

BANGLADESH TECHNICAL EDUCATION BOARD

**4-YEAR DIPLOMA-IN-ENGINEERING
PROGRAM**

SURVEYING TECHNOLOGY

SYLLABUS

THIRD SEMESTER

SURVEYING TECHNOLOGY (78)
THIRD 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	7831	Cadastral Surveying	2	6	4	20	80	50	50	200
2	7832	Leveling	2	3	3	20	80	25	25	150
3	6632	Computer-II	0	6	2	-	-	50	50	100
4	5931	Math-III	3	3	4	30	120	50	-	200
5	5722	English-II	2	2	3	20	80	50	-	150
6	5913	Chemistry	3	3	4	30	120	25	25	200
7	5821	Social Science -2	2	0	2	20	80	-	-	100
		<i>Total</i>	14	23	22	140	560	250	150	1100

7831	CADASTRAL SURVEY	T	P	C
		2	6	4

AIMS

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

- conduct cadastral survey work.
- record surveyed data and plot the map.
- locate lost boundary.
- Conduct tertiary levelling work.

SHORT DESCRIPTION

Introduction to cadastral surveying; Preparation of records of rights; Extractein of areas; Preparation comparative map; Tertiary levelling

DETAIL DESCRIPTION**Theory :*****INTRODUCTION TO CADASTRAL SURVEY***

- 1 Understand the basic concept of cadastral survey.**
 - 1.1 Explain the meaning of cadastral survey.
 - 1.2 Mention the purpose of cadastral survey.
 - 1.3 Describe the scope of cadastral survey.
 - 1.4 Explain the terms base line, cheek line and station point.
 - 1.5 Explain the scales used in cadastral survey.
- 2 Understand the features of the instrument used in cadastral survey.**
 - 2.1 List the instrument and accessories used in cadastral survey.
 - 2.2 Identify Guntr's Chain, ranging rod, offset rod, tape and arrors.
 - 2.3 Explain the construction and uses of plane table.
- 3 Understand the features of optical square.**
 - 3.1 State the principle of optical square.
 - 3.2 Explain the construction of optical square.
 - 3.3 Mention the uses of the optical square.
 - 3.4 Mention the procedure of checking and adjustment of optical square.
- 4 Understand the concept of the revisional settlement and S. A. operation.**
 - 4.1 State the meaning of revisional settlement.
 - 4.2 State the meaning of S. A. operation.

- 4.3 Explain the term right of records.
- 4.4 Mention the purpose of revisional settlement and S.A. operation.
- 5 Understand the main traverse, sub traverse & mouza traverse.**
 - 5.1 Define mouza traverse, and sub traverse.
 - 5.2 Mention the classification of traverse.
 - 5.3 List the field works involved in mouza and sub traversing.
 - 5.4 Explain the mouza and sub traversing by methods of included angle and direct Co-ordinate.
 - 5.5 Explain the checking of Mouza and sub traverse.
- 6 Understand the concept of plotting main, sub & mouza traverse including computation of area.**
 - 6.1 Mention the procedure of plotting Mauza and sub Traverse
 - 6.2 Calculate the bearing from included angles of mouza and sub traverse.
 - 6.3 Compute co-ordinates of Mouza and sub traverse.
 - 6.4 Describe Bowditehe's rule and transit rule.
 - 6.5 State the balancing of the closed mouza and sub traverse.
 - 6.6 Compute the area of closed Mouza and sub traverse by co-ordinate, latitude and double meridian, departure and total tatitude methods.
- 7. Understand the concept of traverse in solving problems**
 - 7.1 Indetify different types of problems in mouza and sub traversing.
 - 7.2 Calculate the length and bearing of a missing side and any included angles of mouza and sub traverse
- 8. Understand the sources of errors in theodolite Mouza and sub traversing.**
 - 8.1 List the sources of errors in theodolite Mouza and sub traverse, survey.
 - 8.2 List Mistakes in theodolite Mouza and sub Traverse survey.
 - 8.3 Explain the closing errors in theodolite Mouza and sub Traversing.
- 9 Understand the methods of preparing mouza map.**
 - 9.1 Define mouza map.
 - 9.2 Describe the use of scale in mouza map preparation.
 - 9.3 Identify the symbols used in mouza map.
 - 9.4 State the meaning of sikmiline, cheek lline, main station, sub-station and chanda.
 - 9.5 List the meaning of khaka.
 - 9.6 List the stages making mouza map.
 - 9.7 Mention the rule of numbering the plots.
 - 9.8 Explain the method of writing heading, sub-headings and numbering on mouza map.
- 10 Understand the aspects of kistower.**
 - 10.1 Explain kistower.

- 10.2 Describe the method of writing field book.
- 10.3 Identify the instrument used in kistowar.
- 10.4 List the manpower required in kistowar.
- 10.5 Mention the stage in kistowar. Manual and digital method
- 10.6 Explain field work in kistowar (e.g. finding station, making quadrilateral, distribution of error, making kistowar, making field book of check line).
- 10.7 Describe office work in kistowar (e.g. inking and writing heading, writing symbols).
- 10.8 Describe office work by digital data impute and data processing.
- 11 Understand the concept records of right.**
 - 11.1 State the meaning of records of right.
 - 11.2 State the meaning of the terms; khanapuri, bujharat, attestation, khatian, draft publication objection and apiel and final publication.
- 12. Understand the different methods of computing area of plot.**
 - 12.1 State the meaning of extraction or computing areas.
 - 12.2 Identify instrument required for computing areas of regular and irregular plot.
 - 12.3 Mention the procedure for carrying out the field work for computing of areas within regular and irregular perimeter.
 - 12.4 Compute area along boundary using different rules.
- 13. Understand the methods of computing area from given mouza.**
 - 13.1 Identify the instrument and method used in computing area.
 - 13.2 Mention the procedure of computing area from a map with the help of scale & divider.
 - 13.3 Calculate an area with the help of scale & divider.
 - 13.4 Mention the procedure of computing area from a given map with the help of acre-comb.
 - 13.5 Calculate an area from a map with the help of acre-comb.
 - 13.6 Calculate an area from a map with the help of digital map mesurer.
 - 13.7 Convert the calculated area from F.P.S system to metric system i.e. acre to hectare and vice versa.
- 14. Understand the features of comparative map.**

State the meaning of cadastral map.

 - 14.1 State the meaning of demarcation of Mouza boundary.
 - 14.2 State the purpose of demarcation of boundary.
 - 14.3 State the meaning of comparative map.
 - 14.4 Explain comparative scale.
 - 14.5 Outline the necessity of comparative map.
 - 14.6 Describe the procedure of making comparative map.

- 15. Understand the method of demarcation of boundary.**
- 15.1 State the meaning of demarcation of property boundary.
 - 15.2 Outline the necessity of demarcation of boundary property.
 - 15.3 State the meaning of old compilation and old fitting.
 - 15.4 Explain dispute of demarcation.
 - 15.5 List the causes of dispute of demarcation.
 - 15.6 Explain the method of preparing mouza and sub traverse map.
 - 15.7 Mention the method of compiled set up.
 - 15.8 Describe the procedure of booking field notes in field book.
- 16. Understand the methods of relaying of old mouza boundary and lost boundary.**
- 16.1 State the meaning of relaying of old map.
 - 16.2 Mention the purpose of relaying a map.
 - 16.3 State the procedure of plotting offset on map of the boundary.
 - 16.4 Describe the methods of fixing pegs on the boundary in the field.

Practical :

- 1 Identify different instruments and accessories used in cadastral survey.
- 2 Prepare a traverse of a mouza boundary with total station/thoudulite.
- 3 Prepare a sub traverse of a mouza.
- 4 Conduct the star observation on traverse station.
- 5 Conduct the cadastral survey small area with plan table/total station.
- 6 Cheek the cadastral survey map.
- 7 Measure the area of a plot from mouza map.
- 8 Cheek the area of total plots with traversed area.
- 9 Prepare field book.
- 10 Produce plot number.

REFERENCE BOOK

- 1 Surveying and Levelling
— T.P. Kanethker (Vol-I)
- 2 Surveying and Levelling
— Dr. B.C. Pinmia
- 3 A Text Book of Surveying
— P.B. Shahani

7832	LEVELING	T	P	C
		2	3	3

AIMS

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

- Conduct leveling work.
- To enable of use all kinds of level.

SHORT DESCRIPTION

- Introduction to tertiary leveling.
- Introduction to secondary leveling.
- introduction to precise leveling.
- Introduction to digital leveling

DETAIL DESCRIPTION**Theory :****1. Understand the aspects of tertiary leveling**

1. 1 State the meaning of tertiary leveling.
1. 2 Mention the purpose of tertiary leveling.
1. 3 Explain the terms as used in tertiary leveling.
 - a. level Surface.
 - b. level line.
 - c. Horizontal plane.
 - d. Horizontal line.
 - e. Vertical plane.
 - f. Vertical line.
 - g. Datum surface.
 - h. Datum
 - i. Reduced level.
 - j. Formation level.

2 Understand the aspects of secondary leveling.

2. 1 State the meaning of secondary leveling.
2. 2 Mention the purpose of secondary leveling.

3. Understand the aspects of precise leveling

3. 1 State the meaning of precise leveling
3. 2 Mention the purpose of precise leveling.
3. 3 Compare between tertiary, secondary and precise leveling.

- 4 Understand the concept of bench mark (B.M)**
- 4.1 Explain the term bench mark.
 - 4.2 Mention the classification bench mark.
 - 4.3 Compare G.T.S permanent arbitrary and temporary bench mark.
- 5 Understand the features of leveling instruments.**
- 5.1 Identify the equipment and accessories required for leveling.
 - 5.2 Identify the different types of levels.
 - 5.3 Label different parts of level.
 - 5.4 Describe the construction of following levels :
 - a. Dumpy level.
 - b. Tilting level.
 - c. Auto-set level.
 - d. Digital level.
 - 5.5 Define basic terms:
 - a. Keplar type telescope.
 - b. Chromatic aberration
 - c. Spherical aberration.
 - d. Lens formula.
 - e. Diaphragms.
 - f. External and internal focusing telescopes.
 - g. Deferent type of eye-pieces.
 - h. Level tubes.
- 6 Explain the following terms related to leveling:**
- a. Line of collimation.
 - b. Axis of telescope.
 - c. Axis of bubble tube.
 - d. Vertical axis.
 - e. Height of the instrument (HI)
 - f. Line of collimation
 - g. Focusing.
 - h. Parallax.
- 7 Understand the features leveling staff:**
- 7.1 Mention the purpose of leveling staff.
 - 7.2 Identify different types of leveling staff.
 - 7.3 Mention the procedure of taking staff reading with the help of sop with staff, Target staff and folding staff.
- 8. Understand the temporary adjustment of leveling instruments:**
- 8.1 State the meaning of adjustment of leveling instruments.
 - 8.2 Mention different kinds of adjustments of level.
 - 8.3 State different steps of temporary adjustments.

- 9. Understand the permanent adjustment of leveling instrument:**
- 9.1 List the fundamental lines of leveling instrument/
 - 9.2 Explain the relations among the fundamental lines.
 - 9.3 List the permanent adjustments of dumpy level, tilting level, auto-set level and digital level.
 - 9.4 Mention the procedure of identifying and rectifying the various defects in adjustment of dumpy level, . tilting level, auto-set level and digital level.
 - 9.5 Solve problems on permanent adjustments of the levels.
- 10 Understand the concept of tertiary leveling:**
- 10.1 State the meaning of following terms used in tertiary leveling
 - a. Back sight, foresight and intermediate sight reading.
 - b. Change point
 - c. Station
 - d. Balancing the sights
 - 10.2 Identify the positions where the instruments to be set on.
 - 10.2 Mention the procedure of holding a leveling staff.
 - 10.2 Mention the procedure of taking staff readings.
 - 10.2 Mention the procedure of tertiary leveling work.
- 11 Understand the concept booking of staff reading and reduction of level:**
- 11.1. State the necessity of level book.
 - 11.2. Identify different kinds of level book.
 - 11.3. Describe reduction of levels.
 - 11.4. Mention the procedure of booking staff reading in the level book.
 - 11.5. Solve problems on reduction of levels.
 - 11.6. Solve problems on calculation of missing data of level book.
- 12 Understand various aspects of tertiary leveling:**
- 12.1 List different kinds of tertiary leveling, fly leveling, profile leveling, cross-sectioning, check leveling, barometric leveling, trigonometrically leveling, reciprocate leveling and precise leveling.
 - 12.2 State different kinds of leveling, primary leveling. secondary leveling and tertiary leveling.
 - 12.3 Mention the procedure of fly leveling, plevelling, cross sectioning, check leveling.
 - 12.4 Mention the procedure of double tertiary leveling.
 - 12.5 Solve problems of fly leveling, profile leveling, cross sectioning and check leveling.
 - 12.6 State the purposes of reciprocal level ling.
 - 12.7 Mention the procedure of reciprocal leveling.
 - 12.8 Mention the procedure of double tertiary leveling.

- 12.9 Solve problems on reciprocal leveling.
- 13 Understand the concept of plotting level sections:**
- 13.1 State the meaning of longitudinal profile of a leveling works.
- 13.2 State the purpose of plotting long section and cross section of leveling work.
- 13.3 Explain the various elements of longitudinal section and cross section of leveling works.
- 13.4 Mention the procedure of plotting long section and cross section.
- 13.5 Prepare longitudinal profile and cross profile from given data.
- 13.6 Mention the procedure of making working profile.
- 14 Understand the difficulties and errors in leveling:**
- 14.1 Mention the difficulties in leveling.
- 14.2 Mention the procedure of leveling in the following cases:
- Ascending and descending a hill.
 - Staff is too near level.
 - Staff is too low or too high.
 - Staff station is along the line & collimation.
 - Board fencing on the alignment.
 - Wall on the alignment.
- 14.3 List the instrumental natural and personal error in leveling.
- 14.4 Explain the effect of earth's curvature and refraction of light.
- 14.5 Express the derivation of the formula for earth curvature and refraction.
- 14.6 Solve problems on error due to curvature and refraction.
- 14.7 Express the derivation of the formula for distance to the visible horizon and dip of the horizon and solve problem on them.
- 14.8 Explain the common mistakes in leveling.
- 14.9 Specify the magnitude and permissible limits of closing error.
- 15 Understand the digital level.**
- 15.1 Define digital level.
- 15.2 Compare digital level with other common level.
- 15.3 Describe the component of digital level and function of level.
- 15.4 Explain the term of display penal.

Practical :

- Demonstrate Components dumpy level.
- Demonstrate Components Tilling level.
- Demonstrate Components Auto-set level.
- Demonstrate Components Digital level.
- Adjustment of Dumpy level and Tilling level.
- Perform adjustment of Auto-set level.
- Perform the adjustment of digital level.

8. Conduct fly leveling.
9. Conduct differential leveling.
10. Conduct reciprocal leveling.
11. Conduct profile leveling.
12. Conduct Cross-sectioning.
13. Conduct spot level sections.
14. Run the levels connecting at least 3 old tertiary B.M.
15. Establish a new tertiary B.M. to safe place.

Reference Book :

1. Surveying and leveling
- T. P Kanethker (Vol-1)
2. Surveying and leveling
- Df. B.C.Pinaamia
3. A Text Book of Surveying
- P.B.Shahani

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.

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 Demonstrate 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 .
 - 3.6 Retrieve a previously saved worksheet.
 - 3.7 Modify the worksheet.
 - 3.8 Save a modified worksheet.

- 4 Apply formula, function and using templates.**
 - 4.1 Use simple formulae to solve arithmetical computation.
 - 4.2 Use arithmetical operators in formula.
 - 4.3 Edit formula.
 - 4.4 Use mathematical function to solve simple equations.
 - 4.5 Make and use workbook templates.
 - 4.6 Make changes in existing workbook templates
 - 4.7 Validate numbers, dates, times & text.
 - 4.8 Show custom validation.

- 5 Solve engineering problems using 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 GOTO 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 formula or in functions.
 - 6.3 Enter range in formulae or in functions by typing directly or by using cell pointer.
 - 6.4 Create a range name.
 - 6.5 Use range name in formula & functions.
 - 6.6 Copy, Move & Erase cell range.

- 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 Create, change and delete a style.

8 Exercise on Sorting, Searching and Worksheet Printing.

- 8.1 Create a database program
- 8.2 Sort a database in different ways.
- 8.3 Search a record from the database using search criteria.
- 8.4 Extract records from the database that match a given criteria.
- 8.5 Delete records that a given criteria from the database using available database commands.
- 8.6 Show the Print Preview and adjust Page setup option.
- 8.7 Create and use page headers of footers.
- 8.8 Set print area, print titles and different print option
- 8.9 Print portion of worksheet and multiple worksheets
- 8.10 Print ranges from different worksheets on the same pages.

9 Create and Print graphs.

- 9.1 Create bar, line, X-Y and pie graphs.
- 9.2 Add color, titles, legend, grid and levels to the graph.
- 9.3 Add visual impact with colors.
- 9.4 Create 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 commands.

- 10.1 Create 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 Create a macro to convert values into labels vice versa.
- 10.3 Create a macro for inserting blank rows between two rows of data in a worksheet.
- 10.4 Create 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 save the table structure.
- 12 Change the table structure and edit database.**
- 12.1 Modify and Edit the table structure.
 - 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, display 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 screen or to a file.
- 16.2 Use the print menu options and dos-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 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 in Programs.

- 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.

5931	MATHEMATICS – III	T	P
C		3	3

4

AIMS

- To make understand the basic concept and techniques of composition and resolution of vectors and computing the resultant of vectors.
- To enable to use the knowledge of gradient of a straight line in finding speed, acceleration etc.
- To enable to use the knowledge of conic in finding the girder of a railway bridge, cable of a suspension bridge and maximum height of an arch.
- To provide ability to apply the knowledge of differential calculus in solving problem like slope, gradient of a curve, velocity, acceleration, rate of flow of liquid etc.
- To enable to apply the process of integration in solving practical problems like calculation of area of a regular figure in two dimensions and volume of regular solids of different shapes.

SHORT DESCRIPTION

Vector	: Addition and subtraction, dot and cross product.
Co-ordinate Geometry	: Co-ordinates of a point, locus and its equation, straight lines, circles and conic.
Differential Calculus	: Function and limit of a function, differentiation with the help of limit, differentiation of functions, geometrical interpretation of $\frac{dy}{dx}$, successive differentiation and Leibnitz theorem, partial differentiation.

Integral Calculus : Fundamental integrals, integration by substitutions, integration by parts, integration by partial fraction, definite integrals.

DETAIL DESCRIPTION

Vector

1 Apply the theorems of vector algebra.

- 1.1 Define scalar and vector.
- 1.2 Explain null vector, free vector, like vector, equal vector, collinear vector, unit vector, position vector, addition and subtraction of vectors, linear combination, direction cosines and direction ratios, dependent and independent vectors, scalar fields and vector field.
- 1.3 Prove the laws of vector algebra.
- 1.4 Resolve a vector in space along three mutually perpendicular directions
- 1.5 solve problems involving addition and subtraction of vectors.

2 Apply the concept of dot product and cross product of vectors.

- 2.1 Define dot product and cross product of vectors.
- 2.2 Interpret dot product and cross product of vector geometrically.
- 2.3 Deduce the condition of parallelism and perpendicularity of two vectors.
- 2.4 Prove the distributive law of dot product and cross product of vector.
- 2.5 Explain the scalar triple product and vector triple product.
- 2.6 Solve problems involving dot product and cross product.

CO-ORDINATE GEOMETRY

3 Apply the concept of co-ordinates to find lengths and areas.

- 3.1 Explain the co-ordinates of a point.
- 3.2 State different types of co-ordinates of a point.
- 3.3 Find the distance between two points (x_1, y_1) and (x_2, y_2) .
- 3.4 Find the co-ordinates of a point which divides the straight line joining two points in certain ratio.
- 3.5 Find the area of a triangle whose vertices are given.

- 3.6 Solve problems related to co-ordinates of points and distance formula.
- 4 Apply the concept of locus.**
- 4.1 Define locus of a point.
- 4.2 Find the locus of a point.
- 4.3 Solve problems for finding locus of a point under certain conditions.
- 5 Apply the equation of straight lines in calculating various parameter.**
- 5.1 Describe the equation $x = a$ and $y = b$ and slope of a straight line.
- 5.2 Find the slope of a straight line passing through two point (x_1, y_1) and (x_2, y_2) .
- 5.3 Find the equation of straight lines:
- Point slope form.
 - Slope intercept form.
 - Two points form.
 - Intercept form.
 - Perpendicular form.
- 5.4 Find the point of intersection of two given straight lines.
- 5.5 Find the angle between two given straight lines.
- 5.6 Find the condition of parallelism and perpendicularity of two given straight lines.
- 5.7 Find the distances of a point from a line.
- 6 Apply the equations of circle, tangent and normal in solving problems.**
- 6.1 Define circle, center and radius .
- 6.2 Find the equation of a circle in the form:
- $x^2 + y^2 = a^2$
 - $(x - h)^2 + (y - k)^2 = a^2$
 - $x^2 + y^2 + 2gx + 2fy + c = 0$
- 6.3 Find the equation of a circle described on the line joining (x_1, y_1) and (x_2, y_2) .
- 6.4 Define tangent and normal.
- 6.5 Find the condition that a straight line may touch a circle.
- 6.6 Find the equations of tangent and normal to a circle at any point.
- 6.7 Solve the problems related to equations of circle, tangent and normal.
- 7. Understand conic or conic sections.**

- 7.1 Define conic, focus, directrix and eccentricity.
- 7.2 Find the equations of parabola, ellipse and hyperbola.
- 7.3 Solve problems related to parabola, ellipse and hyperbola.

DIFFERENTIAL CALCULUS

FUNCTION AND LIMIT

8. Understand the concept of functions and limits.

- 8.1 Define constant, variable, function, domain, range and continuity of a function.
- 8.2 Define limit of a function
- 8.3 Distinguish between $f(x)$ and $f(a)$.

8.4 Establish i) $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$

 ii) $\lim_{x \rightarrow 0} \frac{\tan x}{x} = 1.$

9. Understand differential co-efficient and differentiation.

- 9.1 Define differential co-efficient in the form of

$$\frac{dy}{dx} = \lim_{h \rightarrow 0} \frac{f(x+h)-f(x)}{h}$$

- 9.2 Find the differential co-efficient of algebraic and trigonometrical functions from first principle.

10. Apply the concept of differentiation.

- 10.1 State the formulae for differentiation:
 - i) sum or difference
 - ii) product
 - iii) quotient

iv) function of function

v) logarithmic function

Find the differential co-efficient using the sum or difference formula, product formula and quotient formula.

10.2 Find the differential co-efficient function of function and logarithmic function.

11. Apply the concept of geometrical meaning of $\frac{dy}{dx}$

11.1 Interpret $\frac{dy}{dx}$ geometrically.

11.2 Explain $\frac{dy}{dx}$ under different conditions

11.3 Solve the problems of the type:

A circular plate of metal expands by heat so that its radius increases at the rate of 0.01 cm per second. At what rate is the area increasing when the radius is 700 cm ?

12 Use Leibnitz's theorem to solve the problems of successive differentiation.

12.1 Find 2nd, 3rd and 4th derivatives of a function and hence find n-th derivatives.

12.2 Express Leibnitz's theorem

12.3 Solve the problems of successive differentiation and Leibnitz's theorem.

13 Understand partial differentiation.

13.1 Define partial derivatives.

13.2 State formula for total differential.

13.3 State formulae for partial differentiation of implicit function and homogenous function.

13.4 State Euler's theorem on homogeneous function.

13.5 Solve the problems of partial derivatives.

INTEGRAL CALCULUS

14 Apply fundamental indefinite integrals in solving problems.

14.1 Explain the concept of integration and constant of integration.

- 14.2 State fundamental and standard integrals.
14.3 Write down formulae for:
i) Integration of algebraic sum.
ii) Integration of the product of a constant and a function.
14.4 Integrate by method of substitution, integrate by parts and by partial fractions.
14.5 Solve problems of indefinite integration.

15 Apply the concept of definite integrals.

- 15.1 Explain definite integration.
15.2 Interpret geometrically the meaning of $\int_a^b f(x)dx$
15.3 Solve problems of the following types:
i) $\int_0^{\frac{\pi}{2}} \cos^2 x dx$ ii) $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$

P* = Practical continuous assessment

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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

Marks 20

<i>Fourteen:</i> Human Resources	3	Enriching the workforce
<i>Sixteen:</i> Wonders Home and Abroad	1	The Sangsad Bhaban
	2	The Jamuna Multi-Purpose Bridge
<i>Seventeen:</i> Modes of Communication	6	E-mail
<i>Nineteen :</i> Healthy Living	5	The disabled among us
<i>Twenty:</i> Jobs and Professions	2	How can I be self-employed?
	3	Self-help a key to success
<i>Twenty-one:</i> Globalization	1	The world as a global village
	3	Modern technology and globalization
	6	Globalization and English

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

Marks 30

Unit	Lesson	Title
<i>One:</i> Pronouns & Determiners	3	Modifier: Pick out modifiers, determiners, Infinitive, participles headword, in the sentence. Question : A beautiful girl of Thirteen dances well. : Headword: girl Pre modifier – a, beautiful Post modifier – of thirteen

<i>Twelve:</i> Further Use of Preposition	2	Use Appropriate Prepositions
<i>Patterns of Sentence Structure</i>		3. Sentence Structure ----- Question a) Analyse sentences Exam : He goes to school. Ans: Sub : He Verb intransitive: goes b) Make Sentence according to the structure Question S+V _I +Ob ₁ +Ob ₂ Answer : He called me a liar.
<i>Fourteen:</i> Idiom and Phrase	9	Make Sentences with the idioms and Phrases in the following. (any five)
<i>Changing Speech</i>		Direct & indirect narration

N.B: The Unit mentioned refers to the Text Book (2nd Paper) English Grammar and Composition for class XI - XII by National Curriculum & Text Book Board, Dhaka.

COMPOSITION

marks 30

Area of interest: With hints/ key words

National, Social, Political Problems: Terrorism, Drug Addiction, Acid Violence, Dowry, Load shedding, Price Hike, Gender Discrimination, Traffic Jam, Deforestation etc.

Calamities: Drought, Erosion, Flood, Cyclone, Earth quake, Landslide etc.

National days and festivals: International Mother Language Day, Independence Day, Victory Day, Pahela Baishakh, May Day etc.

Scientific Development: Satellite, Optical Fiber, E-mail, Internet & Agricultural Development.

Environment Pollution: Water, Air, Sound, Global Warming.

Heritage sites: The Sundarbans, National Memorial, Cox's Bazar Sea Beach, Bhashani Novo Theatre.

Industries: Garments, Textile, Poultry, Leather, Ceramics, Fertilizer.

1. Writing a short composition
2. Writing a formal letter/CV.
3. Writing Letter (Personal/Official)

4. Writing Reports on work place of standard form/ instrument or Construction or fault on / instrument or Construction/ Repairing of instrument or Construction/ a situation/event/incident.
5. Writing letter to the print & Electronic media.

Practical

1. Asking Questions : WH, Yes/No, Tag questions
2. Conversations on real life situations
 - a) Today's market price
 - b) About festival
 - c) Preparation for the examination
 - d) Last day of your Class.
 - e) Visit to the place of interest
 - f) Choice of profession
 - g) Current Topics from Newspapers.

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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, valency 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 equilibria; 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, valency of elements and radicals.
- 1.5 Discuss the variations of valency with examples.
- 1.6 Define active and latent valency.
- 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 Deduce 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, valency 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 Pauli'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-valent 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, acidimetry 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 Permutit 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) calcination (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 alkane, alkene 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-carboxilation, Power Alcohol, Absolute Alcohol .

PRACTICAL :

OBSERVATION AND MEASUREMENT

Measure the pH value of unknown solutions to classify them as neutral , acidic or alkalis.

Prepare a decinormal solution of sodium carbonate.

Determine the unknown strength of an acid. Solve by a standard alkalis solution with a suitable indicator.

QUALITATIVE ANALYSIS OF KNOWN SALTS

Perform test tube tests for the known salt samples Copper salt, Iron salt, Lead salt, Aluminum salt, Ammonium salt, etc.

Perform charcoal oxidation and reduction test for the different salt e.g. such as Lead salt, Copper salt, Iron salt, Calcium salt, etc.

Perform tests to detect unknown basic radicals e.g. Lead, Copper, Iron Calcium, Zinc, Aluminium, Ammonium and Sodium.

Perform tests to detect unknown acid radicals e.g. chloride, nitrate, carbonate and sulphate.

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

উদ্দেশ্য

- পদ্মা-মেঘনা-যমুনা বদ্বীপ অধ্যুষিত ভৌগোলিক অঞ্চলে বাঙ্গালী সমাজ গঠন এবং নানা ঐতিহাসিক বিবর্তনের পর্যায় পেরিয়ে গঠিত আধুনিক বাংলাদেশ সম্পর্কে শিক্ষার্থীদের যথার্থ অবগত করানো এবং তাদের সঠিক বোধ সৃষ্টিকরণ।
- প্রাকৃতিক ও অর্থনৈতিক কাঠামোর পরিমন্ডলে বাংলাদেশের সাংস্কৃতিক বিকাশের সাথে শিক্ষার্থীদের উজ্জীবিত করে বাংলাদেশের যোগ্য ও পরিশীলিত নাগরিক হিসাবে যথার্থ বিকশিতকরণ।

সংক্ষিপ্ত বিবরণী

ইতিহাস

- ইতিহাসের সংজ্ঞা।
- বাংলাদেশের আবহাওয়া ও অধিবাসী।
- প্রাগৈতিহাসিক ও প্রাচীনকালে বাংলাদেশ।
- বাংলায় মুসলমানদের আগমন, প্রতিষ্ঠালাভ ও শাসন – খলজী ও তুর্কী শাসনে বাংলায় স্বাধীন সুলতানী প্রতিষ্ঠা; বাংলাদেশে শাহী আমল, আফগান ও মোঘল আমলে বাংলার শাসন।
- বাংলায় ইউরোপীয় বণিকদের আগমন; নবাবী আমলে বাংলার শাসন ব্যবস্থা; বাংলায় ইংরেজ শাসন ক্ষমতা লাভ ও প্রতিষ্ঠা।
- ব্রিটিশ বিরোধী সশস্ত্র প্রতিরোধ আন্দোলন; সংস্কার আন্দোলন ও জাতীয়তাবাদের বিকাশ এবং বাংলার নবজাগরণ; বঙ্গভঙ্গ ও বঙ্গভঙ্গ উত্তরকালে বাংলার রাজনীতি ও দেশ বিভাগ।
- পাকিস্তান আমলে বাংলাদেশ এবং বাংলাদেশের মুক্তি সংগ্রাম ও যুদ্ধ।

সংস্কৃতি

সংস্কৃতির সংজ্ঞা, আদিযুগে বাংলার সমাজ-সংস্কৃতির রূপরেখা, সুলতানী, মোঘল ও নবাবী আমলের বাংলার সমাজ সংস্কৃতি; ইংরেজ আমলে বাংলার সমাজ ও সংস্কৃতি।
রবীন্দ্র ও নজরুল যুগ এবং রবীন্দ্র ও নজরুল উত্তর বাংলার সমাজ ও সংস্কৃতি; পাকিস্তান আমলে বাংলাদেশের সাংস্কৃতিক রূপরেখা; স্বাধীনতাউত্তর বাংলাদেশের সংস্কৃতি।

বিশদ বিবরণী

ইতিহাস

১. ইতিহাসের সংজ্ঞা, প্রাগৈতিহাসিক আমলের বাংলাদেশ এবং বাংলাদেশের আবহাওয়া ও অধিবাসী সম্পর্কে অবগত হওয়া।
 - ১.১ ইতিহাসের সংজ্ঞা প্রদান।
 - ১.২ বাংলাদেশের প্রাচীন জনপদ উল্লেখ করা।
 - ১.৩ বঙ্গ বা বাংলা নামের উৎপত্তি ব্যাখ্যা করা।
 - ১.৪ বঙ্গের সীমারেখা চিহ্নিত করা।
 - ১.৫ বাংলার আবহাওয়া ও এর অধিবাসীদের চরিত্রে আবহাওয়ার প্রভাব বিবৃত করা।
 - ১.৬ প্রাগৈতিহাসিক ও প্রাচীন বাংলার আর্থসামাজিক ব্যবস্থা বর্ণনা করা।
২. বাংলাদেশে গুপ্ত, রাজা শশাঙ্ক, পাল ও মুসলিম শাসন সম্পর্কে অবগত হওয়া।
 - ২.১ গুপ্ত শাসন আমলে বাংলার শাসনব্যবস্থা বর্ণনা করা।

- ২.২ রাজা শশাঙ্কের রাজ্য বিজয় ও শাসন বর্ণনা করা।
- ২.৩ বাংলার অরাজকতা ও হিউয়েনসাং এর আমলে বাংলার অবস্থা বর্ণনা করা।
- ২.৪ গোপাল কর্তৃক অরাজকতার অবসান ঘটানোর কৃতিত্বের বর্ণনা করা।
- ২.৫ বাংলাদেশে মুসলমানদের আগমন ও বখতিয়ার খলজীর বাংলা বিজয় বর্ণনা করা।
- ২.৬ বাংলাদেশে স্বাধীন সুলতানী শাসন প্রতিষ্ঠায় শামছুদ্দিন ইলিয়াশ শাঐরী কৃতিত্ব বর্ণনা করা।
- ২.৭ বাংলায় মোঘল শাসনের ইতিবৃত্ত ব্যাখ্যা করা।
- ২.৮ ১৭৫৭ সালের পলাশীর যুদ্ধের কারণ, ঘটনা ও ফলাফল বর্ণনা করা।
৩. **পলাশীযুদ্ধ পরবর্তী অবস্থায় ইস্ট ইন্ডিয়া কোম্পানীর আধিপত্য বিস্তার সম্পর্কে জ্ঞাত হওয়া।**
- ৩.১ দেওয়ানী, দ্বৈতশাসন ও বাংলার দুর্ভিক্ষ বর্ণনা করা।
- ৩.২ ইংরেজদের চিরস্থায়ী বন্দোবস্ত এবং এর ফলাফল বর্ণনা করা।
- ৩.৩ বাংলাদেশে জমিদার, প্রজাব্যবস্থা প্রতিষ্ঠা এবং আর্থ-সামাজিক ব্যবস্থায় জমিদারদের ভূমিকা ও প্রজাকুলের সার্বিক অবস্থা উল্লেখ করা।
- ৩.৪ ১৯০৫ সালের বঙ্গভঙ্গ আন্দোলন ও ফলাফল ব্যাখ্যা করা।
- ৩.৫ হাজী শরীয়াত উল্লাহর ফরায়াজী আন্দোলন ও এর ফলাফল ব্যাখ্যা করা।
৪. **বঙ্গভঙ্গউত্তর রাজনীতি ও দেশ বিভাগ সম্পর্কে অবহিত হওয়া।**
- ৪.১ ১৯৩৭ এর নির্বাচন ও এর বৈশিষ্ট্য উল্লেখ করা।
- ৪.২ লাহোর প্রস্তাব ব্যক্ত করা।
- ৪.৩ ১৯৪৩ এর বাংলার দুর্ভিক্ষের কারণ ও এর পূর্বাঙ্গ অবস্থা উল্লেখ করা।
- ৪.৪ পাকিস্তানের পূর্বাঞ্চল হিসাবে ১৯৪৭ সালে পূর্ব পাকিস্তানের প্রতিষ্ঠা ব্যাখ্যা করা।
৫. **পাকিস্তান আমলে বাংলাদেশের (তৎকালীন পূর্ব পাকিস্তান) রাজনীতি, অর্থনীতি ও সামাজিক অবস্থা সম্পর্কে অবগত হওয়া।**
- ৫.১ ভাষা আন্দোলন ও সমকালীন রাজনৈতিক ও সামাজিক প্রেক্ষিত ব্যক্ত করা।
- ৫.২ আওয়ামীলীগ প্রতিষ্ঠা, যুক্তফ্রন্ট ও ২১ দফা দাবীর ভিত্তিতে নির্বাচন অনুষ্ঠান এবং যুক্তফ্রন্টের মন্ত্রিসভা গঠন ও বাতিল আলোচনা করা।
- ৫.৩ পাকিস্তানের সামরিক অভ্যুত্থান, আইয়ুব বিরোধী আন্দোলন ও ৬ দফা দাবী, আগরতলা ষড়যন্ত্র মামলার ইতিবৃত্ত বর্ণনা করা এবং পূর্ব-পশ্চিম পাকিস্তানের অর্থনৈতিক বৈষম্যের খতিয়ান উল্লেখ করা।
- ৫.৪ ১৯৬৯ সালের গণঅভ্যুত্থান এবং এর ধারাবাহিকতায় বাংলাদেশের মুক্তিযুদ্ধ ও স্বাধীন সার্বভৌম বাংলাদেশ প্রতিষ্ঠা করার পটভূমি ও ঘটনা প্রবাহ বর্ণনা করা।
- ৫.৫ ১৯৭১ সালের ঐতিহাসিক মুক্তিযুদ্ধ এবং স্বাধীন সার্বভৌম বাংলাদেশের অভ্যুদয় বর্ণনা করা।
৬. **স্বাধীন সার্বভৌম বাংলাদেশের রাজনীতি ও আর্থ-সামাজিক অবস্থা সম্পর্কে অবগত হওয়া।**
- ৬.১ যুদ্ধোত্তর স্বাধীন সার্বভৌম বাংলাদেশের আর্থ-সামাজিক পুনর্গঠন কর্মতৎপরতা বর্ণনা করা।
- ৬.২ ১৯৭৩ সালের নির্বাচন এবং ১৯৭৪ সালে সংবিধানের ৪র্থ সংশোধনীর মাধ্যমে সরকার পদ্ধতির পরিবর্তন ব্যক্ত করা।
- ৬.৩ ১৯৭৫ সালের ১৫ আগস্ট জাতির জনক বঙ্গবন্ধু শেখ মুজিবুর রহমান -এর শাহাদাত বরণ এবং রাজনৈতিক পটপরিবর্তন।
- ৬.৪ ১৯৮১ সালে রাষ্ট্রপতি জিয়াউর রহমানের শাহাদাত বরণ, ১৯৮২ সালের সামরিক অভ্যুত্থান এবং রাজনৈতিক পটভূমি পরিবর্তন।
- ৬.৫ ১৯৯০ সালে এরশাদ সরকারের পতন এবং তত্ত্বাবধায়ক সরকার পদ্ধতি অনুসঙ্গে ১৯৯১ সনের নির্বাচন এবং গণতান্ত্রিক অনুশীলনের সূচনা।

সংস্কৃতি

৭. **সংস্কৃতির সংজ্ঞা এবং প্রাচীন ও মধ্যযুগীয় বাংলার সংস্কৃতি ও সাহিত্য চর্চা সম্পর্কে অবগত হওয়া।**
- ৭.১ সংস্কৃতির সংজ্ঞা দান।

- ৭.২ প্রাচীন বাংলার ভাষা সাহিত্য ও সংস্কৃতির রূপরেখা বর্ণনা করা।
- ৭.৩ বাঙ্গালী সংস্কৃতি নির্মাণে মর্সিয়া ও পুঁথি সাহিত্যের প্রভাব বর্ণনা করা।
৮. আধুনিক যুগে বাংলাদেশের সংস্কৃতি ও বাংলাভাষার আধুনিক রূপলাভ সম্পর্কে অবগত হওয়া।
- ৮.১ ইংরেজ শাসন আমলে সামাজিক কুসংস্কার দূরীকরণে (স্যার সৈয়দ আহমদ, সৈয়দ আমীর আলী ও রাজা রামমোহন রায়) এর আবির্ভাব এবং তাদের কর্মতৎপরতা ব্যাখ্যা করা।
- ৮.২ ক্যারি সাহেব এবং ফোর্ট উইলিয়াম কলেজ/সংস্কৃত কলেজ স্থাপনের মাধ্যমে বাংলার নতুন সংস্কৃতির রূপলাভ বর্ণনা করা।
- ৮.৩ ইংরেজদের শিক্ষানীতি প্রবর্তন ব্যাখ্যা করা এবং কলিকাতা বিশ্ববিদ্যালয় ও ইসলামিয়া মাদ্রাসা স্থাপনের মাধ্যমে বাংলার সংস্কৃতির বিকাশ ব্যক্ত করা।
- ৮.৪ ঢাকা বিশ্ববিদ্যালয় প্রতিষ্ঠার ইতিবৃত্ত ব্যাখ্যা করা।
৯. ১৯৪৭ এর দেশ বিভাগ ও সাংস্কৃতিক অবস্থার পরিবর্তন সম্পর্কে অবগত হওয়া।
- ৯.১ তৎকালীন পূর্ব পাকিস্তানের তমুদ্দুন মজলিসের ভূমিকা উল্লেখ করা।
- ৯.২ ১৯৫২ সালের ভাষা আন্দোলনের সাংস্কৃতিক গুরুত্ব উল্লেখ করা।
- ৯.৩ ঢাকা কেন্দ্রিক শিল্পী-সাহিত্যিকদের বাংলা সংস্কৃতি বিনির্মাণের ভূমিকা পালন উল্লেখ করা।
- ৯.৪ '৬৯ এর গণ আন্দোলনে সাংস্কৃতিক কর্মীদের ভূমিকা উল্লেখ করা।
- ৯.৫ বাঙলা একাডেমীর প্রতিষ্ঠা এবং বাংলা ভাষা ও সাহিত্যে এর ভূমিকা উল্লেখ করা।
- ৯.৬ আন্তর্জাতিক মাতৃভাষা দিবস হিসেবে ২১ ফেব্রুয়ারির তাৎপর্য ব্যক্ত করা।
- ৯.৭ ভাষা, শিল্প সাহিত্য চর্চায় সংবাদপত্র ও ইলেকট্রনিক মিডিয়ার ভূমিকা উল্লেখ করা।
১০. সংস্কৃতির উপর গ্রামীণ অর্থনীতির প্রভাব অবগত হওয়া।
- ১০.১ তাঁত শিল্প ও মসলিন উৎপাদনের ইতিবৃত্ত ব্যাখ্যা করা।
- ১০.২ পাট চাষের অর্থনৈতিক প্রভাব ব্যক্ত করা।
- ১০.৩ বাঙ্গালী সংস্কৃতির অংশ হিসেবে দুগ্ধজাত মিষ্টান্ন সামগ্রীর (মিষ্টি, মাখন, দধি, পিঠা-পুলি প্রভৃতি) প্রভাব ব্যক্ত করা।
- ১০.৪ দেশীয় মেলা ও পার্বনের সাংস্কৃতিক গুরুত্ব ব্যাখ্যা করা।
- ১০.৫ গ্রামীণ পেশাজীবীদের (কামার, কুমার, তাঁতী, জেলে, ছুতার, ইত্যাদি) সাংস্কৃতিক গুরুত্ব ব্যাখ্যা করা।
১১. বাংলাদেশের সংস্কৃতিতে আদিবাসী সংস্কৃতি ও প্রত্ন তাত্ত্বিক নিদর্শনের অবদান সম্পর্কে অবগত হওয়া।
- ১১.১ বাংলাদেশের আদিবাসী সম্পর্কে উল্লেখ করা।
- ১১.২ বাংলাদেশের সংস্কৃতিতে গাড়া, রাখাইন, সাওতাল, চাকমা আদিবাসীদের সংস্কৃতিক অবদান ব্যাখ্যা করা।
- ১১.৩ বাংলাদেশের প্রাচীন সংস্কৃতির ঐতিহ্য হিসাবে মহাস্থানগড়, ময়নামতি ও পাহাড়পুরের প্রত্নতাত্ত্বিক নিদর্শনের বর্ণনা দান।

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