BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Sher-E-Bangla Nagar

Dhaka-1207.

04-YEAR DIPLOMA IN ENGINEERING CURRICULUM

COURSE STRUCTURE & SYLLABUS

(PROBIDHAN-2022)

GRAPHIC DESIGN TECHNOLOGY

TECHNOLOGY CODE: 96

3rd SEMESTER

(Effective from 2022-2023 Academic Sessions)

DIPLOMA IN ENGINEERING CURRICULUM
COURSE STRUCTURE

(PROBIDHAN-2022)

TECHNOLOGY NAME: GRAPHIC DESIGN TECHNOLOGY (96)

(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	25831	Business Communication	2	-	2	40	60	100	-	-	-	100
2	25913	Chemistry	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	26811	Basic Electronics	2	3	3	40	60	100	25	25	50	150
5	29531	Graphic Materials	2	3	3	40	60	100	25	25	50	150
6	29631	Graphic Design-I	1	3	2	20	30	50	25	25	50	100
7	29632	Basic Photography	2	3	3	40	60	100	25	25	50	150
Total			**15**	**18**	**21**	**300**	**450**	**750**	**150**	**150**	**300**	**1,050**

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

Rationale	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.
Learning Outcome	**After completion of this course, students will be able to** • Effective business communication. • Developing and delivering effective presentations. • Effective interpersonal communications. • Good time management. • Effective problem solving. • Acquiring Knowledge of Information and Communication Technology. • Effective business report writing.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	**Business communication.** 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.	**4**	**8**
2.	**Communication model and feedback.** 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.	**3**	**6**
3.	**Types of communication.** 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.	**5**	**9**
4.	**Formal and informal communication.** 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.	**2**	**4**

5.	**Methods of communication.** 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.	**Effective listening** 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.	**Essentials of communication** 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.	**Report writing** 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.	**Office management.** 9.1 Define office and office work. 9.2 State the characteristics of office work. 9.3 Define filing and indexing. 9.4 Discuses the method of filing. 9.5 Discuses the method of indexing. 9.6 Distinguish between filing and indexing.	**3**	**5**
10.	**Business letter, official and semiofficial letters.** 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**
	Total	**32**	**60**

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
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	

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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
26811	BASIC ELECTRONICS	T	P	C
		2	3	3

Rationale	Electronic devices have become an important part of our day-by-day life. Now a days it is difficult for us to live without electronic device. We live in a generation that uses electronics and smart technologies. Where robots and artificial intelligence is capable of doing human works in all technological equipment with more ease and efficiency. Operation of all machines, devices and equipment are controlled by electronic device and circuits. This subject covers only such topics which will enable the diploma engineers to identify and maintenance the electronics parts and able to proper fault finding.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** • Describe soldering • Determine the value of Capacitor & Resistor using numeric and color code. • Describe Semiconductor and Semiconductor Diode. • Describe Rectifier circuits • Explain Construction and characteristics of PNP and NPN Transistor. • Explain the construction and operation of Single and Multi stage amplifier
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** • Perform soldering. • Calculate values of different resistors and capacitors with the help of color code. • Check the semiconductor diode and Determine characteristics of Diode • Verify the wave-shape of half-wave and full wave rectifier circuit • Test special diodes. • Verify the bipolar junction transistor characteristics. • Determining Q-Point and gain of transistor amplifier. • Determining frequency response of single stage R-C coupled transistor amplifier.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	SOLDERING AND COLOR CODE 1.1Define soldering. 1.2List the materials of soldering. 1.3Describe the steps of soldering. 1.4Mention the properties of a good soldering joint. 1.5Describe the active and passive components used in electronic circuits. 1.6Mention the function of resistor, capacitor and inductor in electronic circuits. 1.7Describe the procedure of determining the value of Capacitor, & Resistor using numeric and color code.	3	4
2	SEMICONDUCTOR 2.1Define conductor, semiconductor and insulator. 2.2Describe semiconductor with atomic structure. 2.3Describe the effect of temperature on conductivity of Semiconductor. 2.4Classify Semiconductor. 2.5List the commonly used semiconductor 2.6Describe the formation of P-type and N-type semiconductor. 2.7Describe the charges on N-type and P-type Semiconductor 2.8Explain the majority & minority charge carriers of P-type & N-Type Semiconductor.	3	4
3	SEMICONDUCTOR DIODE 3.1Define PN junction diode 3.2Describe the formation of PN junction. 3.3Explain forward and reverse bias in PN junction. 3.4Explain the forward and reverse Voltage-Current (VI) characteristics curve of PN junction diode. 3.5Define load line, static resistance, (iii) dynamic resistance, 3.6Define forward breakdown voltage, (v) Peak inverse voltage (PIV) and (vi) Reverse break down voltage. 3.7Describe the specification of PN Junction diode.	3	4
4	SPECIAL DIODES 4.1Define Zener Diode. 4.2Describe the operation of Zener diode. 4.3Explain Volt-Ampere(VI) characteristics of Zener diode. 4.4 Describe the application of Zener diode in, voltage stabilization, meter protection and peak clipper circuits. 4.5Describe the construction, operation and application of Tunnel diode, Varactor diode,	3	4

	Schottky diode, Step-Recovery diode, PIN diode, LED, LCD, photo diode and Solar cell.		
5	**DC POWER SUPPLY** 5.1 Define dc power supply 5.2 Describe importance of dc power supply . 5.3 Compare regulated and unregulated power supply. 5.4 Describe the operation of a typical regulated dc power supply with block diagram. 5.5 Define rectifier and rectification. 5.6 Explain the operation of half wave, full wave and bridge rectifier circuit. 5.7 Determine the ripple factor, efficiency and TUF of half wave, full wave and bridge rectifier. 5.8 Explain the operation of capacitor; inductor-capacitor and pi (π) filter circuit. 5.9 Solve problem related to ripple factor, efficiency and TUF.	3	8
6	**BIPOLAR JUNCTION TRANSISTOR (BJT)** 6.1 Define Transistor. 6.2 Describe the construction of PNP and NPN Transistor. 6.3 Explain the mechanism of current flow of PNP and NPN Transistor. 6.4 State the biasing rules of BJT. 6.5 Establish the relation among Base, Emitter and Collector current ($I_E = I_C + I_B$).	2	4
7	**Transistor Characteristics** 7.1 Describe three basic transistor configuration (CB, CC, CE) circuits. 7.2 Explain the characteristics curve of CB, CC and CE transistor configurations. 7.3 Describe current amplification factor α, β and γ. 7.4 Establish the relation among α, β and γ. 7.5 Solve problem related to I_E, I_C, I_B, α, β and γ	3	4
8	**TRANSISTOR BIASING AND STABILIZATION** 8.1 Define load line, Operating point, stability and stabilization. 8.2 State the biasing rule of transistor. 8.3 Describe faithful amplification. 8.4 Describe the methods of drawing DC load line. 8.5 Explain the leakage current in CB & CE circuits. 8.6 List the factors affecting stability of Q-points. 8.7 Describe various methods of transistor biasing. 8.8 Determine the stability factor of various transistor biasing circuits. 8.9 Solve problem related to components values, Q-Points and stability factor.	4	8

9	**SINGLE STAGE TRANSISTOR AMPLIFIER** 9.1 Define amplifier and single stage amplifier. 9.2 Mention the types of amplifier. 9.3 Explain operation of transistor as amplifier with graphical demonstration. 9.4 Describe the operation of voltage divider biased CE amplifier circuit. 9.5 Explain the phase reversal of CE amplifier. 9.6 Draw DC and AC equivalent circuit of voltage divider biased CE amplifier circuit. 9.7 Determine the AC equivalent load resistance of the CE amplifier circuit. 9.8 Determine voltage and power gain of the CE amplifier circuit. 9.9 Solve problem related to voltage and power gain where β and input resistance of the transistor are given.	4	10
10	**MULTISTAGE TRANSISTOR AMPLIFIER** 10.1 Define Multi stage amplifier. 10.2 Describe role of capacitor in single stage amplifier. 10.3 Describe gain, decibel gain frequency response, half power point, 3db point and bandwidth. 10.4 Mention the advantages of dB gain. 10.5 Describe the operation of RC coupled, Transformer coupled and direct coupled multistage amplifier. 10.6 Explain the frequency response of RC coupled, Transformer coupled and direct coupled multistage amplifier. 10.7 Mention the advantages and disadvantages of RC coupled, Transformer coupled and direct coupled multistage amplifier. 10.8 Solve problem related to voltage and power gain where β and input resistance of the transistor are given.	4	10
	Total	32	60

Detailed Syllabus (Practical)

Unit	Experiment name with procedure	Class (3 Period)	Continuous Marks
1	**Solder & de-solder of electronic components and wires to the other components and circuit boards.** 1.1. Select electronic components, wires and PCB. 1.2. Select the rating of the soldering iron suitable for the work piece. 1.3. Clean and tin both iron & work piece. 1.4. Feed new soldering materials to the tinned and	1	3

	heated joint in order to produce a correct soldering. 1.5. Check the quality of soldering. 1.6. Clean and tin iron and de-solder the joint and components. 1.7. Use solder suckers and solder braid for de-soldering. 1.8. Maintain the record of performed job.		
2	**Determine the values of different resistors, capacitors and inductor.** 2.1 Select resistors, capacitors and inductors of different values. 2.2 Identify the colors or numeric code 2.3 Determine the value of resistors, capacitor **and inductor** with tolerance. . 2.4 Maintain the record of performed job.	1	2
3	**Sketch forward and reverse characteristics curves of a semiconductor diode.** 3.1 Select meter, power supply, components and materials. 3.2 Complete circuit according to circuit diagram for forward bias. 3.3 Check all connections. 3.4 Apply different forward voltage and measure corresponding forward current. 3.5 Record results in tabular form. 3.6 Connect circuit according to circuit diagram of reverse bias. 3.7 Apply different reverse voltage and measure corresponding forward current. 3.8 Record results in tabular form. 3.9 Sketch the VI curves from collected data. 3.10 Maintain the record of performed job.	1	2
4	**Sketch waves of half-wave and full-Wave rectifier circuit** 4.1 Select meter, component, oscilloscope and materials. 4.2 Complete circuit of a half wave rectifier according to the circuit diagram. 4.3 Check the circuit before operation. 4.4 Measure the input and output voltage and observe wave shapes in the oscilloscope. 4.5 Sketch the input and output voltage wave shapes. 4.6 Maintain the record of performed job.	1	3
5	**Testing special diodes.** 5.1 Select different types of special diodes. 5.2 Set the AVO meter in the ohm scale. 5.3 Measure resistances for each of two terminals. 5.4 Determine the condition (good and bad). 5.5 Determine the different terminals.	2	2

	5.6 Maintain the record of performed job.		
6	**Identifying the type and terminals of bipolar junction transistor.** 6.1 Select PNP and NPN bipolar junction transistors. 6.2 Take AVO and manufacturer's literature of transistor. 6.3 Identify transistor terminals. 6.4 Measure base-emitter and base-collector resistance. 6.5 Determine the specifications with the help of manufacturer's literatures. 6.6 Identify PNP, NPN transistors. Base, Collector and Emitter. 6.7 Maintain the record of performed job.	2	3
7	**Determining input and output characteristics of a transistor in common emitter connection.** 7.1. Select DC power supply units, AVO meters, circuit board, components, and required materials. 7.2. Construct the circuit. 7.3. Adjust the voltage to appropriate point. 7.4. Record input and output voltage and current. 7.5. Plot the curve with recorded data. 7.6. Determine the value of β. 7.7. Maintain the record of performed job.	2	2
8	**Determine the Q- point of R-C coupled CE transistor amplifier.** 8.1. Draw the circuit diagram for the experiment. 8.2. Collect tools, equipment and materials. 8.3. Make all the connections according to the circuit diagram. 8.4. Check the connections. 8.5. Energize the circuit and record the Collector emitter voltage and collector current. 8.6. Draw the load line and locate the Q-Point on the load line. 8.7. Maintain the record of performed job.	2	3
9	**Determine the voltage gain of CE transistor amplifier.** 9.1. Draw the circuit diagram of CE transistor amplifier. 9.2. Collect required tools, equipment and materials. 9.3. Make all the connections according to the circuit diagram. 9.4. Check the connections and Q-Point. **9.5.** Energize the circuit and record the input and output voltage. **9.6.** Calculate the voltage gain. **9.7.** Maintain the record of performed job.	2	2
10	**Demonstrate the frequency response of single stage R-C coupled CE transistor amplifier.** 10.1. Draw the circuit diagram for the experiment. 10.2. Collect required tools, equipment and materials. 10.3. Make all the connections according to the circuit diagram. 10.4. Check the connections.	2	3

	10.5. Energize the circuit and record the data. 10.6. Draw the frequency response curve from the data. 10.7. Maintain the record of performed job.		
	Total	16	25

Necessary Resources (Tools, Equipment and Machinery):

Sl. No.	Item Name	Quantity
1	Soldering Iron with Stand, De-soldering gun, Third Hand , Hot air gun, Iron Sponge, AVO Meter, Flat screw driver, Philips screw driver, Cutting pliers, Nose pliers, Automatic multifunction wire stripper. Tester, Knife, Power extension board.	30 Nos
2	DC power Supply, Function generator, Oscilloscope, Analog Electronics Trainer, Power project board/ bread board, Center tap Transformer (220/12V, 2A, 5A)	10 nos
3	Diode, Resistor, Potentiometer, Inductor, Capacitor, Transistor, LED, Zener Diode, Photo Diode.Tunnel diode, Varactor diode, Schottky diode, Step-Recovery diode, PIN diode, LCD and Solar cell.	50 nos
4	Resin, Soldering lead, Soldering tip, Fixable wire, Wire Brush	as required

Recommended Books:

Sl No.	Book Name	Writer Name	Publisher Name & Edition
1	Principles Of Electronics	V. K. Mehta	S.Chand
2	Basic Electronics (Solid State)	B. L. Theraja	S. Chand

Website References:

Sl. No.	Web Link	Remarks
1	https://www.youtube.com/channel/	
2	https://youtu.be/qsWkA-5grogo	
3	https://youtu.be/eXyGIPrD5Qk	
4	https://you.be/f-WiulYIrow	

Subject Code	Subject Name	Period per Week		Credit
29531	GRAPHIC MATERIALS	T	P	C
		2	3	3

Rationale	Printing technology has great demand in every sphere of our life. Whatever we use in our daily life there must have various uses of printing. There are many types of printing technologies such as Offset printing, Gravure printing, Letterpress printing, Screen printing, Digital printing. The student studying in printing technology must have some basic knowledge about all types of graphic and printing materials. Graphic materials are the prerequisite to do any graphic and printing related job. The subject will enable the diploma engineers to acquire knowledge on graphic and printing materials used in pre-press, press and post press section.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** ▪ Mention the pre-press materials ▪ Describe the various press materials ▪ Mention the paper and board manufacturing materials ▪ Mention the printing ink materials ▪ Explain the post-press materials.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** ▪ Apply the art and copy preparation materials ▪ Identify negative and positive films ▪ Recognize various types of image carrier ▪ Identify the raw materials used in various printing system ▪ Recognize various types of printing paper, board and ink. ▪ Use various post press materials.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Marks
1	**MATERIALS FOR ART AND COPY PREPARATION** 1.1 List the paper and board used in art design and copy preparation. 1.2 Mention the use of pen, pencil, and shading sheet in art and copy preparation. 1.3 Discuss the uses of airbrush. 1.4 Discuss the different category of brushes. 1.5 Describe the characteristics of water color, poster color, oil paint.	2	4
2	**Materials used in desktop publications** 2.1 Describe various types of storage devices. 2.2 Mention various types of software used in DTP section. 2.3 Describe various types of substrates used in DTP section. 2.4 Describe the use of film for positive output.	3	4
3	**Photography and photographic materials** 3.1 Describe the different types of graphic film. 3.2 Mention the name of developing agent of Photographic Film. 3.3 Describe the preparation of developing and fixing solution. 3.4 Explain the function of light source used in graphic arts process camera. 3.5 Describe the digital photographic materials.	3	6
4	**Image preparation materials** 4.1 Describe different metals used in Image preparation. 4.2 Mention different types of plate used in offset printing process. 4.3 List different types of chemical used in offset plate preparation. 4.4 Describe the function and application of coating materials of offset plate used in image preparation. 4.5 State the characteristics of offset plate coating solution. 4.6 State the raw materials of CtP system.	4	6
5	**Offset printing materials** 5.1 List the materials used in offset Printing 5.2 Explain the function of dampening roll covering/sock materials. 5.3 Describe the dampening roller materials. 5.4 Describe the method of preparation of damping solution. 5.5 Describe the blanked preparation materials. 5.6 Explain the function of alcohol in dampening solution.	4	8
6	**Gravure printing materials** 6.1 Mention the raw materials of gravure printing. 6.2 List the chemical and solvent use in gravure printing. 6.3 Discuss the characteristics of paper and non-paper substrates. 6.4 Mention the different types of ink use in gravure printing. 6.5 List the lamination, glue, solvent and other materials use in lamination process.	3	6

7	**Screen printing materials** 7.1 List the materials used in screen printing. 7.2 List the mesh materials. 7.3 Describe stencil making materials. 7.4 Describe Flock printing materials. 7.5 Explain the different types of screen printing Ink used in different types of stock or media.	**3**	**6**
8	**Printing Paper and board** 8.1 Explain the pulp. 8.2 List different types of materials used for paper and board manufacturing. 8.3 State the method of paper storing. 8.4 List the raw materials used in paper and board manufacturing.	**4**	**7**
9	**Printing Ink** 9.1 List the main ingredients of printing ink. 9.2 Explain the function of pigment. 9.3 Describe the method of Ink manufacturing. 9.5 Describe the method of testing offset Ink. 9.6 Explain the factors raw materials that influence in printing performance.	**4**	**7**
10	**Binding and packaging materials** 10.1 Mention different materials of binding. 10.2 List the different materials of packaging. 10.3 State the materials used for folding carton. 10.4 Mention the uses of book decoration materials. 10.5 List the raw materials use in die cutting.	**2**	**6**
	Total	**32**	**60**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Continuous Marks
1	**Identify the materials for art and copy preparation** 1.1 Collect the materials 1.2 Recognize and show the materials 1.3 Name shortly and describe the materials 1.4 Maintain and record the job	**1**	**2**
2	**Distinguish the negative and positive films** 2.1 Arrange the negative and positive films 2.2 Justify the negative and positive with logically 2.3 Compare between negative and positive 2.4 Maintain and record the job	**2**	**3**
3	**Identify various image carrier** 3.1 Arrange various image carriers used in printing press 3.2 Name the image carriers 3.3 Compare between various image carriers 3.4 Maintain and record the job	**2**	**2**

4	**Identify the raw materials used in offset printing press** 4.1 Arrange the raw materials 4.2 Write the name of raw materials 4.3 Discuss about the use of raw materials 4.4 Maintain and record the job	**2**	**3**
5	**Identify the raw materials used in gravure printing press** 5.1 Arrange the raw materials 5.2 Write the name of raw materials 5.3 Discuss about the use of raw materials 5.4 Maintain and record the job	**1**	**2**
6	**Identify the raw materials used in screen printing press** 6.1 Arrange the raw materials 6.2 Write the name of raw materials 6.3 Discuss about the use of raw materials 6.4 Maintain and record the job	**2**	**3**
7	**Identify various types of printing media/stock** 7.1 Collect various types of media /stock 7.2 Predict the GSM of various media 7.3 Write the characteristics of various media 7.4 Maintain and record the job	**2**	**3**
8	**Identify various types of printing ink** 8.1 Arrange various types of printing ink used in various system 8.2 Distinguish the inks used in various system 8.3 Write the characteristics of different printing inks 8.4 Maintain and record the job	**2**	**3**
9	**Identify various types of binding materials** 9.1 Collect and arrange the materials 9.2 Discuss about the use of arranged materials 9.3 Write down the function of various binding materials 9.4 Maintain and record the job	**1**	**2**
10	**Identify the packaging materials** 10.1 Collect and arrange the materials 10.2 Identify different materials 10.3 Observe the function of various packaging materials 10.4 Maintain and record the job	**1**	**2**
	Total	**16**	**25**

Necessary Resources (Graphic materials, tools & equipments):

Sl.	Item Name	Quantity
01	Letterpress machine tool box	01 set
02	Offset machine tool box	02 set
03	Gravure printing machine tool box	01 set
04	Screen printing machine tool box	01 set
05	Negative film and positive film	5 set
06	Eye Glass / Magnifier	5 set
07	Paper & Board Jogging Table	1 set
08	Chemical (Printing Ink, Image remover, Benzin, Kerosin, Lubricant oil, Dampening solution, Plate cleaner, Blanket cleaner, Linsid oil etc.)	1 set

09	Ps. Plate	1 Packet
10	Blanket	5 set
11	Brush (.2", .5" etc.)	5 set
12	Light Table	1 set
13	Hand gloves	25 set
14	Goggles	5 set
15	Apron	25 set
16	Pencil, Marker	05 Set
17	Geometrical measurement box	5 set
18	Scissors, Anti cutter, Scale	5 set
19	Paper (Offset, Newsprint, Art)	10 Ream (Demy)
20	Board (Art, Ivory, Duplex)	10 Ream (Demy)
21	Anti-set-off powder	05 Packet
22	Letterpress printing ink	1 set
23	Offset printing ink	1 set
24	Gravure printing ink	1 set
25	Screen printing ink	1 set
26	Digital printing ink	1 set
27	Various types of image carrier	5 set
28	Various types of binding materials	5 set
29	Various types of packaging materials	5 set
30	Pen	10 pc
31	Pencil	10 pc
32	Shading sheet	5 packet
33	Airbrush	10 pc
34	Poster color	5 set
35	Water color	5 set
36	Oil paint	5 set

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Graphic Materials	Md. Abdul Mannan	BTEB
02	Handbook of Print Media	Prof. Dr. –Ing. Helmut Kipphan, Heidelberg	Heidelberg
03	Surface Preparation	Mollah Md. Golam Mostafa	BTEB
04	Ink & Paper	Mollah Md. Golam Mostafa	BTEB

Website References:

Sl	Web Link	Remarks
01	http://printwiki.org	
02	http://google.com/printing-materials	
03	http://youtube.com/printing-materials	

Subject Code	Subject Name	Period per Week		Credit
29631	Graphic Design-I	T	P	C
		1	3	2

Rationale	Diploma in Engineering Level students are required to acquire the knowledge and skills on concept of basic graphic design, basic elements of graphic design, color and design technique, drawing instruments and materials, lettering numbering and alphabet of Line, principles of conventional and modern layout, drawing Media and techniques, product design and carton drawing. Have been given more emphasis on practical aspect rather than theory in teaching learning approach.
Learning Outcome (Theoretical)	**At the end of the course the students will be able to:** ▪ State History of graphic design. ▪ Describe Graphic Design fundamental. ▪ Describe Line, Shapes, Space, Texture, Light, color, Image & Typography. ▪ Describe Principles of Layout. ▪ Mention commonly used Instruments and materials of graphic design carry out the Drawing Media and Techniques. ▪ Describe Product Design and Carton Drawing.
Learning Outcome (Practical)	**At the end of the course the students will be able to** ▪ Apply drawing instruments for basic drawing technique. ▪ Perform various types of Bangla and English font with pencil and pen. ▪ Sketch various types of Layout. ▪ Prepare texture & pattern using pen & pencil. ▪ Practice Free hand drawing with Pencil Media ▪ Practice Free hand drawing with Wash Media**.** ▪ Perform secondary color mixing. ▪ Illustrate a layout and design with pen and ink. ▪ Prepare Newspaper Page Layout. ▪ Sketch free hand Book Cover Design.

Detailed Syllabus (Theory)

Unit	Topics with contents	Class (1Period)	Final Marks
1.	**HISTORY & FUNDAMENTAL OF GRAPHIC DESIGN** 1.1 Define Graphic Design. 1.2 Describe history of graphic design. 1.3 Discuss symbol of graphic design. 1.4 Explain the calligraphy. 1.5 Describe rock & cave art. 1.6 Discuss Innovation of Graphic Design. 1.7 Illustrate the principle of Graphic Design.	**3**	**8**
2.	**ELEMENTS OF GRAPHIC DESIGN** 2.1 Mention the element of Graphic Design. 2.2 Describe Shape & Space. 2.3 Describe texture and pattern. 2.4 Describe Typography & Image. 2.5 State Light & color. 2.6 Describe source of Light & color. 2.7 Discuss additive & subtractive color. 2.8 Mention the properties of color. 2.9 Describe color swatch.	**5**	**10**
3	**LAYOUT, INSTRUMENTS AND MATERIALS OF GRAPHIC DESIGN.** 3.1 Define Printing Layout. 3.2 Describe the Principle of Layout. 3.3 Describe golden proportion. 3.4 Describe the Types of Balance. 3.5 Describe the Tone Hormone. 3.6 List different types of drawing instruments. 3.7 Mention the standard sizes of drawing board & sheet 3.8 Describe set squares and Parallel bar. 3.9 Describe Lettering guide, Template, Scale Pantograph and French curve.	**4**	**6**
4	**DRAWING MEDIA AND TECHNIQUES.** 4.1 Discuss Pencil Techniques for Drawing. 4.2 Describe Codes of pencils.	**2**	**3**

	4.3 Discuss the Wash Drawing for making Layout. 4.4 Discuss the Airbrush Technique. 4.5 Discuss the use of soft and hard Pastel Technique. 4.6 Describe the freehand use of pen and ink.		
5	**PRODUCT DESIGN AND CARTON DRAWING.** 5.1 Define Product Design. 5.2 Discuss Layout of Product design. 5.3 Describe parts of a Carton. 5.4 Describe different type of Carton. 5.5 Describe the needs of Carton Design.	**2**	**3**
	Total	**16**	**30**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Continuous Marks
1	**APPLY DRAWING INSTRUMENTS FOR BASIC DRAWING TECHNIQUE.** 1.1 Follow Occupational Safety & Health (OSH) practices. 1.2 Perform simple setup of drawing instruments. 1.3 Sketch freehand on the dirty drawing paper. 1.4 Clean & store tools & equipment. 1.5 Maintain the record of perform task.	1	2
2	**PERFORM VARIOUS TYPES OF BANGLA AND ENGLISH FONT WITH PENCIL AND PEN.** 2.1 Follow Occupational Safety & Health (OSH) practices. 2.2 Interpret drawing as per specification. 2.3 Select & Collect tools and equipment as per job requirements. 2.4 Draw graph 2.5 Perform various types of Bangla and English font with pencil and pen. 2.6 Clean & store tools & equipment. 2.7 Maintain the record of perform task.	2	3
3	**SKETCH VARIOUS TYPES OF LAYOUT.** 3.1 Follow Occupational Safety & Health (OSH) practices. 3.2 Interpret drawing as per specification. 3.3 Select & Collect tools and equipment as per job requirements. 3.4 Setup work piece. 3.5 Sketch various types of layout. 3.6 Clean & store tools & equipment. 3.7 Maintain the record of perform task.	2	2
4	**PREPARE TEXTURE & PATTERN USING PEN & PENCIL.** 4.1 Follow Occupational Safety & Health (OSH) practices 4.2 Interpret drawing as per specification. 4.3 Select & Collect tools and equipment as per job requirements. 4.4 Setup work piece.	2	2

	4.5 Prepare Texture & Pattern Using Pen & Pencil. 4.6 Clean & store tools & equipment. 4.7 Maintain the record of perform task.		
5	**PRACTICE FREE HAND DRAWING WITH PENCIL MEDIA**. 5.1 Follow Occupational Safety & Health (OSH) practices. 5.2 Interpret drawing as per specification. 5.3 Select & Collect tools and equipment as per job requirements. 5.4 Setup work piece. 5.5 Practice Free Hand Drawing With Pencil Media. 5.6 Clean & store tools & equipment. 5.7 Maintain the record of perform task.	2	3
6	**PRACTICE FREE HAND DRAWING WITH WASH MEDIA.** 6.1 Follow Occupational Safety & Health (OSH) practices. 6.2 Interpret drawing as per specification. 6.3 Select & Collect tools and equipment as per job requirements. 6.4 Setup work piece. 6.5 Practice Free Hand Drawing With Wash Media. 6.6 Clean & store tools & equipment. 6.7 Maintain the record of perform task.	2	3
7	**PERFORM SECONDARY COLOR MIXING.** 7.1 Follow Occupational Safety & Health (OSH) practices. 7.2 Interpret drawing as per specification. 7.3 Select & Collect tools and equipment as per job requirements. 7.4 Setup work piece. 7.5 Perform Secondary Color Mixing. 7.6 Clean & store tools & equipment. 7.7 Maintain the record of perform task.	1	2
8	**ILLUSTRATE A LAYOUT AND DESIGN WITH PEN AND INK.** 8.1 Follow Occupational Safety & Health (OSH) practices. 8.2 Interpret drawing as per specification. 8.3 Select & Collect tools and equipment as per job requirements. 8.4 Setup work piece. 8.5 Illustrate A Layout And Design With Pen And Ink. 8.6 Clean & store tools & equipment. 8.7 Maintain the record of perform task.	1	2
9	**PREPARE NEWSPAPER PAGE LAYOUT**. 9.1 Follow Occupational Safety & Health (OSH) practices. 9.2 Interpret drawing as per specification. 9.3 Select & Collect tools and equipment as per job requirements. 9.4 Setup work piece. 9.5 Prepare Newspaper Page Layout. 9.6 Clean & store tools & equipment. 9.7 Maintain the record of perform task.	2	3
10	**SKETCH FREE HAND BOOK COVER DESIGN.** 10.1 Follow Occupational Safety & Health (OSH) practices. 10.2 Interpret drawing as per specification. 10.3 Select & Collect tools and equipment as per job requirements. 10.4 Setup work piece. 10.5 Sketch Free Hand Book Cover Design. 10.6 Clean & store tools & equipment. 10.7 Maintain the record of perform task.	1	3
	Total	**16**	**25**

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

Sl	Item Name	Quantity
01	Drawing related accessories	25 no's
02	Measurement related accessories	25 no's

Recommended Software:

Sl	Name	Quantity
01	Paint	As Necessary

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Printing Layout and Design	Allen Hurlburt	Watson-Guptill (February 1, 1989)
02	Illustration today 3	robert ross	Published by International Textbook Company, Scranton, Pa., 1983
03	Commercial art techniques	S. Ralph Maurello	Wm. Penn Publishing (January 1, 1952)

Website References:

Sl	Web Link	Remarks
01	https://www.pdfdrive.com/graphic-design-printing-technology-e33533658.html	
02	https://www.pdfdrive.com/freehand-drawing-and-sketching-d188306728.html	
03	https://en.wikipedia.org/wiki/Commercial_art	

Subject Code	Subject Name	Period per Week		Credit
29632	Basic Photography	T	P	C
		2	3	3

Rationale	Students of Graphic Design & Printing Technology required knowledge on digital & conventional photography to make perfect photo & designing. Completing the basic photography subject students will able to operate digital cameras properly. For a graphic designer, photography is the prerequisite. Moreover, digital photography has special demand in various sphere of life. This subject covers the history of the camera, operating camera in auto and manual mode, camera filters, accessories used in the camera, different types of light used in photography, different types of exposures, using flash to take pictures in different environments, snapping good pictures in any environment, different types of lenses, studio lights.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** ▪ Mention main parts of a camera. ▪ Describe camera lights. ▪ Describe different types of exposure. ▪ Define studio photography. ▪ Describe picture compositions. ▪ Describe lens. ▪ State digital photography. ▪ Define ISO. ▪ Explain triangle & third rules of camera.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** ▪ Operate digital camera. ▪ Perform digital camera setting. ▪ Perform Light setting. ▪ Operate light expose. ▪ Take picture with manual mode. ▪ Take picture in any environment. ▪ Control flash photography.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1	**CAMERA** 1.1 Describe the history of camera. 1.2 Define digital & analog camera. 1.3 Describe different types of camera. 1.4 Explain working process of a camera. 1.5 Classify body parts a camera. 1.6 Describe the buttons of camera. 1.7 Describe mode dial of camera. 1.8 Mention the conversion process of still to video picture mode. 1.9 State the safety process of a camera.	**4**	**8**
2	**ACCESSORIES OF CAMERA** 2.1 Define filter. 2.2 Describe various types of filter. 2.3 State different types of camera tripod. 2.4 Describe different types of camera bag. 2.5 Describe Lens and camera safety materials. 2.6 Describe various types of light. 2.7 Explain memory card of camera.	**2**	**5**
3	**LIGHT AND PHOTOGRAPHY** 3.1 Define light. 3.2 Describe different types of light. 3.3 Explain quality of light. 3.4 Describe Angle of light. 3.5 Mention the importance of light in photography. 3.6 State strobe & flash light. 3.7 Describe reflection of light.	**4**	**6**
4	**EXPOSURE CONTROLLING** 4.1 Describe aperture. 4.2 Define International Standard Organization (ISO) mode. 4.3 Explain shutter speed. 4.4 Define exposure triangle. 4.5 Explain Aperture, Shutter speed & ISO of exposure triangle. 4.6 Define depth of field. 4.7 Describe the lens effects on depth of field. 4.8 State over, normal and under expose.	**4**	**7**
5	**FLASH PHOTOGRAPHY** 5.1 Describe flash power and range. 5.2 Define auto flash. 5.3 Describe fill flash and off. 5.4 Describe uses of flash. 5.5 Mention the advantages and disadvantages of flash. 5.6 Mention the types of flash.	**2**	**6**

	5.7 Explain flash control system. 5.8 Define flood light.		
6	**COMPOSITION RULES OF PHOTOGRAPHY** 6.1 Define Leading line. 6.2 List the different leading lines. 6.3 State rules of thirds. 6.4 Describe Negative spaces. 6.5 Define Horizon line. 6.6 List the different horizon lines. 6.7 Describe symmetry and patterns. 6.8 Explain repetition scene.	**4**	**8**
7	**LENS** 7.1 Define lens. 7.2 Mention various type of lens. 7.3 Define 18-55 mm lens. 7.4 Describe zoom lens & kit lens. 7.5 Mention the different types of lens cleaner. 7.6 Explain zone focusing. 7.7 Differentiate between zoom and focus ring.	**2**	**4**
8	**COLOR OF LIGHT** 8.1 Define color. 8.2 Explain RGB color. 8.3 Explain visible & invisible light. 8.4 Describe electromagnetic of color. 8.5 Define color reflection. 8.6 Describe different types of light.	**4**	**7**
9	**DIGITAL IMAGE** 9.1 Define pixel. 9.2 Explain image dimension. 9.3 Describe image resolution. 9.4 Describe professional & amateur picture. 9.5 Explain continuous mode photography. 9.6 Explain movie mode.	**2**	**4**
10	**STUDIO PHOTOGRAPHY** 10.1 Define continuous light. 10.2 Explain connecting camera with studio lights. 10.3 Differentiate between hard and soft light. 10.4 Explain choosing background. 10.5 Define portrait and landscape photography. 10.6 Explain time lapse photography.	**4**	**5**
	Total	**32**	**60**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Marks
1	**Draw a picture of a digital camera and show the units and parts.** 1.1 Draw a camera picture front side on white sheet. 1.2 Identify with line camera parts. 1.3 Write down the parts name. 1.4 Maintain the record of perform job.	2	3
2	**Perform exposure calculation.** 2.1 Run camera. 2.2 Take photo with low light. 2.3 Take photo with normal light. 2.4 Take photo with high light. 2.5 Calculate expose light. 2.6 Maintain the record of performed job.	2	4
3	**Perform exposure light setting** 3.1 Set flash light with camera. 3.2 Prepare strobe light left and right side of camera. 3.3 Test the all light for preparing take a photo. 3.4 Maintain the record of performed job.	2	3
4	**Perform a portrait photography.** 4.1 Prepare camera for taking photograph. 4.2 Take a photo with portrait mode. 4.3 Maintain the record of performed job.	1	1
5	**Perform landscape photography.** 5.1 Prepare camera for taking photograph. 5.2 Take a photo with landscape mode. 5.3 Maintain the record of performed job.	1	1
6	**Perform a picture with normal expose.** 6.1 Take a picture with normal light. 6.2 Calculate three types of picture. 6.3 Maintain the record of performed job.	1	2
7	**Perform a picture with over and under expose.** 7.1 Take a picture with high light. 7.2 Take a picture with low light. 7.3 Calculate three types of picture. 7.4 Maintain the record of performed job.	1	2

8	**Snap a picture on manual mode.** 8.1 Change camera mode dial. 8.2 Set mode dial to manual mode. 8.3 Control aperture, expose, and shutter speed. 8.4 On extra flash light. 8.5 Release shutter button. 8.6 Maintain the record of performed job.	**2**	**4**
9	**Shot a picture for modeling.** 9.1 Run the camera. 9.2 Set a model in front of camera. 9.3 Set background with matching color. 9.4 Take modeling photograph 9.5 Maintain the record of performed job.	**2**	**3**
10	**Snap photo with auto mode.** 10.1 Set mode dial with auto mode. 10.2 Prepare Camera to shot. 10.3 Release Press button slightly. 10.4 Maintain the record of performed job.	**2**	**2**
	Total	**16**	**25**

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

Sl	Item Name	Quantity
01	Camera body	5 Sets
02	Lenses	5 Sets
03	Color filter	10 Nos
04	Camera Bag	5 Sets
05	Tripod	5 Sets
06	Timer	5 Sets
07	Silica gel	5 Sets
08	Memory Card	5 Nos
09	Card Reader	5 Nos
10	Pen drive	5 Nos
11	Data cable	5 Nos
12	Flash Light	5 Nos
13	Strobe light	15 Nos
14	Color Background	20 Nos
15	Curtain	20 Nos

16	Background Stand	20 Nos
17	Battery Charger	5 Nos
18	Rechargeable battery	20 Nos
19	Light	20 Nos
20	Lens Kit	1 litter
21	Cotton cloth	10 Gauge
22	Safety Tool box	1 Set

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	The Textbook of Digital Photography	Dennis P. Curtin	Photocourse, Second Edition
02	Perfect Digital Photography.	Jay Dickman, Jay Kinghorn	Technical Editor, Second Edition
03	Digital Photography	Kris Butler, ACD Newsletters Editor	ACD Newsletters

Website References:

Sl	Web Link	Remarks
01	http://files.acdsystems.com/english/registration/going-digital.pdf	**Digital Photography.**
02	https://www.pdfdrive.com/the-textbook-of-digital-photography-photocourse-e4986693.html	**The text book of digital photography.**
03	http://soul-foto.ru/photo_books/Jay%20Dickman,%20Jay%20Kinghorn.%20Perfect%20Digital%20Photography.%20Second%20Edition.%202009.pdf	**Perfect Photography**