BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

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

COMPUTER TECHNOLOGY
TECHNOLOGY CODE: **666**

3rd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

3rd SEMESTER

Sl. No.	Subject Code	Name of the Subject	T	P	C	Theory		Practical		Total
						Cont. Assess	Final Exam	Cont. Assess	Final Exam	
1	66631	Programming Essentials	2	3	3	40	60	25	25	150
2	66632	Web Design	0	6	2	-	-	50	50	100
3	66633	Graphics design-II	0	6	2	-	-	50	50	100
4	66634	IT support-II	0	6	2	-	-	50	50	100
5	65931	Mathematics-3	3	3	4	60	90	50	-	200
6	65913	Chemistry	3	3	4	60	90	25	25	200
7	65811	Social Science	3	0	3	60	90	-	-	150
Total			**11**	**27**	**20**	**220**	**330**	**250**	**200**	**1000**

66631	Programming Essentials	T	P	C
		2	3	3

OBJECTIVES

• To develop knowledge and skill on programming Basics.
• To develop knowledge and skill to create, compile, debug & execute a program.

SHORT DESCRIPTION

Basics of programming Language; Basics of Python; Variables; Data types; Strings; Operators; Decision making and Looping statements; Lists; Tuples; Functions; File operations;

DETAIL DESCRIPTION

Theory:

1. Basics of Programming
1.1.   State Computer Program and Programming
1.2.   Explain Programming Language and its classification.
1.3.   State Generation of Programming Languages.
1.4.   Describe Translator Program.
1.5.   Uses of Computer Programs
1.6.   Describe Algorithm and Flowchart.
1.7.   Prepare Algorithm and Flowchart for simple problems.
1.8.   Explain the Process of Program Planning.

2. BASICS OF PYTHON
2.1.   Describe the History of Python.
2.2.   Explain the features of Python.
2.3.   Describe the Structure of Python Program
2.4.   State Identifiers and Keywords
2.5.   State Lines , Indentation, Multi-Line Statements and Multiple Statements on a

        Single Line
2.6.   State Quotation and Comments in Python
2.7.   State Command Line Arguments

3. VARIABLE AND DATA TYPES
3.1.   Assigning Values to Variables
3.2.   State Multiple Assignment
3.3.   Describe StandardData Types
3.4.   Explain Data Type Conversion

4. STRINGS
4.1.   State Accessing Values in Strings and Updating Strings
4.2.   Uses of Escape Characters
4.3.   Explain String Special Operators and String Formatting Operator

11. FILES I/O

11.1.   Printing to the Screen
11.2.   Reading Keyboard Input
11.3.   Uses of input Function
11.4.   Describe Opening and Closing Files
11.5.   Explain Reading and Writing Files

Practical:
Perform skill to create, compile, debug & execute programs to solve specific problems.

1. Simple programs using basic structure of a programming Language (Python).
   1.1. A program for printing a message.
   1.2. A program for adding two integer numbers.

2. Simple programs using variables
   2.1. A program to calculate the average of a set of N numbers.
   2.2. A program to convert the given temperature in Fahrenheit to Celsius andvice versa.
   2.3. A program to calculate the area of a circle.
   2.4. Write similar programs using variables.

3. programs using operators
   3.1. A program to convert days to months and days.
   3.2. A program to calculate the area of a triangle.
   3.3. A program to compare two integer numbers.
   3.4.   Write similar programs using operators.

4. Programs using Branching Statements.
   4.1. A program to select and print the largest of the three numbers.
   4.2. A program to compute the roots of a quadratic equation.
   4.3.   Write similar programs using Branching Statements.

5. Programs using Looping Statements
   5.1. A program to print odd or even numbers from 1 to 100.
   5.2.   A program to find the maximum or minimum number from a set of numbers
   5.3.   A program for searching prime numbers.
   5.4.   Write similar programs using Loop Statements.

6. Programs using Lists.

    6.1. A program to sort numbers in ascending or descending order using onedimensional array.

    6.2.   A program to print numbers in two dimensional forms.

    6.3.   Write similar programs using Lists.

7. Programs using functions.

    7.1.   A program to calculate the area of a triangle using function.

    7.2.   A program that uses a function to sort an array of integers.

    7.3.   A program to calculate factorial of any integer using recursive function.

    7.4.   Write similar programs using functions.

8. Programs using files.

    8.1. A program to store information to or to read information from file.

    8.2.   Write similar programs using files.

Reference books:

        1. Learning Python – Mark Lutz

        2. Website List:

          http:// python.howtocode.com.bd

          http:// www.learnpython.org

          http://pythontutor.com

66632	Web Design	T	P	C
		0	6	2

Objectives

To be able to perform Web Design.

To be able to perform Design to HTML.

Short Description

This Subject covers the knowledge, skills and attitudes required to –

- Enter text and graphic medias for the webpage using HTML (Hypertext Mark-up Language) and check the completed website for QA (Quality Assurance) using latest common browsers.
- Use advanced web editing software's to design and develop interactive websites and check the completed website for accuracy using common browsers.
- Convert design (.psd, in design, image etc) to HTML and check the completed HTML for accuracy using common browsers.
- Add animations for website using CSS3, HTML5 or latest.
- Develop Cascading Style Sheets (CSS) that are linked to a HTML document in order to externally define and control styles and structure to enhance and achieve commonality among web documents, and check compatibility of the completed CSS with common browsers.
- Add and edit animations for website using common front end framework.
- Enter dynamic features for the Client Side Dynamic Web page using JavaScript and check the completed website for accuracy using common browsers.

1. **Create and Edit Webpage Using HTML**
   1.1. Follow OSH practices
      1.1.1. Safe work practices are observed as according to workplace procedures.
      1.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
      1.1.3. Turn on your PC properly.
   1.2. Plan a website to meet client requirements.
      1.2.1. The purpose and intended audience of the website are identified.
      1.2.2. The design requirements and constraints are identified.
      1.2.3. A conceptual design is developed.
      1.2.4. Necessary software installed and checks other requirement.
   1.3. Create the website using hypertext mark-up language in accordance with the design specifications.
      1.3.1. Structure and element tags are added and attributes are assigned to meet client requirements in terms of the layout and formatting of the pages and enhancements using given templates and follow the web standards.

1.3.2. Webpage content are added to the site, and also formatted in accordance with client requirements and be aware of legislation.

1.3.3. Hyperlinks are added to allow successful navigation between the pages of the website.

1.3.4. A sitemap is created that allows for ease of access to content

1.3.5. The website is saved to a file by use of the program tools available for the task.

1.4. Test the website.

1.4.1. The website is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.

1.4.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

1.4.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

2. Use web design and content guidelines

2.1. Plan a website to meet the client requirements.

2.1.1. The purpose and intended audience of the website are identified.

2.1.2. The design requirements and constraints are identified.

2.1.3. A conceptual design is developed.

2.1.4. Necessary software installed and checks other requirement.

2.2. Select web editing softwares

2.2.1. Appropriate web editing software is started.

2.2.2. A virtual web folder is created in application server

2.2.3. A website project is created in editing tool

2.3. Create the website using templates

2.3.1. Use appropriate front end design framework i.e. Twitter bootstrap, Zurb Foundation,
uikit etc.

2.3.2. Structure and element tags are added and attributes are assigned to meet client requirements in terms of the layout and formatting of the pages and enhancements using given design templates.

2.3.3. Contents (Text and graphics) are added to the site, and also formatted in accordance with client requirements by maintain standards and be aware of legislation.

2.3.4. Hyperlinks are added to allow successful navigation between the pages of the website.

2.3.5. A sitemap is created that allows for ease of access to content

2.3.6. The website is saved to a file by use of the program tools available for the task.

2.4. Test the website.

2.4.1. The website is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.

2.4.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

2.4.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

3. **Convert design to HTML**
   3.1. Plan a website to meet client requirements.
      3.1.1. The purpose and intended audience of the website are identified.
      3.1.2. The design requirements and constraints of using provided templates are identified.
      3.1.3. Required design is developed.
      3.1.4. Necessary software installed and checks other requirement.
   3.2. Convert design to HTML.
      3.2.1. The given design template is converted into the required format (image, text etc).
      3.2.2. Website layout developed.
      3.2.3. Web content (image, text etc) placed into the right position by using proper HTML tags.
      3.2.4. Content is formatted properly by maintain standards and be aware of legislation.
      3.2.5. Structure and element tags are added and attributes are assigned to meet the specifications of the brief in terms of the enhancements, layout and formatting of the pages using given design.
      3.2.6. Hyperlinks are added to allow successful navigation between the pages of the website.
      3.2.7. The HTML file is named properly and saved in a proper location.
   3.3. Test the website.
      3.3.1. The website is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.
      3.3.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.
      3.3.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

4. **Use Web Animation (Basic level)**
   4.1. Select appropriate language to create animation.
      4.1.1. Appropriate animation language file is attached.
      4.1.2. Necessary plug-ins are installed. (animate.css)
      4.1.3. Necessary software installed and checks other requirement.
   4.2. Use animation in the website
      4.2.1. Appropriate style sheet is added to the project.
      4.2.2. Animation is applied onto the website by maintain standards and be aware of legislation.
   4.3. Animation test
      4.3.1. The animation is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.
      4.3.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.
      4.3.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

5.   Develop Cascading Style Sheet (CSS)

5.1. Determine Purpose and Accessibility

    5.1.1. Plan to purpose of the HTML document is identified.

    5.1.2. The IDE where the CSS will be used is identified and necessary software installed and checks other requirement.

    5.1.3. Accessibility options are identified and determine for visually, physically or otherwise impaired persons.

5.2. Set styles

    5.2.1. Appropriate styles that are to be controlled by the CSS are identified.

    5.2.2. The styles are defined and documented in accordance with established design principles or business guidelines.

5.3. Create CSS

    5.3.1. CSS is created using the determined styles by maintain standards and be aware of legislation.

    5.3.2.   CSS is edited and changes are confirmed in linked HTML document

    5.3.3. CSS is tested / validated according to established design principles or business guidelines. (https://jigsaw.w3.org/css-validator)

5.4. Link CSS to HTML documents

    5.4.1. CSS is linked to the HTML document

    5.4.2. CSS styles are applied to the mark-up language document.

6.   Use Web Animation (Intermediate level)

6.1. Select the animation editing tool

    6.1.1.   Appropriate front end framework (slick slider, cycle slider, wow.js, http://zurb.com/playground/motion-ui, bootstrap component jQuery or relevant) is determined.

    6.1.2.   Appropriate animation tool is started

    6.1.3.   Necessary plug-ins are installed by maintain standards and be aware of legislation.

6.2. Prepare animation using editing tool

    6.2.1. Plan a conceptual animation flow is determined.

    6.2.2. Animation is edited and prepared to be implemented in the webpage

    6.2.3. Necessary software installed and checks other requirement.

6.3. Use animation in the website

    6.3.1. Required and accompanying files are included at right place and appropriate class or id declared plus properly activated.

    6.3.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

7.   Develop a Client Side Dynamic Webpage using JavaScript (Basic Level)

7.1. Plan the dynamic features to be added to a website to meet client requirements.

    7.1.1.   Plan the purpose and intended audience of the website are identified.

    7.1.2.   The design requirements and constraints are identified.

    7.1.3.   A conceptual design is developed.

    7.1.4.   Necessary software installed and checks other requirement.

7.2. Add JavaScript to the website in accordance with the design specifications.

    7.2.1.   JavaScript element is added and attributes are assigned to meet client requirements in terms of the layout and formatting of the pages and enhancements.

    7.2.2.   Interactivity is added, edited and formatted to the website in accordance with client requirements.

    7.2.3.   Dynamic content is added in each and every page, if required, in accordance with client requirements.

    7.2.4.   The website is saved to a file by use of the program tools available for the task.

7.3. Test the website.

    7.3.1.   The theme is tested to ensure compatibility, functionality, correct any errors and log in according to the testing procedures in the plan.

    7.3.2.   The theme is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

    7.3.3.   The theme is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

66633	Graphic Design II	T	P	C
		0	6	2

Objectives

To be able to perform Design.

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Short Description

This Subject covers the knowledge, skills and attitude required to –

- Demonstrate creative Design work using multiple Graphics DesignSoftware
- CreateTemplate using Graphic Design Software.
- Develop graphics incorporating a range of features for cross-media publishing based on a client brief using a high-end application.
- Find recent developments in Graphic Design.

1.   Perform creative design work using multiple Graphics Design Software
  1.1. Follow OSH practices
     1.1.1. Safe work practices are observed according to workplace procedures
     1.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
  1.2. Preparations
     1.2.1. Specify the required Creative Design work
     1.2.2. Identify multiple Graphics Design Software as per requirement
     1.2.3. Collect required contents
     1.2.4. Identify appropriate Tools and arrange them as needed
  1.3. Initiate Design work
     1.3.1. Set ruler/unit/Grids/Guides as per requirement
     1.3.2. Prepare Key Drawing / Design Layout as per requirement
     1.3.3. Set Various Marks for Illustration Software
     1.3.4. Apply Layer lock
     1.3.5. Transfer Design Layout toPhoto Editing Software
  1.4. Create Design Background
     1.4.1. Set resolution and colour mode as per requirement
     1.4.2. Set guides to Photo Editing Software for designing background as required
     1.4.3. Insert graphical contents for designing background as required
     1.4.4. Manipulate graphical contents
     1.4.5. Apply effects as per requirement
     1.4.6. Save the Design for further use in appropriate File Format
  1.5. Complete Design
     1.5.1. Place and link the Design Background toIllustration Software
     1.5.2. Insert vector related contents
     1.5.3. Apply font attributes and typographical design
     1.5.4. Apply Design Principles as per requirements

1.5.5. Complete the Design work
1.6. Review and Finalize
    1.6.1. Use Artwork and Preview
    1.6.2. Use Layer Hide-Unhide option
    1.6.3. Create Outline and Group
    1.6.4. Save in appropriate File Format
    1.6.5. Transfer the image to recipient

2. Create Template using Graphic Design Software

2.1. Analyse design brief
    2.1.1. Client's design brief is analysed and the requirements are identified
    2.1.2. Key devices are selected and collected as per job requirements
2.2. Arrange elements on a page
    2.2.1. Page layout application software are selected
    2.2.2. Client copy, images, basic elements are created and assembled to conform to the design brief
    2.2.3. Text is prepared and required fonts and font size are used
    2.2.4. The help function is accessed if required and solution to queries found
    2.2.5. Document set up is completed to conform to the design brief.
2.3. Finalise artwork
    2.3.1. Additional text are manipulated and added
    2.3.2. Pages and combined elements are composed correctly to suit specified page size
    2.3.3. Artworks are outlined.
    2.3.4. Bleed allowance, margins and borders are incorporated as per workplace standard
    2.3.5. Character and paragraph attributes are added and changed as per job requirements.
2.4. Check quality
    2.4.1. Text is reviewed for possible errors and omissions and errors are corrected
    2.4.2. A hard copy proof is printed and rechecked for errors, omissions and the overall balance of the layout and correct tonal quality
    2.4.3. Trim marks and margins are correctly placed
    2.4.4. Necessary changes are made and reviewed on screen and re-proofed as required
    2.4.5. The job is saved according to enterprise procedures
    2.4.6. A proof or PDF is created

3. Develop materials for output

3.1. Create balance image quality and file size
    3.1.1. Key devices are selected & collected as per job requirements.
    3.1.2. Graphic software are selected as per requirements
    3.1.3. Graphics files are opened and design brief requirements are confirmed.
    3.1.4. Graphics are repeated efficiently using a symbol or stamp to reduce file size
    3.1.5. Slices are created from objects, layers or groups and updated as required

3.1.6. Type anti-aliasing is demonstrated.

3.1.7. Tasks are automated and where necessary scripts are used for automation.

3.2. Manipulate objects and text.

3.2.1. Objects and text are manipulated and edited according to design brief.

3.2.2. Repetition tools are identified and used to create duplicates and then are manipulated as a group

3.2.3. Complex shapes are created and edited.

3.2.4. Retouching elements are used

3.3. Import images

3.3.1. Bitmap images are embedded and / or linked in the file

3.3.2. Placed Bitmaps are modified and / or duplicated according to design requirements

3.3.3. Bitmaps are masked and / or an opacity mask is added

3.3.4. Layered file is exported to image editing program and edited

3.4. Develop variable templates

3.4.1. Based on the design brief, objects are identified within the template as variables

3.4.2. An automated script or an image server is used to ensure variations, using data stored in any ODBC-compliant source

3.4.3. The template variables are tested to ensure correct operation.

3.5. Separate Colour artwork

3.5.1. The correct format for the colour separation is determined by the requirements of the pre-press workflow system

3.5.2. Command preferences are set to correct preferences for print quality and process

3.5.3. Based on printer feedback the colour separation options are set according to print requirements of the design brief

3.5.4. Process and spot colours are combined as required

3.6. Prepare for final media

3.6.1. A screen frequency value appropriate for the print quality is selected and colour separation preferences are saved

3.6.2. Spreads and chokes traps are created to avoid mis-registration

3.6.3. The overlapping and overprint of objects are defined

3.6.4. A proof is created and the separations checked, any required editing is completed and the file is saved

3.6.5. Metadata tags are embedded to catalogue, organise and retrieve artwork

3.6.6. For cross-media publishing purposes web-safe colours are selected

3.6.7. File formats are chosen to best represent artwork styles

3.6.8. Objects are linked to create an image map that meets design requirements

3.6.9. Objects are layered to create animation frames and exported for animation set up

3.6.10.   Compression options are selected that keep the image quality high and the file size low.

3.6.11.   Export options are set to the best settings for the final media and the file is saved and exported

4. Find and use recent developments of tools and procedure in graphic Design

    4.1. Search for new Developments

        4.1.1. Use Internet and other sources to find new Software or Software Versions

        4.1.2. Identify the new developments or the new Versions

    4.2. Determine the new developments in design arena.

        4.2.1. Compare the new tools with the old ones

        4.2.2. Find Tutorials/Learning Materials for the new tools

    4.3. Adopt the new Developments

        4.3.1. Use the new tools on a trial basis to identify the developments

        4.3.2. Identify the benefits that the new tools can provide

        4.3.3. Adopt the new tools for professional use

66634	IT Support II	T	P	C
		0	6	2

Objectives

To be able to perform hardware troubleshooting

To be able to perform setup network environment and maintenance

Short Description

This subject covers the knowledge, skills and attitude required to –

- Plan, manage, support and install software in networked computer according to client/organizational need/guidance
- Diagnosis equipment and software fault of computer and repair according to organizational procedure to keep them working maintain security of standalone computer from software threat such as virus, worm, Trojan horse etc.
- Evaluate the system status using standard diagnostic tools.
- Use of various product documentation to installation, configuration, troubleshoot of software and hardware product
- Diagnose computer and network faults and troubleshoot in a systematic way.

1. **Install software to networked computer**

    1.1 Follow workplace health and safety - OSH

    1.1.1. Electrical isolation is maintained at the time of installation of the network equipment

    1.1.2. Electrical hazard is avoided at all times

    1.1.3. Safe work practice observed and PPE worn as required for the work performed.

    1.2. Determine software requirements

    1.2.1. According to organization or client plan or requirements list of software is documented

    1.2.2. Analyze the list of software and dependency on other software is also included in the list

    1.2.3. Software licenses cost (if required) is determined

    1.2.4. Installation plan is documented

    1.2.5. Installation plan, budget is approved from the appropriate persons of organization

    1.3. Collect required software

    1.3.1. Required software is downloaded from the software repository or collected from the appropriate vendor

    1.4. Install software to the networked computer

    1.4.1. Important system data and configuration files are backed up (if required) period to the new

    1.4.2. According to the approved installation plan (1.5) software is installed to the networked computer

    1.4.3. In the installation procedure organization/client guidelines are followed at all times

    1.4.4. Installation disk and licenses are stored in an appropriate place

    1.4.5. Installation procedure is documented

    1.5. Tuning the software configuration

    1.5.1. Parameter and configuration of the software is optimized for better performance

    1.6. Determine and provide instruction to the client

      1.6.1. Instructions from the software manual or user guidelines are documented

      1.6.2. Appropriate person in the organisation is reported to if training is required

  1.7. Provided post installation support and maintenance

      1.7.1. Long term support and maintenance plan along with budget is documented and submitted to the organization for approval

      1.7.2. After approval of organization the support and maintenance plan is preserved for future use

2. Maintain equipment and software in working order

  2.1. Identify faults and determine the cause of fault or system performance degradation

      2.1.1. Equipment and software maintenance specification is reviewed

      2.1.2. Diagnosis procedure for fault detection and analysis is identified

      2.1.3. Fault/degradation of equipment/software performance is identified

      2.1.4. Fault is reported to the appropriate person

      2.1.5. Existing problem area is assessed

      2.1.6. Result of the assessment is analyzed

      2.1.7. Main cause of the problem is identified

      2.1.8. Maintenance manual, historical fault data is analyzed for information about the cause of current fault

  2.2. Plan to repair or replacement of equipment or software

      2.2.1. Work plan for replacement or repair of faulty equipment or software is revised

      2.2.2. Replacement or repair plan is approved from the appropriate person

  2.3. Repair fault

      2.3.1. Faulty equipment or software is repaired or replaced with the minimum disruptions of the client

  2.4. Update document

      2.4.1. Fault and maintenance data, replacement of equipment or software is recorded

      2.4.2. Maintenance document is review and updated with the consultation of the appropriate person

      2.4.3. Updated maintenance document is preserved for future use.

3. Maintain standalone security

3.1. Check antivirus software

    3.1.1. Safe work practice observed and PPE worn as required for the work performed.

    3.1.2. Operating system license is checked and verified

    3.1.3. Antivirus software is installed

    3.1.4. Antivirus software licence is checked and update database

    3.1.5. Appropriate person is reported to take necessary actions to update or renew licenses

3.2. Protect standalone system from security threat

    3.2.1. Antivirus guard started/activated

    3.2.2. System recovery disk is created and preserved

    3.2.3. Important directory and files are backed up regularly and preserved

3.3. Protect important user account

    3.3.1. System administrator accounts are determined

    3.3.2. Administrator accounts password are verified according to the standard password rule

    3.3.3. Administrator accounts passwords are preserved in a secured place

    3.3.4. Administrator accounts are protected

3.4. Apply security update of operating system, other software and install only trusted software

    3.4.1. Security updates of OS and other software are downloaded/collected and applied

    3.4.2. Before installing any new software license is verified

    3.4.3. Installation source disk, directory or file signature is verified

    3.4.4. Installing trusted software

3.5. Observe security status of the standalone system regularly and record security incident and possible actions taken

    3.5.1. Full system is scanned and observed for possible vulnerabilities in regular basis

    3.5.2. Identified security incident and its details is documented

    3.5.3. Possible actions and remedy is recorded

3.6. Identify, analyze and nullify possible security threat and recover system from possible damage

    3.6.1. Possible security threat of standalone system is identified

    3.6.2. Possible cause of infection is determined from the analysis

    3.6.3. Security threat (Identified) is analysed to find out its characteristics

    3.6.4. Capability of the security threat is determined from the analysis

    3.6.5. Affected files are nullified

    3.6.6. Security threat is removed or from the system using antivirus software

3.7. Recover system from possible damage

    3.7.1. Damage done by security threat is determined clearly

    3.7.2. Antivirus software is used to recover affected files

    3.7.3. If some files are need to be deleted, possible effect is identified

    3.7.4. If boot sector of the standalone system is damaged, recovery disk is used to recover boot sector

    3.7.5. Deleted files are restored from the backup

4. Evaluate system status and run standard diagnostic tools.

4.1. Determine the scope, parameters &Plan to evaluate system status

    4.1.1. Scope for evaluating the system status is determined

    4.1.2. Parameter is determined to evaluate system status

    4.1.3. Plan is developed to evaluate the system status

4.2. Identify & Use the appropriate diagnostic tools

    4.2.1. To evaluate the system status, appropriate diagnostic tools are identified

    4.2.2. System status is evaluated according to the parameters and plan

4.3. Record evaluation report

    4.3.1. System status is observed and recorded

    4.3.2. Effect of change of system status is recoded

4.4. Analyse & Report the system status

    4.4.1. Record of the system status is analysed

    4.4.2. System performance status is observed from the analysis

    4.4.3. System status is summarized

    4.4.4. In case of system performance degradation, possible corrective measures are determined and documented

4.4.5. System status evaluation is reported to the appropriate person

5. Use Product Documentation for IT support

5.1. Identify product and management software

    5.1.1. Product and its version is identified

    5.1.2. Management software (driver, admin, configuration) is identified

5.2. Identify operating system and available product documentation

    5.2.1. Operating system is identified under which the product will be used

    5.2.2. All available documentation of the product is identified according to the product version

5.3. Determine the task or problem with the product and correct documentation related with the task

    5.3.1. Task to be done or problem of use of the product is determined

    5.3.2. Correct documentation related to the task or problem is identified.

5.4. Apply knowledge base system & the steps to complete the task or to solve the problem

    5.4.1. Knowledge base system is used to clearly determine the steps in the actions

    5.4.2. All the steps in actions are applied in order to complete the task or to solve the problem

    5.4.3. Feedback of each actions are recorded and verified with the product documentation

    5.4.4. All the steps in actions are applied in order to complete the task or to solve the problem

    5.4.5. Feedback of each actions are recorded and verified with the product documentation

5.5. Determine and record the side effect and report to the appropriate person

    5.5.1. All side effects of the actions are determined and verified with product documentation

    5.5.2. Side effects of all the actions are recorded and preserved for the future use as the product extended documentation

    5.5.3. Side effects are reported to the appropriate person

6. Troubleshoot Computers & Networks

6.1. Gather information from networks and computers to assist the identification of a fault

    6.1.1. Network design, support and maintenance documents are reviewed

    6.1.2. Computer manuals and maintenance documents are reviewed

6.2. Identify the fault

    6.2.1. Appropriate person is interviewed about the problem

    6.2.2. Analyzed the problem scenarios (using 2.1, 2.2 and 3.1)

    6.2.3. Using diagnostic tools the fault is identified

6.3. Identify the Solution

    6.3.1. Appropriate person (if required) is consulted and solution is identified

    6.3.2. Repair or Replacement of hardware equipment cost is calculated and approved from the appropriate person

6.4. Repair or replace faulty equipment/software components

    6.4.1. Faulty hardware equipment or software component is repaired or replaced

    6.4.2. Repaired/replaced equipment is tested

    6.4.3. Network activity is tested.

6.5. Update document

    6.5.1. Network and Computer maintenance and troubleshooting document are updated

65931 **MATHEMATICS -3** **T P C**
  3 3 4

AIMS

  • 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.

  • To enable to use the knowledge of gradient of a straight line in finding speed, acceleration etc.

  • To enable to use the knowledge of conic in finding the girder of a railway bridge, cable of a   suspension bridge and maximum height of an arch.

  • To make understand the basic concept and techniques of composition and resolution of vectors   and computing the resultant of vectors.

• **SHORT DESCRIPTION**

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.

Co-ordinate Geometry: Co-ordinates of a point, locus and its equation, straight lines, circles and conic.

Vector: Addition and subtraction, dot and cross product.

DETAIL DESCRIPTION

MENSURATION:

1   **Apply the concept of area of triangle.**
    1.1   Find the area of triangle in the form,

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

        ii) $A = \dfrac{c}{4} \sqrt{4a^2 - c^2}$, 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.
    1.2   Use formula in 1.1 to solve problems.

2 **Apply the concept of finding areas of quadrilateral & Parallelogram & finding areas of 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   **Apply the concept of 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

        b)   Octagon when length of side is given.
    3.4   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.

4   Understand 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.

5   Apply the concept of 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 6.2 & 6.3.

6   Apply the concept of surface area, volume of a prism, parallelepiped and cylinder.
      6.1   Define a prism, parallelepiped and a cylinder.
      6.2   Explain the formulae for areas of curved surfaces of prism, parallelepiped and cylinder.
      6.3   Explain the formulae for volume of prism, parallelepiped and cylinder when base and height are given.
      6.4   Solve problems related to 7.2, 7.3.

7   Apply the concept of the surface area, volume of pyramid, cone and sphere.
      7.1   Define pyramid, cone and sphere.
      7.2   Explain the formula for areas of curved surfaces of pyramid, cone and sphere.
      7.3   Explain the formula for volumes of pyramid, cone and sphere.
      7.4   Solve problems related to 8.2, 8.3.

CO-ORDINATE GEOMETRY

8   Apply the concept of co-ordinates to find lengths and areas.
      8.1   Explain the co-ordinates of a point.
      8.2   State different types of co-ordinates of a point.
      8.3   Find the distance between two points (x_1, y_1) and (x_2, y_2).
      8.4   Find the co-ordinates of a point which divides the straight line joining two points in certain ratio.
      8.5   Find the area of a triangle whose vertices are given.
      8.6   Solve problems related to co-ordinates of points and distance formula.

9   Apply the concept of locus & the equation of straight lines in calculating various Parameter.
      9.1   Define locus of a point.
      9.2   Find the locus of a point.
      9.3   Solve problems for finding locus of a point under certain conditions.
      9.4   Describe the Equation x=a and y=b and slope of a straight line.
      9.5   Find the slope of a straight line passing through two point $(x_1, y_1,)$ and (x_2, y_2).
      9.6   Find the equation of straight lines:
            (i)   Point slope form.

            (ii)   Slope Intercept form.

            (iii)   Two points form.

            (iv)   Intercept form.

            (v)   Perpendicular form.

      9.7   Find the point of intersection of two given straight lines.
      9.8   Find the angle between two given straight lines.
      9.9   Find the condition of parallelism and perpendicularity of two given straight lines.
      9.10   Find the distances of a point from a line.

10 Apply the equations of circle, tangent and normal in solving problems.
  10.1   Define circle, center and radius.
  10.2   Find the equation of a circle in the form:
          (i) $x^2 + y^2 = a^2$

          (ii) $(x - h)^2 + (y - k)^2 = a^2$

          (iii) $x^2 + y^2 + 2gx + 2fy + c = 0$

  10.3   Find the equation of a circle described on the line joining (x_1, y_1) and (x_2, y_2).
  10.4   Define tangent and normal.
  10.5   Find the condition that a straight line may touch a circle.
  10.6   Find the equations of tangent and normal to a circle at any point.
  10.7   Solve the problems related to equations of circle, tangent and normal.

11 Understand conic or conic sections.
  11.1   Define conic, focus, Directorx and Eccentricity.
  11.2   Find the equations of parabola, ellipse and hyperbola.
  11.3   Solve problems related to parabola, ellipse and hyperbola.

VECTOR :

12 Apply the theorems of vector algebra.
  12.1   Define scalar and vector.
  12.2   Explain null vector, free vector, like vector, equal vector, collinear vector, unit vector, position vector, addition and subtraction of vectors, linear combination, direction cosines and direction ratios, dependent and independent vectors, scalar fields and vector field.
  12.3   Prove the laws of vector algebra.
  12.4   Resolve a vector in space along three mutually perpendicular directions
  12.5   Solve problems involving addition and subtraction of vectors.

13 Apply the concept of dot product and cross product of vectors.
  13.1   Define dot product and cross product of vectors.
  13.2   Interpret dot product and cross product of vector geometrically.
  13.3   Deduce the condition of parallelism and perpendicularity of two vectors.
  13.4   Prove the distributive law of dot product and cross product of vector.
  13.5   Explain the scalar triple product and vector triple product.
  13.6   Solve problems involving dot product and cross product.

Reference

SL No	Athour	Title	Publication
01	G. V. Kumbhojkar	Companian to basic Maths	Phadke Prakashan
02	Murary R Spigel	Vector & Tensor Analysis	Schaum's Outline Series
03	Md. Abu Yousuf	Vector & Tensor Analysis	Mamun Brothers
04	Rahman & Bhattacharjee	Co-ordinate Geometry & Vector Analysis	H.L. Bhattacharjee
05	Md. Nurul Islam	Higher Mathematics	Akkhar Patra Prakashani

65913   CHEMISTRY   **T   P   C**
                                                                   3   3   4

Objectives:

1.   **To Understand Mole Concept And Volumetric Analysis.**
2.   **To Represent The Formation Of Bonds In Molecules.**
3.   **Able To Select Appropriate Materials Used In Construction.**
4.   **Apply Knowledge To Enhance Operative Life Span Of Engineering Material And   Structure By Various Protective Methods.**

Short Description: Chemistry Is A Basic Science Subject Which Is Essential To All Engineering Courses. It Gives Knowledge Of Engineering Material, Their Properties Related Application And Selection Of Material For Engineering Application. It Is Intended To Teach Student The Quality Of Water And Its Treatment As Per The Requirement And Selection Of Various Construction Materials And Their Protection By Metallic And Organic Coatings. The Topics Covered Will Provide Sufficient Fundamental As Well As Background Knowledge For The Particular Branch.

Section - 01 (Physical and Inorganic Chemistry)

1. Atomic Structure and Chemical Bond

   1.1 Definition of Element, Atoms, Molecules, Fundamental Particle of Atom, Their Mass, Charge,   Location.
   1.2 Definition of Atomic Number, Mass Number, Isotope, Isotone and Isobar.
   1.3 Electronic Configuration Based on Hunds Rule, Aufbau's Principle, Paulis Exclusion Principle
   1.4 Definition Of Atomic Weight, Equivalent Weight of An Element, Molecular Weight, Mole In   Terms of Number, Mass, Volume.
   1.5 Define Symbol, Valency And Formula.
   1.6 Explain Chemical Bond, Octet Rule.
   1.7 Explain Formation of Various Types of Chemical Bonds: Covalent, Ionic, Co-Ordinate Bond.
   1.8 Explain The Bonding Along With Example CH_4, H_2, O_2, Nacl, $Mgcl_2$.
   1.9 Explain Quantum Number, Orbit And Orbital.

2. Ionic Equilibrium

   2.1 Concept of Acid, Base, Salt and Types Of Salts.
   2.2 Ph, Poh, Ph Scale.
   2.3 Basicity of An Acid and Acidity of A Base.
   2.4 Normality, Molarity, Molality, Volumetric Analysis.
   2.5 Titration and Indicator.
   2.6 Buffer Solution and Its Mechanism.

3. Chemical Reaction, Oxidation and Reduction.

   3.1 Define Chemical Reaction And Explain The Various Type Of Chemical Reaction.
   3.2 Explain The Full Meaning Of A Chemical Equation.
   3.3 Concept of Catalyst.
   3.4 Modern Concept of Oxidation and Reduction.
   3.5 Simultaneous Process of Oxidation and Reduction.
   3.6 Explain The Oxidation Number.

4. Water Treatment

   4.1 Concept of Hard And Soft Water
   4.2 Hardness of Water
   4.3 Describe The Softening Method Of Permuted Process And Ion Exchange Resin Process.
   4.4 Advantage and Disadvantage of Hard Water in Different Industries.
   4.5 Water Treatment Plant Visit and Reporting.

5. Corrosion And Alloy

5.1 Types of Corrosion. (Dry and Wet Corrosion)

5.2 Atmospheric Corrosion, Types Of Atmospheric Corrosion And Their Mechanism, Oxide Films   Factors Affecting Atmospheric Corrosion.

5.3 Electrochemical Corrosion, Mechanism of Electrochemical Corrosion.Types of Electrochemical   Corrosion. Factors Affecting Electrochemical Corrosion.

5.4. Protective Measures Against Corrosion: Coating (Galvanic and Zinc, Organic Coating Coating   Agents, Electroplating, Metal Cladding)

5.5 Concept of Alloy.

Section -2 (Organic Chemistry)

6. Organic Chemistry and Introduction to Polymers:

6.1 Types of Chemistry.

6.2 Catenation Property of Carbon.

6.3 Organic Compounds, Its Properties and Applications.

6.4 Classification of Organic Compound By Structure and Functional Group: Definne: Homologous   Series, Alkanes, Alkenes and Alkynes; Properties And Uses of General Formula ; Names and   Structure of First Five Members Hydrocarbons .

6.5 Polymer, Monomer, Classification of Polymers, Polymerization, Addition and Condensation   Polymerization.

6.6 Plastics: Definition, Its Types and Uses.

Section -3 (Industrial Chemistry)

7. Glass and Ceramic:

7.1 Concept of Glass and Its Constituents, Classification and Uses of Different Glass, Elementary Idea   of Manufacturing Process of Glass.

7.2 Introduction to Ceramic Materials, Its Constituent.

7.3 Industrial Application of Glass and Ceramic.

7.4 Industry Visit and Reporting.

8. Soap and Detergent:

8.1 Introduction - A. Lipid B. Fats and Oils

8.2 Saponification of Fats and Oils, Manufacturing Of Soap.

8.3 Synthetic Detergent, Types of Detergents and Its Manufacturing.

8.4 Exclusives: TNT, RDX, Dynamite.

8.5 Paint and Varnish

8.6 Adhesives.

9. Cement, Pulp And Papers:

9.1 Concept of Cement and Its Constituents, Classification and Uses of Different Cement,   Manufacturing   Process 0f Cement.

9.2 Manufacturing Process of Pulp and Papers.

9.3 Industry Visit and Reporting.

1. Use Of Laboratory Tools And Safety Measures

2. **Observation And Measurement :**
   2.1 Determine the Strength of Hcl Solution Using 0.1N Na_2CO_3

   2.2 Determine The Strength of Naoh By Using 0.1N Hcl Solution.

3. **Qualitative Analysis Of Known And Unknown Salts :**
   3.1 Identification of Known Salt (Sample Copper, Iron, Aluminum, Led, Ammonium and Zinc Salt.)
   3.2 Identification of Unknown Basic Radical (E.G. Led, Copper, Iron, Zinc, Aluminum, Ammonium)
   3.3 Identification of Unknown Acid Radicals (E.G. Chloride, Nitrate, Sulphate, Carbonate)

Source or Reference Book
1. Higher Secondary Chemistry (Paper 1st And 2nd)- Writer Dr.Gazi Md.Ahsanul Karim. And Md.Robiul Islam
2. Higher Secondary Chemistry (Paper 1st And 2nd)- Writer Dr.Soroz Kanti Singha Hazari .
3. An Introduction To Metallic Corrosion And Its Prevention- Writer Raj Narayan.
4. Organic Chemistry- Writer Morrisson And Boyad.
5. Inorganic Chemistry - Writer Ali Haider

SOCIAL SCIENCE

	T	P	C
	3	0	3

OBJECTIVE

To provide opportunity to acquire knowledge and understanding on :
- importance of civics and its relationship with other social sciences
- The relationship of an individual with other individuals in a society
- social organizations, state and government
- rule of law, public opinion and political parties
- UNO and its roles
- The basic concepts and principles of economics and human endeavor in the economic system.
- The realities of Bangladesh economy and the current problems confronting the country.
- The role of Diploma Engineers in industries.
- our motherland and its historical background
- good citizenship through practicing our socio- economic culture
- liberation war and its background
- nationalism and life style of the nation

SHORT DESCRIPTION

Civics and Social Sciences; Individual and Society; Nation and Nationality; Citizenship; state and government; Law; Constitution; Government and its organs; public Opinion; Political Party; UNO and its organs;

Scope and importance of Economics; Basic concepts of Economics- Utility, Wealth, Consumption, income wages, salary, value in use and savings; Production – meaning, nature, factors and laws; Demand and Supply; market equilibrium, national income, Current economic problems of Bangladesh; Role of Diploma Engineers in the economic development of Bangladesh; Occupations and career planning; Engineering teem.

Part-1 (Civics)

1. **Understand the meaning and scope of civics and inter relations of social sciences.**
    1.1   Define civics and social science.
    1.2   Explain the importance of civics in the personal and social life of an individual.
    1.3   Describe the relationship of all social science (civics, Economics, political science, Sociology, ethics)

2. **Understand the relationship of the individual with the society, Nationality and nation, Rights and duties of a citizen.**
    2.1   Define the concept (individual, society, socialization, Nation, Nationality, citizen and citizenship).
    2.2   State the relationship among the individuals in the society.
    2.3   Discuss the methods of acquiring citizenship and state the   causes of losing citizenship
    2.4   Describe the rights of a citizen and state the need for developing good citizenship.

3. **Appreciate the relationship between the state and government, law and organs of government.**
    3.1   Meaning the state, government and law
    3.2   Discuss the elements of state.
    3.3   Discuss the classification of the forms of government
    3.4   Distinguish between cabinet form of Government and presidential form of government.
    3.5   Describe the main organs of Government (legislature, Executive and judiciary)
    3.6   Discuss the sources of law
4. **Understand and the classification of constitution**
    4.1   Define the Constitution.
    4.2   Explain the deferent form of Constitution
    4.3   Explain state the salient feature of Bangladesh constitution.

4.4   Define the fundamental rights of Bangladesh constitution.
4.5   Meaning of human rights.

5. Understand the role of UNO in maintaining world peace
5.1   Explain the major functions of UNO.
5.2   State the composition and functions of General Assembly.
5.3   Describe the Composition and functions of Security Council.
6.4   Discuss the role of Bangladesh in the UNO.

6. Understand the role of Ethics values and good governance
6.1   Define the values, ethics and good governance.
6.2   Discuss the role of government to establish good governance

Part-2 (Economics)

1. Understand the fundamental concepts of economics.
1.1   Define the Microeconomics and Macroeconomics.
1.2   Discuss the definition of Economics as given by eminent economists.
1.3   Describe the importance of economics for Technical Student.
1.4   Define commodity, utility, value, wealth, consumption, income, savings, wages, value in use, value in exchange and salary.
1.5   Differentiate between value in use and value in exchange.
1.6   Explain wealth with its characteristics.

2. Understand the production process and the concept of the law of diminishing returns in the production process.
2.1   Discuss production mode and process
2.2   Explain the nature of different factors of production.
2.3   Discuss production function.
2.4   Discuss the law of diminishing returns.
2.5   State the application and limitations of the law of diminishing returns.
2.6   Describe the law of production (increasing constant and diminishing).

3. Understand the concept of demand, supply and utility.
3.1   Define the term, "demand and supply".
3.2   Explain the law of demand and supply .
3.3   Draw the demand and supply curve.
3.4   Discuss Market equilibrium.
3.5   Define the utility, total and marginal utility
3.6   Illustrate the law of diminishing utility.
3.7   Explain the law of diminishing marginal utility

4. Understand national income.
4.1   Define nation income.
4.2   Explain how to measure national income.
4.3   Discuss GNP, GDP and NNP.
4.4   Discuss economic development and growth

5. Understand the current issues and the availability and use of natural resource in the   economic development of Bangladesh

     5.1   Define rural and urban economics.

     5.2   Identify major problems of rural and urban economy.

     5.3   Explain the migration of rural population to urban areas.

     5.4   List of the Natural resource of Bangladesh and classify them according to sources of availability.

     5.5   Explain the importance of the mine, forest and water resources and potential uses for sustainable development.

6. Role of a Diploma Engineer in the Development of Bangladesh Economy.

     6.1   Explain the concept of the term, "Engineering team"

     6.2   Identify the functions of Engineers, Diploma Engineers, craftsmen forming the engineering team.

     6.3   Discuss the role of a Diploma Engineer in the overall economic development of Bangladesh.

     6.4   Explain socio-economic status of a diploma Engineer.

Part-3 ((Bangladesh: History& Culture)

সংক্ষিপ্ত বিবরণী

ইতিহাস

- ইতিহাসের সংজ্ঞা।

- বাংলাদেশের আবহাওয়া ও অধিবাসী।

- বাংলায় ইংরেজ শাসন ক্ষমতালাভ ও প্রতিষ্ঠা।

- ব্রিটিশ বিরোধী সশস্ত্র প্রতিরোধ আন্দোলন; সংস্কার আন্দোলন ও জাতীয়তাবাদেও বিকাশ এবং বাংলার নবজাগরণ; বঙ্গভঙ্গ ও বঙ্গভঙ্গ উত্তরকালে বাংলার রাজনীতি ও দেশ বিভাগ।

- পাকিস্তান আমলে বাংলাদেশ, বঙ্গবন্ধুর নেতৃত্বে বাংলাদেশের মুক্তি সংগ্রাম ও স্বাধীনতালাভ।

সংস্কৃতি

সংস্কৃতি, সভ্যতার সংজ্ঞা, সংস্কৃতির প্রকরণ, ভাষা আন্দোলন উত্তর বাংলার সংস্কৃতি, স্বাধীনতা উত্তর বাংলাদেশের সংস্কৃতির বিবর্তন, বাংলাদেশের সংস্কৃতিতে প্রত্নতার্ত্বিক নিদর্শন ও ক্ষুদ্র নৃতাত্ত্বিক গোষ্ঠীসমূহ।

সহায়ক পুস্তক

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