



**BANGLADESH TECHNICAL EDUCATION BOARD**

**Agargaon, Sher-E-Bangla Nagar**

**Dhaka-1207.**

**04-YEAR DIPLOMA IN ENGINEERING CURRICULUM  
COURSE STRUCTURE & SYLLABUS  
(PROBIDHAN-2022)**

**CIVIL TECHNOLOGY**

**TECHNOLOGY CODE: 64**

**3<sup>rd</sup> SEMESTER**

**(Effective from 2022-2023 Academic Sessions)**

# DIPLOMA IN ENGINEERING CURRICULUM

## COURSE STRUCTURE

(PROBIDHAN-2022)

**TECHNOLOGY NAME: CIVIL TECHNOLOGY (64)**

(3<sup>RD</sup> SEMESTER)

Sl. No.	Subject		Period Per Week		Credit	Marks Distribution						Grand Total
						Theory Assessment			Practical Assessment			
	Code	Name	Theory	Practical		Continuous	Final	Total	Continuous	Final	Total	
1	25831	Business Communication	2	-	2	40	60	100	-	-	-	100
2	25922	Physics-II	3	3	4	60	90	150	25	25	50	200
3	25931	Mathematics-III	3	3	4	60	90	150	25	25	50	200
4	26431	Structural Mechanics	2	3	3	40	60	100	25	25	50	150
5	26432	Surveying-I	2	3	3	40	60	100	25	25	50	150
6	26433	Construction Process-I	2	3	3	40	60	100	25	25	50	150
7	28511	Computer Office Application	-	6	2	-	-	-	50	50	100	100
<b>Total</b>			<b>14</b>	<b>21</b>	<b>21</b>	<b>280</b>	<b>420</b>	<b>700</b>	<b>175</b>	<b>175</b>	<b>350</b>	<b>1,050</b>

Subject Code	Subject Name	Period per Week		Credit
25841	Business Communication	T	P	C
		2	0	2

<b>Rationale</b>	<p>Business communication plays a vital role in modern time. Business communication the process of sharing information between employees within and outside a company. Business communication is essential for success and growth of every organization. By studying this course students will be able to acquire knowledge on communication, Communication model and feedback, Types of communication, Formal and informal communication, Report writing, Methods of communication, effective listening, Essentials of communication, Office management and developed skills on delivered effective presentation, interpersonal communication, listening, report writing and business letter.</p>
<b>Learning Outcome</b>	<p><b>After completion of this course, students will be able to</b></p> <ul style="list-style-type: none"> <li>• Effective business communication.</li> <li>• Developing and delivering effective presentations.</li> <li>• Effective interpersonal communications.</li> <li>• Good time management.</li> <li>• Effective problem solving.</li> <li>• Acquiring Knowledge of Information and Communication Technology.</li> <li>• Effective business report writing.</li> </ul>

## Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	<p><b>Business communication.</b></p> <p>1.1 Define business.            1.2 Define communication.            1.3 Define business communication.            1.4 Describe the scope of business communication.            1.5 Mention the Importance of communication in modern business.            1.6 State the objectives of business communication.            1.7 State the functions of business communication.            1.8 Discuss the principles of communication.            1.9 Mention the essential elements of communication process.</p>	<b>4</b>	<b>8</b>
2.	<p><b>Communication model and feedback.</b></p> <p>2.1 Define communication model.            2.2 State the Importance of communication model.            2.3 State the basic functions of Communication model.            2.4 Mention the Limitation of communication model.            2.5 Define feedback.            2.6 State the basic principles of effective feedback.            2.7 State the essential feedback to complete communication process.</p>	<b>3</b>	<b>6</b>
3.	<p><b>Types of communication.</b></p> <p>3.1 Define channel of communication.            3.2 Mention the channel of communication.            3.3 State the different types of communication.            3.4 Distinguish between upward and downward communication.            3.5 State the merits and demerits of upward communication.            3.6 State the merits and demerits of downward communication.            3.7 Define two-way communication.            3.8 Explain- `Two-way communication is more important now a day.            3.9 State the merits and demerits of two-way communication.</p>	<b>5</b>	<b>9</b>
4.	<p><b>Formal and informal communication.</b></p> <p>4.1 Define the formal and informal communication.            4.2 Describe the advantages and disadvantages of formal communication.            4.3 Describe the advantages and disadvantages of informal communication.            4.4 Difference between formal and informal communication.</p>	<b>2</b>	<b>4</b>

5.	<b>Methods of communication.</b> 5.1 Define communication methods. 5.2 Discuss the various methods of communication. 5.3 Discuss the merits and demerits of oral communication. 5.4 Discuss the merits and demerits of written communication. 5.5 Difference between oral and written communication.	3	6
6.	<b>Effective listening</b> 6.1 Define listening. 6.2 State the different types of listening. 6.3 State the importance of listening. 6.4 Define effective listening. 6.5 Discuss the barriers to effective listening. 6.6 Discuss the way for overcoming barriers to effective listening.	3	5
7.	<b>Essentials of communication</b> 7.1 Discuss the essential qualities of good communication. 7.2 Discuss the barriers of communication. 7.3 Discuss the way for overcoming barriers to good communication.	2	4
8.	<b>Report writing</b> 8.1 Define report, business report and technical report. 8.2 State the essential features of a good report. 8.3 Mention the factors to be considered while drafting a report. 8.4 State the components of technical report. 8.5 Distinguish between a technical report and general report. 8.6 Prepare a technical report.	4	7
9.	<b>Office management.</b> 9.1 Define office and office work. 9.2 State the characteristics of office work. 9.3 Define filing and indexing. 9.4 Discusses the method of filing. 9.5 Discusses the method of indexing. 9.6 Distinguish between filing and indexing.	3	5
10.	<b>Business letter, official and semiofficial letters.</b> 10.1 Define then business letter, official and semiofficial letters. 10.2 State the Importance of business letter. 10.3 Prepare Curriculum vitae (CV), Appointment letter, joining letter, leave letter, Complain Letter and tender notice.	3	6
	<b>Total</b>	<b>32</b>	<b>60</b>

#### REFERENCE BOOK:

1. Business Communication and Report Writing-Professor Murtaza Ali
2. Business Communication-মো: খালেকুজ্জামান ও মো: মোশারফ হোসেন চৌধুরী

Subject Code	Subject Name	Period per Week		Credit
25922	PHYSICS-II	T	P	C
		3	3	4

<b>Rationale</b>	Physics is the basic science for all engineering students as well as diploma engineering students. To develop a foundation in scientific principles and processes for the understanding and application of various technology. It will help the students to study in technical subject of diploma engineering students.
<b>Learning Outcome (Theoretical)</b>	After undergoing the subject students will be able: 1. Identify and classify various types of source of heat and temperature. Describe determination procedure temperature of materials and heat capacity of solid and liquid. 2. Describe second law of thermodynamics, heat engine. 3. Describe static electricity current electricity, magnetism, reflection of light. Refraction of light, photoelectric effect, structure of atom, Theory of relativity, semiconductor and electronics.
<b>Learning Outcome (Practical)</b>	After undergoing the subject (Practical) the students will be able to: 1. Compare the operation of common thermometers. 2. Determine the co-efficient of linear expansion of solid. 3. Measure the specific heat capacity of Brass, steel etc. 4. Determine the latent heat of fusion of ice. 5. Verify the Ohm's Law. 6. Determine the Mechanical Equivalent of Heat by using Joule's Calorimeter. 7. Verify the laws of reflection. 8. Find out the focal length of a concave mirror. 9. Determine the refractive index of a glass slab 10. Determine the angle of minimum deviation & refractive index of prism.

### Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period )	Final Marks
1.	<b>THERMOMETRY</b> 1.1 Define Heat & Temperature 1.2 Mention the unit of Heat & Temperature 1.3 Relate between different scale of Temperature 1.4 State the construction and graduation of mercury Thermometer 1.5 Define specific heat, thermal capacity and water equivalent 1.6 Mention units of specific heat, thermal capacity and water equivalent 1.7 Explain the principle of Calorimetry, 1.8 Discuss various kinds of specific latent heat	3	5
2	<b>EFFECT OF HEAT ON MATERIALS</b> 2.1 Define linear, superficial and cubical expansion of solid. 2.2 Define Coefficient of linear, superficial and cubical expansion of solid. 2.3 Relate between coefficient of linear, superficial and cubical	4	7

	<p>expansion of solid.</p> <p>2.4 Explain the methods of heat transfer by conduction, convection and Radiation with example.</p> <p>2.5 Define Thermal conductivity and Coefficient of the thermal conductivity</p> <p>2.6 List the factors which determine the quantity of heat (Q) flowing through a material and Show that the quantity of heat flowing through a material can be found</p> <p>from <math>Q = \frac{KA(\theta_H - \theta_C)t}{d}</math></p> <p>2.7 State Stefan-Boltzman Law.</p> <p>2.8 State Newton's law of cooling.</p> <p>2.9 State wine's law.</p> <p>310 Explain Greenhouse effect.</p>		
3	<p><b>NATURE OF HEAT AND MECHANICAL EQUIVALENT</b></p> <p>3.1 Describe the caloric theory and kinetic theory of heat</p> <p>3.2 State the limitation of the caloric theory of heat</p> <p>3.3 Explain the mechanical equivalent of heat</p> <p>3.4 Explain the first law of thermodynamics</p> <p>3.5 Explain Isothermal and adiabatic change.</p> <p>3.6 Describe Specific heat of a gas, Molar specific heat or molar heat capacity.</p> <p>3.7 Relate between pressure and volume of a gas in adiabatic change i, e; <math>PV^\gamma = \text{const.}</math></p> <p>3.8 Relate between <math>C_p</math> and <math>C_v</math> for and ideal gas (<math>C_p - C_v = R</math>)</p>	4	6
4	<p><b>SECOND LAW OF THERMODYNAMICS</b></p> <p>4.1 Explain Reversible process and irreversible process.</p> <p>4.2 Explain 2nd law of thermodynamics</p> <p>4.3 Define heat engine</p> <p>4.4 Explain the principle of Carnot's cycle</p> <p>4.5 Mention the formula thermal efficiency of a heat engine</p> <p>4.6 Distinguish between internal combustion engine and external combustion engine.</p> <p>4.7 Describe Entropy</p> <p>4.8 Mention the significant of entropy</p> <p>4.9 Describe Change of entropy in a reversible and irreversible process.</p>	4	6
5	<p><b>ELECTROSTATIC</b></p> <p>5.1 Define Charge and Nature of charge.</p> <p>5.2 State the Law of attraction and repulsion of charge.</p> <p>5.3 Explain the Coulomb's Law</p> <p>5.4 Define Electric field and electric intensity.</p> <p>5.5 Define Electric Potential and Potential difference</p> <p>5.6 Relate between electric intensity and electric Potential.</p> <p>5.7 Define Capacitor and capacitance.</p> <p>5.8 Explain Energy of Capacitor.</p> <p>5.9 Mention the Uses of capacitor.</p>	3	5
6	<p><b>MAGNETISM</b></p> <p>6.1 Describe Earth's Magnetism.</p> <p>6.2 Define Magnet, Magnetic Substance, Non-magnetic Substance, Magnetic Pole</p> <p>6.3 Define Magnetic field, Magnetic Intensity.</p> <p>6.4 Explain Magnetic Permeability, Magnetic Susceptibility</p> <p>6.5 Explain Declination &amp; inclination, Horizontal Component of</p>	4	7

	<p>Earth's Magnetic field <math>B_H</math> or <math>H</math> of Magnetic Elements of Earth</p> <p>6.6 Classify Magnetic Materials</p> <p>6.7 Compare among Diamagnetic, Paramagnetic and Ferromagnetic substance.</p> <p>6.8 Describe Magnetic Domain.</p>		
7	<p><b>REFLECTION OF LIGHT</b></p> <p>7.1 Define mirror (plane and spherical), image (real and virtual) and magnification.</p> <p>7.2 Classify mirror and image</p> <p>7.3 Describe the reflection of light</p> <p>7.4 State the laws of reflection of right</p> <p>7.5 Describe the verification of laws of reflection</p> <p>7.6 Define pole, principal axis, center of curvature, radius of curvature, Principal focus in case of concave and convex mirrors</p> <p>7.7 Express the general equation of concave and Convex mirror</p> <p>7.8 Mention the uses of mirror and identify of Mirror.</p>	3	6
8	<p><b>REFRACTION OF LIGHT</b></p> <p>8.1 Describe refraction of light</p> <p>8.2 State the laws of refraction</p> <p>8.3 Express the verification of laws of refraction</p> <p>8.4 Describe critical angle and total internal refract reflection.</p> <p>8.5 Relate between refractive index, minimum deviation of angle of the prism.</p> <p>8.6 Define lens</p> <p>8.7 Mention the kinds of lens.</p> <p>8.8 Define center of curvature, radius of Curvature, Principal axis, first and second Principal focus, Optical center.</p> <p>8.9 Derive general equation of the lens (Concave and convex)</p> <p>8.10 Explain power of lens and equivalent of lens.</p>	3	8
9	<p><b>PHYSICAL OPTICS</b></p> <p>9.1 Describe Electromagnetic Wave</p> <p>9.2 Define Poynting Vector</p> <p>9.3 Describe Electromagnetic Spectrum</p> <p>9.4 Mention the wavelength of visible light spectrum</p> <p>9.5 Define Light Year</p> <p>9.6 Define Wave and Wave front</p> <p>9.7 State the Huygens' Principle</p> <p>9.8 Define Coherent Source</p> <p>9.9 Define Interference of Light, Diffraction of Light and Polarization of Light.</p> <p>9.10 Classify Interference of Light, Diffraction of Light and Polarization of Light.</p>	4	8
10	<p><b>PHOTO ELECTRIC EFFECT</b></p> <p>10.1 Describe Electrical conductivity of gases.</p> <p>10.2 Describe Discharge tube.</p> <p>10.3 Define Cathode ray and X- Ray</p> <p>10.4 Mention the properties of Cathode ray and X- Ray</p> <p>10.5 Mention the use of X- Ray</p> <p>10.6 Discuss photo electric effect</p> <p>10.7 Derive Einstein's photo electric equation.</p>	4	6



11	<b>STRUCTURE OF ATOM</b> 11.1 Describe the concept of structure of Atom 11.2 Discuss Thomson of Atomic models 11.3 Discuss Rutherford model of Atomic models 11.4 Discuss Bohr model of Atomic models 11.5 Derive the equation of Radius and Energy by using Bohr model 11.6 Explain Energy level of Electron 11.7 Derive the frequency of Photon by using Hydrogen atom Spectrum	3	6
12	<b>NUCLEAR PHYSICS</b> 12.1 Explain radioactivity 12.2 Describe radioactive rays 12.3 Deduce Radioactive decay law 12.4 Define half- life and mean-life of radioactive atom 12.5. Relate between half-life and radioactive decay constant 12.6 Describe Nuclear Reactor 12.7 Explain nuclear fission & fusion.	3	7
13	<b>MODERN PHYSICS</b> 13.1 Describe the concept of Modern Physics 13.2 Discuss about Reference frame 13.3 Explain Inertial and Non-Inertial Reference 13.4 Describe reference frame and Motion 13.5 Postulates of special Theory of Relativity 13.6 Explain the Galilean Transformation 13.7 Describe Lorentz Transformation 13.8 Define Black Holes and black body radiation.	3	7
14	<b>THEORY OF RELATIVITY AND ASTRO PHYSICS</b> 14.1 Describe Relativity 14.2 Discuss the types of Relativity 14.3 Explain Einstein's theory of Relativity 14.4 Describe the Relativity of time: Time Dilation 14.5 Discuss Relativity of Length : Length Contraction 14.6 Discuss Relativity of mass 14.6 Relate between mass and Energy ( $E=mc^2$ )	3	6
<b>Total</b>		<b>48</b>	<b>90</b>

### Detailed Syllabus (Practical)

Unit	Topics with Contents	Class (3 Period)	Continuous Marks
1	<b>COMPARE THE OPERATION OF COMMON THERMOMETERS</b> 1.1 Observe the different types of thermometer 1.2 Apply relation formula 1.3 Measure the temperature of liquid such normal water, hot water & ice 1.4 Calculate and compare the operation of thermometer 1.5 Maintain the record of the performance of experiment.	1	1

2	<p>DETERMINE THE CO-EFFICIENT OF LINEAR EXPANSION OF A SOLID BY PULLINGER'S APPARATUS</p> <p>2.1 Collect Pullinger's Apparatus , Thermometer and screw gauge</p> <p>2.2 Apply heat to boil producer</p> <p>2.3 Calculate the Linear expansion of solid</p> <p>2.4 Maintain the record of the performance of experiment.</p>	1	1
3	<p>MEASURE THE SPECIFIC HEAT CAPACITY OF VARIOUS SUBSTANCES. (BRASS, STEEL)</p> <p>3.1 Collect Calorimeter, Thermometer, Brass, Balance</p> <p>3.2 Apply the formula for specific heat</p> <p>3.3 Measure various terms according to formula</p> <p>3.4 Calculate Specific heat capacity</p> <p>3.5 Maintain the record of the performance of experiment.</p>	1	2
4	<p>DETERMINE THE LATENT HEAT OF FUSION OF ICE</p> <p>4.1 Collect Calorimeter, Thermometer, Brass, Balance and ice</p> <p>4.2 Apply the formula for latent heat of fusion</p> <p>4.3 Measure various terms according to formula</p> <p>4.4 Calculate latent heat of fusion</p> <p>4.5 Maintain the record of the performance of experiment.</p>	1	2
5	<p>DETERMINE THE LATENT HEAT OF FUSION OF ICE</p> <p>5.1 Collect Calorimeter, Thermometer, Brass, Balance and Vapor producer</p> <p>5.2 Apply the formula for latent heat of Vapor</p> <p>5.3 Measure various terms according to formula</p> <p>5.4 Calculate latent heat of fusion</p> <p>5.5 Maintain the record of the performance of experiment.</p>	1	2
6	<p>DETERMINE THE MECHANICAL EQUIVALENT OF HEAT BY USING JOULE'S CALORIMETER</p> <p>6.1 Collect Joule's Calorimeter, Thermometer, Voltmeter</p> <p>6.2 Apply Joule's formula for heat equivalent</p> <p>6.3 Measure various terms according to formula</p> <p>6.4 Determine the Mechanical Equivalent of Heat</p> <p>6.5 Maintain the record of the performance of experiment.</p>	2	2
7	<p>VERIFY THE LAWS OF REFLECTION</p> <p>7.1 Collect Plane mirror, pin and drawing board</p> <p>7.2 Apply the laws of reflection</p> <p>7.3 Measure the incident angle and reflection angle</p> <p>7.4 Verify the laws of reflection</p> <p>7.5 Maintain the record of the performance of experiment.</p>	2	4
8	<p>FIND OUT THE FOCAL LENGTH OF A CONCAVE MIRROR</p> <p>8.1 Collect Optical bench &amp; concave mirror</p> <p>8.2 Apply focal length formula.</p>	2	4

	8.3 Measure the object length & Image length 8.4 calculate the focal length by using formula 8.5 Maintain the record of the performance of experiment.		
9	DETERMINE THE REFRACTIVE INDEX OF A GLASS SLAB 9.1 Collect glass slab, pin, drawing paper and drawing board 9.2 Apply the Snell's law 9.3 Measure incident and refractive angle 9.4 calculate the refractive index 9.5 Maintain the record of the performance of experiment.	3	4
10	DETERMINE THE ANGLE OF MINIMUM DEVIATION AND REFRACTIVE INDEX OF A GLASS PRISM BY USING 1-D GRAPH 10.1 Collect prism, pin, drawing paper and drawing board 10.2 Apply the laws of minimum deviation 10.3 Measure incident angle and minimum deviation 10.4 Calculate the refractive index of prism 10.5 Maintain the record of the performance of experiment.	2	3
	Total	16	25

### Recommended Books:

Sl	Book Name	Writer Name
	<b>REFERENCE BOOKS:</b> 1. Higher Secondary Physics - Second Part 2. A Text Book of Heat and Thermodynamics 3. A Text Book of Optics 4. Higher Secondary Physics - Second Part 5. Higher Secondary Physics -Second Part 6. Thermodynamics	- by Dr. Shahjahan Tapan - by N Subrahmanyam and Brij Lal - by N Subrahmanyam and Brij Lal - by Prof. Golam Hossain Pramanik - by Ishak Nurun Nabi - by K K Ramalingam

### Website References:

Sl	Web Link	Remarks
1	<a href="http://www.nctb.gov.bd">www.nctb.gov.bd</a>	

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

<b>Rationale</b>	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
<b>Learning Outcome (Theoretical)</b>	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.
<b>Learning Outcome (Practical)</b>	<b>Able to solve problems related to area and volume of various type of shaped.</b>

### Detailed Syllabus (Theory)

Unit	Topics with Contents	Class ( 1 Period)	Final Marks
1	<p><b>MENSURATION(Area of Triangle):</b></p> <p>1.1 Find the area of triangle in the form,  <math display="block">A = \frac{\sqrt{3}}{4} a^2</math>, a = length of a side of equilateral triangle.  <math display="block">A = \frac{c}{4} \sqrt{4a^2 - c^2}</math>, where a = length of equal sides, c = third side.  <math display="block">A = \sqrt{s(s-a)(s-b)(s-c)}</math>, where a, b, c = length of the sides of a Triangle and 2s is the perimeter of the triangle.</p> <p>1.2 Use formula in 1.1 to solve problems.</p>	<b>4</b>	<b>8</b>
2	<p><b>MENSURATION (Areas of quadrilateral, Parallelogram, rhombus &amp; trapezium)</b></p> <p>2.1 Define quadrilateral &amp; 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 &amp; 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 &amp; trapezium.</p>	<b>3</b>	<b>6</b>
3	<p><b>MENSURATION(Finding areas of regular polygon):</b></p> <p>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.</p>	<b>3</b>	<b>6</b>

<b>Unit</b>	<b>Topics with Contents</b>	<b>Class ( 1 Period)</b>	<b>Final Marks</b>
	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	<b>MENSURATION(Areas of circle, sector and segment):</b>  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.	<b>3</b>	<b>6</b>
5	<b>MENSURATION(Area &amp; Volume of a rectangular solid):</b>  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.	<b>3</b>	<b>5</b>
6	<b>MENSURATION(Surface area &amp; volume of a prism):</b>  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	<b>3</b>	<b>5</b>
7	<b>MENSURATION (Area &amp; volume of Parallelepiped and cylinder):</b>  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	<b>3</b>	<b>5</b>
8	<b>MENSURATION (Surface area &amp; volume of pyramid):</b>  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	<b>2</b>	<b>4</b>
9	<b>MENSURATION (Surface area &amp; volume of cone and sphere):</b>  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	<b>3</b>	<b>5</b>
10	<b>GEOMETRY:</b>  <b>Conic or conic sections:</b>  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.	<b>3</b>	<b>5</b>
11	<b>CALCULAS (Differential Equations of first order and first degree):</b>  11.1 Define differential equation, ordinary & partial differential equation.	<b>4</b>	<b>7</b>

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	<b>CALCULAS (Differential Equations of first order and first degree of homogeneous equations):</b> 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	<b>CALCULAS (First order and first degree of Exact differential equations):</b> 13.1 Define Exact differential equation. 13.2 Define integrating factor. 13.3 Solve problems related to Exact differential equations.	3	5
14	<b>CALCULAS (First order and first degree of Linear differential equations):</b> 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	<b>CALCULAS (Laplace Transformation):</b> 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) $\sin at$ (vi) $\cos at$ (vii) $e^{at} t^n$ (viii) $e^{at} \sin bt$ (ix) $e^{at} \cos bt$ 15.3 Define inverse Laplace transformation 15.4 Solve problem related to 15.1, 15.2, 15.3	4	8
	<b>Total</b>	<b>48</b>	<b>90</b>

**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
	<b>Total</b>	<b>16</b>	<b>25</b>

**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: <a href="http://www.youtube.com">www.youtube.com</a>	Remarks
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SUBJECT CODE	SUBJECT NAME	PERIOD PER WEEK		CREDIT
26431	STRUCTURAL MECHANICS	T	P	C
		2	3	3

<b>Rationale</b>	<p>Structural mechanics deals with the mechanism of forces applied on structure and its effects on the structure. It works with various mechanical properties of materials such as deformation, elongation, stress, strain, modulus of elasticity etc. It computes internal stress or forces acting within the structure either for design or investigation. It is vital subject for structural analysis. Structural analysis needs input data such as loads, the structure's geometric representation and support conditions and the materials' properties. Output quantities may include support reactions and stresses.</p> <p>Structural mechanics is a field of study within applied mechanics that investigates the behavior of structures under mechanical loads, such as bending of a beam and torsion of a shaft. The students should acquire knowledge, skills and attitude regarding mechanical properties of materials and perform skills to test materials strength.</p>
<b>Learning Outcome (Theoretical)</b>	<p><b>After undergoing the subject, students will be able to</b></p> <ul style="list-style-type: none"> <li>• State mechanical properties of materials.</li> <li>• State compression and tensile testing machine.</li> <li>• Describe tensile and compression test.</li> <li>• Mention different types of forces.</li> <li>• Differentiate among moment, couple and forces.</li> <li>• Compute friction of a body on horizontal and inclined planes.</li> <li>• Define centroid and Centre of gravity.</li> <li>• Define torsion and torsional stress.</li> <li>• Define shear force and bending moment.</li> <li>• Calculate and draw Shear Force and Bending Moment diagram.</li> </ul>
<b>Learning Outcome (Practical)</b>	<p><b>After undergoing the subject, students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Identify the compression and tensile testing machine.</li> <li>2. Demonstrate compression</li> <li>3. Operate tensile testing machine.</li> <li>4. Prepare concrete cylinder and cube with specified ratio.</li> <li>5. Perform compression test of cylinder and cube.</li> <li>6. Perform tensile test of mild steel with UTM machine.</li> <li>7. Determine the co-efficient of friction of concrete and mild steel.</li> <li>8. Determine the resultant of forces by force board.</li> <li>9. Determine reactions of a beam by using spring balance.</li> </ol>



## DETAILED SYLLABUS (THEORY)

Unit	Topics with Contents	Class (1 Period)	Final Marks
<b>1.</b>	<p><b>MECHANICAL PROPERTIES OF MATERIALS</b></p> <p>1.1 Mention the necessity of mechanical properties of materials.</p> <p>1.2 Define Stress, tensile stress, compressive stress, shear stress, Strain, tensile strain, compressive strain and shear strain.</p> <p>1.3 State Hooke's law, modulus of elasticity and modulus of rigidity.</p> <p>1.4 Explain stress-strain diagram of mild steel and concrete.</p> <p>1.5 Define Elasticity, proportional limit, yield point, ultimate stress, breaking stress, working stress and factor of safety.</p> <p>1.6 Define Strength, stiffness, toughness, ductility, malleability, brittleness, creep, fatigue failure, resilience, modulus of resilience, thermal stress in simple bar and poissons ratio.</p> <p>1.7 Calculate stress, strain, modulus of elasticity and modulus of rigidity.</p> <p>1.8 Solve problems involving resilience, thermal stress and poissons ratio.</p> <p>1.9 Compute stress develop in composite bar under tension.</p>	<b>04</b>	<b>08</b>
<b>2</b>	<p><b>WORK, POWER AND ENERGY</b></p> <p>2.1 Define work, power and energy.</p> <p>2.2 Specify the units of work, power and energy.</p> <p>2.3 Describe work done in rotation and represent by area.</p> <p>2.4 Mention the different types of energy.</p> <p>2.5 Explain the relations of potential energy and kinetic energy.</p> <p>2.6 Solve problems on work, power and energy.</p>	<b>03</b>	<b>06</b>
<b>3</b>	<p><b>LAWS OF FORCES</b></p> <p>3.1 Illustrate the laws of forces.</p> <p>3.2 Define Force, co-linear forces, parallel forces and laws of equilibrium of forces.</p> <p>3.3 State the composition of forces and resolution of forces.</p> <p>3.4 Calculate the resultant of co-planar forces.</p> <p>3.5 Explain Lami's theorem.</p> <p>3.6 Solve the problems on Lami's theorem.</p>	<b>04</b>	<b>06</b>
<b>4</b>	<p><b>MOMENT OF FORCES</b></p> <p>4.1 Define moment and couple.</p> <p>4.2 Mention the properties of couple.</p> <p>4.3 Differentiate between moment and force.</p> <p>4.4 Solve the problems on moment of couple and forces.</p>	<b>03</b>	<b>06</b>
<b>5</b>	<p><b>FRICTIONAL FORCES</b></p> <p>5.1 State friction, static friction and dynamic friction.</p> <p>5.2 Mention the laws of static and dynamic friction.</p> <p>5.3 Explain angle of friction and co-efficient of friction.</p> <p>5.4 Compute friction of a body on horizontal planes.</p> <p>5.5 Compute friction of a body on inclined planes.</p> <p>5.6 Compute frictional force acting on a ladder.</p>	<b>04</b>	<b>06</b>
<b>6</b>	<p><b>CENTROID AND CENTRE OF GRAVITY</b></p> <p>6.1 Define centroid and Centre of gravity.</p> <p>6.2 State the axis of symmetry and parallel axis.</p> <p>6.3 Explain parallel axis theorem.</p>	<b>03</b>	<b>06</b>

	6.4 Compute the centroid of Rectangular, Triangular, Circular, Semi-circular, Hollow, I-shaped, T-shaped and L-shaped by the moment method. 6.5 Solve the problem on Centre of gravity of a composite section.		
<b>7</b>	<b>MOMENT OF INERTIA</b> 7.1 Define Moment of Inertia 7.2 State 1st and 2nd moment of area. 7.3 Explain the meaning of radius of gyration. 7.4 Mention the theorems of moment of inertia. 7.5 Compute the polar moment of inertia of a rectangular and circular section. 7.6 Compute the moment of inertia of plane area about any axis of Rectangular, Triangular, Circular, Semi-circular, Hollow shaped, I-shaped, T-shaped and L-shaped.	<b>04</b>	<b>08</b>
<b>8</b>	<b>TORSION</b> 8.1 State the laws of motions. 8.2 Explain circular motion. 8.3 Define torsion and torsional stress. 8.4 Mention the fundamental assumptions of torsional stress. 8.5 Find the relation between torsional stress and strain. 8.6 Interpret the formulas relating to finding torque. 8.7 Solve the problems on involving torsion.	<b>03</b>	<b>06</b>
<b>9</b>	<b>SHEAR FORCE AND BENDING MOMENT</b> 9.1 Define beam. 9.2 List different types of beams. 9.3 Mention various types of load on beams. 9.4 Define shear force and bending moment. 9.5 Differentiate between shear force and bending moment. 9.6 Mention the sign conventions of shear force and bending moment. 9.7 List the characteristics of shear force and bending moment diagram. 9.8 Calculate and draw SF and BM diagram of simply supported and cantilever beams with point load, distributed load and both.	<b>04</b>	<b>08</b>
	<b>Total</b>	<b>32</b>	<b>60</b>

### **DETAILED SYLLABUS (PRACTICAL)**

<b>Sl.</b>	<b>Experiment Name</b>	<b>Class (3 Period)</b>	<b>Marks (Continuous)</b>
<b>1</b>	<b>PERFORM COMPRESSION TEST OF A CONCRETE CYLINDER AND CUBE.</b> 1.1 Construct concrete cylinder and cube with specified ratio. 1.2 Perform compression test of a concrete cylinder. 1.3 Perform compression test of a concrete cube. 1.4 Maintain the record of performed task.	<b>2</b>	<b>4</b>
<b>2</b>	<b>PERFORM TENSILE TEST OF MILD STEEL ROD AND DRAW STRESS-STRAIN CURVE WITH TEST RESULTS.</b>	<b>2</b>	<b>4</b>

	<p>2.1 Perform tensile test of mild steel rod.</p> <p>2.2 Draw stress-strain curve with test results.</p> <p>2.3 Maintain the record of performed task.</p>		
<b>3</b>	<p><b>CALCULATE PERCENTAGE ELONGATION OF MILD STEEL</b></p> <p>3.1 Perform tensile test of mild steel rod.</p> <p>3.2 Determine the percentage elongation of mild steel.</p> <p>3.3 Maintain the record of performed task.</p>	<b>2</b>	<b>2</b>
<b>4</b>	<p><b>DETERMINE THE RESULTANT FORCES USES FORCE BOARD.</b></p> <p>4.1 Set up the force board.</p> <p>4.2 Apply the load on force board.</p> <p>4.3 Determine the resultant of forces.</p> <p>4.4 Maintain the record of performed task.</p>	<b>2</b>	<b>3</b>
<b>5</b>	<p><b>PROVE THE LAMI'S THEOREM BY USING FORCE BOARD.</b></p> <p>5.1 Set up the force board.</p> <p>5.2 Apply the load on force board.</p> <p>5.3 Determine the resultant of forces.</p> <p>5.4 Maintain the record of performed task.</p>	<b>2</b>	<b>3</b>
<b>6</b>	<p><b>DETERMINE THE CO-EFFICIENT OF FRICTION OF CONCRETE AND MILD STEEL.</b></p> <p>6.1 Used concrete and mild steel block.</p> <p>6.2 Determine the co-efficient of friction of concrete.</p> <p>6.3 Determine the co-efficient of friction of mild steel.</p> <p>6.4 Maintain the record of performed task.</p>	<b>2</b>	<b>3</b>
<b>7</b>	<p><b>DETERMINE REACTIONS OF A BEAM BY USING SPRING BALANCE.</b></p> <p>7.1 Set up the beam with spring balance.</p> <p>7.2 Apply the load on the beam in different point.</p> <p>7.3 Observe reactions of the beam in spring balance.</p> <p>7.4 Maintain the record of performed task.</p>	<b>4</b>	<b>6</b>
	<b>Total</b>	<b>16</b>	<b>25</b>

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

<b>SI</b>	<b>Item Name</b>	<b>Quantity</b>
01	Compression Testing machine	2 nos
02	Tensile Testing machine	2nos
03	Universal Testing Machine	2 nos
04	Mixer Machine	2 nos
05	Spring Balance	5 nos
06	Measuring Steel Tape	5 nos
07	Force Board	As Necessary
08	Cube Mold	As Necessary
09	Cylinder Mold	As Necessary

**RECOMMENDED BOOKS:**

SI	Book Name	Writer Name	Publisher Name & Edition
01	Structural Mechanics	W Morgan and D T Williams	Harlow: Longman Scientific & Technical -5 <sup>th</sup> Edition.
02	Structural Mechanics	Singer / Popov	Prentice-Hall; 1st Edition
03	Mechanics of Materials	Philip Gustave Laurson and Williams Junkin Cox	John Wiley Sons, Third Edition.
04	Structural Mechanics	A. K. Upadhyay	SK Kateria & Sons.
05	Applied Mechanics	R.S Khurmi	S.Chand Publishing

**WEBSITE REFERENCES:**

SI	Web Link	Remarks
01	<a href="http://www.youtube.com">www.youtube.com</a>	Search here with topics
02	<a href="http://www.google.com">www.google.com</a>	Search here with topics

SUBJECT CODE	SUBJECT NAME	PERIOD PER WEEK		CREDIT
26432	SURVEYING - I	T	P	C
		2	3	3

<b>Rationale</b>	<ul style="list-style-type: none"> <li>Diploma in Engineering holders have to use land survey for implement project. So provide the student with the opportunity to acquire knowledge and skill to: Work with chain, plane table and Compass survey, Cadastral survey , Record surveyed data and plotting map. Locate unknown points. Create the area using instruments, Calculate the area using different Methods.</li> </ul>
<b>Learning Outcome (Theoretical)</b>	<p><b>After undergoing the subject, students will be able to</b></p> <ul style="list-style-type: none"> <li>Describe the objectives of Survey</li> <li>State different methods of chain survey.</li> <li>Interpret Compass Surveying.</li> <li>Explain Plane table surveying.</li> <li>Discuss Cadastral Surveying.</li> </ul>
<b>Learning Outcome (Practical)</b>	<p><b>After undergoing the subject, students will be able to</b></p> <ol style="list-style-type: none"> <li>Identify various types of survey.</li> <li>Perform chain survey</li> <li>Perform Compass survey</li> <li>Perform Plane table survey.</li> <li>Perform Cadastral survey.</li> <li>Identify the various types of Khatiyani/Mutation and Porcha.</li> </ol>

## DETAILED SYLLABUS (THEORY)

Unit	Topics with Contents	Class ( 1 Period)	Final Marks
<b>1.</b>	<p><b>THE CONCEPTS OF SURVEYING</b></p> <p>1.1 Define surveying</p> <p>1.2 Discuss the purpose of surveying.</p> <p>1.3 Classify Primary divisions of survey.</p> <p>1.4 Explain field work and office work in surveying.</p> <p>1.5 Mention the survey instruments</p> <p>1.6 Mention the Maintain and adjustment procedure survey Instruments.</p> <p>1.7 Discuss the classification of surveying based of shape of earth Nature of field object of surveying and instrument employed.</p> <p>1.8 Differentiate between plane and geodetic survey.</p>	<b>2</b>	<b>2</b>
<b>2</b>	<p><b>THE BASIC PRINCIPLE OF CHAIN SURVEYING.</b></p> <p>2.1 Describe the purpose and scope of chain surveying.</p> <p>2.2 Describe basic principle of chain surveying.</p> <p>2.3 Explain chain line, base line, tie line, check line and station points.</p> <p>2.4 Explain ill and well-conditioned triangle.</p> <p>2.5 Mention the rules to be followed while chaining.</p> <p>2.6 State the Procedure of instrument in chain surveying.</p> <p>2.7 List the equipment and accessories used in chain surveying.</p> <p>2.8 Describe Gunter’s chain, Engineer’s chain, meter chain, ranging rod, cross-staff, offset rod, plumb-bob, arrows, tapes, whites.</p> <p>2.9 Describe the uses of linen, steel and invar tape.</p> <p>2.10 Explain the uses of arrows, ranging rod, offset rod, cross-staff, prism square, box-sextant and clinometer.</p>	<b>3</b>	<b>7</b>
<b>3</b>	<p><b>USE OPTICAL SQUARE.</b></p> <p>3.1 Describe the principle of optical square.</p> <p>3.2 Explain the construction and use of optical square.</p> <p>3.3 Explain the procedure of checking and adjustment of optical square.</p> <p>3.4 Describe the procedure of measuring offset by optical square.</p> <p>3.5 Describe the different methods of locating unknown points with reference to two known points.</p>	<b>2</b>	<b>7</b>
<b>4</b>	<p><b>PROCEDURE OF CHAIN SURVEYING.</b></p> <p>4.1 Explain reconnaissance surveying.</p> <p>4.2 Describe the procedure of chain surveying.</p> <p>4.3 State the considerations of selecting station points.</p> <p>4.4 Describe the procedure of ranging of survey line.</p> <p>4.5 Describe the procedure of measuring linear distances with the help of chain and tape.</p> <p>4.6 The booking procedure of field book.</p> <p>4.7 State single line and double line field book.</p>	<b>3</b>	<b>7</b>

	<p>4.8 Describe the procedure of booking in a single line field book.</p> <p>4.9 Describe the procedure of booking in a double line field book.</p> <p>4.10 Describe precautions in booking field notes.</p>		
<b>5</b>	<p><b>CHAINING ACROSS OBSTACLES.</b></p> <p>5.1 Describe the procedure of setting out perpendicular by chain and tape when the point is accessible.</p> <p>5.2 Describe the procedure of setting out perpendicular by chain and tape when the point is inaccessible.</p> <p>5.3 Describe the procedure of chaining across obstacles when the chaining obstructed.</p> <p>5.4 Describe the procedure of chaining across obstacles when the vision obstructed</p> <p>5.5 Describe the procedure of chaining across obstacles when both chaining and vision obstructed.</p>	<b>2</b>	<b>3</b>
<b>6</b>	<p><b>ERRORS IN CHAINING.</b></p> <p>6.1 List the errors in chaining.</p> <p>6.2 Identify the causes for which a chain may be too-long or too-short.</p> <p>6.3 Calculate the correct distance and correct area from measured distance and measured area when the chain was too-long or too-short.</p> <p>6.4 Explain cumulative and compensating errors with causes of those errors.</p> <p>6.5 List the mistakes in chain surveying.</p> <p>6.7 Explain the name of necessary correction to be applied to the measured length of a line in order to obtained its true length.</p> <p>6.8 Explain the formula for correction of tapes for absolute length, variation of temperatures, variation of pull, Sag and slope.</p> <p>6.9 Compute correct length of line after necessary correction due to variation of pull, sag and slope.</p>	<b>3</b>	<b>5</b>
<b>7</b>	<p><b>CHAIN SURVEY MAP AND DIFFERENT METHODS OF COMPUTING AREA</b></p> <p>7.1 List the instrument and materials required for plotting a survey map.</p> <p>7.2 Discuss different types of scale.</p> <p>7.3 State suitable scale for plotting a map.</p> <p>7.4 Describe the procedure of plotting a survey map from field book.</p> <p>7.5 Draw conventional symbols used in plotting maps.</p> <p>7.6 Describe the units of measurements in plane surveying.</p> <p>7.7 Describe different methods of computing areas within regular and irregular perimeters.</p> <p>7.8 Carry out the field work for calculation of areas within regular and irregular perimeters.</p> <p>7.9 Compute the area along boundary by mid-ordinate rule, average ordinates rule, trapezoidal rule and Simpson's rule.</p>	<b>3</b>	<b>7</b>
<b>8</b>	<p><b>BASIC TERMS USED IN COMPASS SURVEYING.</b></p>	<b>3</b>	<b>4</b>

	<p>8.1 Describe the purpose and scope of compass surveying.</p> <p>8.2 List the instrument and accessories required for compass survey.</p> <p>8.3 Define terms- meridian, true meridian, magnetic meridian, arbitrary meridian, bearing, true bearing, magnetic bearing, arbitrary bearing, magnetic declination, dip of the needle, deflected angle, exterior angle, interior angle.</p> <p>8.4 Describe prismatic, surveyors and trough compass.</p> <p>8.5 Differentiate prismatic and Surveyor compass.</p> <p>8.6 State the use of different compass.</p> <p>8.7 Describe the procedure of compass survey.</p> <p>8.8 Define local attraction.</p> <p>8.9 Detect local attraction and correct the observed bearings.</p>		
<b>9</b>	<p><b>CONVERSION OF BEARING</b></p> <p>9.1 Explain for bearing and back bearing.</p> <p>9.2 Compute back bearing from fore bearing and fore bearing from back bearing.</p> <p>9.3 Explain whole circle bearing and reduced bearing and necessity of converting them.</p> <p>9.4 Convert whole circle bearing to reduced bearing and reduced bearing to whole circle bearing.</p>	<b>2</b>	<b>2</b>
<b>10</b>	<p><b>BASIC CONCEPT OF PLANE TABLE SURVEYING.</b></p> <p>10.1 State the purpose and scope of plane table surveying.</p> <p>10.2 List the instruments and accessories required for plane-table survey.</p> <p>10.3 Describe the procedure of setting up plane table.</p> <p>10.4 Explain the term orientation.</p> <p>10.5 Describe orientation by magnetic needle and back sighting.</p> <p>10.6 Mention the methods of plane table survey.</p> <p>10.7 Describe radiation, intersection, traversing and resection methods.</p> <p>10.8 Define three points problem.</p> <p>10.9 Describes the advantages and disadvantage of plane table survey.</p>	<b>3</b>	<b>7</b>
<b>11</b>	<p><b>BASIC CONCEPT OF CADASTRAL SURVEY.</b></p> <p>11.1 Define cadastral survey and mouza map.</p> <p>11.2 Define the purpose of cadastral survey.</p> <p>11.3 Mention the classification of mouza scale.</p> <p>11.4 List the equipment and accessories used in cadastral survey.</p> <p>11.5 Mention the Classification of Survey Khatiyani</p> <p>11.6 Define the terms Dag, Khatiyani, JL number, ROR. CS, SA, RS BS, City Khatiyani, Station, attestation and Diara survey</p> <p>11.7 Define the terms RS Mouza, CS Mouza, SA Mouza, City Mouza Maps.</p> <p>11.8 State the stages of cadastral survey.</p> <p>11.9 Explain the procedure of preparing a cadastral survey map.</p> <p>11.10 Describes the rules for numbering the plots.</p>	<b>3</b>	<b>7</b>
<b>12</b>	<b>IDENTIFY THE BOUNDARY OF PROPERTY and CAD.</b>	<b>3</b>	<b>2</b>



	12.1 Describe the procedure for demarcation of boundary lines of property. 12.2 Describe the procedure for locating of lost boundary. 12.3 Procedure to Transfer Mouza map in Auto CAD. 12.4 Define DLRS and their function 12.5 Mention Land survey Tribunal and their function.		
	<b>Total</b>	<b>32</b>	<b>60</b>

### **DETAILED SYLLABUS (PRACTICAL)**

Sl.	Experiment Name	Class (3 Period)	Marks (Continuous)
<b>1</b>	<b>IDENTIFY DIFFERENT INSTRUMENTS AND ACCESSORIES REQUIRED FOR CHAIN SURVEY.</b> 1.1.1 List the Instrument and Accessories for Chain Survey. 1.1.2 Tag over the Instrument and Accessories with name tag. 1.1.3 Adjusted the instrument and Accessories. 1.1.4 Observe Smoothness. 1.1.5 Maintain the record of performed task.	<b>1</b>	<b>2</b>
<b>2</b>	<b>PERFORM LENGTH OF PARALLEL LINES BY CHAIN AND TAPE</b> 2.1.1 Set a line with Chain or tape and ranging rod. 2.1.2 Checked alignment. 2.1.3 Set parallel lines reference to the existing line. 2.1.4 Measure correctness. 2.5 Maintain the record of performed task.	<b>1</b>	<b>2</b>
<b>3</b>	<b>PERFORM PERPENDICULARS LINE WITH THE HELP OF OPTICAL SQUARE AND TAPE.</b> 3.1.1 Set a line with Chain or tape and ranging rod. 3.1.2 Set perpendicular lines over a point of the existing line using optical square. 3.1.3 Checked measurement. 3.1.4 Measure correctness. 3.1.5 Maintain the record of performed task.	<b>1</b>	<b>2</b>
<b>4</b>	<b>PERFORM A DISTANCE ACROSS OBSTACLES.</b> 4.1 Set three or four points for to a obstacles area using Ranging rod. 4.2.1 Identify a reference point to calculate that lines which is not observed. 4.2.2 Checked measurement. 4.2.3 Measure correctness. 4.2.4 Maintain the record of performed task.	<b>1</b>	<b>2</b>
<b>5</b>	<b>PERFORM CHAIN SURVEY OF A FIELD.</b> 5.1.1 Create area for chain survey. 5.1.2 Perform length of every line. 5.1.3 Checked measurement.	<b>1</b>	<b>2</b>

	5.1.4 Measure correctness. 5.1.5 Maintain the record of performed task.		
<b>6</b>	<b>IDENTIFY THE DIFFERENT INSTRUMENTS AND ACCESSORIES REQUIRED IN COMPASS SURVEY.</b> 6.1.1 List the Instrument and Accessories for compass Survey. 6.1.2 Tag over the Instrument and Accessories with name tag. 6.1.3 Adjusted the instrument and Accessories. 6.1.4 Observe Smoothness. 6.1.5 Maintain the record of performed task.	<b>1</b>	<b>2</b>
<b>7</b>	<b>CREATE MAGNETIC BEARING BY PRISMATIC AND SURVEYORS COMPASS.</b> 7.1.1 Set a north south line. 7.1.2 Set angle in clockwise. 7.1.3 Checked angle. 7.1.4 Measure correctness. 7.1.5 Maintain the record of performed task.	<b>1</b>	<b>2</b>
<b>8</b>	<b>CREATE A PLOT THE MAP OF A PLACE BY RADIATION, INTERSECTION AND TRAVERSING METHOD WITH THE HELP OF PLANE TABLE.</b> 8.1.1 Set plane table in a given position. 8.1.2 Perform length of every point as per method 8.1.3 Checked measurement 8.1.4 Measure correctness. 8.1.5 Maintain the record of performed task.	<b>2</b>	<b>2</b>
<b>9</b>	<b>PERFORM THE POSITION OF THE INSTRUMENT STATION ON THE PLAN OF THE PLANE TABLE BY SOLVING THREE POINTS PROBLEM.</b> 9.1.1 Set plane table in a given position. 9.1.2 Perform length of every point as per method 9.1.3 Draw the area as per point and measurement. 9.1.4 Checked measurement. 9.1.5 Measure correctness. 9.1.6 Maintain the record of performed task	<b>2</b>	<b>2</b>
<b>10</b>	<b>SET A AREA OF A PLOT FROM MOUZA MAP.</b> 10.1 Perform measurement from the mouza map. 10.2 Perform length of every point as per scale. 10.3 Draw the area as per point and measurement. 10.4 Checked measurement. 10.5 Measure correctness. 10.6 Maintain the record of performed task	<b>2</b>	<b>2</b>
<b>11</b>	<b>PERFORM THE POSITION OF A POINT IN THE FIELD WHICH IS ALREADY PLOTTED ON THE MOUZA MAP.</b> 11.1 Perform a plot as per the mouza Dag no. 11.2 Perform length of every point as per scale. 11.3 Calculate the area as per plot.	<b>2</b>	<b>3</b>

	11.4 Checked measurement. 11.5 Measure correctness. 11.6 Maintain the record of performed task		
<b>12</b>	<b>LOCATE THE BOUNDARY LINE OF A PROPERTY WITH THE HELP OF CHAIN, TAPE AND PLANE TABLE WHICH IS ALREADY PLOTTED ON THE MOUZA MAP.</b> 12.1 Perform locket a plot from a mouza map as per Dag no. 12.2 Perform length of every point as per scale. 12.3 Perform How to measure mouza plot using gunia or 330 feet = 1 inch scale. 12.4 Maintain the record of performed task	<b>1</b>	<b>2</b>
	<b>Total</b>	<b>16</b>	<b>25</b>

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

<b>SI</b>	<b>Item Name</b>	<b>Quantity</b>
01	Engineering Chain	5 nos
02	Meter Chain	5 nos
03	Gunter Chain	5 nos
04	Ranging Rod	5 nos
05	Optical Square	5 nos
06	Prismatic Compass with tripod	5 nos
07	Survey Compass/Pocket Compass	5 nos
08	Plane Table and wooden tripod with accessories	5 nos
09	Alidade	5 nos
10	Rectangular Compass	5 nos
11	Engineer's Level (Spirit Level)	5 nos
12	Plumbing fork	5 nos
13	Plumb Bob	5 nos
14	Steel Tape (30 m )	10 nos
15	Arrow	100 nos
16	Gunia Scale ( 2")	10 nos
17	1"( inch) =330'(Feet) Scale	10 nos
18	80 inch :1 mile Scale	10 nos
19	Divider	10 nos
20	Diagonal Brass Scale	10 nos
21	Measuring Wheel	5 nos
22	Measuring Tape ( 5 m)	10 nos
23	Pegs	10 nos
24	Ranging and Offset rods	30 nos
25	Thread	500 gm
26	Cross-staff,	5 nos
27	Prism square,	5 nos
28	box-sextant.	5 nos
29	Clinometer.	5 nos

**RECOMMENDED BOOKS:**

<b>SI</b>	<b>Book Name</b>	<b>Writer Name</b>	<b>Publisher Name &amp; Edition</b>
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)	
10.	Surveying (Volume I & II)	S.K.Duggal.	
11.	Surveying & Levelling-	S.V.Kulkarni.	

**WEBSITE REFERENCES:**

<b>SI</b>	<b>Web Link</b>	<b>Remarks</b>
01	<a href="http://www.youtube.com">www.youtube.com</a>	Search here with topics
02	<a href="http://www.google.com">www.google.com</a>	Search here with topics
03	<a href="https://www.youtube.com/watch?v=-1KSBqYHfOg">https://www.youtube.com/watch?v=-1KSBqYHfOg</a>	Search here with topics
04	<a href="https://www.youtube.com/watch?v=vB8bhi5vbg4">https://www.youtube.com/watch?v=vB8bhi5vbg4</a>	Search here with topics
05	<a href="https://www.youtube.com/watch?v=HDGGQTeEHWM">https://www.youtube.com/watch?v=HDGGQTeEHWM</a>	Search here with topics
06	<a href="https://www.youtube.com/watch?v=_iIKDK7ef_I">https://www.youtube.com/watch?v=_iIKDK7ef_I</a>	Search here with topics

SUBJECT CODE	SUBJECT NAME	PERIOD PER WEEK		CREDIT
26433	Construction Process-I	T	P	C
		2	3	3

<b>Rationale</b>	<p>Construction process-I is the pre-requisite of Construction process-II. Civil Engineering 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 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.</p> <p>To perform above task, it is essential that students should have knowledge of various item of work like concrete, masonry, block masonry, partition wall etc, and their constructional details. Therefore, the subject of Construction Process-I is very important for Civil Engineering diploma Graduates.</p>
<b>Learning Outcome (Theoretical)</b>	<p><b>After undergoing the subject, students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Explain construction Health and safety.</li> <li>2. Explain different types of Hand tools, power tools and Equipment.</li> <li>3. Explain different types of Concrete and its properties, strength durability and workability.</li> <li>4. Explain the proportioning, mixing, transporting, placing and curing procedure of concrete.</li> <li>5. Explain method of preparation of cement concrete and special types of concrete.</li> <li>6. Describe the classification of brick masonry and Bond.</li> <li>7. Describe the procedure of block masonry, composite masonry.</li> <li>8. Describe the different types of partition wall and drywall.</li> </ol>
<b>Learning Outcome (Practical)</b>	<p><b>After undergoing the subject, students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Identify the various Health and Safety Equipment.</li> <li>2. Apply the procedure to maintain safety in work place.</li> <li>3. Identify and list the hand tools, Power tools and Equipment In construction Project.</li> <li>4. Perform Re-store procedure of Tools and Equipment.</li> <li>5. Perform to draw a grading curve for various samples of aggregates and find out the FM value.</li> <li>6. Perform slump test of different concrete works.</li> <li>7. Apply the procedure of cube and cylinder test for concrete and interpret the results.</li> <li>8. Perform compaction processes of concrete.</li> <li>9. Perform Chemical Curing and limitations of various methods of curing.</li> <li>10. Construct sample corner (L) joints of brick wall with different width and maintain bond.</li> <li>11. Conduct hollow and solid block wall up to 3 layers.</li> <li>12. Perform to lay cavity wall construction.</li> <li>13. Perform Drywall partition in a Model Room.</li> </ol>

## DETAILED SYLLABUS (THEORY)

Unit	Topics with Contents	Class ( 1 Period)	Final Marks
<b>1.</b>	<b>CONSTRUCTION HEALTH AND SAFETY</b> 1.1 Define personal health and safety. 1.2 Define Personal Protective Equipment. 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 Explain the procedure to maintain safety in work place.	<b>1</b>	<b>2</b>
<b>2</b>	<b>CONSTRUCTION TOOLS AND EQUIPMENT'S</b> 2.1 Define tools and Equipment. 2.2 List the tools used in construction work. 2.3 List the Equipment for Construction work. 2.4 Explain the procedure to use hand tools and Power tools. 2.5 Explain the procedure to use Equipment. 2.6 Explain the maintaining procedure of Tools and Equipment. 2.7 Explain the Re-store procedure of Tools and Equipment.	<b>1</b>	<b>3</b>
<b>3</b>	<b>FEATURES AND PROPERTIES OF CONCRETE</b> 3.1 Define concrete. 3.2 Mention the different Types of concrete. 3.3 List the uses of concrete in construction. 3.4 List the function of ingredients for concrete. 3.5 Mention the advantages and limitations of concrete. 3.6 Point out the characteristics of materials used in concrete. 3.7 Define strength, durability, workability, laitance and segregation. 3.8 List the factors affecting the strength, durability and workability of concrete. 3.9 Define water-cement ratio. 3.10 Describe the effect of water-cement ratio on the strength of concrete.	<b>4</b>	<b>8</b>
<b>4</b>	<b>PROPORTIONING, MIXING, TRANSPORTING, PLACING AND COMPACTION AND CURING OF CONCRETE.</b> 4.1 Explain the significance of proportioning the ingredients of concrete. 4.2 List the methods of concrete mix design. 4.3 Describe batching of concrete mix design by volume and weight. 4.4 Describe the ready-mix concrete. 4.6 Mention the advantages and limitations of ready-mix concrete. 4.7 State the various methods of transporting concrete. 4.8 Mention the sequence of placing concrete in different situations. 4.9 Explain curing and methods of curing. 4.10 Mention the advantages and limitations of various methods of curing.	<b>4</b>	<b>8</b>
<b>5</b>	<b>SPECIAL CONCRETE.</b> 5.1 List the special types of concrete. 5.2 Compare between polymer concrete and super plasticized concrete. 5.3 Mention the procedure used in the production of Ferro-cement construction. 5.4 Explain pre-stressed concrete. 5.5 Mention the procedure used in production of pre-stressed concrete. 5.6 Explain the procedure of fair face Concrete.	<b>2</b>	<b>6</b>
<b>6</b>	<b>CONCRETE CONSTRUCTION AND SUPERVISION</b> 6.1 Define precaution and supervision of concrete construction.	<b>3</b>	<b>7</b>

	<p>6.2 List the special precautions to be observed for concreting under water.</p> <p>6.3 List the special precautions to be observed for concreting in cold weather.</p> <p>6.4 Mention the special precautions to be observed for concreting in hot weather.</p> <p>6.5 List the factors to be considered while supervising good quality concrete.</p> <p>6.6 Explain the factors to be considered while supervising good quality RCC construction.</p> <p>6.7 Explain the factors to be considered while supervising good quality pre-stressed concrete construction.</p>		
<b>7</b>	<p><b>BRICK MASONRY</b></p> <p>7.1 Define brick masonry.</p> <p>7.2 Explain bond.</p> <p>7.3 Define header, stretcher, course, bed, joint and closer.</p> <p>7.4 Define bond in brick masonry</p> <p>7.5 Sketch Header, stretcher, English, Flemish, Garden wall and Rat trap Bond.</p> <p>7.6 Mention the functions of good brick bonding.</p> <p>7.7 Mention different types of bonds in brick masonry.</p> <p>7.8 Explain the procedure of brick laying.</p> <p>7.9 List the defects in brick masonry.</p> <p>7.10 Mention the considering factors of brick masonry works.</p>	<b>4</b>	<b>8</b>
<b>8</b>	<p><b>BLOCKMASONRY</b></p> <p>8.1 Define hollow and solid block.</p> <p>8.2 Explain the necessity of hollow and solid block.</p> <p>8.3 Sketch hollow and solid block.</p> <p>8.4 Mention the feature of hollow and solid block.</p> <p>8.4 Point out different types of hollow and solid block.</p> <p>8.5 Mention the advantages and limitations of hollow and solid block.</p> <p>8.6 Describe the construction procedure of hollow and solid block.</p> <p>8.7 Mention the precautions of hollow and solid block works.</p>	<b>3</b>	<b>7</b>
<b>9</b>	<p><b>COMPOSITE MASONRY</b></p> <p>9.1 Define composite masonry.</p> <p>9.2 Mention different types of composite masonry.</p> <p>9.3 Sketch brick backed stone slab masonry.</p> <p>9.4 Mention the advantages and limitations of using reinforced brick masonry.</p> <p>9.5 Define cavity wall.</p> <p>9.6 Explain the necessity of cavity wall.</p> <p>9.7 Sketch cavity walls.</p> <p>9.8 Mention the feature of cavity wall.</p>	<b>2</b>	<b>3</b>
<b>10</b>	<p><b>PARTITION WALL</b></p> <p>10.1 Define partition wall.</p> <p>10.2 Mention the common requirement of partition wall.</p> <p>10.3 Mention the functions of partition wall.</p> <p>10.4 List different types of partition wall.</p> <p>10.5 Describe the construction procedure of Brick partition, Drywall partition, Glass partition, Aluminum partition and Light weight partition (timber stud work board) wall.</p> <p>10.6 Mention the advantages and limitations of different partition wall.</p> <p>10.7 Differentiate between load bearing (main) wall and partition wall.</p>	<b>4</b>	<b>8</b>
	<b>Total</b>	<b>32</b>	<b>60</b>

## DETAILED SYLLABUS (PRACTICAL)

Unit	Experiment name with procedure	Class (3 Period)	Continuous Marks
<b>1.</b>	<b>PERFORM CONSTRUCTION HEALTH AND SAFETY</b> 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.	<b>1</b>	<b>2</b>
<b>2</b>	<b>IDENTIFY CONSTRUCTION TOOLS AND EQUIPMENT</b> 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.	<b>1</b>	<b>3</b>
<b>3</b>	<b>PERFORM AGGREGATE GRADING OF CONCRETE</b> 3.1 Collect 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.	<b>2</b>	<b>6</b>
<b>4</b>	<b>PERFORM PROPERTIES OF CONCRETE</b> 4.1 Collect required tools, equipment and materials. 4.2 Perform slump test of different concrete works. 4.3 Conduct cube test of different concrete works. 4.4 Conduct cylinder test for concrete and interpret the results. 4.5 Maintain the record of performed job.	<b>2</b>	<b>6</b>
<b>5</b>	<b>PERFORM PROPORTIONING, MIXING, TRANSPORTING, PLACING AND COMPACTION OF CONCRETE</b> 5.1 Collect required tools and materials. 5.2 Mix concrete for required Proportion. 5.3 Perform transporting of concrete. 5.4 Perform placing of concrete. 5.5 Perform compaction processes of concrete. 5.6 Perform Curing by using chemical/water. 5.6 Maintain the record of performed job.	<b>2</b>	<b>6</b>
<b>6</b>	<b>PERFORM CURING OF CONCRETE</b> 6.1 Select place of curing. 6.2 Select process of curing. 6.3 Perform Curing by using chemical and water. 6.4 Maintain the record of performed job.	<b>1</b>	<b>3</b>
<b>7</b>	<b>IDENTIFY SPECIAL TYPES OF CONCRETE</b> 7.1 Select special type of concrete. 7.2 Identify the feature polymer concrete and super plasticized concrete. 7.3 Maintain the record of performed job.	<b>1</b>	<b>3</b>
<b>8</b>	<b>OBSERVE CONCRETE CONSTRUCTION AND SUPERVISION</b> 8.1 Field visit. 8.2 Maintain the record of field visit.	<b>1</b>	<b>3</b>
<b>9</b>	<b>PERFORM BRICK MASONRY.</b> 7.1 Identify tools and materials of Masonry work. 7.2 Collect the required tools and materials. 7.3 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. 7.4 Construct sample corner (L) joints of 25 cm to 50 cm width English	<b>2</b>	<b>6</b>



	bond brick wall up to 5 layers. 7.5 Construct sample cross (+) joints of 12.5 cm to 25 cm width Stretcher and Header bond 7.6 Construct sample corner (L) joints of 25 cm to 50 cm width Flemish bond brick wall up to 5 layers. 7.7 Construct sample corner (L) joints of 25 cm to 50 cm width Hader bond brick wall up to 5 layers. 7.8 Observe curing. 7.9 Maintain the record of performed job.		
<b>10</b>	<b>CONSTRUCT BLOCK MASONRY</b> 11.1 Identify tools and materials of Block Masonry. 11.2 Collect the required tools and materials. 11.3 Prepare hollow and solid block wall up to 3 layers. 11.4 Perform precautions to be taken while construction of hollow and solid block. 11.5 Observe proper curing. 11.5 Maintain the record of performed job.	<b>1</b>	<b>4</b>
<b>11</b>	<b>EXECUTE COMPOSITE MASONRY.</b> 12.1 Select the required tools and materials. 12.2 Collect the required tools and materials. 12.3 Sketch cavity walls 12.4 Perform to lay cavity wall construction. 12.5 Observe proper curing. 12.6 Maintain the record of performed job.	<b>1</b>	<b>4</b>
<b>12</b>	<b>PERFORM PARTITION WALL.</b> 13.1 Select the required tools and materials. 13.2 Collect the required tools and materials. 13.3 Perform Aluminum partition wall 13.4 Perform Drywall partition in a Model Room. 13.5 Maintain the record of performed job.	<b>1</b>	<b>4</b>
	<b>Total</b>	<b>16</b>	<b>50</b>

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

SI	Item Name	Quantity
<b>1</b>	<b>LIST OF HAND TOOLS:</b> Chisel(Bolster, Cold), Boning rods, Hammer(Brick, Lump, Double-end Comb, Sledge), Bricklayers Line Pins, Trowel, Brickwork Gauge Rod, Water Level, Plumb Rule and Bob, Spirit Level, Jointers, Mixing Tools, Straight Edge, Saws(Hand, Masonry, Circular), Masonry Square, Bump cutter/screed, Concrete mixer, Cordless drill, Crowbar, Digging bar, End frames, Gloves, Hoe, Iron pan, Jack plane, Ladder, Measuring box, Measuring tape, Measuring wheel, Pick axe, Polishers, Putty knife, Rammer, Rubber Boots, Safety glasses, Safety helmet, Scratchers, Spade, Straight edge brushes.	
<b>2</b>	<b>LIST OF POWER TOOLS:</b> Vibrator, Slump Cone.	<b>2</b>
<b>3</b>	<b>LIST OF EQUIPMENT:</b> Sand screen machine, Wheel barrow, Mini Mixer Machine, Brick Cutter Machine.	<b>2</b>

### RECOMMENDED BOOKS:

SI	Book Name	Writer Name	Publisher Name & Edition
01	Building Construction	B C Punmia	Laxmi Publishers, 5 <sup>th</sup> 2004
02	Building Construction	Varghese P C	Prentice-Hall of India Pvt.Ltd; 1st

			edition (April 8, 2010)
03	Building Construction and materials	<b>Sushil Kumar</b>	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, 27 <sup>th</sup> 2009
07	Construction and Foundation Engineering	Dr. J Jha, S K Sinha	Khanna Publishers

**WEBSITE REFERENCES:**

SI	Web Link	Remarks
01	<a href="http://www.laxmipublications.com">www.laxmipublications.com</a>	Search here with topics
02	<a href="http://www.ishkapur@vsnl.com">www.ishkapur@vsnl.com</a>	Search here with topics
03	<a href="http://www.kopykitab.com">www.kopykitab.com</a>	Search here with topics
04	<a href="http://www.theconstructor.org/construction/construction-tools-list-images-building/20238/">www.theconstructor.org/construction/construction-tools-list-images-building/20238/</a>	Search here with topics
05	<a href="http://www.civiljungle.com/civil-engineering-tools-and-equipment/">www.civiljungle.com/civil-engineering-tools-and-equipment/</a>	Search here with topics

Subject Code	Subject Name	Period Per Week		Credit
		T	P	
28511	COMPUTER OFFICE APPLICATION	0	6	C
				2

<b>Rationale</b>	This is a generic course for all diploma programs required to enable the graduates to use and work with ICT competently. It includes typing in Bangla and English, using the internet for e-communication & e-interaction, operating a computer and allied devices, Operating Word Processing, Spreadsheet Analysis, and Presentation software. This course also enables a graduate to adopt further study in upper-level courses using IT and other sectors. This course is designed to emphasize practical aspects rather than theory.
<b>Course Learning Outcome</b>	<p>After undergoing the subject, students will be able to:</p> <ul style="list-style-type: none"> <li>• type Bangla and English smoothly</li> <li>• use internet for e-communication &amp; interaction</li> <li>• operate a computer and allied devices</li> <li>• perform the operation of Word Processing App, Spreadsheet Application, and Presentation Package.</li> </ul>

### Detailed Syllabus (Practical)

CLO	Experiment name with the procedure	Class (3 Periods per class)	Marks
1	<p><b>TYPE TEXT AND DOCUMENTS IN ENGLISH AND BANGLA.</b></p> <p><b>1.1 Startup and Shutdown of a computer.</b></p> <p>1.1.1 Identify Basic <b>Computer Hardware</b> devices <b>Computer Hardware:</b> System Unit, Motherboard, Processor, Power supply, SSD, Hard Disk, RAM, ROM</p> <p>1.1.2 Check Peripherals and connect with the system unit. <b>Peripherals:</b> Monitor, Keyboard, Mouse, Modem, Scanner, Printer, Multimedia Projector</p> <p>1.1.3 Connect Power cords/adaptor properly with computer and power outlets socket.</p> <p>1.1.4 Switch on the Computer gently.</p> <p>1.1.5 Arrange and customize PC <b>Desktop / GUI settings</b> as per requirement. <b>Desktop / GUI settings:</b> Icons, Taskbar, View, Resolutions</p> <p>1.1.6 Close Unsaved files and folders</p> <p>1.1.7 Close Open software and switch off hardware devices.</p> <p>1.1.8 Switch off Computer gently.</p> <p>1.1.9 Switched off Power at the respective power outlets.</p> <p><b>1.2 Install the Typing Tutor software.</b></p>	3	5

	<p>1.2.1. Identify Required <i>Hardware</i> and <i>software</i> of typing Tutor software.  <b>Software:</b> Operating System, Microsoft Office, Open Office, Typing Tutor, Bangla Typing Software, Google doc, Avro, Bijoy.</p> <p>1.2.2. Install English and Bangla Typing tutor software.</p> <p>1.2.3. Install Bangla Unicode Typing Tutor Software.</p> <p>1.2.4. Install Required fonts for typing of Bangla and English.</p> <p><b>1.3 Practice text Typing in English and Bangla.</b></p> <p>1.3.1 Start Typing tutor software.</p> <p>1.3.2 Practice English Home key drilling systematically.</p> <p>1.3.3 Practice Typing in English as per Standard procedure (30 WPM).</p> <p>1.3.4 Install Specialized Bangla Typing tutor software.</p> <p>1.3.5 Practice systematically Bangla Home key typing.</p> <p>1.3.6 Type Bangla document as per standard procedure (20 WPM).</p> <p>1.3.7 Type Text documents repeatedly to increase typing speed in both English and Bangla.</p> <p><b>1.3 Maintain the record of the performed job.</b></p>		
2	<p><b>USE THE INTERNET FOR E-COMMUNICATION &amp; INTERACTION</b></p> <p><b>2.1 Access resources from the internet</b></p> <p>2.1.1. Interpret <b>Internet Terms</b> and their uses.  <b>Internet Terms:</b> Browser, web page, URL, HTML and http/https, E-mail, social media, IP, Download, Malware, Router, Bookmark, E-commerce</p> <p>2.1.2. Select and install Appropriate <b>internet browsers</b>  <b>Internet browsers:</b> Microsoft Edge, Google Chrome, Internet Explorer, Opera, Safari, QQ Browser, UC, Yandex</p> <p>2.1.3. Carry out <b>Browser Settings</b> for smooth operation.  <b>Browser Settings:</b> Synchronization, Privacy and Security, Auto fill, Appearance, Language, Download, Accessibility</p> <p>2.1.4. Open the Internet browser and write/select a web address / URL in /from the address bar to access <b>Information.</b>  <b>Information:</b> Text Information, Graphics, Video</p> <p>2.1.5. Use <b>Search engines</b> to access information.  <b>Search engines:</b> Google, Yahoo, Alta Vista, Msn, Bing</p> <p>2.1.6. Use internet resources (Free and Paid Platform)</p> <p>2.1.7. Share/download/upload Video / Information From/to web site/<b>social media.</b>  <b>social media:</b> Facebook, Twitter, LinkedIn, YouTube</p> <p>2.1.8. Communicate using social media and professional's Media.</p> <p>2.1.9. Search and follow Netiquette' (or web etiquette) Principles.</p> <p><b>2.2 Use Web Services.</b></p>	4	6

	<p>2.2.1. Identify <b>Web Services</b> and service provider as per job requirement. <b>Web Services:</b> Communication (Zoom, Bip, Meet), Storage (Drop box, Mega, One Drive, Google Drive)</p> <p>2.2.2. Interpret the Function of the web services</p> <p>2.2.3. List Information for creating an account in web Services.</p> <p>2.2.4. Identify <b>Google services</b>. <b>Google services:</b> Drive, Calendar, Map, Translator, Docs, Sheets, Slide, Forms, Search, Contact, Classroom, Image Search, Blogger, Meet</p> <p>2.2.5. List Functions of Google services.</p> <p>2.2.6. Demonstrate Google Services.</p> <p><b>2.3 Use and manage E-mail.</b></p> <p>2.3.1 Identify and select <b>E-mail services</b> to create a new e-mail address. <b>E-mail services:</b> Free mail services (Gmail, Yahoo, Hotmail), Webmail Services</p> <p>2.3.2 Compose E-mail and attach prepared document.</p> <p>2.3.3 Send E-mail to different types of recipients using the CC and BCC option.</p> <p>2.3.4 Read, forward, reply, and delete E-mail as per requirement.</p> <p>2.3.5 Create and manipulate custom email folders.</p> <p>2.3.6 Print E-mail message.</p> <p><b>2.4 Maintain the record of the performed job.</b></p>		
3	<p><b>OPERATE A COMPUTER AND ALLIED DEVICES</b></p> <p><b>3.1 Perform Basic Setting</b></p> <p>3.1.1 Change power options properties as per requirement.</p> <p>3.1.2 Terminate Non-responding application as specified.</p> <p>3.1.3 Identify and adjust System information, operating system version, date &amp; Time display system, color settings, and available RAM as per job requirement.</p> <p>3.1.4 Set Keyboard Language according to the instructions.</p> <p>3.1.5 Install Fonts following standard procedures.</p> <p>3.1.6 Adjust Screen Resolution as per job requirement.</p> <p>3.1.7 Identify Basic <b>Hardware and Software problems</b> and take the remedy. <b>Hardware and Software problem:</b> Can't Open, Slow, Hang, Display Problem, Setting Problem, Keyboard and Mouse Problem, Sound Problem, Input devices are not working, No network, Slow internet, Printer is not working, Software installation problem</p> <p><b>3.2 Operate Computer</b></p> <p>3.2.1 Create Files and folders</p> <p>3.2.2 <b>Manipulate</b> Files and folders as per requirement. <b>Manipulated:</b> Opened, Copied, Renamed, Deleted, Sorted.</p> <p>3.2.3 View and search Properties of files and folders.</p> <p>3.2.4 Practice Control panel settings.</p> <p>3.2.5 Format and defragment <b>Storage devices</b> as per requirement. <b>Storage devices:</b> Hard drive, Flash Drive, Flash Memory</p> <p>3.2.6 Take Backups as required.</p> <p>3.2.7 use and change Password as per job requirement</p>	3	5

	<p><b>3.3 Manage Security of Hardware and Software.</b></p> <p>3.3.1 Installed Custom software and Antivirus software according to standard operating procedure.</p> <p>3.3.2 Scan Storage devices using antivirus software.</p> <p>3.3.3 Scan Folders and Files using the current version of Software.</p> <p>3.3.4 Update Scanning software or virus definition regularly.</p> <p>3.3.5 Identify <b>Cyber Security issues</b> or hardware and software. <b>Cyber Security issues:</b> Hacking, Phishing, Data Leakage, Threat</p> <p>3.3.6 Recognize and avoid Cyber threats and attacks.</p> <p><b>3.4 Manage Printer and Printer settings</b></p> <p>3.4.1 Install Printers on the computer according to the manufacturer's instructions.</p> <p>3.4.2 Print Documents from an application.</p> <p>3.4.3 Print, pause, restart, or cancel using print manager.</p> <p><b>3.5 Maintain the record of performed job</b></p>		
4	<b>OPERATE WORD PROCESSING APPLICATION</b>		
	<p><b>4.1 Create documents.</b></p> <p>4.1.1. Open <b>Word-processing application</b>. <b>Word-processing application:</b> MS Word, Open Office</p> <p>4.1.2. Create <b>Documents</b>. (Word documents, Standard CV with different text &amp; Fonts, image, and table, Application / Official letter with proper paragraph and indenting, spacing, styles, illustrations, tables, header &amp; footers and symbols, Standard report/newspaper items with column, footnote, and endnote drop cap, indexing and page numbering)</p> <p>4.1.3. Add Text and Data according to information requirements.</p> <p>4.1.4. Use Document templates as per the job required.</p> <p>4.1.5. Use <b>Formatting Tools</b> when creating the document. <b>Formatting Tools:</b> (Bold, Italic, Underline, Strikethrough, Subscript, Superscript, Change case, Text highlight color, Font color, Font, Font size, Clear formatting, Format painter, Illustrations and styles, Text, Table, Symbols, Header &amp; footer, Text alignment)</p> <p>4.1.6. Insert and edit Equation as per job requirement.</p> <p>4.1.7. Save Documents are as per job requirements.</p> <p><b>4.2 Customize basic settings to meet page layout conventions</b></p> <p>4.2.1 Adjust Page layout to meet information requirements</p> <p>4.2.2 Open and use User interface and <b>toolbars</b> as per job requirement. <b>Toolbars:</b> File tab, Title bar, Ribbon, Ruler, Status bar, View button, Zoom control, Document area, Dialog box launcher, Backstage view</p> <p>4.2.3 Change <b>Font Format</b> to suit the purpose of the document. <b>Font Format:</b> Times New Roman, Arial, Nikosh, NikoshBan, Kalpurush,</p>	8	16

- SutonnyMJ, Century, Century gothic, Vrinda
- 4.2.4 Change **Alignment** and line spacing according to document requirements.  
**Alignment:** Left, Right, Center, Top, Text direction, Cell margins
- 4.2.5 Modify Margins to suit the purpose of the document.

**4.3 Format documents**

- 4.3.1 Use formatting features, Symbols, and styles as per requirement.
- 4.3.2 Highlight and Copy Text from other areas in the document or form another active document.
- 4.3.3 Insert headers and footers to incorporate necessary data.
- 4.3.4 Save Documents in another **file format**  
**file format:** .doc, .docx, .pdf, .xps, .xml
- 4.3.5 Save and close document to **Storage device**.  
**Storage device:** Flash Drive, Hard Disk Drive, Memory Card, CD/DVD

**4.4 Create a table.**

- 4.4.1 Insert the standard table into the document.
- 4.4.2 Split and /or merge the cells to meet the Information requirement.
- 4.4.3 Insert, delete, modify and move columns and rows if Necessary.
- 4.4.4 Insert Text into the table.
- 4.4.5 Operation carried for **Data Handled** as per job Requirement.  
**Data Handled:** Sort, Repeat Header row, convert to Text, Formula, Autofit.
- 4.4.6 Use Styling tools according to style requirements.
- 4.4.7 Add formula to the table as per job requirement.

**4.5 Add illustrations**

- 4.5.1 Insert appropriate **illustrations** into the document and Customize if necessary.  
**Illustrations:** Picture, clip art, Shapes, Smart Art, Chart
- 4.5.2 Position and resize images according to the Document formatting requirements.

**4.6 Perform mail merge operation**

- 4.6.1 Determine sender and recipients as per job Requirements.
- 4.6.2 Follow preparatory steps for mail merge.
- 4.6.3 Add recipients for mail merge.
- 4.6.4 Perform Mail merge operation.
- 4.6.5 Send mail.

**4.7 Create references**

- 4.7.1 Plan Footnote, endnote, and citation.
- 4.7.2 Create Footnote and endnote.
- 4.7.3 Create citation.

**4.8 Print information**

- 4.8.1 Connect **printer** with computer and power outlet Properly.  
**Printer:** Dot matrix printer, Laser Printer, Inkjet printer
- 4.8.2 Switch on power at both the power outlet and

	<p>printer.</p> <p>4.8.3 Install and add printer.</p> <p>4.8.4 Select correct printer settings and print the document or selected part as per job requirements.</p> <p>4.8.5 View or cancel print from the printer spool.</p> <p><b>4.9 Maintain the record of the performed job.</b></p>		
5	<p><b>OPERATE SPREADSHEET APPLICATION</b></p> <p><b>5.1 Create spreadsheets</b></p> <p>5.1.1. Open <i>Spreadsheet Application</i>,</p> <p>5.1.1. Create spreadsheet files and enter numbers, text, and symbols into cells according to information requirements.</p> <p>5.1.2. Enter simple <b>formulas and functions</b> using cell Referencing where required.</p> <p><b>Formulas:</b> SUM, AVERAGE, IF, MAX, MIN, COUNT, RANK, Date and Time, Math and Trig, AND, OR, NOR, Between, ABS, Greater than, less than</p> <p><b>Functions:</b> Mathematics, Logical, Simple statistical</p> <p>5.1.3. Correct formulas when error messages occur.</p> <p>5.1.4. Use a range of common tools during spreadsheet development.</p> <p>5.1.5. Edit columns and rows within the spreadsheet.</p> <p>5.1.6. Use the auto-fill function to increment data where required.</p> <p>5.1.7. Save spreadsheet file to directory or folder.</p> <p><b>5.2. Customize basic settings:</b></p> <p>5.2.1. Adjust page layout to meet user requirements or special needs.</p> <p>5.2.1. Open and view different toolbars.</p> <p>5.2.2. Change font settings so that they are Appropriate for the purpose of the Document.</p> <p>5.2.3. Change <b>alignment</b> options and line spacing according to spreadsheet formatting features.</p> <p><b>Alignment: Right, Left, Centre, Top, Middle, Bottom</b></p> <p>5.2.4. <b>Format</b> cell to display different styles as required.</p> <p><b>Format:</b> Bold, Italic, Underline, Font size, color, change case, Alignment, and intend</p> <p>5.2.5. Modify margin sizes to suit the purpose of the spreadsheets.</p> <p>5.2.6. View multiple spreadsheets concurrently.</p> <p><b>5.3. Format spreadsheet:</b></p> <p>5.3.1. Use formatting features as per job requirements.</p> <p>5.3.2. Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet.</p> <p>5.3.3. Use formatting <b>tools</b> as required within the spreadsheet.</p> <p>5.3.4. Align information in a selected cell as required.</p> <p>5.3.5. Insert headers and footers using formatting features.</p> <p>5.3.6. Save the spreadsheet in another format.</p> <p>5.3.7. Save and close the spreadsheet to the storage device.</p> <p><b>5.4. Sort and filter data in worksheet</b></p> <p>5.4.1. Create worksheets.</p> <p>5.4.2. Insert data into the sheet.</p> <p>5.4.3. Sort data with different criteria.</p> <p>5.4.4. Filter data with different conditions,</p> <p>5.4.5. Print sorted or filtered data</p> <p><b>5.5. Incorporate object and chart in the spreadsheet:</b></p>	6	10



	<p>5.5.1. Import an object into an active spreadsheet.  5.5.2. Manipulate imported objects by using formatting features.  5.5.3. Create a chart using selected data in the spreadsheet.  5.5.4. Display selected data in a different chart.  5.5.5. Modify chart using formatting features.</p> <p><b>5.6. Create worksheets and charts</b>  5.6.1. Create Worksheets as pre-requirement.  5.6.2. Enter Data as per job requirement.  5.6.3. use function for calculating and editing logical operations.  5.6.4. Format <b>Sheets</b> as per requirement.  <b>Sheets:</b> Salary Sheet with sorting, filtering, and chart, Mark/Grade/Tabulation sheets for simple result processing.  5.6.5. Create <b>Charts and Graphs</b> as per job requirements.  <b>Charts and Graphs:</b> Column, Pie, Line, Bar, Table, Scatter  5.6.6. Preview and print Charts/ Sheets.</p> <p><b>5.7. Print spreadsheet:</b>  5.7.1. View spreadsheet in print preview mode.  5.7.2. Select basic printer options.  5.7.3. Print spreadsheet or selected part of the spreadsheet.  5.7.4. Submit the spreadsheet to the appropriate person for approval or feedback.</p> <p><b>5.8. Maintain the record of the performed job.</b></p>		
6	<p><b>OPERATE PRESENTATION PACKAGE:</b></p> <p><b>6.1. Create presentations:</b>  6.1.1 Open <b>Application package</b> for presentation and create a simple design for a presentation according to organizational requirements.  <b>Application package:</b> PowerPoint, Prezi  6.1.2 Open a blank presentation and add text and graphics using the user interface and toolbar.  6.1.3 Apply existing styles within a presentation.  6.1.4 Use presentation templates and slides to create a presentation.  6.1.5 Use various <b>Illustrations</b>, audio, video, and <b>effects</b> in the presentation.  <b>Illustrations:</b> Picture, Clip art, Photo, Shape, Smart art, Chart  <b>Effects:</b> Entrance, Emphasis, Exit, Motion path, Sound  6.1.6 Add design, transition, and animation as per job requirement  6.1.7 Save the presentation to the correct directory.</p> <p><b>6.2 Customize basic settings:</b>  6.2.1 Adjust display to meet user requirements.  6.2.2 Open and view different <b>toolbars</b> to view options.  6.2.3 Ensure <b>font settings</b> are appropriate for the purpose of the presentation.  6.2.4 Select necessary font tools as per job requirements.  6.2.5 View multiple slides at once.</p> <p><b>6.3 Format presentation</b>  6.3.1 Use and incorporate organizational charts, bulleted lists and modify as required.  6.3.2 Add and manipulate <b>objects</b> to meet presentation purposes.  <b>Objects:</b> image, chart, worksheet, equation, slide  6.3.3 Import and modify <b>objects</b> for presentation purposes.  6.3.4 Modify slide layout, including text and colors to meet presentation requirements.  6.3.5 Use <b>formatting tools</b> as required within the presentation.  6.3.6 Duplicate slides within and/or across a presentation.  6.3.7 Record the sequence of slides and/or delete slides for presentation purposes.</p>	4	8

<p><b>6.3.8</b> Save the presentation in another <b>format</b>.</p> <p>6.3.9 Save and close presentation to disk.</p> <p><b>6.4 Add Slide show effects</b></p> <p>6.4.1 Incorporate animation and multimedia effects into the presentation as required to enhance the presentation and present the presentation.</p> <p>6.4.2 Add <b>Slide transition effect to</b> ensure a smooth presentation.</p> <p>6.4.3 Test the presentation for overall impact</p> <p>6.4.4 Use on-screen navigation tools to start and stop slide shows or move between different slides.</p> <p><b>6.5 Create a template using a master slide</b></p> <p>6.5.1 Open Blank presentation and click the slide master form view tab.</p> <p>6.5.2 Create slide layout and/or customized as per requirements.</p> <p>6.5.3 Add Theme based colors, fonts, effects, backgrounds and style to the presentation.</p> <p>6.5.4 Set page orientation for all of the slides.</p> <p>6.5.5 Save and close presentation</p> <p><b>6.6 Print presentation and notes</b></p> <p>6.6.1 Select the appropriate print format to print presentation.</p> <p>6.6.2 Select preferred slide orientation.</p> <p>6.6.3 Add notes and slide numbers.</p> <p>6.6.4 Preview slide and check spells before presentation.</p> <p>6.6.5 Print selected slides.</p> <p><b>6.7 Maintain the record of performed job.</b></p>			
	<b>Total</b>	<b>28</b>	<b>50</b>

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

Sl	Item Name	Quantity
01	Computer System / Laptop	01 per student
Accessories		
02	Extra Key Board	05 Piece
03	Extra Mouse	05 Piece
04	Extra System / Laptop Unit	02 Piece
05	Extra Mother Board	02 Piece
06	Extra RAM	05 Piece
07	Extra Hard Disk	02 Piece
08	Extra SSD	02 Piece
09	Multimedia Projector	01 Piece
10	Multimedia pointer	01 Piece
11	Potable wireless Sound System	01 set
12	Network Adapter	02 Piece
13	VGA cable	02 Piece
14	Printer (LASER)	01 Piece
15	Printer (Dot Matrix )	01 Piece
16	Printer (Inkjet)	01 Piece
17	Printer Cable	01 Piece
18	Monitor	01 Piece
19	Modem	01 Piece
20	Scanner	01 Piece

21	Power cords/Power adapter	01 Piece
22	UPS/ IPS	01 Piece

**Recommended Books:**

SI	Book Name	Writer Name	Publisher Name & Edition
01	MOS 2010, Study Guide	<u>Joan ambert,</u> <u>Joyce Cox</u>	<b>Up-to-date Edition</b>
02	Computer Application in Business	<u>R. Parameswaran</u>	

**Website References:**

SI	Web Link	Remarks
01	<a href="https://teachers.tech/microsoft-office-tutorials/">https://teachers.tech/microsoft-office-tutorials/</a>	
02	<a href="https://www.javatpoint.com/ms-word-tutorial">https://www.javatpoint.com/ms-word-tutorial</a>	
03	<a href="https://www.tutorialspoint.com/word/index.htm">https://www.tutorialspoint.com/word/index.htm</a>	