BANGLADESH TECHNICAL EDUCATION BOARD

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

FOOTWEAR TECHNOLOGY (698)

SYLLABUS

SECOND SEMESTER

Footwear Technology (698)
2nd Semester

Sl No	Sub. Code	Name of the Subject	T	P	C	Marks				Total
						Theory		Practical		
						TC	TF	PC	PF	
1	69821	Footwear Manufacture-I	3	3	4	60	90	25	25	200
2	69822	Material Science – I	3	3	4	60	90	25	25	200
3	66621	Computer Application-I	0	6	2	-	-	50	50	100
4	65921	Mathematics-II	3	3	4	60	90	25	25	200
5	65912	Physics-I	3	3	4	60	90	25	25	200
6	65712	English	2	0	2	40	60	50	-	150
	Total=		**14**	**18**	**20**	**280**	**420**	**225**	**125**	**1050**

69821	FOOTWEAR MANUFACTURE-I	T	P	C
		3	3	4

OBJECTIVES

1. To develop the basic knowledge of footwear.
2. To familiarize with the basic knowledge of different types of foot and footwear.
3. To acquire knowledge on the properties and functions of different types of footwear.
4. To develop the knowledge on the anatomy of foot and footwear.
5. To acquaint with the knowledge of shoe last, its types and features.
6. To acquire knowledge about foot measurement and shoe sizing.

SHORT DESCRIPTION

The student will able to understand the basic concept, style, types and anatomy of footwear. They will also be able to select appropriate last for the manufacturing of footwear of the related foot. They can measure the different foot parameters to determine accurate shoe size and fitting.

Theory

1. Understand the basic knowledge of Footwear.

- 1.1 Define footwear and foot gear.
- 1.2 Describe the history of footwear.
- 1.3 Distinguish between footwear and foot gear.
- 1.4 Mention the purposes of footwear.
- 1.5 Mention the types of footwear.
- 1.6 Describe the characteristics features of basic styles of footwear.
- 1.7 Describe the characteristics features of comfortable footwear.
- 1.8 Describe the characteristics features of safety footwear.
- 1.9 Describe the characteristics features of occupational footwear.
- 1.10 Distinguish between oxford and derby, moccasin and casual shoes.

2. Understand the anatomy of shoe.

- 2.1 Sketch the shoe's section.
- 2.2 Mention the different parts of a shoe.
- 2.3 Describe the different parts of shoe upper.
- 2.4 State the different parts of shoe lining.
- 2.5 Describe the different parts of shoe bottom
- 2.6 Sate the anatomy of ladies and gents heel.
- 2.7 Describe the purposes, types and properties of toe puff and counter stiffener.
- 2.8 Describe the purposes, types and properties of insole, sole shank and heel.
- 2.9 Describe the purposes, types and properties of welts, ornaments and fittings.
- 2.10 Describe about the footwear care.

3. Understand the shoe last

- 3.1 Define last.
- 3.2 Describe the importance of last.

3.3 Mention the difference between last and feet.
3.4 Describe the last features for different styles of footwear.
3.5 Compare between last and feet
3.6 Mention the last specification.
3.7 Sate the classification of lasts.
3.8 Mention the defects of last.
3.9 Illustrate the symmetric and asymmetric lasts.
3.10 Describe custom made last.
3.11 Describe after care of last/storage of last.

4. Understand the foot measurement.

4.1 Define biometry.
4.2 Describe the importance of foot measurement
4.3 State various system of foot measurement.
4.4 Describe different foot measurement devices.
4.5 Measure foot using foot impression or foot print.
4.6 Measure foot using size stick.
4.7 State the Branock foot device.
4.8 State the foot measurement tips.
4.9 Illustrate the using technique of shoe tap.

5. Understand the shoe sizing and fitting.

5.1 Explain shoe size, shoe fitting, multi-fitting.
5.2 Describe the principal of shoe fitting.
5.3 Distinguish among different shoe sizing systems
5.4 Illustrate different fitting systems.
5.5 Describe conversation of sizes from one scale to another.
5.6 State the factors of shoe fitting.
5.7 Depict the inconsistency of shoe fitting

PRACTICAL

1. Introduce and identify different working tools of footwear manufacture.
2. Cut various straight lines on paper.
3. Cut various curve lines on paper.
4. Cut brown paper using supplied templates.
5. Cut pattern paper using supplied templates.
6. Determine the heel to ball length of human foot.
7. Determine the different girth measurement of human foot.
8. Determine the shoe sizing and fitting of human foot.

REFERENCE BOOKS

1. Manual of Shoe Making by R.G. Miller.
2. Shoe Designing a Manual - Leather Technology Mission, CLRI.

3. Professional Shoe Fitting by National Shoe Retailer Association.
4. Text book of Footwear manufacture by J. H. Thornton.
5. Introduction to the Modern Footwear Technology by B. Venkatappaiah.
6. The Complete Dictionary of Footwear by Swayam Siddha.
7. Foot Last Footwear: Structure, types and defects. Noor Mohammad, COEL & LFMEAB, Dhaka.

69822	Material Science - I	T	P	C
		3	3	4

OBJECTIVES

- To be able to understand the basic concepts of material science.
- To acquire knowledge on principles of properties of materials.
- To understand about various materials used in footwear manufacturing.
- To characterize and apply the various upper materials for making footwear.
- To select suitable lining materials for the shoe upper.
- To understand different types of adhesives used in footwear manufacture.

SHORT DESCRIPTION

Student will able to learn about different upper materials with their properties characterization and applications for footwear. They will be able to develop skill on the selection and application of lining materials. They will also be able to gather knowledge and skill on the characterization and application of different types of adhesives.

DETAIL DESCRIPTION

Theory

1. **Understand the leather upper materials.**

    1.1 Define upper materials
    1.2 State the ideal properties of leather upper materials.
    1.3 Identify the various parts of leather.
    1.4 Describe the effect of structure on the properties of leather.
    1.5 List out the types of finished leather.
    1.6 Compare between leather and synthetic materials.

2. **Understand the lining materials.**

    2.1 Define lining
    2.2 State the functions of lining
    2.3 List out the types of lining materials
    2.4 State the different types of leather for lining.

3. **Understand the toe puff and stiffeners for footwear.**

    3.1 Define toe puff
    3.2 State the purposes of toe puff
    3.3 State the types of toe puff
    3.4 Describe the application and positioning of toe puff
    3.5 Describe the toe puff faults and their effects on footwear
    3.6 Define counter stiffener
    3.7 State the purpose of shoe stiffener
    3.8 List out the types of shoe stiffener
    3.9 State the selection criteria of stiffeners for different types of footwear
    3.10 Describe the positioning of stiffener and its faults

4. **Understand the reinforcements.**

    4.1 Define reinforcement
    4.2 List out the types of reinforcement materials

4.3 State the purpose of using reinforcement in footwear
4.4 State the selection criteria of reinforcement materials for footwear manufacture
4.5 Describe the different seam reinforcing materials for footwear.
4.6 Describe reinforcement for strengthening loops (Ghillies, D-rings), lasting strains, buckle straps;
4.7 Describe the advantages and disadvantages of reinforcement.

5. **Understand the application of the fasteners.**
   5.1 Define fastener.
   5.2 Outline different types of fasteners
   5.3 State the purposes of fasteners
   5.4 Define eyelets
   5.5 State the types of eyelet
   5.6 Describe the slide fasteners and their uses.

6. Understand the adhesive:
   6.1 Define adhesive
   6.2 State the different types of adhesive
   6.3 Describe the properties of different types of adhesives (Neoprene, PU, Latex, Natural rubber Solution, Hot melt Adhesive, Pressure Sensitive Adhesive).
   6.4 State the selection criteria of adhesives for upper and solings.
   6.5 Illustrate the application procedure of various adhesive on different types of upper and bottom materials
   6.6 Discusses the faults remedy of adhesion.

7. **Understand the shanks for footwear.**
   7.1 Define shank
   7.2 State the types of shank
   7.3 State the purpose of shank in footwear
   7.4 State the use of shank for high heel shoes

Practical

1 Identify the different types leather upper materials.

2 Identify different types of lining materials.

3 Identify different types of footwear.

4 Selection criteria for reinforcement materials.

5 Selection the fasteners.

6 Interpret the use accessories.

Reference Books

1. Introduction to the Modern Footwear Technology by Venkatappaiah B.
2. Manual of Shoe Making by R. G. Miller (Editor)
3. Boot and Shoe Production by J Korn. (Editor)

4. Text Book of Footwear Manufacture by J. H Thornton.
5. Making Shoes by Ruth Thomson
6. Product Knowledge by Swayam Siddha
7. Text Book of Footwear Materials by J. H Thornton.

66621	Computer application –1	T	P	C
		0	6	2

OBJECTIVES.

- To develop skill to use computer and computer operating system.
- To perform skill on using word processing software packages to create documents.
- To perform skill on using presentation software packages for documents presentation.
- To perform skill on using Internet and e-mail for sending and receiving documents.

SHORT DESCRIPTION

Computer hardware System, Operating Systems, pirating system environment, Customizing and configuring operating System files; Utility software and Anti viruses; Fundamentals of word processing; Create Simple documents; Print and preview the document; Manage files; Format the documents; Merge files; skill on presentation software, skill on Internet, e-mail and web browsing.

DETAIL DESCRIPTION

1. Show skill on computer hardware.

1.1Identify the main components of Personal Computer.
1.2Identify the CPU components and commonly used I/O devices and memories.
1.3Identify Primary and secondary storage devices & demonstrate the maintenance of the devices.
1.4Identify the allied equipment used with PC system(UPS, Stabilizer band IPS).
1.5Make the cable connection of PC system, UPS and printer with power line.
1.6Turn ON the power Switch and demonstrate booting effect of PC system.

2 Practice on windows operating system environment.

2.1Observe the windows Screen and identify each item on desktop.
2.2Show the function of start button & taskbar.
2.3Start and quit programs.
2.4Switch between programs.
2.5Open and close a document.
2.6Find something using find command.
2.7Start a program by using run command.

3 Practice on customizing and configuring windows operating system.

3.1Change system setting (say, system date, time, password, etc).
3.2Configure the taskbar, shortcuts, desktop items etc.
3.3Install driver software & configure printer, plotter, mouse & other PC equipment.
3.4Use windows explorer for copy, move, delete or rename files and folder.
3.5Add items to the start menu.
3.6Create a shortcut on the desktop.
3.7Customize windows i.e. desktop colors, patterns, wallpaper, screen saver, etc.

4 Practice on advance features of windows operating system and disk utilities.

4.1Use windows efficiently (i.e. copying, moving files quickly).
4.2Organize your applications into groups (i.e. creating & deleting a group).
4.3Install a new application program.
4.4Back up, compare and restore files.
4.5Freeze disk space (i.e. check your system's disk space, delete unnecessary files).

5 Practice on Disk Operating System(DOS).

5.1Restart the computer in DOS mode.
5.2use internal and external DOS commands.
5.3Create, delete and view directories.
5.4Change directories.
5.5Use wild card in DOS mode.

6 Perform skill in managing disk.

6.1Format and unformat a disk.
6.2Create a system disk.
6.3Make a system disk.
6.4Restore directories and files.
6.5Recover files from defective disks.

7 Perform skill in working with files and folder.

7.1Organize files and folders.
7.2Copy files (copy a single file, a group of files).
7.3Rename a file.
7.4Delete files (delete a single file, a group of files).
7.5Copy directories & sub directories.
7.6Show directories such as directory tree directory name, paths, and the current directory.

8 Perform skill in working with utilities software and anti viruses.

8.1 Run antivirus software (say Toolkit, Norton Antivirus, PC cillin, Kaspersky etc) and scan for viruses.
8.2Protect the computer from viruses.
8.3Run utility software such as PC, Tools, NC, NU, etc.
8.4Use utility software for copying, renaming, deleting and moving folders or files.
8.5Develop keyboard skills by standard touch typing rules using typing tutor packages.

9 project1: Connect each part of a personal computer(PC) ,operate it with Windows operating system and install / uninstall programs/software's.

WORD PROCESSING:

10 Practice on creating a simple document using word processor.

10.1 Open windows based word processor and identify the different elements of the editing window.

10.2 Type text, edit text using word processor.
10.3 Select text and modify the text.
10.4 Save the document then quit & reopen the document.
10.5 Copy, move, and delete text.
10.6 Copy from one word document to another.

11 Practice on working with graphics and drawing.

11.1 Import graphics using insert picture command.
11.2 Use clipboard to insert art.
11.3 Resize graphics, crop graphics with mouse and with picture command.
11.4 Open drawing tools bar.
11.5 Draw a textbox and write text to it.
11.6 Draw graphs using different objects from the drawing tools bar.
11.7 Group, Ungroup, rotate and flip objects.
11.8 Fill drawn items with different color, change line styles, arrow heads, line colors & shades of gray.

12 Show skill on managing file.

12.1 Open previously saved documents.
12.2 Open documents form or within word.
12.3 Open non-word documents.
12.4 Open documents as read only.
12.5 Find files, searching by file names, dealing with large lists, Searching inside documents.
12.6 Save under a different file name and save to other location.
12.7 Save in non-word formats.
12.8 Make backup files for safe keeping and recover damaged file.

13 Show skill on formatting a document.

13.1 Change document margins.
13.2 Set margin with the page setup dialog box.
13.3 Drag margins in pint preview.
13.4 Pint in the margins.
13.5 Repaginate documents.
13.6 Force page breaks and force paragraphs to start on a new page.
13.7 Move and delete page breaks.
13.8 Keep things (lines, paragraphs, etc.) together on a page.

14 Show skill in selecting characters and fonts.

14.1 Format the character with the formatting toolbar.
14.2 Create and use different options of font dialog box.
14.3 Create keyboard shortcuts for character formatting.
14.4 Underline text (double, single, dotted, etc) and create bold Italicized character.
14.5 Expand and condense character spacing.
14.6 Create superscripts and subscripts and color character.
14.7 Demonstrate the change case command.
14.8 Remove and toggle to remove character formatting.
14.9 Type special characters and symbols using the symbol command.
14.10 Bullet the existing paragraphs.
14.11 Type new bullet lists, change bullet styles and specify custom bullets.

15 Practice on paragraphs, line spacing, borders and shading.

15.1 Create paragraphs and split text into multiple paragraph.
15.2 Join and delete paragraphs.
15.3 Format the paragraph with the formatting toolbar, paragraph dialog box & keyboard shortcuts.
15.4 Index paragraphs automatically and index with the ruler, toolbar keyboard shortcuts and with paragraph dialog box.
15.5 Align and justify text and a adjust the space between lines such as single spacing, double spacing etc.
15.6 Create and remove borders and shading.
15.7 Create lines with the border command.
15.8 Show the border toolbar.
15.9 Show custom border and lines increase the space between border and text.

16 Practice on tables and Perform skill in modifies table design.

16.1 Create a simple table using table button & table menu.
16.2 Enter and edit text in a table.
16.3 Select cells, columns, rows group of cells and the whole table.
16.4 Add rows at the end and in the middle of a table, than delete rows.
16.5 Change row heights, and resize rows with cell height and width.
16.6 Change the spacing between rows.
16.7 Insert columns at the right edge and in the middle of a table, then delete the columns.
16.8 Change column and cell width with the ruler and the auto fit bottom.
16.9 Marge cells.
16.10 Change the space between columns merge different cells.

17 Project 2: Create a complete document(such as a personal bio-data) with MS Word in Bengali and English using all necessary formatting with graphics, table and save it in a created folder.

18 Practice on previewing & printing.

18.1 Connect printer to computer and keep paper in the printer tray.
18.2 Open page setup dialogue box and set the paper size.
18.3 Show print preview to adjust document.
18.4 Open print dialog box options to print document.
18.5 Show, use and leave print dialog box.

Presentation Software:

19 Create a PowerPoint Presentation.

19.1 Identify the different components of MS PowerPoint package.
19.2 Design template color schemes, animation schemes etc.
19.3 Add/delete slides in the Presentation.
19.4 Add pictures, graphs, charts and other objects into slides.
19.5 Animate text and other objects in a very attractive way or motion.
19.6 Save and execute the slides.

20 Enhance PowerPoint Presentation.

20.1 Use sound effects and custom path of animation effects in the Presentation
20.2 Add video clips.
20.3 View slides of PowerPoint Presentation in different ways(for example outlining, slide shorter etc.).
20.4 Reorder slides on the outline tab.
20.5 Preview and print the Presentation .

21. Perform attractive Presentation using MS PowerPoint.

21.1 Customize slide show setup for a particular audience.
21.2 Setup a slide show, rehashing and timing of a Presentation.
21.3 Review and adjust slide timing as per requirements.
21.4 Perform skill on Packaging for CD and Show the Presentation .

22. Perform skill on Internet applications.

22.1 Connect to the Internet using dial up or broadband connection.
22.2 Identify the different components of browsing software's like Internet explorer, Mozilla Firefox etc.
22.3 Browse and visit the reputed websites all over the world.
22.4 Use the search engines for searching information on the web.
22.5 Read news papers from the Internet.

23. Perform skill on Electronic mailing system.

23.1 Create an e-mail account (on yahoo, Hotmail, Gmail etc.)
23.2 Compose an e-mail message.
23.3 Attach file to an e-mail message and open an attached file.
23.5 Send and receive e-mail messages by using your created account...
23.6 Delete messages temporarily and permanently.
23.5 Sign out from your created e-mail account.

65921	MATHEMATICS – II	T	P	C
		3	3	4

OBJECTIVES

- To enable in solving the simultaneous equations with the help of determinant and matrix.
- To make understand the exponential series.
- To enable to calculate the areas of regular polygons, hexagons, octagon, hydraulic mean 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

SHORT DESCRIPTION

Algebra: Determinants, Matrix, Partial Fractions, Exponential Series.

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

Menstruation: Area of rectangles, squares, triangles, quadrilaterals, parallelograms,rhombus, trapezium, circle, sector, segment; Volume of rectangular solids, prism, parallelepiped, pyramids, cones, spheres, frustum of pyramid and cone; Area of curved surface of prism. Cylinder cone, pyramid and frustum of cone.

DETAIL DESCRIPTION

ALGEBRA:

1 Apply determinants to solve simultaneous equations.

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

2 Apply partial fraction to break the numerator and denominator.

2.1Define matrix, null matrix, unit matrix, square matrix. column matrix, row matrix, inverse matrix, transpose matrix, adjoin matrix, rank of a matrix, singular matrix.
2.2Explain equality, addition and multiplication of matrix.
2.3Find the rank of a matrix.
2.4solve 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 Solve problems using binomial theorem

3.1Define proper and improper fractions.
3.2Resolve in to partial fraction of the followings types :

a) Denominator having a non-repeated linear factor.
b) Denominator having a repeated linear factor.
c) Denominator having a quadratic factors.
d) Denominator having a combination of repeated, non-repeated and quadratic factors.

4 Understand exponential series.

4.1Define e.

4.2Prove that e is finite and lies between 2 and 3.

4.3 Prove that $e^x = 1 + \frac{x}{1} + \frac{x^2}{1} + \frac{x^3}{1} + \frac{x^4}{1}$ ..... to ∞

4.4 Solve problems of the followings types :

i) $1 + \frac{1}{1} + \frac{1}{1} + \frac{1}{1}$ + ... to ∞

ii) $\frac{1}{1} + \frac{1+2}{1} + \frac{1+2+3}{1} + \frac{1+2+3+4}{1}$ + ... to ∞

TRIGONOMETRY

5 Apply the concept of inverse circular function.

5.1Explain the term inverse circular function and principal value of a trigonometrical ratio.

5.2Deduce mathematically the fundamental relations of different circular functions.

5.3Convert a given inverse circular function in terms of other functions.

5.4Prove 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) $2\tan^{-1} x = \sin^{-1}\frac{2x}{1+x^2} = \cos^{-1}\frac{1-x^2}{1+x^2} = \tan^{-1}\frac{2x}{1-x^2}$

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

6 Apply the principle of properties of triangles.

6.1Prove 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) $\Delta = \frac{1}{2}bc\sin A$.

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

6.3 Solve the problems of the following types:

i) Prove $\cos(B - C) + \cos A = 2R$

ii) An object experiences two forces F_1 and F_2 of magnitude 9 and 13 Newtons with an angle 100^0 between their directions. Find the magnitude of the resultant R.

7 Apply the concept of area of triangle.

7.1Find the area of triangle in the form,

i) $A=\frac{\sqrt{3}}{4}a^2$, a = length of a side of equilateral triangle.

ii) $A=\frac{c}{4}\sqrt{4a^2-c^2}$, where a= length of equal sides, c= third side.

iii) $A=\sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c = length of the sides of a triangle and 2s is the perimeter of the triangle.

7.2 Use formula in 7.1 to solve problems.

8 Apply the concept of finding areas of quadrilateral & Parallelogram.

8.1Define quadrilateral & Parallelogram.
8.2Find the areas of quadrilateral when off sets are given.
8.3Find the areas of a parallelogram.
8.4Solve problems using above formulae.

9 Apply the concept of finding areas of rhombus & trapezium.

9.1Define rhombus & trapezium.
9.2Find the areas of rhombus when the diagonals are given.
9.3Find the areas of trapezium in terms of its parallel sides and the perpendicular distance between them.
9.4 Solve problems related to rhombus & trapezium.

10 Apply the concept of finding areas of regular polygon.

10.1 Define a regular polygon.
10.2 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. 10.3 Find the area of a regular.
a) hexagon
b)octagon
when length of side is given.
10.4 Solve problems of the followings 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.

11 Understand areas of circle, sector and segment.

11.1 Define circle, circumference, sector and segment.
11.2 Find the circumference and area of a circle when its radius is given.
11.3 Find the area of sector and segment of a circle.
11.4 Solve problems related to the above formulae.

12 Apply the concept of volume of a rectangular solid.

12.1 Define rectangular solid and a cube.
12.2 Find geometrically the volume of a rectangular solid when its length, breadth and height are given.
12.3 Find the volume and diagonal of a cube when side is given.
12.4 Solve problems with the help of 12.2 & 12.3.

13 Apply the concept of the volume of a prism and a parallelepiped.

13.1 Define a prism, parallelepiped and a cylinder.

13.2 Find the volume of prism, parallelepiped and cylinder when base and height are given.

13.3 Solve problems related to 13.2.

14 Apply the concept of the volume of pyramid, cone and sphere.

14.1 Define pyramid, cone and sphere.

14.2 Explain the formula for volume of pyramid, cone and sphere.

14.3 Solve problems related to 14.2.

15 Apply the concept of surface area of prism, cylinder and cone.

15.1 Explain the formulae for areas of curved surfaces of prism cylinder and cone.

15.2 Solve problems related to15.1.

65912	PHYSICS-I	T	P	C
		3	3	4

OBJECTIVES

- To provide 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

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. UNITS VECTOR AND SCALAR QUANTITIES

Understand vector and scalar quantities.

1.1 List and identify the symbols of fundamental SI Unit and some derived SI Unit.
1.2 Define vector quantities with examples.
1.3 Define scalar quantities with examples.
1.4 Show the various representations of the vector quantities; and representation of a vector by unit vector.
1.5 Distinguish between vector and scalar quantities.
1.6 Find and explain the resultant of two vectors in different directions.
1.7 Resolve a vector into horizontal & vertical component.
1.8 Explain the dot and cross product of two vectors.
1.9 Projection of a vector.
1.10 Define laws of triangle of vector.

2. MOTION AND EQUATIONS OF MOTION

Understand motion and equations of motion.

2.1 Define rest and motion.
2.2 Classify motion.
2.3 Define and explain displacement, speed, velocity, acceleration and retardation.
2.4 Deduce the relationship between displacement, velocity, acceleration and retardation from these definitions.
2.5 Distinguish between (i) speed and velocity (ii) velocity and acceleration.
2.6 Projectile motion.
2.7 Equation of motion of a freely moving body thrown obliquely vertically upward or motion of projectile.

3. Understand circular motion

3.1 Define circular motion.
3.2 Define angular velocity and linear velocity with their units.
3.3 Deduce the relation between angular velocity and linear velocity.
3.4 Define centripetal and centrifugal force with examples.
3.5 Prove centrifugal force = $\frac{MV^2}{r}$
3.6 Define and explain angular momentum, torque and moment of inertia.
3.7 Angular acceleration and relation between torque and angular acceleration.

4. FORCE AND NEWTON'S LAWS OF MOTION

Understand force and Newton's laws of motion

4.1 Define force.
4.2 Define different units of force and their correlation and also mention the dimension of force.
4.3 Define parallel force and a couple.
4.4 Find out the resultant of parallel forces.
4.5 Define inertia and momentum.
4.6 Impulsive force and impulse of a force.
4.7 Relation between impulse of force and momentum.
4.8 State and prove the principals of conservation of momentum.
4.9 State Newton's laws of motion.
4.10 Prove P=mf, from Newton's 2nd law of motion.

5. GRAVITY AND GRAVITATION

Understand gravity and gravitation.

5.1 Define and explain the Kepler's Law.
5.2 Define gravity and gravitation.
5.3 State the laws of gravity and gravitation.
5.4 Define and determine the gravitational constant (G) and also mention its units and dimension.
5.5 Define acceleration due to gravity 'g' and also mention its units and dimension.
5.6 Discuss the variation of 'g' at different places.
5.7 Define mass and weight with their units and dimension.
5.8 Distinguish between mass and weight.
5.9 Define and explain gravitational potential and escape velocity
5.10 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.

6. SIMPLE HARMONIC MOTION (SHM)

Understand simple harmonic motion.

6.1. Define 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. Describe a compound pendulum.
6.7. Discuss the conditions under which a pendulum clock will go slow or fast.
6.8. Potential energy, kinetic energy and average potential and kinetic energy of a particle executing SMH.
6.9. Principle of conservation of mechanical energy.

7. WORK, POWER AND ENERGY

Understand 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 Show that the K.E. gained by a falling body is equal to the P.E. Lost by the body.
7.7 Describe transformation of energy and work energy theorem.
7.8 Recognize that the useful work can be found from:

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

7.9 Describe conservative and non- conservative force.

8. ELASTICITY

Understand the concept of 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 Poisson's ratio and work done in deforming a body or potential energy.
8.9 Elastic behavior of a solid and stress- strain graph.

FRICTION

9. Understand Friction

9.1 Define friction.
9.2 Describe the different kinds of friction.
9.3 Define the laws of static friction.
9.4 Define the co-efficient of static friction.
9.5 Describe the angle of static friction and angle of repose.
9.6 Describe the laws of kinetic friction.
9.7 State the co-efficient and angle of kinetic friction.
9.8 Show that the co-efficient of static friction is equal to the tangent of angle of repose.
9.9 Describe an experiment to determine the co-efficient of static friction.
9.10 State the merits and demerits of friction.

10. HYDROSTATICS Understand behavior of fluids.

10.1 Define pressure as force per unit area and state that it is measured in N/m^2 or Pa (Pascal).
10.2 State characteristics of liquid pressure.
10.3 Establish that pressure at a point in a fluid is dependent upon the density of the fluid, the depths in the fluid and acceleration due to gravity.
10.4 Surface tension and surface energy, Angle of contact.
10.5 Capillarity and theory of capillarity.
10.6 Viscosity and co-efficient of viscosity.
10.7 Necessity of viscosity.

11. Wave and Sound

11.1 Wave and wave motion.
11.2 Transverse wave and longitudinal wave.
11.3 Some definitions relating waves.
11.4 Progressive wave and stationary waves.
11.5 Equation of progressive wave.
11.6 Sound and production of sound.
11.7 Sound is a longitudinal traveling wave.
11.8 Interference of sound: Constructive and Destructive interference.
11.9 Mathematical analysis of interference of sound.
11.10 Define beats and Mechanism of formation of beats.

12. SOUND

Understand nature and behavior of sound.

12.1 Identify that sound is produced by vibration and travels through a medium as a longitudinal wave.
12.2 Distinguish between the production and behavior of longitudinal and transverse waves.
12.3 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.

12.4 State the approximate frequency range for
   a. infrasonic sound
   b. Ultrasonic (supersonic) sound.

12.5 Explain how sound is absorbed, reflected & refracted by different types of surface.

12.6 Describe the practical uses of echo sounding devices.

12.7 Define velocity of sound.

12.8 State the velocity of sound at NTP in still air.

12.9 Compare the effects of pressure, temperature & humidity on the velocity of sound in air.

12.10 Doppler Effect and Expression for the change of frequency or pitch due to Doppler Effect.

PRACTICAL

Observations and Measurements

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.

65712 English T P C
2 2 3

Objectives:

After the completion of the course, learners will be able to develop-

- ⋆Listening with understanding
- ⋆The fluency of speech
- ⋆Reading with understanding
- ⋆Grammatical accuracy with emphasis on spelling & punctuation
- ⋆Creative writing
- ⋆Transferring information
- ⋆Communicating effectively

CONTENTS

Seen comprehension

Unit	Lesson	Title
Three: Learning English	1	Learning a language
	2	Why learn English
	3	How to learn English
Six: Our Environment	1	The environment and the ecosystem
	2	How the environment is polluted
	7	How to manage waste
Seven: Disasters we live with	5	The shake and the quake
Thirteen: We and our rights	2	Women have rights too.

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

1. (a) Uses of Articles.
(b) Uses of Tense *(Right forms of verbs with indicators)
(c) Classify verbs: (Auxiliary, Principal, transitive, intransitive, finite, non-finite, causative, quasi-passive)
(d) Uses of voice.

2. Sentence:
(a) Sentence structure: (Assertive, Interrogative, Portative, Imperative, Exclamatory, Simple, Complex and Compound)
(b) Question making: WH, Yes/No, Tag question

3. Enrich vocabulary: synonyms, Antonyms
4. Change Parts of speech and uses of suffix and prefix.

Communication

1. Style of letters: (full blocked, blocked, semi- blocked)
2. Parts of writing official letters: Techniques of writing (Heading, reference, date, inside address, topic, greetings, complementary closing, signature, supplements.)
3. Write dialogues: (with teacher, principal, shopkeeper, hotel manager, station master, OC, DC, newcomer, buyers, doctor, friend, colleagues etc).

4. Write a guided paragraph with questions.

Resource Person of Syllabus & Course Structure