BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Sher-E-Bangla Nagar

Dhaka-1207.

04-YEAR DIPLOMA IN ENGINEERING CURRICULUM

COURSE STRUCTURE & SYLLABUS

(PROBIDHAN-2022)

SURVEYING TECHNOLOGY

TECHNOLOGY CODE: 78

3rd SEMESTER

(Effective from 2022-2023 Academic Sessions)

DIPLOMA IN ENGINEERING CURRICULUM

COURSE STRUCTURE

(PROBIDHAN-2022)

TECHNOLOGY NAME: SURVEYING TECHNOLOGY (78)

(3RD SEMESTER)

Sl. No.	Subject		Period Per Week		Credit	Marks Distribution						
						Theory Assessment			Practical Assessment			Grand Total
	Code	Name	Theory	Practical		Continuous	Final	Total	Continuous	Final	Total	
1	25913	Chemistry	3	3	4	60	90	150	25	25	50	200
2	25931	Mathematics-III	3	3	4	60	90	150	25	25	50	200
3	25916	Statistics	2	-	2	40	60	100	-	-	-	100
4	26434	Basic Construction Process	2	3	3	40	60	100	25	25	50	150
5	27831	Leveling	2	3	3	40	60	100	25	25	50	150
6	27832	Survey CAD	1	3	2	20	30	50	25	25	50	100
7	27833	Geography of Bangladesh	2	-	2	40	60	100	-	-	-	100
8	27834	Geodetic Surveying	2	3	3	40	60	100	25	25	50	150
Total			17	18	23	340	510	850	150	150	300	1,150

Subject Code	Subject Name	Period per Week		Credit
25913	CHEMISTRY	T	P	C
		3	3	4
Rationale	**Chemistry is the branch of science that deals with study of matter, its composition, physical and chemical properties and applications. It is important for diploma engineers to have knowledge of chemistry as those may face problems in fields as diverse as design and development of new materials, quality control and environmental engineering that are basically chemistry oriented in nature. Chemistry is the backbone in designing and understanding the nature of various engineering materials. Many advances in engineering and technology either produce a chemical demand. The subject covers atomic structure, chemical reaction, ionic equilibrium, organic and vocational chemistry to understanding and application. The emphasis will be more on teaching practical aspect rather than theory.**			
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** **Describe Atomic Structure** **Describe Symbol, valency and radical** **Describe Properties of gas and its law** **Different types of bonds** **Define Acid, base and salt** **Describe Buffer solution, pH and its application** **State Different types of reaction and catalyst** **Calculate oxidation and reduction number** **Describe Hardness of water and its removing process** **Illustrate Electrolysis process** **State organic chemistry** **Describe Various type of hydrocarbon** **State Different types of alcohol** **Describe Aromatic compound and its use** **Explain Food security and processing**			
Learning Outcome (Practical)	**After undergoing the subject, students will be able to perform:** **Use laboratory equipment's and safety measure** **Perform Preparation of various strength of solution** **Calculate the strength of unknown solution** **Identify Nature of different type of solution** **Perform Qualitative analysis of radicals and salt** **Perform Preparation of vinegar and sanitizer**			

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1	**ATOMIC STRUCTURE** 1.1 Define Element, atoms and molecules. 1.2 Define molecular mass, atomic number, mass number, mole and Aveogadro's number. 1.3 Distinguish between atom and molecule. 1.4 Describe Fundamental particle of atom. 1.5 Define isotope, isobar and isotone. 1.6 Define Orbit and Orbital. 1.7 Explain Quantum number. 1.8 Describe Electronic configuration based on Aufbau principle, Hunds rule and Paulis exclusion principle.	6	10
2	**SYMBOL, VALENCY AND FORMULA** 2.1 Define Symbol, Valency and formula. 2.2 Discuss the variations of valency. 2.3 Describe active and latent valency. 2.4 Describe Radicals.	3	6
3	**GAS** 3.1 Define gas and vapor. 3.2 Mention the Characteristic of gas. 3.3 Distinguish between gas and vapor. 3.4 Define STP, NTP and Absolute temperature. 3.5 Mention the Boyle's, Charle's and Avogadro's law. 3.6 Establish the ideal gas equation (PV=nRT)	4	7
4	**CHEMICAL BOND** 4.1 Define Chemical Bond. 4.2 Define Octet rule. 4.3 Explain Ionic bond, Covalent bond and Co-ordinate covalent bond. 4.4 Mention the Characteristic of ionic and covalent compound. 4.5 Differentiate between ionic and covalent compounds.	3	7
5	**ACID, BASE AND SALT** 5.1 State Modern concept of Acid and Base. 5.2 List the properties of acid and base. 5.3 Classify Salt 5.4 Explain Basicity of an acid and acidity of a base.	3	6
6	**IONIC EQUILIBRIUM** 6.1 Explain pH and pH scale. 6.2 Define Normality, Molarity and Molality. 6.3 Define Primary and Secondary Standard Substances. 6.4 Define Standard Solution, Titration and Indicator. 6.5 Define Buffer Solution and Its Mechanism. 6.6 Describe Importance of pH in Agriculture and Chemical Industries.	3	6

7	**CHEMICAL REACTION** 7.1 Define Exothermic and endothermic reaction. 7.2 Define Chemical Reaction 7.3 Classify Chemical Reaction. 7.3 Describe Catalyst and Catalysis. 7.5 Mention the uses of Catalyst in Industries.	**3**	**7**
8	**OXIDATION AND REDUCTION** 8.1 Describe Modern concept of Oxidation and Reduction. 8.2 Define Oxidizing agent and Reducing agent. 8.3 Describe Simultaneous process of Oxidation and Reduction. 8.4 Explain the Oxidation number / state. 8.5 Distinguish Between Oxidation number and Valency.	**3**	**6**
9	**WATER** 9.1 Define Hard and Soft water. 9.2 Define Hardness of water. 9.2 Describe permutit process to removal the hardness of water. 9.3 Mention the Advantage and disadvantage of Soft and Hard water. 9.4 Describe Reverse Osmosis process.	**3**	**6**
10	**ELECTRO-CHEMISTRY** 10.1 Define Electrolyte, Electrolysis and Electrode. 10.2 State the Mechanism of Electrolysis process. 10.3 Mention the Process of Chrome Electro-plating. 10.4 Define Galvanizing. 10.5 Mention the importance of Galvanizing.	**3**	**5**
11	**Basic concept of organic chemistry** 11.1 Define organic chemistry. 11.2 Classify organic compound 11.3 Mention the Catenation properties of Carbon 11.4 Distinguish between organic & inorganic compound 11.5 Explain homologous series of organic compound 11.6 State molecular & structural formula of methane, ethane, propane & butane. 11.7 Describe functional group of organic compounds	**3**	**6**
12	**Aliphatic Hydrocarbon** 12.1 Define hydrocarbon, saturated and unsaturated hydrocarbon 12.2 Describe nomenclature of alkane, alkene and alkyne IUPAC system. 12.3 Mention the uses of hydrocarbon methane, ethane and ethyne.	**3**	**4**
13	**Alcohol** 13.1 Define alcohol. 13.2 Describe the classification of alcohol. 3.3 Define absolute alcohol, rectified sprit and power alcohol. 4.4 Define enzyme and fermentation.	**3**	**4**
14	**Aromatic Compound** 14.1 Define aromatic compound. 14.2 Define aromaticity and Hackle's Theory. 14.3 Describe Synthesis Benzene from phenol, acetylene and benzoic acid. 14.4 Mention the uses of benzene.	**3**	**5**
15	**VOCATIONAL CHEMISTRY** 15.1 Define Food security, Natural and approved chemical preservatives.	**2**	**5**

	15.2 Describe canning process of Mango and Pineapple. 15.3 Describe canning process of Fish and Meat.		
	Total	**48**	**90**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Marks (Continuous)
1	Safe Use of Laboratory and Familiar with instrument 1.1 Follow Laboratory Rules and OSH 1.2 Wear Apron, Safety Glass, Mask and Gloves. 1.3 Use of Conical flask, Wash bottle, Burette, Pipette 1.3 Use Flammable substance according to instruction 1.4 Importance of minimum use of chemical. 1.5 Use of Fast aid box. 1.6 Follow DO's or Don't in laboratory.	**2**	**2**
2	Perform Preparation of decimolar (0.1M) Na_2C0_3 Solution	**1**	**2**
3	Determine the strength of H_2SO_4 Solution by decimolar (0.1M)	**1**	**2**
4	Perform Preparation of decimolar (0.1M) NaOH Solution.	**1**	**2**
5	Determine the strength of Hydrochloric acid (HCl) Solution by decimolar (0.1M) NaOH Solution	**1**	**2**
6	Measure the pH value of unknown solution using pH meter and paper.	**1**	**3**
7	Identify Radicals: Cu^{2+}, Al^{3+}, Fe^{2+}, Fe^{3+}, Ca^{2+}, Zn^{2+}, NO_3^-, Cl^-, SO_4^{2--}, CO_3^{2-}	**3**	**3**
8	Identify salt: ($Cu(NO_3)_2$, $AlCl_3$, $FeSO_4$, $FeCl_3$, $CaCO_3$, $ZnCl_2$)	**4**	**4**
9	Perform Preparation of vinegar from Acetic acid	**1**	**2**
10	Perform Preparation of Sanitizer using Isopropyl Alcohol	**1**	**3**
	Total	**16**	**25**

Necessary Resources (Apparatus and equipment's):

Sl	Item Name	Quantity
01	Test tube, Test tube holder, Test tube Stand, Test tube brush, Bunsen burner , Cork borer, Spatula, Droper, Clamp	
02	Beaker, Conical flask, Round bottomed flask, Volumetric flask, Distillation flask , Pneumatic trough	
03	Porcelain basin, Crucible, Mortar and pastle	
04	Thistle funnel, Buchner funnel, Common funnel, Dropping funnel	
05	Woulfsbottle, Wash bottle, Reagent bottle,	
06	Retort, Gas gar, Gas chamber, War gauge, Watch glass, Capillary tube, Platinum wire, Copper wire,	

07	Tripod stand, Burette stand, Ring stand, Crucible tong, Gas generator/ Gas Cylinder	
08	Burette, Pipette, Measuring cylinder, Glass rod	
09	Digital balance, Analytical balance, Weight box, pH meter, pH paper, Litmus paper, Filter paper, Kipp's apparatus	
10	Safety glass, Gloves, Apron, Mask, Fire estighguser, First aid box	

Required Chemicals:

Sl	Item Name (Consumables Materials)	Quantity
01	Distilled water, Petrol, Grease etc	
02	Different type of acid : HCl, H_2SO_4, HNO_3, H_3PO_4, CH_3C00H etc.	
03	Different type of base such as NaOH, KOH, $Ca(OH)_2$, $Al(OH)_3$, NH_4OH, etc	
04	Different type of salt :[$Cu(NO_3)_2$, $AlCl_3$, $FeSO_4$, $FeCl_3$, $CaCO_3$, $ZnCl_2$, NH_4Cl etc]	
05	Different type of indicator	
06	Different type of reagent such as Potassium Ferro cyanide, Potassium iodide , Nessler's solution, Potassium pyroantimonate solution, Ammonium oxalate solution, etc	

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Higher secondary chemistry	Dr. Sarozkantishinghahazari	Hasan book house
02	Higher secondary chemistry	Mahbub hasnlinkon	Akharpatro
03	Engineering chemistry	Uppal	Khanna publishers
04	Chemistry practical	Dr. Sarozkantishinghahazari	Hasan book house

Website References:

Sl	Web Link	Remarks
01	www. researchgate. net	

Prepared by:

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Subject Code	Subject Name	Period per Week		Credit
25931	Mathematics-III	T	P	C
		3	3	4

Rationale	To be able to understand the binomial expansion. To enable to calculate the areas of regular polygons, hexagons, octagon, hydraulic mean a depth (HMD) of a Channel, area occupied by water of circular Culvert. Excavation work. To provide the ability to calculate volume of regular solids like pyramid, frustum of pyramid, Prismoid, wedge and area of curved surfaces. To understand the Laplace transformation
Learning Outcome (Theoretical)	Express Binomial expansion. To able to find the area triangle, quadrilateral, parallelogram, regular polygon & circle volume of solid Shaped. Able to solve problems related to area & volume of various type of shaped.
Learning Outcome (Practical)	**Able to solve problems related to area and volume of various type of shaped.**

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1	**MENSURATION(Area of Triangle):** 1.1 Find the area of triangle in the form, A= $\frac{\sqrt{3}}{4}a^2$, a = length of a side of equilateral triangle. A= $\frac{c}{4}\sqrt{4a^2-c^2}$, where a = length of equal sides, c = third side. A= $\sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c = length of the sides of a Triangle and 2s is the perimeter of the triangle. 1.2 Use formula in 1.1 to solve problems.	**4**	**8**
2	**MENSURATION (Areas of quadrilateral, Parallelogram, rhombus & trapezium)** 2.1 Define quadrilateral & Parallelogram. 2.2 Find the areas of quadrilateral when off sets are given. 2.3 Find the areas of a parallelogram. 2.4 Solve problems using above formulae. 2.5 Define rhombus & trapezium. 2.6 Find the areas of rhombus when the diagonals are given. 2.7 Find the areas of trapezium in terms of its parallel sides and the perpendicular distance between them. 2.8 Solve problems related to rhombus & trapezium.	**3**	**6**
3	**MENSURATION(Finding areas of regular polygon):** 3.1 Define a regular polygon. 3.2 Find the area of a regular polygon of n sides, when (i) The length of one side and the radius of inscribed circle are given. (ii) The length of one side and the radius of circumscribed circle are given. 3.3 Find the area of a regular. a) Hexagon, Octagon when length of side is given.	**3**	**6**

Unit	Topics with Contents	Class (1 Period)	Final Marks
	3.4 Solve problems of the following's types: A hexagonal polygon 6 m length of each side has a 20 cm width road surrounded the polygon. Find the area of the road.		
4	**MENSURATION(Areas of circle, sector and segment):** 4.1 Define circle, circumference, sector and segment. 4.2 Find the circumference and area of a circle when its radius is given. 4.3 Find the area of sector and segment of a circle. 4.4 Solve problems related to the above formulae.	**3**	**6**
5	**MENSURATION(Area & Volume of a rectangular solid):** 5.1 Define rectangular solid and a cube. 5.2 Find geometrically the volume of a rectangular solid when its length, breadth and height are given. 5.3 Find the volume and diagonal of a cube when side is given. 5.4 Solve problems with the help of 5.2 & 5.3.	**3**	**5**
6	**MENSURATION(Surface area & volume of a prism):** 6.1 Define a prism. 6.2 Explain the formulae for areas of curved surfaces of prism. 6.3 Explain the formulae for volume of prism when base and height are given. 6.4 Solve problems related to 6.2, 6.3	**3**	**5**
7	**MENSURATION (Area & volume of Parallelepiped and cylinder):** 7.1 Define a parallelepiped and a cylinder. 7.2 Explain the formulae for areas of curved surfaces of parallelepiped and cylinder. 7.3 Explain the formulae for volume of parallelepiped and cylinder when base and height are given. 7.4 Solve problems related to 7.1, 7.2, 7.3	**3**	**5**
8	**MENSURATION (Surface area & volume of pyramid):** 8.1 Define pyramid. 8.2 Explain the formula for areas of curved surfaces of pyramid. Explain the formula for volumes of pyramid. 8.3 Solve problems related to 8.2, 8.3	**2**	**4**
9	**MENSURATION (Surface area & volume of cone and sphere):** 9.1 Define cone and sphere. 9.2 Explain the formula for areas of curved surfaces of cone and sphere. 9.3 Explain the formula for volumes of cone and sphere. 9.4 Solve problems related to 9.2, 9.3	**3**	**5**
10	**GEOMETRY:** **Conic or conic sections:** 1.1 Define Conic, Focus, Directorix and Eccentricity. 1.2 Find the equations of Parabola, Ellipse and Hyperbola. 1.3 Solve problems related to Parabola, Ellipse and Hyperbola.	**3**	**5**
11	**CALCULAS (Differential Equations of first order and first degree):** 11.1 Define differential equation, ordinary & partial differential equation.	**4**	**7**

Unit	Topics with Contents	Class (1 Period)	Final Marks
	11.2 Define order and degree of differential equation. 11.3 Solve the differential equations of the form: Variable separable.		
12	**CALCULAS (Differential Equations of first order and first degree of homogeneous equations):** 12.1 Define Homogeneous equation & Homogeneous differential equation. 12.2 Define order and degree of differential equation. 12.3 Solve the differential equations of the form: Homogeneous equation.	**3**	**5**
13	**CALCULAS (First order and first degree of Exact differential equations):** 13.1 Define Exact differential equation. 13.2 Define integrating factor. 13.3 Solve problems related to Exact differential equations.	**3**	**5**
14	**CALCULAS (First order and first degree of Linear differential equations):** 14.1 Define Linear differential equation. 14.2 Define integrating factor, Bernoulli's equation. 14.3 Solve problems related to Linear differential equations.	**4**	**8**
15	**CALCULAS (Laplace Transformation):** 15.1 Define Laplace transformation in the form $F(S) = \int_0^{\infty} f(t)e^{-st}dt$ 15.2 Express the deduction of Laplace transformation of the following functions. (i) Constant (ii) t (iii) t^n (iv) e^{at} (v) sinat (vi) Cosat (vii) e^{at} t^n (viii) e^{at} sinbt (ix) e^{at} cosbt 15.3 Define inverse Laplace transformation 15.4 Solve problem related to 15.1, 15.2, 15.3	**4**	**8**
	Total	**48**	**90**

N.B. Marks allotted per chapter above may be rearranged if necessary.

Detailed Syllabus (Practical)

SL	Experiment name with procedure	Class (3 Period)	Continuous Marks
01	Find out the area of triangle	1	2
02	Find out the areas of quadrilateral, parallelogram, rhombus & trapezium	2	3
03	Calculate the areas of regular polygon	1	2
04	Calculate the areas of circle, sector and segment	2	3
05	Find out the area & volume of a rectangular solid	1	2
06	Calculate the surface area & volume of a prism	2	3
07	Find out the area & volume of cylinder	1	2
08	Calculate the surface area & volume of pyramid	2	2
09	Find out the surface area & volume of cone and sphere	1	2
10	Solve the problems related to conic sections & differential equation	3	4

SL	Experiment name with procedure	Class (3 Period)	Continuous Marks
01	Find out the area of triangle	1	2
02	Find out the areas of quadrilateral, parallelogram, rhombus & trapezium	2	3
03	Calculate the areas of regular polygon	1	2
04	Calculate the areas of circle, sector and segment	2	3
05	Find out the area & volume of a rectangular solid	1	2
06	Calculate the surface area & volume of a prism	2	3
07	Find out the area & volume of cylinder	1	2
08	Calculate the surface area & volume of pyramid	2	2
09	Find out the surface area & volume of cone and sphere	1	2
10	Solve the problems related to conic sections & differential equation	3	4
	Total	**16**	**25**

N.B. Marks allotted per chapter above may be rearranged if necessary.

Necessary Resources (Tools, equipment's and Machinery):

SL	Item Name	Quantity
01	Scale	1 no
02	Geometric Box	1 no

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
1.	Companion to basic Maths	G. V. Kumbhojkar	Phadke Prakashan
2.	Co-ordinate Geometry & Vector Analysis	Rahman & Bhattacharjee	H.L. Bhattacharjee
3.	Higher Mathematics	Md. Nurul Islam	Akkhar Patra Prakashani
4.	Mathematics for Polytechnic Students	S. P Deshpande	Pune Vidyarthi Graha Prakashan
5.	Mathematics for Polytechnic Students (Volume I)	H. K. Das	S.Chand Prakashan
6.	Engg.Maths Vol I & II	Shri Shantinarayan	S.Chand & Comp
7.	Higher Mathematics	Dr. B M Ekramul Haque	Akshar Patra Prakashani
8.	Differential & Integral Calculus	Md. Abu Yousuf	Mamun Brothers

Website References:

SL	Web Link: www.youtube.com	Remarks

Subject Code	Subject Name	Period Per Week		Credit
25916	STATISTICS	T	P	C
		2	0	2

Rationale	Statistics is the science of learning from data. Statistical knowledge helps an engineer use the proper methods to collect the data and helps to analyze that data correctly to get genuine information from that data. Statistics also help the users how to present summarized information from those data. Engineers have to solve lots of problems on a daily basis and in doing this they need to deal with information in the form of data. Therefore, after learning statistics the students will be able to solve the problems in their working place in a scientific and appropriate way. Apart from this, statistics also help to assume any future data correctly and scientifically**.**
Learning Outcome (Theoretical)	**After completion of this course, students will be able to:** • Describe the basic concept and principles of statistics. • Illustrate the data collection process and presentation method. • Use different graphical representations in various field of application. • Calculate the possible outcome in the field of various aspects. • Explain the application of statistics.

Detailed Syllabus (Theory)

SL No.	Topics with Contents	Class (1 Period)	Final Marks
1	**STATISTICS, POPULATION, SAMPLE AND SPSS** 1.1 Define Statistics. 1.2 Describe the Functions of Statistics. 1.3 Describe the Role of Statistics. 1.4 Define Population and Sample. 1.5 Distinguish between Population and Sample. 1.6 Explain the uses of Statistics in various fields. 1.7 Describe Statistical Package for the Social Science (SPSS) 1.8 Mention the advantages of SPSS in data analysis	2	04
2	**DATA, ATTRIBUTE AND VARIABLE** 2.1 Define Data, Attribute and Variable. 2.2 Classify Data. 2.3 State the Methods of Collection of Primary and Secondary data. 2.4 Distinguish between Primary and Secondary data. 2.5 Classify Variable. 2.6 Differentiate between Attribute and Variable. 2.7 Distinguish between Variable and Constant.	3	05
3	**FREQUENCY DISTRIBUTION AND GRAPHICAL REPRESENTATION** 3.1 Define Frequency, Frequency Distribution and Cumulative Frequency. 3.2 Describe Different Types of Frequency Distribution. 3.3 Define Histogram, Frequency Polygon, Bar Diagram, Ogive Curve, Pie Chart. 3.4 Illustrate the Types of Graphical Representation. 3.5 State the importance of graphically presenting data. 3.6 Solve the Problems related Histogram and Pie Chart. 3.7 Mention the procedure for the Preparation of Pie Chart. 3.8 Distinguish between Histogram and Frequency Polygon. 3.9 State the Importance of Frequency Polygon. 3.10 Explain the Procedure of Frequency Distribution.	5	10
4	**CENTRAL TENDENCY** 4.1 Define Central Tendency, Arithmetic Mean, Geometric Mean and Harmonic Mean. 4.2 Classify Measures of Central Tendency. 4.3 Discuss the Properties of Arithmetic Mean. 4.4 Calculate the Arithmetic Mean for Grouped, Ungrouped data and Unequal Frequency Distribution. 4.5 Mention the advantage and disadvantage of Arithmetic mean. 4.6 List the uses of Arithmetic mean and Geometric mean. 4.7 Proof AM≥GM≥HM. 4.8 Solve the Problems of Harmonic mean and Geometric mean.	4	07

5	**MEDIAN AND MODE** 5.1 Define Median and Mode. 5.2 State the formula of Median and Mode. 5.3 Explain the uses of Median and Mode. 5.4 Mention the merits and demerits of Median and Mode. 5.5 Distinguish between Median and Mode. 5.6 Solve the problems of Median and Mode.	**4**	**06**
6	**DISPERSION AND RANGE** 6.1 Define Dispersion and Range. 6.2 Illustrate the different types of Dispersion. 6.3 Discuss the Relative Measures of Dispersion. 6.4 Mention the uses of Dispersion and Range. 6.5 Solve the problems of Dispersion and Range.	**2**	**04**
7	**VARIANCE AND STANDARD DEVIATION** 7.1 Define Variance, Standard Deviation and Mean Deviation. 7.2 State the formula of Variance and Standard Deviation. 7.3 State the Co-efficient of Variation. 7.4 Discuss the uses of Standard Deviation and Variance. 7.5 Distinguish between Mean Deviation and Standard Deviation. 7.6 State the Quartile Deviation. 7.7 Solve the problems of Standard Deviation and Variance.	**4**	**08**
8	**CORRELATION AND REGRESSION** 8.1 Define Correlation and Regression. 8.2 Classify the Correlation. 8.3 State the Co-efficient of Correlation. 8.4 Proof $-1 \leq r \leq +1$ for Correlation. 8.5 Solve the problems of Correlation. 8.6 State the Regression equation. 8.7 Differentiate between Correlation and Regression. 8.8 Show the Regression equation of Y on X. 8.9 Show the Regression equation of X on Y.	**3**	**06**
9	**PROBABILITY, TEST OF HYPOTHESIS AND SURVEY** 9.1 Define Probability. 9.2 Define Binomial, Poisson and Normal Probability Distribution. 9.3 State the formula of Binomial, Poisson and Normal Probability Distribution. 9.4 Define test of Hypothesis, Null Hypothesis and Alternative Hypothesis. 9.5 Define Type-I error, Type-II error and Level of Significance. 9.6 Define survey and Census survey. 9.7 State the classification of survey. 9.8 Describe the methods of Census survey.	**2**	**04**

10	**MENSURATION** 10.1 Define Mensuration. 10.2 Mention the Principles of Mensuration 10.3 State the Units of Mensuration 10.4 State the formula of Area of Square, Area of Rectangle, Area of Triangle. 10.5 Explain the formula of Circle, Cone and Pyramid. 10.6 State the formula of Sphere and Cylinder. 10.7 Solve the problems related to Mensuration.	**3**	**06**
	Total	**32**	**60**

Recommended Books:

SL No.	Book Name	Writer Name	Publisher Name & Edition
01	Mensuration and Statistics	Dr. Md. Motiur Rahman Md. Masuduzzamn	-
02	Mensuration and Statistics	Nagendra Nath Paul Herombo Kumar Roy	Hague Publications & 01 November, 2013
03	Statistics	Md Abdul Aziz	The Angels Publications & June, 2013
04	Statistics	Khan Mohammad Sharif	Hasan Book House & June, 2013

Website References:

SL No.	Web Link	Remarks
01	Youtube.com	**-**

SUBJECT CODE	SUBJECT NAME	PERIOD PER WEEK		CREDIT
26434	Basic Construction Process	T	P	C
		2	3	3

Rationale	Basic Construction process is the related subject for survey diploma holder. Survey diploma graduates have to supervise construction of various project works involving use of various construction work based on quality. It does have physical parts with which we can make an appropriate shelter, service for the client to use it. So, to know how to build a construction project, one must know about Concrete, its types, properties, use of concrete, brick masonry, block masonry, different type of partition wall, drywall, damp proof chemical, plastering and pointing, painting and varnishing, door and window etc. This set of knowledge and skill to gives confidence to understand and construct a project. The students should have requisite knowledge regarding characteristics, uses and availability of various building item of work for construction purposes. In addition, specifications of various materials should also be known (BNBC/PWD) for effective quality control. To perform above task, it is essential that students should have knowledge of various item of work like concrete, masonry, block masonry, partition wall, plastering and pointing, painting and varnishing etc , and their constructional details. Therefore, the subject of Basic construction Processes is very important for Civil Engineering diploma Graduates.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to** 1. Explain construction Health and safety. 2. Explain different types of Hand tools, power tools and Equipment's. 3. Explain Features and Properties of Concrete 4. Explain the Concrete Construction and Form Work 5. List the building Component and their function 6. Explain the Brick Masonry. Block Masonry and Composite Masonry. 7. Describe the different types of partition wall and drywall. 8. State Plastering and Pointing**.** 9**.** Explain the procedure of painting and varnishing**.** 10. Explain damp proofness.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to** 1. Identify the various types of personal protective equipment's. 2. Identify hand tools and power tools. 3. Perform slump test. 4. Perform compressive strength test of concrete. 5. Observe field visit. 6. Perform brick masonry wall. 7. Perform hollow and solid block wall. 8. Perform aluminum and dry partition wall. 9. Perform plastering work. 10. Perform pointing work. 11. Perform painting and varnishing work.

DETAILED SYLLABUS (THEORY)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	**CONSTRUCTION HEALTH AND SAFETY** 1.1 Define personal health and safety. 1.2 Define Personal Protective Equipment (PPE). 1.3 List the PPE for Construction Work. 1.4 List the color code practice of Helmet in construction Project. 1.5 List the color code practice of High visible vest in construction Project. 1.6 State the safety procedure in work place.	1	2
2	**CONSTRUCTION TOOLS AND EQUIPMENT'S** 2.1 Define tools and Equipment. 2.2 List the hand tools used in construction work. 2.3 List the Equipment for Construction work. 2.4 State the procedure to use hand tools and Power tools. 2.5 Mention the procedure to use Equipment. 2.6 Describe the maintaining procedure of Tools and Equipment. 2.7 Explain the Re-store procedure of Tools and Equipment.	1	3
3	**FEATURES AND PROPERTIES OF CONCRETE** 3.1 Define concrete. 3.2 Mention the different Types of concrete. 3.3 List the function of ingredients for concrete. 3.4 Define strength, durability, workability, laitance and segregation. 3.5 List the affecting factors on strength, durability and workability of concrete. 3.6 Define water-cement ratio, mixing, curing of concrete 3.8 Describe the ready-mix concrete. 3.9 Mention the methods of curing.	4	8
4	**CONCRETE CONSTRUCTION AND FORM WORK.** 4.1 Mention the precaution and supervision process of concrete construction. 4.2 List the special precautions for under water Concrete. 4.3 List the factors to be considered while supervising good quality concrete production. 4.4 Explain the function of fare face Concrete, pre-stressed concrete and Ferro-cement concrete. 4.5 State form works. 4.6 Define centering and shuttering. 4.7 Mention the essential requirements of a good form work.	5	8
5	**BRICK MASONRY. BLOCK MASONRY AND COMPOSITE MASONRY** 5.1 Define brick, hollow block and composite masonry. 5.2 Define header, stretcher, course, closer and bond. 5.3 Mention the functions of good bonding. 5.4 Explain the procedure of brick laying. 5.5 Mention the advantages and limitations of hollow and sloid block. 5.6 Describe the construction procedure of hollow and sloid block. 5.7 List the defects in brick masonry.	4	8
6	**BUILDING COMPONENT** 6.1 Define building component. 6.2 List the main component of a building.	6	8

	6.3 Define foundation, lintel, arch, column, beam, stair, floor, roof, parapet, sun shed, Cornish. 6.4 Describe the classification of foundation. 6.5 Define the technical terms used in stairs. 6.6 Mention the components of a floor and roof. 6.7 Name the suitable materials used for the construction of floor and roof. 6.8 Describe the construction procedures of floor tile. 6.9 Describe the construction procedures of RCC roof.		
7	**PARTITION WALL**. 7.1 Define partition wall. 7.2 Mention the common requirement of partition walls. 7.3 Mention the functions of partition wall. 7.4 List different types of partition walls. 7.5 Mention the functions of Brick partition, Drywall partition, Glass partition, Aluminum partition and Light weight partition (timber stud work, board) wall.	**2**	**4**
8	**DAMPNESS OF BUILDING.** 8.1 Mention the causes of dampness in building. 8.2 Mention the ill effects of dampness in building. 8.3 Describe remedial measures against efflorescence. 8.4 Identify different type of termites. 8.5 Name the chemicals used for anti-termite treatment.	**1**	**3**
9	**PLASTERING AND POINTING.** 9.1 Define plastering and pointing. 9.2 Mention the various types of plastering and pointing . 9.3 Mention the common tools used for plastering and pointing works. 9.4 Describe the process of applying plaster on a wall surface. 9.5 Mention the common defects in plastering and pointing.	**3**	**7**
10	**PAINTING & VARNISHING.** 10.1 State the purpose of painting & varnishing. 10.2 Describe the characteristics of good paints & varnishes. 10.3 State the various defects in painting & varnishing. 10.4 Describe the application procedure of specific surfaces: distemper, weather coat, snowcem (Cement-based paint), plastic emulsion paint, Synthetic enamel paint, Polish .	**3**	**7**
11	**CONCEPT OF DOORS AND WINDOWS.** 11.1 List different type of doors. 11.2 Identify the technical terms used in doors. 11.3 List the aluminum section to required for aluminum sliding windows. 11.4 Mention the aluminum section required for aluminum fixed windows.	**2**	**2**
	Total	**32**	**60**

DETAILED SYLLABUS (PRACTICAL)

Unit	Experiment name with procedure	Class (3 Period)	Final Marks
1.	**PERFORM CONSTRUCTION HEALTH AND SAFETY** 1.1 Perform color code practice of Helmet and High visible vest in construction Project. 1.2 Follow procedure to maintain safety in work place. 1.3 Maintain the record of performed job.	1	1
2	**IDENTIFY CONSTRUCTION TOOLS AND EQUIPMENT** 2.1 Identify hand tools, Power tools and Equipment in construction Project. 2.2 Perform Re-store procedure of Tools and Equipment. 2.3 Maintain the record of performed job.	1	1
3	**PERFORM AGGREGATE GRADING OF CONCRETE** 3.1 Collet various size of aggregate. 3.2 Mix different aggregate. 3.3 Perform aggregate grading. 3.3 Perform to draw the grading curves for various samples of aggregates and find out the FM value. 3.4 Maintain the record of performed job.	1	2
4	**PERFORM SLUMP TEST OF CONCRETE** 4.1 Collet required tools, equipment and materials. 4.2 Mixing concrete for required Proportion. 4.3 Perform slump test of different concrete works. 4.4 Maintain the record of performed job.	1	3
5	**PERFORM STRENGTH TEST OF CONCRETE** 4.1 Collet required tools, equipment and materials. 4.2 Mixing concrete for required Proportion. 4.3 Perform compressive strength test for concrete (cube and cylinder). 4.5 Perform compressive strength test for concrete using different type curing. 4.5 Maintain the record of performed job.	1	2
6	**OBSERVE CONCRETE CONSTRUCTION AND SUPERVISION** 6.1 Field visit. 6.2 Maintain the record of field visit.	1	1
7	**PERFORM BRICK MASONRY.** 7.1 Select and collect required tools and materials. 7.2 Conduct brick masonry work to erect pillars of sizes 25 cm x 25 cm to 50 cm x 50 cm with English bond up to 5 layers. 7.3 Construct sample corner (L) joints of 25 cm width English bond brick wall up to 5 layers. 7.4 Observe curing. 7.5 Checked quality 7.6 Maintain the record of performed job.	1	2
8	**CONSTRUCT HOLLOW AND SOLID BLOCK MASONRY** 8.1 Select and collect required tools and materials. 8.2 Prepare hollow and sloid block wall up to 3 layers. 8.3 Perform precautions to be taken while construction of hollow and solid block. 8.4 Observe proper curing. 8.5 Checked quality 8.6 Maintain the record of performed job.	1	2
9	**MAKE A MODEL FOR COLUMN FOOTING** 9.1 Select and collect the required tools and materials.	1	1

	9.2 Sketch a column footing. 9.3 Perform to make a model for column footing. 9.4 Observe proper process. 9.5 Checked quality 9.6 Maintain the record of performed job.		
10	**PERFORM TILES WORK ON FLOOR CONSTRUCTION.** 10.1 Select and collect required tools and materials. 10.2 Perform tiles on floor. 10.3 Filled the tiles joint. 10.4 Checked quality 10.5 Maintain the record of performed job.	**1**	**1**
11	**PERFORM PARTITION WALL.** 11.1 Select and collect required tools and materials. 11.2 Perform Aluminum partition wall 11.3 Perform Drywall partition in a Model Room. 11.4 Checked quality 11.5 Maintain the record of performed job.	**1**	**2**
12	**PERFORM DAMP PROOF COURSE (DPC).** 12.1 Select and collect required tools and materials. 12.2 Perform damp proof chemical select and mix with mortar. 12.4 Perform laying of DPC. 12.5 Checked quality 12.5 Maintain the record of performed job.	**1**	**2**
13	**PERFORM PLASTERING AND POINTING.** 13.1 Select and collect required tools and materials. 13.2 Perform plaster on suitable wall 13.3 Perform pointing on masonry wall joint. 13.4 Observe proper procedure. 13.5 Checked quality 13.6 Maintain the record of performed job.	**2**	**2**
14	**PERFORM PAINTING & VARNISHING.** 14.1 Select and collect required tools and materials. 14.2 Perform surface preparation. 14.3 Perform proper mixing procedure of paint. 14.4 Perform distemper on interior wall 14.5 Perform snow cem / weather coat on exterior wall 14.6 Perform plastic emulsion on interior wall 14.7 Perform enamel paint on steel surface 14.8 Perform varnish on wooden surface. 14.9 Checked quality 14.10 Maintain the record of performed job.	**2**	**3**
	Total	**16**	**25**

NECESSARY RESOURCES (TOOLS, EQUIPMENT'S AND MACHINERY):

Sl	Item Name	Quantity
	HAND TOOLS:	
1	Chisel (Bolster, Cold)	05 Nos
2	Boning rods	05 Nos
3	Hammer (Brick, Lump, Double-end Comb, Sledge)	05 Set
4	Bricklayers Line Pins	05 Nos
5	Trowel	05 Nos

6	Notch Trowel	05 Nos
7	Water Level	05 Nos
8	Plumb Bob	05 Nos
9	Spirit Level	05 Nos
10	Jointers	05 Nos
11	Mixing Tools	05 Nos
12	Straight Edge	05 Nos
13	Hand Saw	05 Nos
14	Masonry Square	05 Nos
15	Bump cutter/screed	05 Nos
16	Crowbar	05 Nos
17	End frames	05 Nos
18	Hoe	05 Nos
19	Masonry Pan	05 Nos
20	Ladder	05 Nos
21	Measuring box	05 Nos
22	Measuring tape	05 Nos
23	Measuring wheel	05 Nos
24	Pick axe	05 Nos
25	Polishers	05 Nos
26	Putty knife	05 Nos
27	Rammer	05 Nos
28	Scratchers	05 Nos
29	Spade	05 Nos
30	Straight edge brushes	05 Nos
31	Paint Brushes	05 Nos
32	Rollers	05 Nos
33	Plastic Bucket	05 Nos
34	Plastic Roller Tray	05 Nos
35	Putty Knife	05 Nos
36	Sanding Sponges	05 Nos
37	Wheel barrow	
	POWER TOOLS:	
38	Circular saw	05 Nos
39	Cordless drill	05 Nos
40	Brick Cutter Machine	05 Nos
41	Vibrator	05 Nos
	SAFETY TOOLS	
42	Gloves	05 Nos
43	Safety Boots	05 Nos
44	Safety glasses	05 Nos
45	Safety helmet	05 Nos
46	Safety belt	05 Nos
47	Ear plug	05 Nos

	EQUIPMENT:	
1	Sand screen machine	01 Nos
2	Mini Concrete Mixer Machine	01 Nos
3	Compressive Strength Test Machine	01 Nos
4	Slump Test set	05 Nos
5	Cylinder Mold (3nos = 01set)	05 Set
6	Cube Mold (3nos = 01set)	05 Set
7	Sander	05 Set
8	Multipurpose Paint Mixer	05 Set

RECOMMENDED BOOKS:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Building Construction	B C Punmia	Laxmi Publishers, 5th 2004
02	Building Construction	**Varghese P C**	Prentice-Hall of India Pvt.Ltd; 1st edition (April 8, 2010)
03	Building Construction and materials	**Sushil Kumar**	STD, INDIA. 20th Edition, 2010
04	A Text Book of Construction	S P Aurora & S P Bindra	Dhanpat Rai Publishers
05	Building Construction	G J Kulkarni	Mittal Publishers
06	Building Construction	S C Rangwala	Charotar Publishers, 27th 2009
07	Construction and Foundation Engineering	Dr. J Jha, S K Sinha	Khanna Publishers

WEBSITE REFERENCES:

Sl	Web Link	Remarks
01	https://youtu.be/iSrmfGtlG3A	Search here with topics
02	https://youtu.be/NPwVl2YLTto	Search here with topics
03	www.kopykitab.com	Search here with topics
04	www.theconstructor.org/construction/construction-tools-list-images-building/20238/	Search here with topics
05	www.civiljungle.com/civil-engineering-tools-and-equipment/	Search here with topics

SUBJECT CODE	SUBJECT NAME	PERIOD PER WEEK		CREDIT
27831	LEVELING	T	P	C
		2	3	3

Rationale	Survey Engineering diploma holders have to supervise construction of various types of civil & survey works involving use of various like Road construction, Khal/nala Excavation, Re- Excavation. The students should have requisite knowledge regarding characteristics, uses and availability of various Methods and skills introducing to determine Cross-section, Long Section for various Level purposes. In addition, specifications of various level work should also be known (PWD/BNBC) for effective quality control.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to** • State different between Dumpy level, Auto-level and Digital level. • Mention different types of adjustment of level instruments. • Describe field tertiary leveling work. • Describe field spot leveling work. • Discuss different type of Errors in level work. • Compute long section and cross section of leveling work. • Describe Contour survey. • Compute Contour survey work.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to** 1. Identify the various types Dumpy level, Auto-level and Digital level. 2. Perform Permanent & temporary adjustment of level instruments. 3. Practice fly level, dumpy level, reciprocal level, profile level, spot level. 4. Perform Set to Bench Mark. 5. Practice Contour survey by level machine.

DETAILED SYLLABUS (THEORY)

Unit	Topics with Contents	Class (1Period)	Final Marks
1.	**Leveling and Digital Leveling** 1.1 Define Leveling. 1.2 Purposes of leveling. 1.3 Mention the Methods of Leveling. 1.4 List the Leveling Instrument. 1.5 Point out the Leveling Staff. 1.6 Define Bench Mark. 1.7 Mention the classification of Bench Mark (B.M) 1.8 Define digital level. 1.9 Compare between digital level and other common level.	06	11
2	**Adjustment of Level Instruments** 2.1 State adjustment of level instruments. 2.2 Mention different kinds of adjustments of level. 2.3 State different steps of temporary adjustments.	02	04
3	**Tertiary leveling** 3.1 State Back sight, foresight and intermediate sight reading and Changing point or turning point. 3.2 Explain the following terms related to leveling: level Surface., level line, Horizontal plane, Horizontal line, Vertical plane, Vertical line, Datum surface, Datum, Reduced level, Formation level, Laser ranging. 3.3 Mention the setting positions of level instruments. 3.4 Mention the procedure of holding a leveling staff. 3.5 Mention the procedure of taking staff readings. 3.6 Mention the procedure of tertiary leveling work. 3.7 Describe Hand signal During observations.	02	04
4	**Permanent adjustment of level instrument** 4.1 List the fundamental lines of leveling instrument. 4.2 Explain the terms as level instrument a Line of collimation. b Axis of telescope. c Axis of bubble tube. d Vertical axis. e Height of the instrument . f Focusing. g Parallax. 4.3 Explain the relations among the fundamental lines. 4.4 List the permanent adjustments of dumpy level, auto-set level and digital level. 4.5 Mention the procedure of identifying and rectifying the various defects in adjustment of dumpy level,. Tilting level, auto-set level and digital level. 4.6 Solve problems on permanent adjustments of the levels (two-peg	03	07

	test).		
5	**Booking and Reducing Level** 5.1 State the necessity of level book. 5.2 Mention different kinds of level book. 5.3 Describe reduction of levels. 5.4 Mention the procedure of booking staff reading in the level book. 5.5 Solve the problems on reduction of levels & missing data of level book.	**03**	**07**
6	**Aspects of tertiary leveling** 6.1 List different kinds of tertiary leveling, fly leveling, profile leveling, cross-sectioning, check leveling, barometric leveling, reciprocal leveling and precise leveling. 6.2 Distinguish among leveling, primary leveling. secondary leveling and tertiary leveling. 6.3 Mention the procedure of fly leveling, profile leveling, cross sectioning, check leveling. 6.4 Mention the procedure of double tertiary leveling. 6.5 Mention the procedure of reciprocal leveling. 6.6 Solve the problems of fly leveling, profile leveling, reciprocal leveling, cross sectioning and cheek leveling.	**04**	**05**
7	**Plotting level section** 7.1 State longitudinal profile of a leveling works. 7.2 State the purposes of plotting long section and cross section of leveling work. 7.3 Explain the various elements of longitudinal section and cross section of leveling. 7.4 Prepare longitudinal profile and cross profile from given data. 7.5 Mention the procedure of making working profile.	**04**	**07**
8	**Leveling problems** 8.1 Describe Leveling on steep slope. 8.2 State Leveling on summit and hollows. 8.3 Mention the process of taking level measurement of an overhead point. 8.4 Describe Leveling ponds and lakes too wide to be sighted across. 8.5 State Leveling across river. 8.6 Describe Leveling past high wall.	**02**	**03**
9	**Errors in leveling** 9.1 Mention the procedure of leveling. 9.2 Mention the procedure of leveling in the following cases a. Ascending and descending a hill. b. Staff is too near level. c. Staff is too low or too high. d. Staff station is along the line & collimation. e. Board fencing on the alignment. f. Wall on the alignment. 9.3 List the instrumental natural and personal error in leveling. 9.4 Explain the effect of earth's curvature and refraction of light.	**03**	**03**

	9.5 Solve problems on error due to curvature and refraction. 9.6 Express the derivation of the formula for distance to the visible horizon and dip of the horizon. 9.7 Solve the problems related on. 9.8 Explain the common mistakes in leveling. 9.9 Mention the magnitude and permissible limits of closing error.		
10	**C0NTOURING** 10.1 Define contour and Contouring. 10.2 Describe Contour interval. 10.3 Mention the Characteristics of contours. 10.4 Describe Methods of locating contours. 10.5 Describe Interpolation of contours. 10.6 Describe Contour gradient. 10.7 List the uses of the contours maps.	**03**	**09**
	Total	**32**	**60**

DETAILED SYLLABUS (PRACTICAL)

Sl.	Experiment Name	Class (3 Period)	Marks (Continuous)
1	**Demonstrate component parts of dumpy level, auto-set level and digital level.** 1.1 Setup three types leveling instrument on the tripod. 1.2 Demonstrate component parts of three types of level. 1.3 Identify Digital level machine staff. 1.4 Maintain the record performed job.	**1**	**2**
2	**Adjust level machine** 2.1 Perform temporary adjustment of Dumpy level 2.2 Perform temporary adjustment of Auto-set level. 2.3 Perform temporary adjustment of Digital-set level. 2.4 Maintain the record performed job.	**2**	**4**
3	**Compute Booking and Reducing level data** 3.1 Perform collecting level data. 3.2 Perform procedure of booking staff reading in the level book. 3.3 Observe proper process. 3.4 Maintain the record performed job.	**2**	**4**
4	**Perform longitudinal profile and cross profile** 4.1 Create longitudinal profile. 4.2 Create longitudinal profile. 4.3 Observe proper process. 4.4 Maintain the record of performed task.	**3**	**4**
5	**Perform get through leveling problems** 5.1 Perform get through Leveling on steep slope. 5.2 Perform get through Leveling on summit and hollows. 5.3 Perform get through an overhead point. 5.4 Perform get through Leveling ponds and lakes too wide to be sighted across. 5.5 Observe proper process. 5.6 Maintain the record of performed task.	**2**	**3**

6	**Perform get through across river & high wall** 6.1 Perform get through Leveling across river. 6.2 Perform get through Leveling across high wall. 6.3 Observe proper process. 6.4 Maintain the record of performed task.	**2**	**3**
7	**Identify errors in leveling** 7.1 Identify instrumental natural and personal error in leveling. 7.2 Identify common mistakes in leveling. 7.3 Identify magnitude and permissible limits of closing error. 7.4 Observe proper process. 7.5 Maintain the record of performed task.	**2**	**2**
8	**Perform contouring** 8.1 Perform Contour interval. 8.2 Sketch a Contour interval map. 8.3 Perform Contour gradient. 8.4 Sketch a Contour gradient map. 8.5 Follow proper process. 8.6 Maintain the record of performed task.	**2**	**3**
	Total	**16**	**25**

NECESSARY RESOURCES (TOOLS, EQUIPMENT'S AND MACHINERY):

Sl	Item Name	Quantity
01	Dumpy Level Machine	2 nos
02	Auto Level Machine	2 nos
03	Digital Level Machine	2nos
05	Level Machine Tripod	2 nos
06	Manual staff	3 nos
07	RAB/BAR code staff	3 nos
08	Measuring tape	As Necessary
09	Surveyor Umbrella	As Necessary

RECOMMENDED BOOKS:

Sl	Book Name	Writer Name	Publisher Name & Edition
01.	Surveying	Dr. B.C Punmia	Laxmi publications (p) Limiteds
02.	Surveying and leveling	T.P Kanatkar	Delhi-jalandhar,s,.chand ans Co.
03.	Surveying and Leveling	N.N Basak	Delhi Standard Publisher Distributors.
04.	Surveying and Leveling	S.V Kulkarani	

WEBSITE REFERENCES:

Sl	Web Link	Remarks
01	www.youtube.com	Search here with topics
02	www.google.com	Search here with topics
03	www.en/wikipedai.org/wiki/surveying	Search here with topics

SUBJECT CODE	SUBJECT NAME	PERIOD PER WEEK		CREDIT
27832	SURVEY CAD	T	P	C
		1	3	2

Rationale	Survey CAD is Survey computer-aided design. It allows users to create and edit digital 2D and 3D designs faster and more readily than hand. Survey CAD is a design tool which will reduce the human efforts compared manual drafting. The data can also be saved and kept in the cloud, making them accessible from anywhere at any time. CAD is a software application that is used to create drafting solutions. Survey diploma Students must create drawing appropriately in their Engineering projects, Survey Engineering Students apply the SURVEY CAD their field level like as Mapping, Data processing, Data Export/import and Data management from skill level. This subject will cover the basics of Survey CAD. Emphasis is placed on drawing setup, creating and modifying geometry; storing and retrieving predefined shapes; placing, rotating, and scaling objects, adding text and dimensions, using levels, coordinate systems, and plot/print to scale.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to** • Describe fundamental of CAD commands • Describe to copy, move, offset, trim, fillet, array, chamfer, extend, break, rotate, stretch, mirror, change, delete, scale and edit commands. • Mention the functions and uses of CAD Commands • Describe plan, section, and elevation road, canal by CAD.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to-** 1. Demonstrate CAD commands 2. Practice AutoCAD commands 3. Perform plan, section, elevation of road and canal by CAD. 4. Practice elevation of contour line by survey CAD. 5. Practice draw contour map by survey CAD. 6. Practice contour plotting by survey CAD. 7. Practice create a topographic/contour and mouza map. 8. Perform print a mouza map, contour map and topographic map.

DETAILED SYLLABUS (THEORY)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	**INTRODUCTION TO AutoCAD** 1.1 Define AutoCAD 1.2 State start and exit procedure of AutoCAD 1.3 Name different tools of AutoCAD 1.4 State the necessity of drawing units and limits 1.5 Explain the Cartesian Coordinate System, Absolute and Relative Coordinates, Polar Coordinate System 1.6 Mention the advantages of layers in drawing using AutoCAD 1.7 Mention the functions of hatch in drawing using AutoCAD	4	08
2	**Survey CAD SOFTWARE** 2.1 Explain survey CAD 2.2 Mention the purposes of survey CAD 2.3 List the name of survey work done by survey CAD 2.4 List of the survey CAD software using survey work 2.5 Describe workflow of survey CAD 2.6 Describe direction, distance and angles of survey CAD 2.7 describe the transfer process of road profile from level book data by CAD.	03	04
3	**CONTOUR MAP AND MOUZA MAP** 3.1 State contour intervals, glacier contour, terrain contour and modeling of contour map 3.2 Describe the elevation assigning process of contour line by survey CAD 3.3 Describe drawing process of contour map by survey CAD 3.4 Describe process of contour plotting by CAD 3.5 Describe process of mouza map scanning by CAD 3.6 Describe procedure of mouza map plotting by CAD 3.7 Describe procedure of mouza map area calculation by survey CAD	03	06
4	**PLOTTING AND PRINTING** 4.1 Define survey layout 4.2 describe function of survey layout 4.3 Mention the steps of the survey layout of survey CAD 4.4 Mention the scale of survey layout. 4.5 Describe model space view in survey CAD 4.6 Describe guideline of survey layout work 4.7 Describe the printing survey map by plotter	03	06
5	**DATA MANAGEMENT IN AUTOCAD CIVIL 3D** 5.1 Describe the data import and export procedure of survey CAD 5.2 State DWG File, DXF File, DWS File and DWT File of Survey CAD 5.3 Explain GUI of AutoCAD Civil 3D 5.4 Explain tools space of AutoCAD Civil 3D 5.5 Explain panorama of AutoCAD Civil 3D	03	06
	Total=	16	30

DETAILED SYLLABUS (PRACTICAL)

Sl.	Experiment Name	Class (3 Period)	Marks (Continuous)
01	**PERFORM PAGE LAYOUT USING AUTOCAD** 1.1 Open AutoCAD 1.2 Create a new AutoCAD file 1.3 Set up the units and dimension style 1.4 Set up the drawing limits 1.5 Save the drawing 1.6 Exit from Auto CAD	**2**	**4**
02	**PERFORM DRAW AND SAVE DRAWING USING CAD** 2.1 Open a new AutoCAD 2.2 Set up the units and dimension style 2.3 Perform the drawing of Line, triangles, rectangle, polygons, circles, and arcs 2.4 Perform the commands of copy, move, mirror, array, offset, trim, oops, fillet, chamfer and extend 2.5 Practice the commands of break, Rotate and stretch 2.6 Practice the commands of change, scale, erase, , undo and redo	**3**	**5**
03	**EDIT EXISTING DRAWING FILE** 3.1 Open an existing AutoCAD drawing 3.2 Erase a line or object 3.3 Practice different types of Zoom commands. 3.4 Perform Trim and extend commands. 3.5 Practice move and copy commands. 3.6 Perform the commands of offset, rotate, stretch, array, mirror, scale, fillet and chamfer in existing drawing 3.7 Perform the commands of P edit, explode and block 3.8 Save the editing drawing	**2**	**4**
04	**PERFORM DIMENSIONING** 4.1 Open an existing AutoCAD file 4.2 Perform the dimension style of leader. 4.3 Perform the linear and aligned dimension. 4.4 Perform the diameter, radius and base dimension. 4.5 Perform continue and override dimension.	**2**	**2**
05	**PRACTICE LAYOUT** 5.1 Create layout for plot/print using paper space and model space. 5.2 Set up the scale & assign pen (if necessary) for plot/print. 5.3 Select the paper & plotter for plotting/printing. 5.4 Set various drawing in different scale in a paper through layout. 5.5 Plot/Print the drawing. 5.6 Save the drawing in PDF format.	**3**	**4**
06	**CREATE PLOTS FROM MOUZA MAP** 6.1 Draw plots from Mouza map 6.2 Calculate Areas of the polts of Mouza 6.3 Give Necessay elements to create plot map 6.4 Prepare your plot map	**2**	**3**

07	**PERFORM PRINT A MAP IN DIFFERENT SCALE** 7.1 Print a topographic map 7.2 Print a mouza map 7.3 Print a contour map 7.4 Print road profile map	**2**	**3**
	Total=	**16**	**25**

NECESSARY RESOURCES (TOOLS, EQUIPMENT'S AND MACHINERY):

Sl	Item Name	Quantity
01	Computer/Laptop	26 Set
02	Projector/Multimedia	2 nos
03	Projector screen	2 nos
04	Auto CAD DVD/Pen drive /Memory Card.	5 nos
05	Smart Board	1 nos
06	CAD Software	2 nos
07	Sound System	2 nos

RECOMMENDED BOOKS:

Sl	Book Name	Writer Name	Publisher Name & Edition
01.	Civil Engineering Drawing	Guru Charon Singh	Standard Publishers (January 1, 2009)
02.	AutoCAD	Engr. Md. Shah Alam	Gayankosh prokashon Evergreen Edition.
03.	Mastering AutoCAD	Engr. Samuel Mallik	
04.	AutoCAD Blue Book vol-1,2,3	Engr. Md. Shah Alam	Gayankosh prokashon Evergreen Edition.

WEBSITE REFERENCES:

Sl	Web Link	Remarks
01	Link https://youtu.be/tNATCAHSgzY	Search here
02	Link https://youtu.be/fri2NEKrorw	Search here
03	https://youtu.be/zrpWYucKEQU	Search here
04	https://youtu.be/6BASEeZ83wE	Search here
02	https://www.polosoftech.com/CAD-services/land-survey-drafting	Search here
03	https://www.autodesk.com/solutions/surveying-software	Search here

Subject Code	Subject Name	Period/Week		Credit
27834	Geography of Bangladesh	T	P	C
		2	0	2

Rationale	Bangladesh became the focal point of world attention in the early 1970s. It emerged victorious, but its development was hindered by the after-effects of the war—the destruction of much of its infrastructure, problems of governmental change, and the enormous difficulties faced by government and aid officials in assembling a data base for long-range planning. Professor Rashid's book—the first major comprehensive geographic inventory of Bangladesh—provides the key elements for such a base. Emphasizing the rural and agricultural characteristics of the country, it also covers in depth its physiography, climate, soils, land utilization, migration and settlement patterns, transportation infrastructure, and human and natural resources and disaster of Bangladesh.
Learning Outcome	After undergoing the subject student will be able to learn: • Describe about introductory of geography of Bangladesh • Explain population and Settlement of Bangladesh • Explain Physiography and geology of Bangladesh • Discuss about natural resources of Bangladesh • Describe Energy, renewable energy, Agriculture, livestock of Bangladesh. • Explain Transport and communication system of Bangladesh. • Describe Health education and Disaster in Bangladesh.

Detailed Content (Theory)

Unit	Topics with Contents	Period	Marks
1	**Introduction to geography of Bangladesh** 1.1 Define geography 1.2 Classify geography 1.3 Describe physical geography 1.4 Describe human geography 1.5 Describe climate and the climatic issues of Bangladesh 1.7 Describe locational characteristics of Bangladesh	3	10
2	**Population and settlements of Bangladesh** 2.1 Define age and sex composition and pyramid 2.2 Describe age and sex pyramid of Bangladesh 2.3 Compare age and sex pyramid of Bangladesh with others countries 2.4 Describe the processes of population change in Bangladesh: fertility, mortality and migration 2.5 Define settlement 2.6 Distinguish between rural and urban settlements	3	10
3	**Physiography and geology of Bangladesh** 3.1.Define physiography and physiographic region 3.2.Classify Physiographic of Bangladesh 3.3.Describe the Physiographic Characteristics of Bangladesh 3.4.Define Rocks and Minerals 3.5.Classify Rocks and Minerals 3.6.Classify Geology of Bangladesh 3.7.Describe Geological Characteristics of Bengal basin 3.8.Describe the Nature of soil of Bangladesh (soil morphology) 3.9.Describe the properties of soils (soil mineralogy) 3.10. Classify the soil of Bangladesh by geographic region/area	4	12
4	**Rivers and wetlands of Bangladesh** 4.1 Differentiate between river and streams 4.2 Describe the river system of Bangladesh 4.3 Define wetlands 4.4 Describe physical characteristics of wetland of Bangladesh 4.5 Describe the Importance of wetland of Bangladesh 4.6 Describe wetland ecosystems of Bangladesh	3	10
5	**Overview of natural resources of Bangladesh** 5.1 Define natural resources 5.2 Classify natural resources 5.3 Describe the Impotence of natural resources of Bangladesh 5.4 Define land and forest resources 5.5 Describe the importance of various resources 5.6 Describe the management issues of various natural resource of Bangladesh	4	10
6	**Energy, renewable energy and mineral resources** 6.1 Define energy and renewable energy	3	8

	6.2 Define mineral resource 6.3 Classify renewable energy of Bangladesh 6.4 Describe the importance of renewable energy of Bangladesh 6.5 Mention types of mineral resources of Bangladesh 6.6 Describe the distribution of minerals resources of Bangladesh		
7	**Agriculture, livestock and economy of Bangladesh.** 7.1 Describe about agricultural products of Bangladesh 7.2 Describe livestock, animal husbandry and fisheries of Bangladesh. 7.3 Describe cropping patterns of Bangladesh 7.4 Classify economy of Bangladesh 7.5 Describe primary, secondary, tertiary and quaternary economy of Bangladesh 7.6 Describe GDP and GNP of Bangladesh	**4**	**10**
8	**Transport and communication systems in Bangladesh** 8.1 Define transport and communication system 8.2 Describe road transport systems of Bangladesh 8.3 Describe rail transport systems of Bangladesh 8.4 Describe water transport systems of Bangladesh 8.5 Describe air transport systems of Bangladesh	**3**	**10**
9	**Health and education in Bangladesh** 9.1 Classify health systems of Bangladesh 9.2 Describe the successes of Bangladesh's health sector 9.3 Describe the Challenges of Bangladesh's health sector 9.4 Classify health educational systems of Bangladesh 9.5 Describe the successes of health sector of Bangladesh	**2**	**10**
10	**Disaster in Bangladesh** 10.1 Define disaster 10.2 Classify disasters 10.3 Describe cyclones, hurricanes and tornedoes of Bangladesh 10.4 Describe flood and flash flood disasters of Bangladesh 10.5 Describe riverbank erosion of Bangladesh 10.6 Describe causes of landslides disasters 10.7 Describe landslides disasters of Bangladesh	**3**	**10**
	Total	**32**	**100**

References Books:

SL	Books Name	Writer Name	Publisher Name
01	Geography of Bangladesh	Haroun Er Rashid	The university press limited

WEBSITE REFWRENCES:

Sl	Web Link	Remarks
1.	https://www.youtube.com/watch?v=MjT2NvWfYns	Search here with topics
2.	https://www.bangladesh.com/travel/geography	Search here with topics
3.	https://www.countryreports.org/country/Bangladesh/geography.htm	Search here with topics
4.	https://www.britannica.com/place/Bangladesh	Search here with topics

SUBJECT CODE	SUBJECT NAME	PERIOD PER WEEK		CREDIT
27834	Geodetic Surveying	T	P	C
		2	3	3

Rationale	Diploma Engineering graduate will conduct land survey of various project. To perform this task student should have the basic knowledge, skills and attitude about geodesy including measurement techniques, coordinate systems, ellipsoids, and datum is reviewed. The modern geodetic and Cartesian coordinates systems, as well as the differences between grid and ground coordinates systems, and the current geodetic and Cartesian coordinate systems available today are discussed.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to** • Describe geodesy • State Physical Geodesy • Explain Horizontal and Vertical Control • Interpret Tide Observation • Explain Space Geodesy. • Explain Map Projections • Explain Cylindrical Projection • Discuss Conical and Azimuthal/Zenithal Projection. • Explain Map Layout, Grid Zone and Grid Systems
Learning Outcome (Practical)	**After undergoing the subject, students will be able to** 1. Demonstrate the Shape and Size of The Earth. 2. Demonstrate the Coordinate Systems, Ellipsoids and Datum 3. Show Cartesian, Geodetic, Geographic and Astronomic Coordinates Measure 4. Calculate the deflection of the Vertical 5. Relate ECEF Cartesian Coordinates with Geodetic Coordinates 6. Demonstrate Different Ellipsoids 7. Practice On Horizontal Vs. Vertical Datum (Nad 83 Vs. Navd88). 8. Practice On Orthometric height Vs. Ellipsoid height. 9. Demonstrate Coordinate Systems: Plane Coordinates. 10. Use Grid Scale Factor, Ellipsoid Scale Factor and Combined Factor 11. Practice on Grid Distances Vs. Ground Distances

DETAILED SYLLABUS (THEORY)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1	**GEODESY** 1.1 Define geodesy. 1.2 Define geometric geodesy. 1.3 Define ellipsoid. 1.4 Describe geometry of an ellipsoid. 1.5 Describe characteristics of an ellipse. 1.6 Describe geodetic latitude and longitude of point on the surface of an ellipsoid.	2	3
2	**PHYSICAL GEODESY** 2.1 Define gravity survey. 2.2 Describe the relation between gravity field and geodetic observation. 2.3 Describe geopotential. 2.4 Describe vertical deflection. 2.5 Describe geoid and its functions. 2.6 Describe the method of estimate geoidal heights. 2.7 Define gravity anomaly. 2.8 Describe estimation of geoidal heights in two - dimensional coordinates.	4	7
3	**HORIZONTAL AND VERTICAL CONTROL** 3.1 Define control point survey 3.2 Describe the procedure of control point survey. 3.3 Describe the selection of a reference ellipsoid. 3.4 Define level and leveling. 3.5 Explain the procedure of leveling method. 3.6 Define vertical datum, Elevation, Reduce Level, Bench Mark and Mean Sea level.	3	7
4	**TIDE OBSERVATION** 4.1 Define Tide observation. 4.2 Describe long period tidal changes and eustatic changes of sea level. 4.3 State Sea level observation. 4.4 Describe tidal station. 4.5 Describe tide gauge. 4.6 Mention the steps of observation of tide level.	4	7
5	**SPACE GEODESY** 5.1 Describe time scale. 5.2 State VLBI (very long baseline interferometry). 5.3 Describe satellite geodesy. 5.4 Describe SLR (Satellite Laser Ranging).	3	5

	5.5 Describe GNSS. 5.6 Describe GPS for space geodesy. 5.7 Describe the application procedure of space geodesy.		
6	**MAP PROJECTIONS** 6.1 Define map projections. 6.2 Mention the types of map projection. 6.3 State scale factor. 6.4 Define meridian, parallel, equator, axis of the earth. 6.5 Define poles, longitude and latitude, 6.6 Define great circle, small circle and grid. 6.7 Define Semi-major axis and Semi-minor axis, 6.8 Define flattening, convergence and zone. 6.9 Describe the procedure of Map projection.	**5**	**7**
7	**CYLINDRICAL PROJECTION** 7.1 State true or regular cylindrical projection. 7.2 State simple or equidistant cylindrical projection. 7.3 Describe cylindrical equal-area projection. 7.4 Describe Mercator projection. 7.5 State transverse Mercator projection. **7.6** Describe UTM Projection.	**4**	**7**
8	**CONICAL AND AZIMUTHAL/ZENITHAL PROJECTION.** 8.1 Define conical projection. 8.2 Describe different types of conical projection. 8.3 Define simple, secant, polyconic and Bonne's conical projection. 8.4 Define lambert conformal and international conical projection. 8.5 Describe different types of Azimuthal projection.	**3**	**4**
9	**MAP LAYOUT, GRID ZONE AND GRID SYSTEMS.** 9.1 Describe Layout of IMW series. 9.2 Describe layout of map sheets in Bangladesh. 9.3 Describe layout of map sheets. 9.4 Define grid zone and grid systems. 9.5 Mention advantages and disadvantages of grid system. 9.6 Explain different types of grid system and grid lettering system. 9.7 Explain grid references and grid constants. 9.8 Describe method of reading grids. 9.9 Describe junctions between grids.	**4**	**3**
	Total	**32**	**50**

DETAILED SYLLABUS (PRACTICAL)

Sl.	Experiment Name	Class (3 Period)	Marks (Continuous)
1.	**DEMONSTRATE THE SHAPE AND SIZE OF THE EARTH.** 1.1 List the Shape and size of the Earth. 1.2 Tag over the Shape with name tag. 1.3 Observe name tag. 1.4 Maintain the record of performed task.	1	2
2.	**DEMONSTRATE THE COORDINATE SYSTEMS, ELLIPSOIDS AND DATUM.** 2.1 List the Coordinate system. 2.2 Locate the Ellipsoids and Datum. 2.3 Observe datum level. 2.4 Maintain the record of performed task.	2	3
3	**SHOW CARTESIAN, GEODETIC, GEOGRAPHIC AND ASTRONOMIC COORDINATES MEASURE.** 3.1 Perform the measure of Cartesian, Geodetic, Geographic Set a line with Chain or tape and ranging rod. 3.2 Check measurement. 3.3 Measure correctness. 3.4 Maintain the record of performed task.	2	3
4	**CALCULATE THE DEFLECTION OF THE VERTICAL** 4.1 Create deflection. 4.2 Perform measurement. 4.3 Check measurement. 4.4 Measure correctness. 4.5 Maintain the record of performed task.	1	2
5	**RELATE ECEF CARTESIAN COORDINATES WITH GEODETIC COORDINATES.** 4.1 Create Coordinate. 4.2 Perform measurement. 4.3 Check measurement. 4.4 Measure correctness. **4.5** Maintain the record of performed task**.**	1	2
6	**DEMONSTRATE DIFFERENT ELLIPSOIDS.** 4.1 Create Ellipsoids. 4.2 Perform measurement. 4.3 Check measurement. 4.4 Measure correctness. **4.5** Maintain the record of performed task.	2	3
7	**PRACTICE ON HORIZONTAL VS. VERTICAL DATUM (NAD 83 VS. NAVD88).** 4.1 Create Datum. 4.2 Perform measurement. 4.3 Check measurement. 4.4 Measure correctness. 4.5 Maintain the record of performed task.	2	2

8	**PRACTICE ON ORTHOMETRIC HEIGHT VS. ELLIPSOID HEIGHT.** 4.1 Create orthometric height 4.2 Create Ellipsoid height 4.3 Perform measurement. 4.4 Check measurement. 4.5 Measure correctness. 4.6 Maintain the record of performed task.	**1**	**2**
9	**DEMONSTRATE COORDINATE SYSTEMS: PLANE COORDINATES.** 4.1 Perform plane coordinate. 4.2 Perform measurement. 4.3 Check measurement. 4.4 Measure correctness. 4.5 Maintain the record of performed task.	**1**	**2**
10	**USE GRID SCALE FACTOR, ELLIPSOID SCALE FACTOR AND COMBINED FACTOR.** 4.1 Use grid scale factor. 4.2 Perform measurement. 4.3 Check measurement. 4.4 Measure correctness. 4.5 Maintain the record of performed task.	**2**	**2**
11	**PRACTICE ON GRID DISTANCES VS. GROUND DISTANCES.** 4.1 Create grid and ground distance. 4.2 Perform measurement. 4.3 Check measurement. 4.4 Measure correctness. 4.5 Maintain the record of performed task.	**1**	**2**
	Total	**16**	**25**

NECESSARY RESOURCES (TOOLS, EQUIPMENT'S AND MACHINERY):

Sl	Item Name	Quantity
01	Total Station	5 nos
02	Distance meter	5 nos
03	Levelling	5 nos
04	Engineering Chain	5 nos
05	GPS/GNNS	5 nos
06	Theodolite	5 nos
07	Meter Chain	5 nos
08	Gunter Chain	5 nos
09	Ranging Rod	5 nos
10	Optical Square	5 nos
11	Prismatic Compass with tripod	5 nos
12	Survey Compass/Pocket Compass	5 nos
13	Plane Table and wooden tripod with accessories	5 nos
14	Alidade	5 nos

15	Rectangular Compass	5 nos
16	Engineer's Level (Spirit Level)	5 nos
17	Plumbing fork	5 nos
18	Plumb Bob	5 nos
19	Steel Tape (30 m)	10 nos
20	Arrow	100 nos
21	Gunia Scale (2")	10 nos
22	1"(inch) =330'(Feet) Scale	10 nos
23	80 inch :1 mile Scale	10 nos
24	Divider	10 nos
25	Diagonal Brass Scale	10 nos
26	Measuring Wheel	5 nos
27	Measuring Tape (5 m)	10 nos
28	Pegs	10 nos
29	Ranging and Offset rods	30 nos
30	Thread	500 gm
31	Cross-staff,	5 nos
32	Prism square,	5 nos
33	Box-sextant.	5 nos
34	Clinometer.	5 nos

RECOMMENDED BOOKS:

Sl	Book Name	Writer Name	Publisher Name & Edition
01.	Surveying and Levelling	T. P. Kanatker	Delhi Standard Publisher Distributors.
02.	Surveying	Norman Thomas	Delhi-jalandhar,s,.chand ans Co.
03.	Surveying	Aziz & Shahjahan	
04.	Plane & Geodetic Survey	D. Clark	
05.	Surveying	B. C. Punmia	
06	Text book of surveying	S.K.Husain, M.S Nagraj	
07.	Surveying & Levelling	-N.N.Basak	
08.	Surveying & leveling	-S.S.Bhavikatti.	
09.	Introduction to Surveying-	Md.Hamidul Islam (KUET)	

WEBSITE REFERENCES:

Sl	Web Link	Remarks
01	https://www.alibaba.com/product-detail/Geodetic-surveying-instrument-automatic-level-machine_60828628298.html	Search here with topics
02	https://www.mynextmove.org/profile/summary/17-1022.01	Search here with topics
03	https://lphlandsurveying.com/geodetic-engineers-tools-and-equipment-total-station/	Search here with topics