BANGLADESH TECHNICAL EDUCATION BOARD
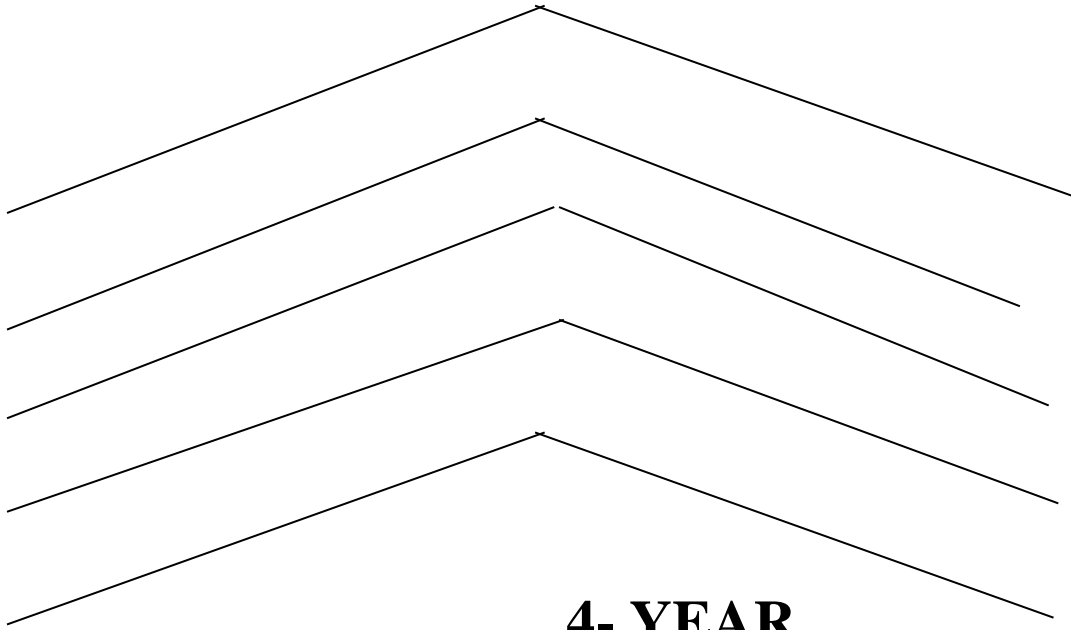
4- YEAR

Garments Design and Pattern Making

SYLLABUS

FOURTH SEMESTER

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Fourth Semester

Sl. No	Subject code	Name of the subject	T	P	C	MARKS				
						Theory		Practical		
						Cont. assess.	Final exam.	Cont. assess.	Final exam.	Total
1	5041	Fabric Manufacturing-I	3	3	4	30	120	25	25	200
2	5042	Textile Dyeing	3	3	4	30	120	25	25	200
3	5043	Garments Manufacturing -I	2	3	3	20	80	25	25	150
4	5044	Basic garments pattern Making	2	6	4	20	80	50	50	200
5	5045	Textile Testing & Quality Control	2	3	3	20	80	25	25	150
6	6632	Computer Application– II	0	6	2	-	-	50	50	100
7	5821	Social Science – II	2	0	2	20	80	00	00	100
		TOTAL	**14**	**24**	**22**	**140**	**560**	**200**	**200**	**1100**

5041   **FABRIC MANUFACTURING-I**   **T   P   C**
                                                    3   3   4

AIMS

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

- Winding and warping
- Sizing and weaving mechanism
- Drafting and denting
- Fabric and knitting
- Non-woven fabric.

SHORT DESCRIPTION

Winding; Warping, Sizing; Size preparation for warping; Drafting; Denting; weaving mechanism; Fabrics; Knitting; Non-woven fabrics.

DETAIL DESCRIPTION

Theory:

1.   Understand Fabric.
   1.1   Basic concept of fabric and yarn.
   1.2   Classify the fabric.
   1.3   Describe the properties of various types of fabric.
   1.4   Mention the Flow-chart of fabric manufacturing process.
   1.5   Yarn count calculation (indirect system (Ne) and direct system (Tex, Denier, jute)

2.   Understand the winding.
   2.1   Define winding.
   2.2   Mention the necessity of winding.
   2.3   Mention the classification of winding.
   2.4   Describe different types of yarn packages.
   2.5   Describe different types of cone, cheese, spool and pirn winding.
   2.6   Describe yarn guide and yarn tensioning devices.
   2.7   Describe different types of winding process.
   2.8   State Yarn defects and their remedies.
   2.9   Solve the winding problems.

3.   Understand the warping.
   3.1   Define warping.
   3.2   Describe the technique of warping.
   3.3   Mention the classification of warping.
   3.4   Describe direct warping.
   3.5   Describe sectional warping.
   3.6   Distinguish between direct warping and sectional warping.
   3.7   Describe the essential function of warping machine.
   3.8   Describe the faults in warping with their remedies.

3.9   State the names of auto motion with short description.
3.10   Solve the winding problems.

4.   Understand the sizing.
4.1   Define sizing.
4.2   State the objects of sizing.
4.3   List the ingredients of sizing.
4.4   Mention the functions of sizing ingredients.
4.5   Procedures of size mixture preparation.
4.6   List different types of sizing.
4.6   Describe the relation of warp sizing and weaving efficiency.
4.7   Identify defects in sizing.
4.8   Describe the remedies of the defects of sizing.
4.9   Mention the Classification of sizing machine
4.10   Describe different sizing process.
4.11   Describe size pick up percentage.
4.12   Solve the sizing problems.

5.   Understand the drafting.
5.1   Define drawing-in, reaching-in.
5.2   Mention the classification of drafting.
5.3   Mention the necessity of drafting.
5.4   Describe the drafting process.

7.   Understand the denting.
7.1   Define denting.
7.2   Mention the classification of denting.
7.3   Mention the necessity of denting.
7.4   Describe the denting process.

8.   Understand Reed count & heald count.
8.1   Define reed count and heald count.
8.2   Classify reed count and heald count.
8.3   Define tie-up and auto-knotting.
8.4   Calculation of reed count and heald count.

9.   Understand lifting plan.
9.2   Define lifting & lifting plan.
9.3   Classify the lifting plan.
9.4   State the necessity of lifting plan.

10.   Understand weaving.
10.1   Define weaving and weaving mechanism
10.2   Describe basic principle of weaving.
10.3   Mention the classification of weaving machine.
10.4   Distinguish between pit loom and frame loom.
10.5   Define frame loom and power loom.

11.   Understand power loom.
    11.1   Define power loom, automatic loom, semi-automatic loom.
    11.2   List the main parts of power loom.
    11.3   State the following accessories of loom (Heald shaft, shuttle, picker, reed, beam, lease rod, picking stick, side liver).
    11.4   Define Tappet, Dobby and Jacquard loom.

12.   Understand the motions of loom
    12.1   State the motions of loom.
    12.2   Classify the motions of loom.
    12.3   Define primary, Secondary and tertiary motions of loom with example.

PRACTICAL:

1.   Identify different packages (cone, cheese, pirn, cop, spool).

2.   Draw different packages (cone, cheese, pirn, cop, spool).

3.   Identify different types of yarn guides & tensioning device.

4.   Draw the driving diagram of sectional & direct warping machine.

5.   Draw a hand loom and indicate the yarn path through the loom.

6.   Draw different parts of loom and level its different parts.

7.   Draw reed and heald.

8.   Find the count of reed and heald.

9.   Draw and level different accessories of loom (shuttle, picker, reed, sley, beam lease rod, temple, heald shaft, treadle, etc.)

10.   Draw the yarn path of a power loom.

11.   Calculate the speed of crank shaft and bottom shaft by gearing sketch of a loom.

5042	TEXTILE DYEING	**T P C**
		3 3 4

AIMS

To be able to develop knowledge, skill and attitude in the field of textile dyeing with special emphasis on:

- Wet processing and soap & detergent.
- Singeing de-sizing and scouring.
- bleaching and mercerizing
- Different types of dyeing and dyeing machines.

SHORT DESCRIPTION

Wet processing; Soap and detergent; Singeing; De-sizing; Scouring; Bleaching; Mercerizing; Dyeing; Direct dyes; Acid dyes; Vat dyes; Sulpher dyes; Azoic dyes; Disperse dyes; Reactive dyes; Dyeing machine.

DETAIL DESCRIPTION

Theory:

1.   Understand the basic concept of wet processing.
  1.1   Define wet processing.
  1.2   Explain the flow chart of wet processing.
  1.3   Describe the importance of wet processing.
  1.4   Define hard & soft water.
  1.5   Explain the problems of hard water in textile wet processing.
  1.6   Mention the uses of various salts in wet processing.
  1.7   Describe the Process to remove hardness of water.

2.   Understand the soap and detergent.
  2.1   Define soap and detergent.
  2.2   Mention the properties of soap.
  2.3   Mention the properties of detergent.
  2.4   Distinguish between soap and detergent.
  2.5   Mention the uses of various detergents in wet processing.

3.   Understand the singeing.
  3.1   Define singeing.
  3.2   Explain the necessity of singeing.
  3.3   Mention different types of singeing process.
  3.4   Describe different processes of singeing.
  3.5   Mention the faults of singeing.

4.   Understand the de-sizing.
  4.1   Define de-sizing.
  4.2   Explain the necessity of de-sizing.
  4.3   Mention different types of de-sizing process.
  4.5   Describe the faults of de-sizing.
  4.6   Describe the test method of de-sizing fabrics.

5. **Understand the scouring.**
   5.1   State the impurities of textile fibre.
   5.2   Mention the percentage of impurities in cotton fibre.
   5.3   Define scouring.
   5.4   Mention the necessity of scouring.
   5.5   Describe the scouring process of cotton in kier, j-box and vapour lock chamber by caustic soda (Alkali).
   5.6   Define carbonizing of wool.
   5.7   Mention the faults of scouring.

6. **Understand the bleaching.**
   6.1   Define bleaching, scouring & souring.
   6.2   Mention the necessity of bleaching.
   6.3   Describe different types of bleaching agents with example.
   6.4   Describe the bleaching of cotton with hypochlorite (HOCL).
   6.5   Describe bleaching of cotton with peroxide (H_2O_2).
   6.6   Describe the bleaching of jute, wool, silk and blended fabrics.
   6.7   Describe souring process.
   6.8   Distinguish between scouring & souring.
   6.9   Mention the advantages and disadvantage of souring.
   6.10 Necessity of pretreatment.

7. **Understand the mercerizing.**
   7.1   Define mercerizing.
   7.2   Mention the purposes of mercerizing.
   7.3   Mention the chemicals used in mercerizing.
   7.4   Describe mercerizing process.
   7.5   Mention the advantages of mercerizing.
   7.6   Explain physical changes of cotton in mercerizing.
   7.7   Describe faults of mercerizing.

8. **Understand the dyeing.**
   8.1   Define dye & dyeing
   8.2   Mention the classification of textile dyes.
   8.3   Explain different theory of dyeing.
   8.4   Distinguish between dyes and pigments.
   8.5   Define, Recipe, M:L (ratio), stripping, topping, after treatment

9. **Understand the direct dyes.**
   9.1   Describe the history of direct dyes.
   9.2   Mention the trade names of direct dyes.
   9.3   Mention the application of direct dyes.
   9.4   Describe after treatment of direct dyes.

10. **Understand the acid dyes.**
    10.1 Describe the history of acid dyes.
    10.2 Mention the classification acid dyes.
    10.3 Describe the application of acid dyes in cellulose & protein fibre.
    10.4 Describe the faults of acid dyeing.

11.   Understand the vat dyes.
    11.1   Define vat dyes.
    11.2   Mention the classification of vat dyes.
    11.3   Describe vatting.
    11.4   Describe dyeing of cotton fabrics with vat dyes.
    11.5   Describe problems with their remedies of vat dyeing.

12.   Understand the disperse dyes.
    12.1   Describe the history of disperse dyes.
    12.2   Mention the classification of disperses dyes.
    12.3   List the chemicals and auxiliaries of disperse dyes.
    12.4   Mention the application of disperses dyes on synthetic fiber.
    12.5   Describe dyeing of polyester, with disperse dyes.
    12.6   Describe blend fabric process with disperse dyes.
    12.7   Describe the stripping of disperse dyes.
    12.8   Mention the problems of disperse dyes.

13.   Understand the reactive dyes.
    13.1   Describe the history of reactive dyes.
    13.2   Mention the classification of reactive dyes.
    13.3   List the trade names of reactive dyes.
    13.4   Describe the effects of salts & alkali in reactive dyeing.
    13.5   Describe reactive dyeing of cotton by hot and cold brand method.
    13.6   Discuss the stripping of reactive dyes.
    13.7   Identify the problems of reactive dyes.

14.   Understand the dyeing machine.
    14.1   List the different dyeing machines for loose fiber, yarn & fabrics dyeing.
    14.2   Describe yarn package dyeing machine.
    14.3   Describe jigger and winch dyeing machine.
    14.4   Describe jet dyeing machine.

PRACTICAL:
    1.   Determine the hardness of water.
    2.   Prepare fabric for dyeing by singeing & de-sizing process.
    3.   Study different wet processing machineries.
    4.   Scour cotton fabric by caustic soda
    5.   Scour jute & wool yarn.
    6.   Scour polyester cotton blended yarn.
    7.   Test scoured fabric.
    8.   Bleach cotton with H_2O_2, bleaching powder and sodium hypochlorite.
    9.   Dye cotton fabric by direct, acid, vat and reactive dyes.
    10.   Dye polyester and blended fabric by disperse dye.
    11.   At least 3 running mills visit.

5043	**GARMENTS MANUFACTURING-I**	T	P	C
		2	3	3

AIMS

To be able to develop knowledge, skill and attitude in the field of garments manufacturing with special emphasis on:
1. Aspects of garments technology.
2. Cloth and tailoring.
3. Accessories and industrial process of garments.
4. Pattern making and sampling.
5. Sewing thread and thread finishing.

SHORT DESCRIPTION

Aspects of garments industry; Tailoring; Industrial process for garments manufacturing; Characteristics of cloth for garments manufacturing; Garments accessories; Garments pattern making; Sample making; Fabric spreading; Components of shirt and trouser; Sewing thread; Thread finishing.

DETAIL DESCRIPTION

Theory:

1. Understand the basic aspects of garments industry.
   1.1 Describe the history of garments industrial development in Bangladesh and other countries in the world.
   1.2 List the names of garments export countries.
   1.3 Discuss the role of garments industries of Bangladesh.

2. Understand the tailoring & industrial process.
   2.1 Define tailoring process.
   2.2 Describe tailoring process.
   2.3 Distinguish between tailoring process and industrial process.
   2.4 Describe the body measurement for tailoring process.
   2.5 Describe the measurement of shirt for tailoring process.
   2.6 Describe the measurement of pant (trouser) for tailoring process.
   2.7 Idea about industrial process of garments manufacturing.

3. Understand the characteristics of cloth for garments manufacturing.
   3.1 Define cloth and garments cloth.
   3.2 Distinguish between cloth and garments cloth.
   3.3 Describe the quality of cloth for making garments.
   3.4 Mention different garment products.
   3.5 Describe the characteristics of different types of cloth (woven, knitted, dyed & printed cloth yarn dyed, pointed and knitted clothes).

4.   Understand the garments accessories.
    4.1   List the accessories or sub-materials of garments industries.
    4.2   Mention the characteristics of different accessories/sub-materials.
    4.3   Discuss the flow chart of garment manufacturing process.

5.   Understand the garments pattern making.
    5.1   Define pattern.
    5.2   Mention the necessity of pattern making.
    5.3   Describe the preparation of a pattern for particular garments.
    5.4   Describe the pattern making of flat method and modeling method.

6.   Understand sample making.
    6.1   Define sample.
    6.2   Mention different types of sample.
    6.3   Describe the different types of sample.
    6.4   Importance of sample garments making.
    6.5   Describe the flow-chart of sample garments making.

7.   Understand the fabric spreading.
    7.1   Define fabric spreading.
    7.2   Mention the necessity of fabric spreading.
    7.3   Describe the methods of fabric spreading.
    7.4   List different types of fabric lay.
    7.5   Describe different types of fabric lays.
    7.6   List the types of fabric packages.
    7.7   Define splices.
    7.8   Describe different types of splices.
    7.9   Importance of splicing.

8.   Understand the fabric spreading machine.
    8.1   Mention the classification of fabric spreading.
    8.2   Describe the manual method of fabric spreading.
    8.3   Describe the mechanical process of fabric spreading.
    8.4   Describe the feature of semi- automatic fabric spreading machine
    8.5   Describe the feature of fully-automatic fabric spreading machine.

9.   Understand different components of shirt and trouser.
    9.1   Draw an ideal shirt & identify its different components.
    9.2   Mention the measurement of different component of shirt.
    9.3   List different component of trouser.
    9.4   Mention the measurement of different component of trouser.
    9.5   Describe the principle of pattern making of a shirt.
    9.6   Describe the principle of pattern making of a trouser.

10.   Understand the sewing thread.
    10.1   Define sewing thread.
    10.2   List the types of sewing thread and packages.
    10.3   Describe each type of sewing thread.

10.4 List the types of thread according to structural formation.
10.5 Describe each types of thread.
10.6 Describe the properties of sewing threads for requiring quality.
10.7 Define thread finish.
10.8 Mention the characteristics of thread finish.

PRACTICAL:

1. Identify the machineries in the garments practical shop.
1. Draw a process of garments manufacturing.
2. Draw and identify different components of shirt.
3. Make a pattern of pant.
4. Make a pattern of shirt.
5. Draw different components of shirt.
6. Make a sample shirt with the help of general sewing machine.
7. Make a sample trouser with the help of general sewing machine.

Reference Books:
1. Garments and Technology-by Professor M.A. Kashem.
2. Pattern making for fashion design-by Helen Joseph Armstrong.
3. Garments Technology and pattern making-by Mr Cooklein.

5044   BASIC GARMENTS PATTERN MAKING   T   P   C
                                                      2   6   4

AIMS

To be able to develop knowledge, skill and attitude in the area of basic garments pattern making with special emphasis on:

- Size and measurement of different garments.
- Pattern construction and pattern alternation
- Draft of the body garments.
- Disposal of fullness and pattern for shirt
- Pockets and collars.

SHORT DESCRIPTION

Size and measurement of different garments; Pattern construction; Draft of the body garments; Pattern alternation; Disposal of fullness; Pockets and collars.

DETAIL DESCRIPTION

Theory:

1. Understand the Pattern making tools
   1.1   Define pattern making tools.
   1.2   List the pattern making tools.
   1.3   Function of each pattern making tools with figure.

2. Understand the Human configuration.
   2.1   Draw and identification of different parts of human body.
   2.2   Ratio of different parts of human body.
   2.3   Relation between human body and garments.
   2.4   Length measurement and girth measurement of human body.
   2.5   System of measurement taking of human body for making garments.
   2.6   Identify the measuring body shape related to age.

3. Understand the size and measurement different garments.
   3.1   Describe different types of sizing system.
   3.2   Mention the standard body measurement of gents garments.
   3.3   Mention the standard body measurement of woman/ladies garments.
   3.4   Describe different garments body shapes according to different ages.

4. Understand the pattern construction.
   4.1   Define pattern.
   4.2   Mention the objectives of pattern making.
   4.3   Describe different types of pattern.
   4.4   Describe the process of pattern making
   4.5   Describe the process of body pattern making of shirt and trouser.
   4.6   Describe construction lines, side center line, seam placement, shoulder dart positions and side seams.
   4.7   Mention the uses of symbols of pattern.

5. **Understand the pattern alteration.**
    5.1   Describe the reduction measurement of pattern.
    5.2   Describe the enlarge measurement technique of pattern.
    5.3   Describe the pattern making of gents.
    5.4   Describe the pattern making of ladies.
    5.5   Describe the preparation of pattern for fitting.
    5.6   Describe the process of pattern alternation.

6. **Understand the disposal of fullness.**
    6.1   Describe dart.
    6.2   Describe pleats.
    6.3   Describe tucks.
    6.4   Describe decorative tucks.
    6.5   Describe gathering.
    6.6   Define smocking.
    6.7   Describe the process of smocking stitches.
    6.8   Describe elastic casing.

7. **Understand the pockets & collars.**
    7.1   Define patch pockets, coin pockets, cargo pockets, cross pockets, hexaganal pocket, square pocket.
    7.2   Describe wallet pockets.
    7.3   Define grain line, CBL, CFL
    7.4   Describe making up straight collar of shirt.

PRACTICAL:

1.   Identify different pattern making tools.
2.   Practice handling the different pattern making tools
3.   Preparation of dart & pleat
4.   Making decorative tucks.
5.   Practice for of gathering
6.   Making up collar of shirt.
7.   Draw grain line and mark top & bottom on the pattern paper
8.   Prepare a pattern of a basic shirt
9.   Prepare a pattern of a basic pant.
10.   Prepare a measurement sheet for particular garments (shirt, T-shirt, trouser).

Reference book:
1. Pattern making for fashion design-by Helen Joseph-Armstrong

5045   TEXTILE TESTING AND QUALITY CONTROL

	T	P	C
	2	3	3

AIMS

To be able to develop knowledge, skill and attitude in the area of textile testing and quality control with special emphasis on:

4   Basic idea of textile testing and humidity.
5   Length and strength of fiber.
6   Fiber fineness and maturity of fiber.
7   Yarn counting, yarn strength, yarn twist and hairiness of yarn.

SHORT DESCRIPTION

Basic aspect of textile testing; Humidity; Methods of measuring humidity of textile materials; Sampling; Identification of textile fibers; Fiber length measurement; Linear density or fineness of fiber; Maturity of fiber; Yarn count measurement; Yarn strength; Hairiness of yarn; Yarn twist.

DETAIL DESCRIPTION

Theory:

1.   **Understand the basic aspects of textile testing.**
       1.1   Define textile testing.
       1.2   Mention the objects of textile testing.
       1.3   Describe the necessity of textile testing.
       1.4   State the factors affecting of test results.
       1.5   List the names of the test for fiber, yarn & fabrics.
       1.6   Mention the names of testing machinery for different tests.
       1.7   List the names of auxiliary equipment for test.

2.   **Understand the humidity.**
       2.1   Define humidity & relative humidity.
       2.2   Describe the dependence of humidity.
       2.3   Mention the effects of humidity on textile testing.
       2.4   Define the terms absolute humidity, standard atmospheres, testing atmosphere, conditioning, moisture content & moisture regains.

3.   **Understand the methods of measuring humidity of textile materials.**
       3.1   Mention the names of different machines used in measuring relative humidity.
       3.2   Describe the working procedure of wet & dry bulb hygrometer.
       3.3   Describe the methods of measuring the humidity of textile materials.
       3.4   Express the deduction of the relation between moisture content & moisture regain.
       3.5   Describe the importance of moisture content (MC) & moisture regain (MR) of textile fibers.
       3.6   Explain absorption process.
       3.7   Explain hysterisis effect.
       3.8   Mention the factors affecting regain of textile fabrics.
       3.9   Describe the working principles of WIRA rapid drying oven.

3.10   Mention the features of wind rapid drying oven.
3.11   Describe the working procedure of the shirley moisture meter.

4.   Understand the sampling.
4.1   Define the terms population, sample & sampling.
4.2   Mention the necessity of sampling.
4.3   Describe the factors influencing the sampling methods.
4.4   Explain random sampling method.
4.5   Explain basic sampling methods.
4.6   Mention different types of sampling.
4.7   Explain the zoning technique for fibers.
4.8   Describe fabric sampling technique for different test.
4.9   Describe sampling scheme for HVI & AFIS testing.

5.   Understand the identification of textile fibers.
5.1   Explain the necessity of identification of textile fibers.
5.2   Describe the methods of sampling preparation for fiber identification.
5.3   Describe the identification method.
5.4   Explain fiber identification method by a microscope.
5.5   Explain fiber identification method by burning test.
5.6   Explain fiber identification method by chemical test.

6.   Understand the fiber length measurement.
6.1   Explain the necessity of fiber testing.
6.2   Explain the necessity of fiber measurement.
6.3   Define staple length, effective length, mean length, model length, spun length, uniformity ratio & uniformity index.
6.4   Express the relation between staple length & effective length.
6.5   Describe fiber length measurement methods (conventional & modern).
6.6   Mention the names of instruments used for the measurement of fiber properties.
6.7   Explain the measurement method of fiber length by shirly comb sorter.
6.8   Describe photoelectric method of measuring fiber length.
6.9   Describe the methods of fiber length measurement with fibrograph machine.
6.10   Describe the methods of fiber length measurement with digital fibrograph machine.

7.   Understand the linear density or fineness of fiber.
7.1   Define linear density of fiber.
7.2   Express the relation between fiber weight & cross sectional area of the fiber.
7.3   Mention different units of fineness.
7.4   Explain the importance of fiber fineness measurement.
7.5   Mention different methods used for fiber fineness measurement.
7.6   List different instruments used for fabric fineness measurement
7.7   Describe the working principle of WIRA cotton fineness meter.
7.8   Define micronaire value of cotton fiber.
7.9   Explain the importance of micronaire value of fiber.
7.10   Classify fiber according to micronaire value.

8. Understand the maturity of fiber.
   8.1 Define maturity.
   8.2 Discuss the cross-sectional view of cotton fiber.
   8.3 Explain the importance of fiber maturity.
   8.4 Explain maturity ratio.
   8.5 Express the relation among the rate of air flow, maturity ratio an fireness.
   8.6 Describe fiber quality index.

9. Understand the yarn count and its measurement.
   9.1 Define count/number/linear density.
   9.2 Define English count, metric count, tex, denier worsted and spyndle, etc.
   9.3 Explain the methods of yarn numbering system.
   9.4 Express the relation between different yarn numbering systems.
   9.5 Mention the system of finding out yarn number.
   9.6 Describe the working procedure of knowse balance.
   9.7 Describe the working principle of beesleys balance.

10. Understand the yarn strength and its measurement.
   10.1 Explain the importance of yarn strength.
   10.2 Define the terms: load, breaking load, stress, mass stress, tenacity, breaking length, strain, elastic recovery, yarn strength and tensile property.
   10.3 Mention the factors affecting yarn strength.
   10.4 Mention the names of yarn strength testing machine.
   10.5 Explain lea strength test of yarn with its advantages and disadvantages.
   10.6 Describe the pendulum lever machine with its principle
   10.7 Describe working procedure of pendulum, lever machine.
   10.8 Mention the relation between single yarn strength and lea strength.
   10.9 Mention the CSP values for different count of yarn as determined by ISI.

11. Understand the hairiness of yarn.
   11.1 Define hairiness of yarn.
   11.2 Explain the importance of hairiness.
   11.3 Explain the effects of hairiness.

12. Understand the yarn twist.
   12.1 Define twist.
   12.2 Explain the importance of twist.
   12.3 Mention the different types of twist.
   12.4 Explain the theory of twist.
   12.5 Express the relation between twist & strength.
   12.6 Explain the structure of yarn.
   12.7 Explain the relation between yarn count & TPI.
   12.8 Define twist factor or twist multiplier (TM).
   12.9 List TM values with respect of yarn count.
   12.10 Discuss the effect of twist of fabric properties.
   12.11 Explain the methods of twist measurement.
   12.12 Describe ordinary twist tester.
   12.13 Describe tension twist tester.

PRACTICAL:

1.   Identify different testing instruments in the testing lab with their objects.
2.   Determine RH by dry & wet bulb hygrometer.
3.   Determine MC & MR by moisture regain tester.
4.   Identify the unknown fiber samples by microscopical, burning & chemical test.
5.   Determine the effective length by comb shorter.
6.   Determine the yarn count by given sample.
7.   Determine the yarn strength by strength tester machine.
8.   Determine the twist (TPI) by twist tester machine.
9.   Determine fiber maturity ratio.
10.   Determine the micronaire value of a given sample by WIRA cotton fineness meter.

6632	**COMPUTER APPLICATION -II**	**T**	**P**	**C**
		0	**6**	**2**

OBJECTIVES

To develop skill on spreadsheet applications.
To develop skill on creating graphs.
To assist in the efficient use of database packages.
To develop skill on computerized database management.
To develop skill on programming with database management.

SHORT DESCRIPTION

Spreadsheet Analysis Package: Applications of spreadsheet; Using worksheet; Apply formula and functions in worksheet; Creating & printing graphs; Create simple macros.

Database management package: Creating the database; Editing the database; Searching the records; Customizing the data entry form; Creating the query; Arranging the records; Generating reports.

Database management language: Creating a command file; Writing simple database program using decision-making commands; Designing data entry screen.

DETAIL DESCRIPTION

SPREAD SHEET ANALYSIS PACKAGE:

1   Apply the basic skills of a spreadsheet software package
    1.1   Run a spreadsheet software package.
    1.2   Identify and use different areas (working area, border area, control panel, mode indicator, and status indicator) of the worksheet screen.
    1.3   Identify the function of different keys (typing key, calculator key, text key, cursor key, etc.) of the keyboard.
    1.4   Move around the worksheet using keys and combination of key.
    1.5   Identify and use the on-screen help facility.
    1.6   Identify and use the types of data, numbers, labels and formula.
    1.7   Discover menus, submenus, pop-up menu, etc.

2   Manage workbooks and windows.
    2.1   Make and use workbooks.
    2.2   Access different types of files.
    2.3   Open files as read only.
    2.4   Demonstrate the options for saving files.
    2.5   Display a workbook in more than one window.
    2.6   Work with more one workbook.
    2.7   Close a workbook.

3   Create a worksheet and use simple commands.
   3.1   Activate entries in a worksheet.
   3.2   Use edit key (F2) to correct or to modify entries.
   3.3   Activate the command menus and select commands.
   3.4   Save the worksheet.
   3.5   Exit from spreadsheet and return to DOS.
   3.6   Retrieve a previously saved worksheet.
   3.7   Modify the worksheet.
   3.8   Save a modified worksheet.

4   Apply formulae, function and using templates.
   4.1   Use simple formulae to solve arithmetical computation.
   4.2   Use arithmetical operators in formulae and logical formula.
   4.3   Edit formulae
   4.4   Use mathematical function to solve simple equations.
   4.5   Change the evaluation order.
   4.6   Control the worksheet calculation.
   4.7   Open new files based on.
   4.8   Make and use workbook templates.
   4.9   Make changes in existing workbook templates
   4.10   Validate numbers, dates, times & text.
   4.11   Show custom validation.

5   Solve engineering problems formula and functions
   5.1   Use mathematical functions to compute trigonometric values, absolute values, random number, square root, logarithmic values, etc for solving engineering problems.
   5.2   Use logical functions to perform an operation depending on a condition in engineering problem.
   5.3   Use statistical function to compute summation, average, minimum value, maximum value, etc in engineering problem.

6   Work with cell pointer to a particular cell.
   6.1   Use go to key to move the cell pointer to particular cell.
   6.2   Use the absolute key to change cell address from one from to another in formulae or in functions.
   6.3   Enter range in formulae or in functions by typing directly or by using cell pointer.
   6.4   Produce a nabbed range.
   6.5   Use named range in formulae functions.
   6.6   Copy cell range (one to one, one to many and to many) with special attention for copying formulae and functions.
   6.7   Move cell range.
   6.8   Erase cell ranges.

7   Format a worksheet.
   7.1   Change the width of a column, a range of column, and change the columns width globally.
   7.2   Insert blank columns and blank rows in a worksheet.

7.3 Delete columns and blank rows in a worksheet.
7.4 Format the display of data of a worksheet globally or by referring a range of cells (e.g. currency format, exponential format, comma format, etc.).
7.5 Format the display of data and of a worksheet globally or referring of cells.
7.6 Protect worksheet function, formula/important text and unprotect a range for entering entries.
7.7 Work with window for viewing worksheet in different ways and freeze rows or columns.
7.8 Produce, change and delete a style.

8 Exercise on setting up worksheet for printing.
8.1 Show the look of printing pages and sorting-searching of database
8.2 Produce and use page headers of footers.
8.3 Set print area, print titles and different print option
8.4 Print section of worksheet formulae and few pages
8.5 Print ranges from different worksheets on the same pages.
8.6 produce a database program
8.7 Sort a database in different in ways.
8.8 Search a record from the database using search criteria.
8.9 Extract records from the database that match a given criteria.
8.10 Delete records that a given criteria from the database using available database commands.

9 Create and Print graphs.
9.1 Produce bar, line, X-Y and pie graphs.
9.2 Add color, titles, legend, gird and levels to the graph.
9.3 Add visual impact with colors.
9.4 Produce linked pictures.
9.5 Save the graph and assign names to different graphs of a single worksheet.
9.6 Print graphs (low or high quality graphs.)
9.7 Plot graphs using a plotter using different colors.
9.8 Change graphs size, print & plot them.

10 Create Macros and using macro command languages.
10.1 Produce simple macros (e.g. to change the width of a cell, to format a cell display, to erase a range of cells etc.) using keystroke commands.
10.2 Produce a macro to convert values into labels vice versa.
10.3 Produce a macro for inserting blank rows between two rows of data in a worksheet.
10.4 Produce a macro for deleting the inserted blank rows in a worksheet.

DATABASE MANAGEMENT PACKAGE:

11 Create the new database.
11.1 Identify the practical database in real world.
11.2 Identify the fields and records of a database.
11.3 Identify the different phases of database design.
11.4 Collect the data form a typical field.

11.5   Determine the category of a typical field.
11.6   Design a typical Paper- pencil database form raw data.
11.7   Run a generalized database management package and identify its display Screen
11.8   Identify the different options of the selected packages.
11.9   Use the on-screen help facilities of DBMS package
11.10 Create and then save the table structure.

12   Change the table structure and edit database.
12.1   Modify the structure and correct mistake, if any.
12.2   Verify the structure (i.e. data of update, number of records. etc)
12.3   Enter or append the new records in the database.
12.4   Use the key combinations for editing.
12.5   Use the available options to edit fields.
12.6   Delete unwanted records and files.
12.7   Save & close database file.
12.8   Use different modes to append and edit records of database.

13   Search and display records and arrange the records of database.
13.1   View a database using list and display command
13.2   Retrieve the database records with different conditions.
13.3   Search within a field.
13.4   Keep the track of specific records.
13.5   Keep the database up-to-date.
13.6   Sort a database on single or multiple fields.
13.7   Sort with qualifier (i.e. sort with specific subset of records).
13.8   Index the database on single or multiple fields.
13.9   Use the function to index on different field types.
13.10 Use the commands for selective indexing and to control the order of records.

14   Create the customized data entry form.
14.1   Draw a typical data entry screen with paper-pencil work.
14.2   Design the screen with all fields.
14.3   Move the field to make the entry form logical and easy to use.
14.4   Change the field width.
14.5   Add or delete field (if necessary).
14.6   Change the display characteristics of fields.
14.7   Use picture functions template and range to format the displayed data.
14.8   Use different options and commands in design menu.
14.9   Draw lines and boxes on the form.

15   Create the query.
15.1   Display and identify query design screen.
15.2   Build a simple query
15.3   Save & apply the query.
15.4   Use the query design menu options.
15.5   Use the symbols and operators to build query.
15.6   Search the records with matching on two or more fields.
15.7   Select the records within range using range operators.

15.8   Find the records with inexact and complex matching.

15.9   Sort the records within queries.

16   Generate the custom reports.

16.1   Send the reports to the screener to a file.

16.2   Use the print menu options and dop-prompt options.

16.3   Produce a quick and selective report.

16.4   Plan the design of the report.

16.5   Design a custom columnar report.

16.6   Find the parts of a report specification.

16.7   Make the changes to the report specification.

16.8   Save & run the report.

17   Work with multiple database and relationship.

17.1   Merge the data form one file to another.

17.2   View the files to relate two or more database files.

17.3   Set up the relationship.

17.4   Modify the relationship.

17.5   Create the report from relational database.

DATABASE MANAGEMENT LANGUAGE:

18   Create a simple command file using expression and function.

18.1   Identify the database editor.

18.2   Use the commands to assign different types of data values to variables.

18.3   Save the memory variable.

18.4   Display the memory variable.

18.5   Release & restore the memory variable.

18.6   Use the mathematical expression.

18.7   Use the mathematical, relational, logical and string operators.

18.8   Use the common function such as EOF, BOF DATE, UPPER & LOWER< CTOD, DTOS, SPACE, TRIM, STR, etc. in command file.

18.9   Use the commonly use commands such as SET TALK, SKIP, RETURN in command file.

18.10   Use the commands to display a string of characters and wait for user response.

18.11   Use commands to display or print text.

19   Design & write a simple programs.

19.1   Identify the basic steps to design a program.

19.2   Write the pseudocode for simple program.

19.3   Convert the pseudocode into actual program code.

19.4   Verify & documents the simple program.

19.5   Save the command file and then exit.

19.6   Run the program.

20   Use the decision making commands.

20.1   Use DO WHILE ---- ENDDO, IF ---- ENDIF and DO CASE ---- ENDCASE to control program flow.

20.2 Use SCAN ---- ENDSCAN command instead of DO WHILE ---- ENDDO.

20.3 Use IF, ELSE and ENDIF commands to branch to the part the program.

20.4 Use nested IF ---- ENDIF statements.

20.5 Write simple program using decision making commands.

20.6 Use immediate IF function.

20.7 Write simple program using immediate IF function.

20.8 Use CASE ---- ENDCASE statement instead more than three IF ---- ENDIF statements.

20.9 Use the EXIT, CANCEL, WAIT and ZAP command in database program.

20.10 Use macro function within programs.

5821 **SOCIAL SCIENCE – II**
(BANGLADESH: HISTORY & CULTURE) **T P C**
2 0 2

D‡Ïk¨

- cÙv-†gNbv-hgybv eØxc Aayy¨wlZ †fŠ‡MvwjK AÂ‡j ev½vjx mgvR MVb Ges bvbv HwZnvwmK weeZ©‡bi ch©vq †cwi‡q MwVZ AvaywbK evsjv‡`k m¤ú‡K© wk¶v_©x‡`i h_v_© AeMZ Kiv‡bv Ges Zv‡`i mwVK †eva m„wóKiY|
- cÖvK…wZK I A_©‰bwZK KvVv‡gvi cwigÛ‡j evsjv‡`‡ki mvs¯‹…wZK weKv‡ki mv‡_ wk¶v_©x‡`i D¾xweZ K‡i evsjv‡`‡ki †hvM¨ I cwikxjZ bvMwiK wnmv‡e h_v_© weKwkZKiY|

msw¶ß weeiYx

BwZnvm

- BwZnv‡mi msÁv|
- evsjv‡`‡ki AvenvIqv I Awaevmx|
- cÖv‰MwZnvwmK I cÖvPxbKv‡j evsjv‡`k |
- evsjvq gymjgvb‡`i AvMgb, cÖwZôvjvf I kvmb – LjRx I ZzK©x kvm‡b evsjvq ¯^vaxb myjZvbx cÖwZôv; evsjv‡`k kvnx Avgj, AvdMvb I †gvNj Avg‡j evsjvi kvmb|
- evsjvq BD‡ivcxq ewYK‡`i AvMgb; bevex Avg‡j evsjvi kvmb e¨e¯’v; evsjvq Bs‡iR kvmb ¶gZv jvf I cÖwZôv|
- we^awUk we‡ivax mk¯¿ cÖwZ‡iva Av‡›`vjb; ms¯‹vi Av‡›`vjb I RvZxqZvev`‡`i weKvk Ges evsjvi beRvMiY; e½f½ I e½f½ DËiKv‡j evsjvi ivRbxwZ I †`k wefvM|
- cvwK¯Ívb Avg‡j evsjv‡`k Ges evsjv‡`‡ki gyw³ msMÖvg I hy×|

ms¯‹…wZ

ms¯‹…wZi msÁv, Avw`hy‡M evsjvi mgvR-ms¯‹…wZi ifc‡iLv, myjZvbx, †gvNj I bevex Avg‡ji evsjvi mgvR ms¯‹…wZ; Bs‡iR Avg‡j evsjvi mgvR I ms¯‹…wZ|
iex›`ª I bRi“j hyM Ges iex›`ª I bRi“j DËi evsjvi mgvR I ms¯‹…wZ; cvwK¯Ívb Avg‡j evsjv‡`‡ki mvs¯‹…wZK ifc‡iLv; ¯^vaxbZvDËi evsjv‡`‡ki ms¯‹…wZ|

wek` weeiYx

BwZnvm

1. **BwZnv‡mi msÁv, cÖv‰MwZnvwmK Avg‡ji evsjv‡`k Ges evsjv‡`‡ki AvenvIqv I Awaevmx m¤ú‡K© AeMZ nIqv|**
   1.1   BwZnv‡mi msÁv cÖ`vb|
   1.2   evsjv‡`‡ki cÖvPxb Rbc` D‡jL Kiv|
   1.3   e½ ev evsjv bv‡gi DrcwË e¨vL¨v Kiv|
   1.4   e‡½i mxgv‡iLv wPýZ Kiv|
   1.5   evsjvi AvenvIqv I Gi Awaevmx‡`i Pwi‡Î AvenvIqvi cÖfve wee„Z Kiv|
   1.6   cÖv‰MwZnvwmK I cÖvPxb evsjv Av_©mvgvwRK e¨e¯’v eY©bv Kiv|

2. **evsjv‡`‡k ¸ß, ivRv kkv¼, cvj I gymwjg kvmb m¤ú‡K© AeMZ nIqv|**
   2.1   ¸ß kvmb Avg‡j evsjvi kvmbe¨e¯’v eY©bv Kiv|
   2.2   ivRv kkv¼i ivR¨ weRq I kvmb eY©bv Kiv|
   2.3   evsjvi AivRKZv I wnD‡qb mvs Gi Avg‡j evsjvi Ae¯’v eY©bv Kiv|

2.4 †Mvcvj KZ©„K AivRKZvi Aemvb NUv‡bvi K…wZ‡Z¡¡i eY©bv Kiv|

2.5 evsjv‡‡k gymjgvb‡`i AvMgb I eLwZqvi LjRxi evsjv weRq eY©bv Kiv|

2.6 evsjv‡‡k ¯^vaxb myjZvbx kvmb cÖwZôvq kvgQwyÏb Bwjqvk kvnxi K…wZZ¡¡ eY©bv Kiv|

2.7 evsjvq †gvNj kvm‡bi BwZe„Ë e¨vL¨v Kiv|

2.8 1757 mv‡ji cjvkxi hy‡×i KviY, NUbv I djvdj eY©bv Kiv|

3. cjvkxhy× cieZ©x Ae¯’vq B÷ BwÛqv †Kv¤úvbxi AvwacZ¨ we¯Ívi m¤ú‡K© ÁvZ nIqv|

3.1 †`Iqvbx, ‰ØZkvmb I evsjvi `ywf©©¶ eY©bv Kiv|

3.2 Bs‡iR‡`i wPi¯’vqx e‡›`ve¯Í Ges Gi djvdj eY©bv Kiv|

3.3 evsjv‡‡k Rwg`vi, cÖRve¨e¯’v cÖwZôv Ges Av_©©-mvgvwRK e¨e¯’vq Rwg`vi‡i f,wgKv I cÖRvKz‡ji mvwe©K Ae¯’v D‡jL Kiv|

3.4 1905 mv‡ji e½f½ Av‡›`vjb I djvdj e¨Lv Kiv|

3.5 nvRx kixqZ Djvni Øvi‡qRx Av‡›`vjb I Gi djvdj e¨Lv Kiv|

4. e½f½DËi ivRbxwZ I †`k wefvM m¤ú‡K© AewnZ nIqv|

4.1 1937 Gi wbe©vPb I Gi ˆewkó¨ D‡jL Kiv|

4.2 jv‡nvi cÖ¯Ívive e¨³ Kiv|

4.3 1943 Gi evsjvi `ywf©‡¶i KviY I Gi c~e©vci Ae¯’v D‡jL Kiv|

4.4 cvwK¯Ív‡bi c~e©vÂj wnmv‡e 1947 mv‡j c~e© cvwK¯Ív‡bi cÖRÖ›v e¨vL¨v Kiv|

5. cvwK¯Ívb Avg‡j evsjv‡‡ki (ZrKvjxb c~e© cvwK¯Ívb) ivRbxwZ, A_©bxwZ I mvgvwRK Ae¯’v m¤ú‡K© AeMZ nIqv|

5.1 fvlv Av‡›`vjb I mgKvjxb ivR‰bwZK I mvgvwRK †cÖ¶vcU e¨³ Kiv|

5.2 AvIqvgxjxM cÖwZôv, hy³d«›U I 21 `dv `vex wfwˇZ wbe©vPb Abyôvb Ges hy³d«‡›Ui gvš¿mfv MVb I evwZj Av‡jvPbv Kiv|

5.3 cvwK¯Ív‡bi mvgwiK Afz¨¨vb, AvBqye we‡iva Av‡›`vjb I 6 `dv `vex, AvMiZjv lohš¿ gvgjv BwZe„Ë eY©bv Kiv Ges c~e©-cwðg cvwK¯Ív‡bi A_©‰bwZK ˆel‡g¨i LZQvb D‡jL Kiv|

5.4 1969 mv‡ji MYAfz¨¨vb Ges Gi avivevwnKZvq evsjv‡‡ki gYhy×hx I ¯^vaxb mve©‡fŠg evsjv‡k cÖRÖ›v Kivi cÖUf~wg I NUbv cÖevn eY©bv Kiv|

5.5 1971 mv‡ji HwZnvwmK gYhy×y× Ges ¯^vaxb mve©‡fŠg evsjv‡‡ki Afz¨¨q eY©bv Kiv|

6. ¯^vaxb mve©‡fŠg evsjv‡‡ki ivRbxwZ I Av_©©-mvgvwRK Ae¯’v m¤ú‡K© AeMZ nIqv|

6.1 hy‡×vËi ¯^vaxb mve©‡fŠg evsjv‡‡ki Av_©©-mvgvwRK cybM©VVb Kg©ZrciZv eY©bv Kiv|

6.2 1973 mv‡ji wbe©vPb Ges 1974 mv‡j msweav‡bi 4_© ms‡kvabxi gva¨g miKvi c×wZ cwieZ©b e¨Lv Kiv|

6.3 1975 mv‡ji 15 AvM÷ RwZi RbK e½eÜz †kL gywReyi ingvb -Gi kvnv`vZ eiY Ges ivR‰bwZK cUcwieZ©b|

6.4 1981 mv‡j ivó«cwZ wRqvDi ingv‡bi kvnv`vZ eiY, 1982 mv‡ji mvgwiK Afz¨¨vb Ges ivR‰bwZK cUf,wg cwieZ©b|

6.5 1990 mv‡j Gikv` miKv‡ii cZb Ges ZˈveavqK miKvi c×wZ Abymš‡M 1991 m‡bi wbe©vPb Ges MYZvwš¿K Abykxj‡bi m~Pbv|

ms¯‹…wZ

7. ms¯‹…wZi msÁv Ges cÖvPxb I ga¨hyMxq evsjvi ms¯‹…wZ I mvwnZ¨ PP©v m¤ú‡K© AeMZ nIqv|

7.1 ms¯‹…wZi msÁv `vb|

7.2 cÖvPxb evsjvi fvlv mvwnZ¨ I ms¯‹…wZi i*f*c‡iLv eY©bv Kiv|

7.3 ev½vjx ms¯‹…wZ wbg©v‡Y gwm©qv I cyuw_ mvwn‡Z¨i cÖfve eY©bv Kiv|

8. AvaywbK hy‡M evsjv‡‡ki ms¯‹…wZ I evsjvfvlvi AvaywbK i*f*cjvf m¤ú‡K© AeMZ nIqv|

8.1 Bs‡iR kvmb Avg‡j mvgvwRK Kzms¯‹vi `~ixKi‡Y (m¨vi ^mq` Avng`, ^mq` Avgxi Avjx I ivRv ivg‡gvnb ivq) Gi Avwef©ve Ges Zv‡‡i Kg©ZrciZv e¨vL¨v Kiv|

8.2 K¨vwi mv‡ne Ges †dvU© DBwjqvg K‡jR/ms¯‹…Z K‡jR ¯’vc‡bi gva¨g evsjvi bZzb ms¯‹…wZi i*f*cjvf eY©bv Kiv|

8.3 Bs‡iR‡‡i wk¶vbxwZ cÖeZ©b e¨vL¨v Kiv Ges KwjKvZv wek¦we`¨vjq I Bmjvwgqvq gv¨vmv ¯’vc‡bi gva¨g evsjvi ms¯‹…wZi weKvk e¨³ Kiv |

8.4 XvKv wek¦we`¨vjq cÖwZôvi BwZnvÏ e¨vL¨v Kiv|

9. 1947 Gi †`k wefvM I mvs¯‹…wZK Ae¯’vi cwieZ©b m¤ú‡K© AeMZ nIqv|

9.1 ZrKvjxb c~e© cvwK¯Ív‡bi ZgyÏyb gRwj‡mi f,wgKv D‡jL Kiv|

9.2 1952 mv‡ji fvlv Av‡›`vj‡bi mvs¯‹…wZK ¸i“Z¡ D‡jL Kiv|

9.3 XvKv †Kw›`ªK wkíx-mvwnwZ¨K‡‡i evsMvjx ms¯‹…wZ wewbg©v‡Yi f,wgKv cvjb D‡jL Kiv|

9.4 Ô69Õ Gi MY Av‡›`vj‡b mvs¯‹…wZK Kg©x‡‡i f,wgKv D‡jL Kiv|

9.5 evOvjv GKv‡Wgxi cÖwZôv Ges evsjv fvlv I mvwn‡Z¨ Gi f~wgKv D‡jL Kiv|

9.6 Av¯Í©©vwZK gvZ…fvlv w`em wn‡m‡e 21 †de&~“qvwii Zvrch© e¨³ Kiv|

9.7 fvlv, wkí mvwnZ¨ PP©vq msev`c‡Î I B‡j±ªwbK wgwWqvi f,wgKv D‡jL Kiv|

10. ms¯‹…wZi Dci MÖvgxY A_©bxwZi cÖfve AeMZ nIqv|

10.1 ZuvZ wkí I gmwjb Drcv`‡bi BwZnvÏ e¨vL¨v Kiv|

10.2 cvU Pv‡li A_©©‰bwZK cÖfve e¨³ Kiv|

10.3 ev½vjx ms¯‹…wZi Ask wn‡m‡e `y»RvZ wgÏÖvbœ mvgMÖxi (wgwó, gvÍb, `wa, wcVv-cywj cÖf…wZ) cÖfve e¨³ Kiv|

10.4 †`kxq †gjv I cve©‡bi mvs¯‹…wZK ¸i“Z¡ e¨vL¨v Kiv|

10.5 MÖvgxY †ckvRxwe‡‡i (Kvgvi, Kzgvi, ZuvZx, †R‡j, QyZvi, BZ¨vw`) mvs¯‹…wZK ¸i“Z¡ e¨vL¨v Kiv|

11. evsjv‡‡ki ms¯‹…wZ‡Z Avw`evmx ms¯‹…wZ I cÖZœ ZvwË¡K wb`k©‡bi Ae`vb m¤ú‡K© AeMZ nIqv|

11.1 evsjv‡‡ki Avw`evmx m¤ú‡K© D‡jL Kiv|

11.2 evsjv‡‡ki ms¯‹…wZ‡Z Mv‡iv, ivLvBb, mvIZvj, PvKgv Avw`evmx‡‡i ms¯‹…wZK Ae`vb e¨L¨v Kiv|

11.3 evsjv‡‡ki cÖvPxb ms¯‹…wZi HwZn¨ wnmv‡e gnv¯’vbMo, gqbvgwZ I cvnvocy‡ii cÖZœZvwË¡K wb`k©‡bi eY©bv `vb|

mnvqK cy¯ÍK

1. iwng, †PŠayix, gvngy` I Bmjvg, Òevsjv‡`‡ki BwZnvm (cwiewa©Z I cwigvwR©Z)Ó; bI‡ivR wKZvwe¯Ívb, AvM÷, 1999|

2. †K, Avjx Òevsjv‡`‡ki BwZnvmÓ; AvwRwRqv eyK wW‡cv, 2001|

3. wmivRyj Bmjvg, Òevsjv‡`‡ki BwZnvm-1704-1971Ó; 1g, 2q I 3q LÛ;

4. evsjv‡``k GwkqvwUK †mvmvBwU, †deªquvwi 2000|

5. †Kv-Av‡šÍvbfv, wcÖ, K‡Zvfw®‹, ÒfviZe‡l©i BwZnvmÓ; cÖMwZ cÖKvkb, 1988|

6. †Mvcvj nvj`vi; Òms¯‹…wZi ic‡všÍiÓ; gy³aviv, †g 1984|

7. †gvZv‡ni †nv‡mb †PŠayix, Òms¯‹…wZ K_vÓ; bI‡ivR wKZvwe¯Ívb, Rvbyqvwi 1998|

8. †Mvcvj nvj`vi, Òevsjv mvwn‡Z¨i ic‡iLv-1g I 2q LÛÓ; gy³aviv, RyjvB 1978|

‡kl