



BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM
SYLLABUS (PROBIDHAN-2016)

GRAPHICS TECHNOLOGY

TECHNOLOGY CODE: 696

2nd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

GRAPHICS TECHNOLOGY (696)

2nd SEMESTER

| Sl. No | Subject Code | Name of the subject | T | P | C | Marks | | | | Total |
|--------------|--------------|---------------------------------------|-----------|-----------|-----------|--------------|------------|--------------|------------|-------------|
| | | | | | | Theory | | Practical | | |
| | | | | | | Cont. assess | Final exam | Cont. assess | Final exam | |
| 1 | 65712 | English | 2 | 0 | 2 | 40 | 60 | 0 | 0 | 100 |
| 2 | 65921 | Mathematics-2 | 3 | 3 | 4 | 60 | 90 | 50 | 0 | 200 |
| 3 | 65912 | Physics-1 | 3 | 3 | 4 | 60 | 90 | 25 | 25 | 200 |
| 4 | 66611 | Computer Application | 0 | 6 | 2 | 0 | 0 | 50 | 50 | 100 |
| 5 | 66712 | Electrical Engineering Fundamental | 3 | 3 | 4 | 60 | 90 | 25 | 25 | 200 |
| 6 | 69521 | Offset Machine operation | 1 | 3 | 2 | 20 | 30 | 25 | 25 | 100 |
| 7 | 65711 | Bangla | 3 | 3 | 4 | 60 | 90 | 50 | 0 | 200 |
| Total | | | 15 | 21 | 22 | 300 | 450 | 225 | 125 | 1100 |

Objectives:

After The Completion of the Course, Learners Will Be Able To Develop-

- Reading, Listening With Understanding
- The Fluency Of Speech
- Grammatical Accuracy With Emphasis On Spelling & Punctuation
- Creative Writing

Seen Comprehension: (Marks-20)

| Unit | Lesson | Title |
|--|--------|---|
| People Or Institutions Making History (Unit One) | 1 | Nelson Mandela ,From Apartheid Fighter To President |
| | 2 | The Unforgettable History |
| Food Adulteration(Unit Three) | 1 | Food Adulteration Reaches Height |
| | 2 | Eating Habit And Hazards |
| Human Relationship(Unit Four) | 2 | Love And Friendship |
| Environment And Nature (Unit Eight) | 1 | Water ,Water Everywhere |
| | 5 | Kuakata: Daughter Of The Sea |
| Greatest Scientific Achievement (Unit Thirteen) | 1 | Some Of The Greatest Scientific Achievements Of The Last 50 Years |
| | 2 | Science And Technology Against An Age- Old Disease |
| Art And Music (Unit Fourteen) | 1 | What Is Beauty? |
| | 3 | Crafts In Our Time |
| Tours And Travels (Unit Fifteen) | 1 | Travelling To A Village In Bangladesh |
| | 4 | The Wonders of Vilayet |

N.B: The Unit Mentioned Refers To The Text Book (1st Paper) English For Today For Class 11- 12
By National Curriculum & Text Book Board, Dhaka.

Grammar (Marks-20)**1. (A) Uses of Articles.**

(B) Uses of Tense *(Right Forms Of Verbs with Indicators)

(C) Classify Verbs: (Regular and Irregular Verbs, Auxiliary, Principal, Finite, Non-Finite Verbs,)

2. Sentence:

(A) Changing Sentences: (Assertive, Interrogative, Optative, Imperative, Exclamatory Simple, Complex and Compound), Comparison of Adjectives/Adverbs

(B) Question Making: WH, Yes/No, Tag Question

3. Enrich Vocabulary: Synonyms, Antonyms; Suffix And Prefix.

4. Voice, Narration

5. Sentence Analysis:

Study of Part of Speech, (Type Of Verbs-Regular and Irregular Verbs, Auxiliary and Principal Verb)
Study of Phrases and Clauses (Noun/ Adjective/ Verb/ Participle /Adverbial/ Prepositional Phrases and Principal /Sub Ordinate /Co Ordinate Clauses)

Free Writing (Marks -20)

1. Write Dialogues: (With Teacher, Principal, Shopkeeper, Hotel Manager, Station Master, Newcomer, Buyers, Doctor, Friend, Colleagues Etc).
2. Report Writing On Different Events/ Occasions/ Accidents.
3. Writing Situational Personal and Official Letters.
4. Writing Job Application with CV /Appointment Letter / Joining Letter
5. Write A Guided Paragraph With Questions.

OBJECTIVES

- To enable in solving the simultaneous equations with the help of determinant and matrix.
- To make understand the exponential series.
- To provide ability to apply the knowledge of differential calculus in solving problem like slope, gradient of a curve, velocity, acceleration, rate of flow of liquid etc.
- To enable to apply the process of integration in solving practical problems like calculation of area of a regular figure in two dimensions and volume of regular solids of different shapes.

SHORT DESCRIPTION

Algebra : Determinants, Matrix, Exponential Series.

Trigonometry : Inverse circular functions, Properties of triangle and solution of triangles.

Differential Calculus : Function and limit of a function, differentiation with the help of limit, differentiation of functions, geometrical interpretation of $\frac{dy}{dx}$, successive differentiation and Leibnitz theorem, partial differentiation.

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

DETAIL DESCRIPTION**ALGEBRA :****1 Apply determinants to solve simultaneous equations.**

- 1.1 Expand a third order determinant.
- 1.2 Define minor and co-factors.
- 1.3 State the properties of determinants.
- 1.4 Solve the problems of determinants.
- 1.5 Apply Cramer's rule to solve the linear equation.

2 Apply the concept of matrix.

- 2.1 Define matrix, null matrix, unit matrix, square matrix. column matrix, row matrix, inverse matrix, transpose matrix, adjoin matrix, rank of a matrix, singular matrix.
- 2.2 Explain equality, addition and multiplication of matrix.
- 2.3 Find the rank of a matrix.
- 2.4 solve the problems of the following types:
 - i) Solve the given set of linear equations with the help of matrix.
 - ii) Find the transpose and adjoin matrix of a given matrix.

3 Understand exponential series.

- 3.1 Define e.
- 3.2 Prove that e is finite and lies between 2 and 3.
- 3.3 Prove that $e^x = 1 + \frac{x}{L^1} + \frac{x^2}{L^2} + \frac{x^3}{L^3} + \frac{x^4}{L^4} + \dots$ to ∞
- 3.4 Solve problems of the followings types :
 - i) $1 + \frac{1}{L^2} + \frac{1}{L^4} + \frac{1}{L^6} + \dots$ to ∞
 - ii) $\frac{1}{L^2} + \frac{1+2}{L^3} + \frac{1+2+3}{L^4} + \frac{1+2+3+4}{L^5} + \dots$ to ∞

TRIGONOMETRY

4 Apply the concept of inverse circular function.

- 4.1 Explain the term inverse circular function and principal value of a trigonometrical ratio.
4.2 Deduce mathematically the fundamental relations of different circular functions.
4.3 Convert a given inverse circular function in terms of other functions.
4.4 Prove mathematically

i) $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \frac{x + y}{1 - xy}$.

ii) $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \frac{x + y + z - xyz}{1 - xy - yz - zx}$

iii) $\sin^{-1} x + \sin^{-1} y = \sin^{-1} \left(x\sqrt{1 - y^2} + y\sqrt{1 - x^2} \right)$

iv) $2 \tan^{-1} x = \sin^{-1} \frac{2x}{1 + x^2} = \cos^{-1} \frac{1 - x^2}{1 + x^2} = \tan^{-1} \frac{2x}{1 - x^2}$

- 4.5 Solve problems of the following types.

a) $2 \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{4} = \frac{\pi}{4}$

b) $\cos \tan^{-1} \cot \sin^{-1} x = x$.

- c) Prove that the area of the segment cut from a circle of radius r by a chord at a distance d from the centre is given by

$$K = r^2 \cos^{-1} \frac{d}{r} - d\sqrt{r^2 - d^2}$$

5 Apply the principle of properties of triangles.

- 5.1 Prove the followings identities :

i) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$.

ii) $a^2 = b^2 + c^2 - 2bc \cos A$

iii) $a = b \cos C - c \cos B$.

v) $\Delta = \frac{1}{2} bc \sin A$.

- 5.2 Establish the followings.

a) $\tan \frac{A}{2} = \sqrt{\frac{(s - b)(s - c)}{s(s - a)}}$

b) $\tan \frac{B - C}{2} = \frac{b - c}{b + c} \cot \frac{A}{2}$

c) $\Delta = \frac{abc}{4R}$

- 5.3 Solve the problems of the following types:

i) Prove $\cos(B - C) + \cos A = \frac{bc}{2R}$

- ii) An object experiences two forces F_1 and F_2 of magnitude 9 and 13 Newtons with an angle 100° between their directions. Find the magnitude of the resultant R .

DIFFERENTIAL CALCULUS

6 Understand the concept of functions.

- 6.1 Define constant, variable, function, domain, range
6.2 Solve problems related to functions.

7 Understand the concept of limits.

- 7.1 Define limit and continuity of a function.
7.2 Distinguish between $\lim_{x \rightarrow a} f(x)$ and $f(a)$.

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

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

8 Understand differential co-efficient and differentiation.

8.1 Define differential co-efficient in the form of

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

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

9 Apply the concept of differentiation.

9.1 State the formulae for differentiation:

- (i) sum or difference
- (ii) product
- (iii) quotient
- (iv) function of function
- (v) logarithmic function

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

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

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

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

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

10.3 Solve the problems of the type:

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

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

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

11.2 Express Leibnitz's theorem

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

12 Understand partial differentiation.

12.1 Define partial derivatives.

12.2 State formula for total differential.

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

12.4 State Euler's theorem on homogeneous function.

12.5 Solve the problems of partial derivatives.

INTEGRAL CALCULUS

13 Apply fundamental indefinite integrals in solving problems.

13.1 Explain the concept of integration and constant of integration.

13.2 State fundamental and standard integrals.

13.3 Write down formulae for:

- (i) Integration of algebraic sum.
- (ii) Integration of the product of a constant and a function.

13.4 Integrate by method of substitution, integrate by parts and by partial fractions.

13.5 Solve problems of indefinite integration.

14 Apply the concept of definite integrals.

14.1 Explain definite integration.

14.2 Interpret geometrically the meaning of $\int_a^b f(x) dx$

14.3 Solve problems of the following types:

$$(i) \int_0^{\pi/2} \cos^2 x dx. \quad (ii) \int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$$

| SL No | Athour | Reference Title | Publication |
|-------|-----------------------|--|--------------------------------|
| 01 | S. P Deshpande | Mathematics for Polytechnic Students | Pune Vidyarthi Graha Prakashan |
| 02 | H. K. Das | Mathematics for Polytechnic Students(Volume I) | S.Chand Prakashan |
| 03 | Shri Shantinakaran | Engg.Maths Vol I & II | S.Chand & Comp |
| 04 | Dr. B M Ekramul Haque | Higher Mathematics | Akshar Patra Prakashani |
| 05 | Md. Abu Yousuf | Differential & Integral Calculus | Mamun Brothers |

65912

PHYSICS-1

T P C
3 3 4

OBJECTIVES

- To develop the students a background of basic science i.e. Physics required for understanding technological subjects.
- To develop a working knowledge of common engineering and industrial materials and to enable to determine through experiments the properties of such materials.
- To develop through experiments an understanding of fundamental scientific concept.
- To develop a basic knowledge and concept of physical properties of common engineering and industrial materials.

SHORT DESCRIPTION

Measurement, Units; Vector and Scalar quantities; Motion and Equations of motion; Force and Newton's Laws of motion; Gravity and Gravitation; Simple Harmonic motion; Hydrostatics; Surface tension and viscosity; Pressure, Sound; wave and sound Concepts and nature of sound, Velocity of sound, Ultrasonic.

DETAIL DESCRIPTION

THEORY :

1. PHYSICAL WORLD AND MEASUREMENT

- 1.1. Nature of Physical World.
- 1.2. Scope and Excitement of Physics.
- 1.3. Few Terms about Physics.
- 1.4. Physics and other world of Technological Knowledge.
- 1.5. Principle of Measurement.
- 1.6. Fundamental and Derived Quantities and Units.
- 1.7. Dimensions of Units.
- 1.8. Errors in Measurement.

2. SCALAR AND VECTOR QUANTITIES

- 2.1 Define vector and scalar quantities with examples.
- 2.2 Show the various representations of the vector quantities; and representation of a vector by unit vector.
- 2.3 Find and explain the resultant of two vectors in different directions.
- 2.4 Resolve a vector into horizontal & vertical component.
- 2.5 Explain the dot and cross product of two vectors.
- 2.6 Define laws of triangle of vector.

3. MOTION AND EQUATIONS OF MOTION

- 3.1 Define rest and motion
- 3.2 Classify and explain of motion.
- 3.3 Define and explain displacement, speed, velocity, acceleration and retardation.
- 3.4 Deduce the relationship between displacement, velocity, acceleration and retardation from these definitions.
- 3.5 Motion of a Projectile.
- 3.6 Equation of motion of a freely moving body thrown obliquely vertically upward or motion of a projectile.
- 3.7 Define angular velocity and linear velocity with their units.
- 3.8 Deduce the relation between angular velocity and linear velocity.
- 3.9 Define centripetal and centrifugal force with examples.
- 3.10 Prove that centrifugal force = $\frac{mv^2}{r}$
- 3.11 State and explain the laws of falling bodies and mention the equation of motion of a body when it is projected vertically upwards or downwards.

4. NEWTON'S LAWS OF MOTION FORCE AND FRICTION

- 4.1 Define force.
- 4.2 State Newton's laws of motion.
- 4.3 Define different units of force and their correlation and also mention the dimension of force.
- 4.4 Prove $P=mv$, from Newton's 2nd law of motion.
- 4.5 Find out the resultant of parallel forces.
- 4.6 Define inertia and momentum
- 4.7 State and prove the principles of conservation of momentum.
- 4.8 Define friction and describe the different kinds of friction.
- 4.9 Define the co-efficient of static friction.
- 4.10 Show that the co-efficient of static friction is equal to the tangent of angle of repose
- 4.11 State the merits and demerits of friction.

5. GRAVITY AND GRAVITATION

- 5.1 Define and explain the Kepler's Law.
- 5.2 Define gravity and gravitation.
- 5.3 Define and determine the gravitational constant (G) and also mention its units and dimension.
- 5.4 Define acceleration due to gravity 'g' and also mention its units and dimension.
- 5.5 Discuss the variation of 'g' at different places.
- 5.6 Define mass and weight with their units and dimension.
- 5.7 Distinguish between mass and weight.
- 5.8 Define and explain gravitational potential and escape velocity

6. SIMPLE HARMONIC MOTION (SHM)

- 6.1 Define Periodic and simple harmonic motion (SHM).
- 6.2 State the characteristics of SHM.
- 6.3 Describe a simple pendulum and a second pendulum.
- 6.4 Define effective length, amplitude, phase, complete oscillation, period of oscillation, frequency.
- 6.5 State and explain the laws of simple pendulum.
- 6.6 Motion of simple pendulum and its time period.

7. WORK, POWER AND ENERGY

- 7.1 Define work, power and energy.
- 7.2 State the units and dimensions of work, power and energy.
- 7.3 State and prove the principle of the conservation of energy.
- 7.4 Define potential energy (PE) and kinetic energy (KE).
- 7.5 Derive the equation of potential and kinetic energy.
- 7.6 Recognize that the useful work can be found from:

$$\text{Efficiency} = \frac{\text{output work}}{\text{input work}} \times 100.$$

8. ELASTICITY

- 8.1 Name some of the general and special properties of matter.
- 8.2 Define Elasticity and Elastic limit.
- 8.3 Define perfectly elastic body and perfectly rigid body.
- 8.4 Define stress and strain with their units and dimensions.
- 8.5 State and explain the Hook's law.
- 8.6 Describe various kinds of modulus of elasticity.
- 8.7 Mention the units and dimensions of modulus of elasticity.
- 8.8 Define and explain Poisson's ratio.

9. HYDROSTATICS

- 9.1 Define pressure as force per unit area and state that it is measured in N/m^2 or Pascal.
- 9.2 State characteristics of liquid pressure.
- 9.3 Establish the pressure at a point in a fluid depend upon the density of the fluid, the depth in the fluid and acceleration due to gravity.
- 9.4 Surface tension and surface energy, Angle of contact.
- 9.5 Capillarity and theory of capillarity.
- 9.6 Viscosity and co-efficient of viscosity.
- 9.8 Necessity of viscosity.

10. WAVE AND SOUND

- 10.1 Wave and wave motion.
- 10.2 Transverse wave and longitudinal wave.
- 10.3 Some definitions relating waves.
- 10.4 Progressive wave and stationary waves.
- 10.5 Equation of progressive wave.
- 10.6 Sound and production of sound.
- 10.7 Sound is a longitudinal traveling wave.
- 10.8 Interference of sound: Constructive and Destructive interference.
- 10.9 Define beats and Mechanism of formation of beats.

11. SOUND AND VELOCITY OF SOUND

- 11.1 Identify that sound is produced by vibration and travels through a medium as a longitudinal wave.
- 11.2 Recognize that sound can be produced of different pitches (frequencies) & that the human ear has an audible frequency range covering approximately 20 Hz to 20 KHz.
- 11.3 State the approximate frequency range for
 - a. infrasonic sound,
 - b. Ultrasonic (supersonic) sound.
- 11.4 Explain how sound is absorbed, reflected & refracted by different types of surface.
- 11.5 Describe the practical uses of echo sounding devices.
- 11.6 Define velocity of sound.
- 11.7 State the velocity of sound at NTP in still air.
- 11.8 Compare the effects of pressure, temperature & humidity on the velocity of sound in air.

PRACTICAL

1. Determine accurate diameter/side of an object using vernier calipers.
2. Measure the area of cross section of a wire by micrometer screw gage.
3. Measure the thickness of a glass plate by speedometer.
4. Verify the law of parallelogram of forces by a force board.
5. Draw $L-T^2$ graph and determine the value of "g" by using a simple pendulum.
6. Determine the coefficient of static friction.
7. Determine Young's modulus of a steel wire by Searle's apparatus.
8. Determine gravity of a solid heavier than and insoluble in water by hydrostatic balance.
9. Determine specific gravity of a liquid by specific gravity bottle.
10. Determine velocity of sound by resonance air column method.

REFERENCE BOOKS:

1. Higher Secondary Physics - First Part - by Dr. Shahjahan Tapan
2. A Text Book of Properties of matter -By N Subrahmanyam and Brij Lal
3. A Text Book of Sound -By N Subrahmanyam and Brij Lal
4. Higher Secondary Physics- First Part -by Prof. Golam Hossain Pramanik
5. Higher Secondary Physics- First Part -by Ishak Nurfungnabi

OBJECTIVES

SHORT DESCRIPTION

DETAIL DESCRIPTION

1. Operate a personal Computer

1.1 Start up a Computer

- 1.1.1 **Peripherals** are checked and connected with system unit
- 1.1.2 Power cords / adapter are connected properly with computer and power outlets socket
- 1.1.3 Computer is switched on gently.
- 1.1.4 PC **desktop / GUI settings** are arranged and customized as per requirement.

1.2 Operate Computer

- 1.2.1 Files and folders are created.
- 1.2.2 Files and folders are **manipulated** as per requirement.
- 1.2.3 Properties of files and folders are viewed and searched.
- 1.2.4 Control panel settings are practiced.
- 1.2.5 **Memory devices** are formatted as per requirement.

1.3 Shutdown computer

- 1.3.1 unsaved file and folders are closed
- 1.3.2 Open software is closed and hardware devices are switched off.
- 1.3.3 Computer is switched off gently.
- 1.3.4 Power at the respective power outlets is switched off.

2. Type text and documents in English and Bangla.

2.1 Install the Typing Tutor software

- 2.1.1 Required **Hardware** and **software** are ready to use.
- 2.1.2 Typing tutor software are collected and selected
- 2.1.3 English Typing tutor software is installed.
- 2.1.4 Specialized Bangla Typing tutor software is installed.

2.2 Practice text typing in English and Bangla

- 2.2.1 Typing tutor software is started.
- 2.2.2 English Home key drilling are practiced systematically
- 2.2.3 Intermediate level typing speed(25 cps) are achieved.
- 2.2.4 Specialized Bangla Typing tutor / software are installed.
- 2.2.5 Bangla Home key typing are practiced systematically
- 2.2.6 Text documents are typed repeatedly for increasing typing speed.

2.3 Type documents

- 2.3.1 **Word processor** is started.
- 2.3.2 Text document are typed.
- 2.3.3 Intermediate level typing speed (30 cps) in English and (20 cps) in Bangla are achieved.

3. Operate Word Processing Application

3.1 Create documents:

- 3.1.1 Word-processing application are opened.

- 3.1.2 **Documents** are created.
- 3.1.3 Data are added according to information requirements.
- 3.1.4 Document templates Used as required.
- 3.1.5 Formatting tools are used when creating the document.
- 3.1.6 Documents are Saved to directory.

3.2 Customize basic settings to meet page layout conventions:

- 3.2.1 Adjust page layout to meet information requirements
- 3.2.2 Open and view different toolbars
- 3.2.3 Change **font format** to suit the purpose of the document
- 3.2.4 Change alignment and line spacing according to document information requirements
- 3.2.5 Modify margins to suit the purpose of the document
- 3.2.6 Open and switch between several documents

3.3 Format documents

- 3.3.1 Use formatting features and styles as required.
- 3.3.2 Highlight and copy text from another area in the document or from another active document
- 3.3.3 Insert headers and footers to incorporate necessary data
- 3.3.4 Save document in another **file format**
- 3.3.5 Save and close document to **a storage device**.

3.4 Create tables:

- 3.4.1 Insert standard table into document
- 3.4.2 Change cells to meet information requirements
- 3.4.3 Insert and delete columns and rows as necessary
- 3.4.4 Use formatting tools according to style requirements

3.5 Add images:

- 3.5.1 Insert appropriate **images** into document and customize as necessary
- 3.5.2 Position and resize images to meet document formatting needs

3.6 Print information and Shutdown computer:

- 3.6.1 **Printer** is connected with computer and power outlet properly.
- 3.6.2 Power is switched on at both the power outlet and printer.
- 3.6.3 Printer is installed and added.
- 3.6.4 Correct printer settings are selected and document is printed.
- 3.6.5 Print from the printer spool is viewed or cancelled and
- 3.6.6 Unsaved data is saved as per requirements.
- 3.6.7 Open software is closed and computer hardware devices are shut downed.
- 3.6.8 Power at the respective power outlets is switched off.

4. Operate Spreadsheet application

4.1 Create spreadsheets

- 4.1.1 Open spreadsheet application,
- 4.1.2 create spreadsheet files and enter numbers, text and symbols into cells according to information requirements
- 4.1.3 Enter **simple formulas and functions** using cell referencing where required
- 4.1.4 Correct formulas when error messages occur
- 4.1.5 Use a range of common tools during spreadsheet development
- 4.1.6 Edit columns and rows within the spreadsheet
- 4.1.7 Use the auto-fill function to increment data where required
- 4.1.8 Save spreadsheet to directory or folder

4.2 Customize basic settings:

- 4.2.1 Adjust page layout to meet user requirements or special needs
- 4.2.2 Open and view different toolbars
- 4.2.3 Change font settings so that they are appropriate for the purpose of the document
- 4.2.4 Change **alignment** options and line spacing according to spreadsheet **formatting features**
- 4.2.5 **Format** cell to display different styles as required
- 4.2.6 Modify margin sizes to suit the purpose of the spreadsheets

4.2.7 View multiple spreadsheets concurrently

4.3 Format spreadsheet:

4.3.1 Use formatting features as required

4.3.2 Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet

4.3.3 Use **formatting tools** as required within the spreadsheet

4.3.4 Align information in a selected cell as required

4.3.5 Insert headers and footers using formatting features

4.3.6 Save spreadsheet in another format

4.3.7 Save and close spreadsheet to **storage device**

4.4 Incorporate object and chart in spreadsheet:

4.4.1 Import an object into an active spreadsheet

4.4.2 Manipulate imported **object** by using formatting features

4.4.3 Create a chart using selected data in the spreadsheet

4.4.4 Display selected data in a different chart

4.4.5 Modify chart using formatting features

4.5 Create worksheets and charts

4.5.1 Worksheets are created as per requirement

4.5.2 Data are *entered*

4.5.3 **Functions** are used for calculating and editing logical operation

4.5.4 **Sheets** are formatted as per requirement.

4.5.5 **Charts** are created.

4.5.6 Charts/ Sheets are previewed.

4.6 Print spreadsheet:

4.6.1 Preview spreadsheet in print preview mode

4.6.2 Select basic printer options

4.6.3 Print spreadsheet or selected part of spreadsheet

4.6.4 Submit the spreadsheet to **appropriate person** for approval or feedback

5. Operate Presentation Package:

5.1 Create presentations:

5.1.1 Open a presentation package application and create a simple design for a presentation according to organizational requirements

5.1.2 Open a blank presentation and add text and graphics

5.1.3 Apply existing styles within a presentation

5.1.4 Use presentation template and slides to create a presentation

5.1.5 Use various **illustrations** and **effects** in presentation

5.1.6 Save presentation to correct directory

5.2 Customize basic settings:

5.2.1 Adjust display to meet user requirements

5.2.2 Open and view different **toolbars** to view options

5.2.3 Ensure **font settings** are appropriate for the purpose of the presentation

5.2.4 View multiple slides at once

5.3 Format presentation:

5.3.1 Use and incorporate organizational charts, bulleted lists and modify as required

5.3.2 Add **objects** and manipulate to meet presentation purposes

5.3.3 Import **objects** and modify for presentation purposes

5.3.4 Modify slide layout, including text and colors to meet presentation requirements

5.3.5 Use **formatting tools** as required within the presentation

5.3.6 Duplicate slides within and/or across a presentation

5.3.7 Reorder the sequence of slides and/or delete slides for presentation purposes

5.3.8 Save presentation in another **format**

5.3.9 Save and close presentation to disk

5.4 Add slide show effects:

- 5.4.1 Incorporate preset animation and multimedia effects into presentation as required to enhance the presentation
- 5.4.2 Add slide transition effects to presentation to ensure smooth progression through the presentation
- 5.4.3 Test presentation for overall impact
- 5.4.4 Use onscreen navigation tools to start and stop slide show or move between different slides as required

5.5 Print presentation and notes:

- 5.5.1 Select appropriate print format for presentation
- 5.5.2 Select preferred slide orientation
- 5.5.3 Add notes and slide numbers
- 5.5.4 Preview slides and spell check before presentation
- 5.5.5 Print the selected slides and submit presentation to appropriate person for feedback

6. Access Information using Internet and electronic mail

- 6.1 Access resources from internet
 - 6.1.1 Appropriate internet **browsers** are selected and installed
 - 6.1.2 Internet browser is opened and web address / URL is written/selected in /from address bar to access **information**.
 - 6.1.3 **Search engines** are used to access information
 - 6.1.4 Video / Information are Shared /downloaded / uploaded from / to web site/**social media**.
 - 6.1.5 **Web based resources** are used.
 - 6.1.6 Netiquette' (or web etiquette) principles are searched and followed

6.2 Use and manage Electronic mail

- 6.2.1 **Email services** are identified and selected to create a new email address
- 6.2.2 Email account is created
- 6.2.3 Document is prepared, attached and sent to different types of recipient.
- 6.2.4 Email is read, forwarded, replied and deleted as per requirement.
- 6.2.5 Custom email folders are created and **manipulated**
- 6.2.6 Email message is printed

OBJECTIVES

- To familiarize the basic electrical quantities & laws and to apply them in solving problems of electrical circuits.
- To acquaint with electro-magnetism, electro-magnetic induction.
- To develop skill in electrical wiring.
- To familiarize with DC generator, AC generator, AC motor, DC Motor & Transformers.
- To appreciate the safety measures to be taken for electrical wiring.

SHORT DESCRIPTION

Electric current; Voltage & Resistance; Conductors and insulators; Ohm's law; Kirchhoff's Law; Joule's law; Faraday's law; Basic electrical circuits; Power and energy; Electro-magnetic induction; House wiring; Controlling devices; Protective devices; Earthing; DC Motor, AC Motor, DC Generator; AC Generator; Transformer & Electricity Act/Rule.

DETAIL DESCRIPTION**Theory :****1 Understand electricity and its nature.**

- 1.1 State the meaning of electricity.
- 1.2 Describe the structure of atom.
- 1.3 Define current, voltage and resistance with unit.

2 Understand conductor semiconductor & insulator.

- 2.1 Define conductor, semiconductor and insulator.
- 2.2 Describe the conductor, semiconductor and insulator.
- 2.3 List at least 5 conductors, 5 semiconductor and 5 insulators.
- 2.4 Describe the factors upon which the resistance of a conductor depends.
- 2.5 State laws of resistance.
- 2.6 Prove the relation $R = \rho L/A$
- 2.7 Explain the meaning of resistivity and unit of resistivity.
- 2.8 Solve problems relating to laws of resistance.

3 Understand Ohm's Law

- 3.1 State Ohm's law.
- 3.2 Deduce the relation between energy current, voltage and resistance.
- 3.3 Solve problems relating to Ohm's law.

4 Understand Kirchhoff's Law

- 4.1 State Kirchhoff's current law.
- 4.2 Explain the Kirchhoff's current law.
- 4.3 Sate Kirchhoff's Voltage law.
- 4.4 Explain the Kirchhoff's Voltage law.
- 4.5 Solve problem by Kirchhoff's Law

5 Understand electric circuit.

- 5.1 Define electric circuit.
- 5.2 Name the different types of electric circuits.
- 5.3 Define series circuit, parallel circuit and mixed circuit.
- 5.4 Describe the characteristic of series circuit and parallel circuit.
- 5.5 Calculate the equivalent resistance of series circuit and parallel circuit.
- 5.6 Solve problems relating to DC series circuit, parallel circuit and mixed circuit.
- 5.7 Define inductor, capacitor, inductive reactance & capacitive reactance.
- 5.8 Write the formula of inductive reactance, capacitive reactance & impedance.

- 6 Apply the concept of electrical power and energy.**
- 6.1 Define electrical power and energy.
 - 6.2 State the unit of electrical power and energy.
 - 6.3 Show the relation between electrical power and energy.
 - 6.4 Name the instruments for measuring of electrical power and energy.
 - 6.5 Draw the connection diagram of wattmeter and energy meter in an electrical circuit.
 - 6.6 Solve problems relating to electrical power and energy Calculation.
- 7 Understand the principles of Joule's law.**
- 7.1 Explain Joule's law regarding the development of heat in electrical circuit.
 - 7.2 Describe meaning of "J".
 - 7.3 Solve problems relating to Joule's law.
- 8 Understand the Faraday's laws of Electro-magnetic Inductions**
- 8.1 Define Electro-magnetic Inductions.
 - 8.2 Explain Faraday's laws of Electro-magnetic Induction.
 - 8.3 Solve problems on Electro-magnetic Induction.
- 9 Understand the uses of wires and cables.**
- 9.1 Define electrical wires and cables.
 - 9.2 Distinguish between wires and cables.
 - 9.3 Uses of wires and cables.
- 10 Understand the different methods of house wiring.**
- 10.1 State the meaning of wiring.
 - 10.2 List the types of wiring.
 - 10.3 State the types of wiring used in:
 - a) Residential building.
 - b) Workshop
 - c) Cinema hall/Auditorium
 - d) Temporary shed
 - 10.4 List the name of fittings used in different types of electrical wiring.
- 11 Understand the controlling and protective devices & uses of them.**
- 11.1 Define controlling device.
 - 11.2 List the different types of controlling devices.
 - 11.3 Define protective devices.
 - 11.4 List the different types of protective devices.
 - 11.5 Uses of different types of fuses used in house wiring.
 - 11.6 Uses of different types of circuit breaker in house wiring.
- 12 Understand the necessity of earthing.**
- 12.1 Define earthing.
 - 12.2 Describe the necessity of earthing.
 - 12.3 List of different types of earthing.
- 13 Understand the principle of operation of transformer.**
- 13.1 Define transformer.
 - 13.2 Describe the working principle of transformer.
 - 13.3 Write the equation relating to voltage, current & turns of primary & secondary winding of transformer.
 - 13.4 List the different losses of transformer.
 - 13.5 Define transformation ratio (voltage, current and turns).
 - 13.6 Solve problems on transformation ratio.
- 14 Concept of the principle of Electrical Machines**
- 14.1 Define electrical machine.
 - 14.2 list of different types of electrical machines.

- 14.3 Define generator.
- 14.4 List of different types of generator.
- 14.5 Uses of generator.
- 14.6 Define motor.
- 14.6 List of different types of motor.
- 14.7 Uses of motor.

Practical:

1 Identify and use electrical measuring instruments.

- 1.1 Identify Voltmeters, Ammeters, Clip-on meter, Frequency meter, Wattmeter, Energy meter and AVO meter.
- 1.2 Select & read the scale of given meters.
- 1.3 Connect correctly voltmeter, ammeter, watt meter and energy meter to a given circuit.

2 Show skill in verification of Ohm's Law.

- 2.1 Sketch the circuit diagram for the verification of Ohm's Law.
- 2.2 List tools, equipment and material required for the experiment.
- 2.3 Prepare the circuit according to the circuit diagram using proper equipment.
- 2.4 Check all connections before the circuit is energized.
- 2.5 Verify the law by collecting relevant data.

3 Show skill in verification of Kirchhoff's Law.

- 3.1 Sketch the circuit diagram for the verification of Kirchhoff's Law.
- 3.2 List tools, equipment and material required for the experiment.
- 3.3 Prepare the circuit according to the circuit diagram using proper equipment.
- 3.4 Check all connections before the circuit is energized.
- 3.5 Verify the laws by collecting relevant data.

4 Verify the characteristics of series and parallel circuits.

- 4.1 Draw the working circuit diagram.
- 4.2 List tools, equipment and materials required for the experiment.
- 4.3 Prepare the circuit according to the circuit diagram using proper equipment.
- 4.4 Check all connections before the circuit is energized.
- 4.5 Record data and verify that in a series circuit total voltage and resistance is equal to the summation of individual voltage and resistance respectively but total current is equal to the individual current.
- 4.6 Record data and verify that for a parallel circuit supply voltage is equal to the branch voltage, supply current is equal to summation of branch currents.

5 Show skill in measuring the power of an electric circuit.

- 5.1 Sketch the necessary circuit diagram of an electrical circuit with electrical load, ammeter, voltmeter and wattmeter.
- 5.2 Prepare the circuit according to the circuit diagram using ammeter, voltmeter and wattmeter.
- 5.3 Record the power, measured by the wattmeter and verify the reading with that of calculated from ammeter and voltmeter.
- 5.4 Compare the measured data with that of calculated and rated power.

6 Show skill in measuring the energy consumed in an electrical circuit.

- 6.1 Sketch the necessary diagram of an electric circuit wattmeter, energy meter and electrical load.
- 6.2 Prepare the circuit according to the circuit diagram user wattmeter and energy meter.
- 6.3 Record the energy measured by the energy meter and verify with that of calculated from wattmeter for a fixed time.

7 Show skill in uses of hand tools, wires and cables.

- 7.1 List the hand tools used in electrical wiring.
- 7.2 Identify the hand tools used in electrical wiring.
- 7.3 Draw neat sketches of hand tools used in electrical wiring.

- 7.4 Identify different types of wires and cables.
7.5 Measure the diameter of the identified wire and cables using standard wire gauge.
- 8 Show skill in preparing wiring circuit of two lamps controlled from two points separately.**
8.1 Sketch a working circuit of two lamps controlled from two points separately.
8.2 Make the wiring circuit using required materials and equipment a wiring board.
8.3 Test the connection of circuit by providing proper supply.
- 9 Show skill in preparing wiring circuit of one lamp controlled from two points.**
9.1 Sketch a working diagram of one lamp controlled by two SPD tumbler Switches.
9.2 Complete the wiring circuit using required materials and equipment on wiring board.
9.3 Test the connection of circuit by providing proper supply.
- 10 Show skill in preparing wiring circuit of one bell with two indicating lamp controlled from two points.**
10.1 Sketch a working diagram of one bell with two indicating lamps controlled by two push button switch.
13.2 Make the wiring circuit using required materials and equipment in wiring board.
13.3 Test the connection of circuit by providing proper supply.
- 11 Show skill in preparing wiring circuit of a fluorescent tube light.**
11.1 Sketch a working diagram of a fluorescent tube light circuit.
11.2 Make the connection of a fluorescent tube light circuit using required materials and equipment.
11.3 Test the connection of the circuit by providing supply.
- 12 Find the transformation ratio of a transformer.**
12.1 Develop a circuit to perform the experiment.
12.2 Select required equipment and materials.
12.3 Connect the components according to the circuit diagram.
12.4 Check the connections.
12.5 Record the primary (E_p) and secondary (E_s) voltages.
12.6 Calculate the transformation ratio using the relation

$$\frac{E_s}{E_p} = \frac{N_s}{N_p} = K$$

12.7 Note down the observations.
- 13 Start a 1-phase capacitor type motor/ceiling fan with regulator.**
13.1 Select the equipment and tools required for the experiment.
13.2 Sketch a working diagram.
13.3 Identify the two sets of coils.
13.4 Connect the capacitor with the proper set of coil.
13.5 Connect power supply to the fan motor.
13.6 Test the rotation of the motor opposite direction by changing the capacitor connection.
13.7 Note down the observations.

REFERENCE BOOKS

- | | |
|--|-----------------|
| 1 A text book of Electrical Technology | -B. L. Theraja |
| 2 Basic Electricity | -Charles W Ryan |
| 3 Basic Electrical theory and Practice | -E. B. Babler |
| 4 Electrical Machine | -Siskind |

AIMS

- To be able to develop Knowledge, skill and attitude of offset machine operation.
- To be able to conduct adjustment of different unit of a sheet feed offset press for operation.
- To be able to prepare inking, dampening, printing and delivery unit according to job standard.

SHORT DESCRIPTION

Printing press, feeding and sheet control, inking and damping unit, printing and delivery, plate and blanket, make-ready, maintaining uniform color, handling raw materials used in pressroom, pressroom safety.

1. Understand offset Printing Press.

- 1.1. Define Offset Printing
- 1.2. Describe the history of Lithographic printing.
- 1.3. Describe Sheet feed single color offset press.
- 1.4. Describe multi-color offset Printing press.
- 1.5. Describe Computer Print Controlled Printing press.
- 1.6. Define the difference between sheet feed and web fed offset press.
- 1.7. Describe the importance of offset printing.

2. Understand feeding and sheet control of offset Printing Press.

- 2.1. Describe the function of different parts of feeding and sheet control unit.
- 2.2. Explain the advantage of various type feeders.
- 2.3. Describe the process of pile height control.
- 2.4. Describe the function of side guide and front guide.
- 2.5. Describe the problem and Remedy of sheet control during printing.
- 2.6. Describe the feedersetting for a new job.

3. Understand inking and Dampening System.

- 3.1. Describe various types of dampening system used in offset printing.
- 3.2. Describe the type and function of dampening cover.
- 3.3. Mention the name and function of inking and dampening roller.
- 3.4. Describe ink drying process.
- 3.5. Describe ink control process.
- 3.6. Describe the preparation process of dampening solution.
- 3.7. Discuss form roller to plate setting.

4. Understand Printing and delivery System Unit.

- 4.1. Describe the function of printing and delivery unit.
- 4.2. Describe the printing cylinder design for sheet fed offset press.
- 4.3. Explain plate mounting process.
- 4.4. Explain why need to control the of cylinder pressure.
- 4.5. Define registration.
- 4.6. Describe the settings process of delivery parts for a new job.

5. Understand Plate and Blanket.

- 5.1. Define offset plate and blanket.
- 5.2. Describe the process of plate Banding and Punching.
- 5.3. Describe offset blanket mounting.
- 5.4. Describe blanket Selection Procedure.
- 5.5. Discuss the care of blanket and offset plate.

6. Understand Pre make ready and make ready.

- 6.1. Describe plate testing and reporting.
- 6.2. Explain test printing.
- 6.3. Describe wash up process before printing.
- 6.4. Describe single color registration on the stock.
- 6.5. Describe multi-color registration on the stock.
- 6.6. Describe the cause of using packaging sheet.

7. Understand maintaining uniform color.

- 7.1. Explain the role of sheet examine during printing.
- 7.2. Discuss about CMYK color.
- 7.3. Describe the pigment and light color.
- 7.4. Describe the ink and dampening solution control process.
- 7.5. Describe solid color printing.

8. Handling Raw materials used in offset printing.

- 8.1. Describe the raw materials used in offset printing.
- 8.2. Describe the method of testing offset ink.
- 8.3. Describe the jocking process of papers and board.
- 8.4. Describe the method of testing paper and board.

9. Understand press room safety.

- 9.1. Describe the cause of accident and remedy during press operation
- 9.2. Describe the cause of accident during handling of raw materials.
- 9.3. Describe the safety procedure.
- 9.4. Explain the function of various firefighting equipment's.
- 9.5. Describe role of management to prevent accident.

Practical

1. Identify different types of raw materials and equipment used in offset printing.
2. Open and set the dampening and inking roller.
3. Set the feeding, inking, dampening and delivery unit for a new job.
4. Mount a plate and blanket for new job.
5. Demonstrate make ready for a new single color job.
6. Demonstrate make ready for a Bi-color job.
7. Run the machine and control ink and dampening solution.
8. Test the grain direction of paper and board.
9. Print a single color job.
10. Print a Bi-color visiting card by single color offset machine.

References:

1. Lithographic Printing- 1 & 2 by Molla Md Golam Mostafa.
2. Lithographic Manual by GATF

উদ্দেশ্য :

১. মাতৃভাষা হিসেবে বাংলা ভাষার প্রকৃতি ও বৈশিষ্ট্য সম্পর্কে ধারণা লাভ। ভাষার ব্যবহারে প্রায়োগিক যোগ্যতা অর্জন।
২. বাংলা সাহিত্য পঠন-পাঠনের মাধ্যমে জাতীয় চেতনা, দেশপ্রেম, মুক্তিযুদ্ধের চেতনা, শুদ্ধাচার, নীতি ও মূল্যবোধের উন্মেষ ঘটানো।

সংক্ষিপ্ত বিবরণী :

মাতৃভাষা ও সৃজনশীলতা : বাংলা ভাষা রীতির বিচিত্রতা, বানান রীতি, পত্র রচনা এবং কবিতা, প্রবন্ধ, নাটক, উপন্যাস ও ছোট গল্প।
বিশদ বিবরণী:

১. বাংলা ভাষার প্রয়োগ:

ক) বাংলা ভাষা :

ভাষার সংজ্ঞা, বাংলা ভাষা রীতি - সাধু, চলিত, আঞ্চলিক বা উপভাষা (সংজ্ঞা, বৈশিষ্ট্য, পার্থক্য ও উদাহরণ)

খ) বাংলা বানান রীতি ও শব্দ প্রয়োগ:

১. বাংলা একডেমির প্রমিত বানান রীতি, ণ-ত্ব ও ষ-ত্ব বিধি

২. শব্দ ও শব্দের শ্রেণি বিভাগ (সংজ্ঞা, শব্দের গঠন, উৎস বা উৎপত্তি ও অর্থগত)

৩. বাক্য প্রকরণ ও গঠন রীতি (সংজ্ঞা, বাক্য গঠন এবং প্রকার)

গ) পত্র রচনা :

আবেদন পত্র (চাকুরি, ছুটি), চাকুরিতে যোগদান পত্র, মানপত্র, স্মারকলিপি, সংবাদপত্রে প্রকাশের জন্য পত্র

২. বাংলা সাহিত্য:

ক. কবিতা :

১. বঙ্গভাষা -মাইকেল মধুসূদন দত্ত

২. সোনার তরী - রবীন্দ্র নাথ ঠাকুর

৩. উমর ফারুক -কাজী নজরুল ইসলাম

৪. বাংলার মুখ আমি- জীবনানন্দ দাশ

৫. আসাদের শার্ট - শামসুর রাহমান

৬. স্বাধীনতা শব্দটি কি করে আমাদের হলো? - নির্মলেন্দু গুণ

খ. প্রবন্ধ :

১. অর্ধাসী -রোকেয়া সাখাওয়াত হোসেন

২. বইকেনা - সৈয়দ মুজতবা আলী

গ. একাঙ্কিকা (নাটিকা): মানুষ -মুনীর চৌধুরী

ঘ. উপন্যাস: লালসালু - সৈয়দ ওয়ালী উল্লাহ

ঙ. ছোট গল্প:

১. হৈমন্তী - রবীন্দ্র নাথ ঠাকুর

২. একুশের গল্প - জহির রায়হান

৩. পাতালেহাসপাতালে - হাসান আজিজুল হক

ব্যবহারিক**১. নির্ধারিত বক্তৃতা :**

বাংলাদেশ ও বাঙালি সংস্কৃতি, বিভিন্ন জাতীয় দিবস (একুশে ফেব্রুয়ারি ও আন্তর্জাতিক মাতৃভাষা দিবস, স্বাধীনতা দিবস, বিজয় দিবস, জাতীয় শোক দিবস, মুজিব নগর দিবস, মহান মে দিবস)

প্রাতিষ্ঠানিক বক্তৃতা- নবাগত শিক্ষক/ছাত্রছাত্রীদের বরণ, গুরুত্বপূর্ণ ব্যক্তিবর্গের আগমন উপলক্ষে বক্তৃতা।

২. উপস্থিত বক্তৃতা :

বিষয়বস্তু উন্মুক্ত

৩. আবৃত্তি :

১. মানুষ - কাজী নজরুল ইসলাম
২. আকাশ নীলা - জীবনানন্দ দাশ
৩. পল্লী জননী - জসীম উদ্দীন
৪. ছাড়পত্র - সুকান্ত ভট্টাচার্য
৫. তোমাকে পাওয়ার জন্য হে স্বাধীনতা - শামসুর রাহমান
৬. নিষিদ্ধ সম্পাদকীয় - হেলাল হাফিজ

৪. বিতর্ক (নমুনা)

সংস্কৃতিই আধুনিক মানুষের ধর্ম

তথ্য প্রযুক্তির অবাধ ব্যবহারই যুব সমাজের অবক্ষয়ের মূল কারণ

গতানুগতিক শিক্ষা নয় কর্মমুখি শিক্ষাই অর্থনৈতিক মুক্তির চাবিকাঠি

চালকের অসাবধনতাই সড়ক দুর্ঘটনার প্রধান কারণ

মুক্তিযুদ্ধের চেতনাই অসাম্প্রদায়িক বাংলাদেশ প্রতিষ্ঠার মূলমন্ত্র

প্রযুক্তির বিকাশই প্রকৃতি বিনাশের একমাত্র কারণ

৫. প্রতিবেদন প্রণয়ন ও উপস্থাপন:

স্থানীয় বিভিন্ন সমস্যা ও অনুসন্ধানী যে কোন বিষয়।