple pendirlum.
6. Determine the coefficient of static friction.
7. Determine Young’s modulus of a steel wire by Searle’s apparatus.
8. Determine gravity of a solid heavier than and insoluble in water by hydrostatic balance.
9. Determine specific gravity of a liquid by specific gravity bottle.
10. Determine velocity of sound by resonance air column method.

5722 **English-II**

T	P	C
2	2	3

OBJECTIVES :

After the completion of the course, learners will be able to develop-

* Reading and writing skills
* Grammatical accuracy with emphasis on spelling & punctuation
* Information Collection
* Creative Writing
* Effective Communication and Correspondence

Contents

Seen Comprehension

Mark-20

Unit	Lesson	Title
Unit-14 Human Resources	3	Enriching the workforce.
Unit-16 Wonders Home and Abroad	1 2	The Sangsad Bhaban The Jamuna Multi-purpose Bridge.
Unit-20 Jobs and professions	2 3	How can I be self-employed? Self-help a key to success.
Unit-21 Globalization	1 3 6	The world as a global village Modern Technology and globalization Globalization and English.

❖ Note: From old syllabus.

A)

Grammar

Mark-20

Unit	Lesson	Title
Unit-one Pronouns and Determiners	3	Determiners
Unit-Eight Direct and Indirect speech	2	Changing speech.

Unit-Twelve Further use of preposition	2	Appropriate prepositions.
Unit-Fourteen Idioms and phrase	9	Some Common Idioms.

- Note: From old syllabus.

Communication

Mark-20+5=25

B) Types of formal documentation (in English)

- Application with CV.
- Appointment letter.
- Letter of enquiry, orders, cancellation.
- Letter of compensation and complaint.
- Letter to the print and Electronic media.
- Writing a Bank solvency certificate.
- Official note.
- Memorandum.
- Notice writing.

Composition

Mark-15

Area of interest: With hints/key words

Notional, Social, Political problems: Terrorism, Drug Addiction, Dowry, Load shedding, price-hike, Gender Discrimination, Traffic Jam.

Calamities: Drought, Flood, Cyclone etc.

National Days and Festivals: International Mother Language Day, Independence Day, Victory Day, May Day, Pahela Baisakh.

Scientific Development: Satellite, E-mail, Internet.

Environment pollution: Water, Air, Sound, Global warming.

Heritage Sites: The Sundarbans, National Memorials, Cox`s Bazar Sea Beach.

Industries: Garments, Textile, poultry, Ceramic, Fertilizer.

i)Write a short composition.
ii)Write a report on a situation/event/incident.

Practical

1. Prepare a report visiting different business firms and facilitate the techniques of sales communication.
2. Give advertisement in the dailies on necessary commodities.
3. Make attractive posters for new products.
4. Speaking on a specific situation.
5. Exchange views with target person (s).
6. Introduce one self.
7. Prepare speech.
8. Role playing on telephonic conversation.
9. Choice of profession.
10. Current topics from Newspaper.

Contents for Oral practice

1. Meeting someone.
2. Asking about daily activities.
3. Traveling by bus/train.
4. Going by Taxi.
5. Meeting at rail station/airport.
6. Getting information at the airport.
7. Getting to the Hotel.
8. Asking directions.
9. Finding ones way.
10. Asking the time and calendar.
11. Arriving early or late.
12. Living in as Apartment.
13. Using the telephone.
14. Talking about shopping.
15. Sending and receiving letters.
16. Dinner conversation.
17. Common health problem.
18. Quitting and finding jobs.
19. Office details.
20. Office conversation.

5812 PHYSICAL EDUCATION AND LIFE SKILL DEVELOPMENT

T	P	C
0	2	1

OBJECTIVES

- To enhance body fitness.
- To make aware of first aid procedure.
- To acquaint with the common games and sports.
- To develop life skill

SHORT DESCRIPTION

Warming up; Yoga; Muscle developing with equipment; First aid; Games & sports; life skill development.

DETAIL DESCRIPTION

1. **National Anthem and Assembly**
   - **1.1 Make assembly**
   - **1.2 Recitation of national anthem**
   - **1.3 National anthem in music**

2. **Warming up**
   - 2.1. General Warming-up :
     Head rotation, Hand rotation, Side twisting, Toe touching, Hip rotation, Keen twisting, Ankle twisting, Push up & Sit up.
   - 2.2. Squad Drill :
     Line, File, Attention, Stand at easy, Stand easy, Left turn, Right turn, About turn, Mark time, Quick march, Right wheel, Left wheel, Open order march & Closed order march.
   - 2.3. Specific warming up :
     Legs raising one by one, Legs raising in slanting position, Knee bending and nose touching, Heels raising, Toes touching & Laying position.
   - 2.4. Mass Physical Exercise (Free hand) :
     Hand raising, Side twisting, Front & back bending, Front curl, Straight arms curl two hands, Hands raising overhead and Push up & Push down.

3. **Yoga**
   - 3.1 Dhyanasan :
     Shabasan, Padmasan, Gomukhasan, Sharbangasan, Shirshsan
   - 3.2 Shasthyasan :
     Halasan, Matshasan, Paban Muktasan, Ustrasan

4. **Muscle Developing with equipment**
   - 4.1 Damball :
     Front curl, Hand sidewise stretching, Arms raising overhead.
   - 4.2 Barball :
     Front press, Leg press, Rowing motion with leverage bar.
   - 4.3 Rope climbing :
     Straight way climbing, Leg raising climbing.
   - 4.3 Horizontal bar:
     Chinning the bar front grip, Chinning the bar wide back grip.

4.4 Jogging Machine :
Slow, medium, and fast running
4.5 Rowing Machine :

5. Show skill on conversation on day to day life

5.1 Today's Market price
5.2 Festivals(religious festivals, National festivals)
5.3 Celebration of National days
5.4 Aim of life
5.5 Visited historical places/sites

6. Human relation

6.1 Family relation
6.2 Relation with neighbor
6.3 Humanitarian Service
6.4 Service for handicapped (intelligent, physical, social etc.)
6.5 Service for orphan / Patient

7. Vote of appreciation

7.1 About dress
7.2 For good work
7.3 For good result
7.4 For good news

8. Telephone conversation

8.1 Use of telephone
8.2 Courtesy for using telephone
8.3 Receiving and sending massages through telephone
8.4 Presenting the gist
8.5 Stress Management Habit to be a man of humor
8.6 Positive thinking
8.7 Habit to changing thinking

9 Time Management

9.1 Determine essential time for a task
9.2 Determine delay and unexpected time
9.3 Determine time for daily activities
9.4 Plan for daily activities

10 Interview Technique

10.1 Mental preparation to face an interview
10.2 Selection of dress for interview
10.3 Introducing himself/herself to the interviewer
10.4 Coping interview

11. Team work

11.1 Organized a team
11.2 Selection of team leader
11.3 Distribution to the task to the members
11.4 Accepting opinion of team members
11.5 Completion of task as a team

12 Social work

12.1 Tree plantation

12.2 Community service (Sanitation, pure drinking water, social culture etc.)